

Stakeholder Consultation on Sustainable Agriculture and Land Use in India

Workshop Summary Report
20th April 2022

*Shakti Sustainable Energy Foundation | Tata-Cornell Institute for Agriculture
and Nutrition | Rainmatter Foundation*

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Context

The consultation on Sustainable Agriculture and Land Use in India, conducted on 20th April 2022 by Shakti Sustainable Energy Foundation in collaboration with Tata-Cornell Institute for Agriculture and Nutrition and Rainmatter Foundation, sought to arrive at better awareness and understanding of climate related actions being taken by ecosystem partners across India on climate-friendly agriculture and land use. It further sought to understand the methodology, knowledge and policy gaps that need to be filled to advance the objectives of climate-positive agriculture and land use

Some of the key issues posed for discussion during the consultation included:

- Identifying existing systems of sustainable agriculture (crops and livestock) and land use prevalent across different parts of India, and discuss GHG emissions aspect of those practices
- Current evidence (and gaps) on the impact of these systems on socio-economic, nutritional, and climate/environment parameters
- Role of policy in scaling these systems

Introductory Remarks

Dr Anshu Bharadwaj, CEO, Shakti Sustainable Energy Foundation opened the event by welcoming the participants. Dr Bharadwaj spoke of the importance of sustainable agriculture and land use for India, especially in the context of climate change. He also emphasized the role that the sector could play in helping India reach its net zero ambitions while maintaining a strong developmental trajectory.

Dr Prabhu Pingali, founding director of the Tata-Cornell Institute for Agriculture and Nutrition, introduced the participants to Tata-Cornell Institute's Zero-Hunger, Zero-Carbon (ZH2C) project, highlighting the importance of broadening the food systems and diversifying our food baskets in tackling both climate change and food security for the country.

A presentation was delivered by Shri T. Vijay Kumar on zero budget natural farming and its potential to reduce greenhouse gas emissions from agriculture while promoting climate resilience and increasing farmer incomes.

This was followed by two sessions:

Session A: Climate change mitigation and adaptation options in agriculture and land management practices (current and future mitigation and adaptation practices and interventions)

Session B: Policy framework for successful inclusion of climate friendly practices into national and state plans

Session A: Summary of Discussion and Action Points

The first session sought to understand the best practices that have the potential to contribute to greenhouse gas emissions reduction from the agriculture sector.

With a growing population and the ever-increasing impacts of climate change on agriculture, one of the most pressing challenges faced by Indian agriculture is the challenge of increasing production while limiting or reducing greenhouse gas emissions from agriculture. Conservation agriculture, with its emphasis on minimal tillage, crop residue management, optimal and timely nutrient management, and crop diversification can emerge as a key technique for promoting soil health, increasing agricultural productivity, and improving the sustainability of production.

While conservation agriculture has been identified as an important practice for sustainable agriculture by the scientific community, adoption by farmers continues to be a challenge despite decades of efforts to push it. There are several gaps which need to be addressed in order to increase the adoption of the practice:

- A key issue that emerged from the discussion was the *disconnect between scientists and the academia engaged in agricultural research and the farmers*. Participants identified overcoming gaps between research and implementation as an important concern that needs to be addressed if conservation agriculture is to be scaled.
- While advocates have made progress in increasing the use of conservation agricultural practices for wheat, conservation agriculture is not being adopted at a desirable scale for paddy cultivation because the latter poses greater challenges, especially in the face of erratic weather patterns.

Key Issues and Challenges in Scaling Up Sustainable Agricultural Practices

Reduced or zero tillage, crop residue management and crop diversification emerged as three critical and high impact practices that could have positive impacts on agriculture in India by reducing the greenhouse gas emissions from the sector and increasing the health and resilience of the land. However, the discussion threw up several challenges that could hinder the ability of practitioners and advocates in scaling up these systems.

Reducing tillage to reduce carbon footprint

- Tilling of land results in the release of a significant amount of carbon dioxide from the soil. Additionally, frequent tillage of land also has negative impacts on soil health by destroying the soil organic matter in the soil and reducing the ability of the soil to retain nutrients and maintain microbiome health.
- Conservation agriculture has the potential to significantly reduce tillage operations and consequent emissions, if the practices prescribed by conservation agriculture are followed precisely.
- It is necessary to reach a state of zero tillage on a piece of land year-round. If zero tillage is practiced on the land during the wheat cycle but not during the paddy cycle, the benefits incurred from the practice during the wheat cycle may be undone. If zero tillage

is difficult for paddy, practitioners at least need to encourage the use of minimal tillage to save the soil organic matter.

- While zero tillage is an important technique to improve soil health and reduce emissions from the land, it should be incorporated alongside crop residue management to yield the best results for soil health.

Crop residue management

If crop residues are kept on the field as mulch, moisture loss from soil reduces and the soil is better able to regulate the soil temperatures, i.e., soil temperature will be higher in the winter and lower in the summer, thereby enabling better microbiome health, improving the aggregation of soil, and enabling better movement of nutrients in the soil, thereby increasing soil organic matter and improving soil health.

Crop Diversification

Crop diversification, which would essentially involve shifting the focus from rice and wheat to include other crops as part of the cropping cycle, has the potential to tackle a vast range from issues- it can reduce emissions, improve soil health, increase the nutritional profile of the country, and ensure a diversified income stream for farmers. However, despite its known benefits, the uptake of the practice by the farming community continues to be below desired levels. *Market linkages emerged as the key challenge in scaling crop diversification.*

- The market for agricultural products in India is heavily oriented towards staple crops like wheat and rice. Both these crops attract high Minimum Support Prices, which disincentivizes crop diversification and distorts the market and favors the production of these crops over others.
- However, even if there is an MSP and price parity for wheat and rice produced using climate-positive practices like natural farming or regenerative agriculture, it would still be difficult to convince farmers to adopt these practices. In order for climate-positive crop diversification to succeed, it needs to be more profitable than chemical intensive farming given the higher labor requirements for these practices.
- MSP, however, cannot be seen as the sole incentive for climate-positive production. Uptake of climate-positive crops like millets has been poor in states like Chhattisgarh despite the fact that the state government has announced a high MSP for the crop and KVKs have been giving farmers extensive training on millet production.
- A real shift can only occur when structures like the MSP are backed by actual procurement. Unless farmers actually begin to get money in hand for these alternate crops, it will be difficult to incentivize farmers to shift their cropping patterns.

Besides market forces, some other considerations that emerged during the course of the conversation were *mechanization*, i.e., machines available in the system are more suitable for the current, chemical intensive practices and the *prevalence of modified seed varieties* over indigenous seeds.

Institutionalizing Climate-Positive Practices and the Role of Traditional Knowledge

- Experience from the ground shows that there is a tremendous amount of traditional knowledge available with several communities that aligns with the climate-positive methods identified in the discussion. For example, many tribal farming communities in Chhattisgarh have traditionally believed that tillage destroys the soil and therefore refrain from tillage.
- Similarly, small and marginal farmers continue to incorporate multi-cropping as part of their cropping systems.
- However, several Krishi Vikas Kendras, which are essentially extended arms of the Indian Council of Agricultural Research, continue to train such farmers in the use of tillage and other methods that are not climate friendly.
- It is critical to embed best practices like conservation agriculture and other climate-positive practices across all levels of institutions from state agricultural departments to agricultural universities to agricultural extension centers to ensure that these practices are scaled.
- The strengths of local groups (for example, women's self-help groups) can also be capitalized upon to catalyze greater awareness of climate-positive sustainable agricultural practices.

Important Take Aways

- Market linkages play a significant role in scaling up of climate-positive practices. It is important for farmers to receive the right kinds of incentives that can encourage them to take up practices that support soil health, reduce emissions and improve land resilience.
- Looking at value chains to support farmers and ensure that they get the best prices for their products is also important in order to encourage climate-positive crop production.
- We need to remember that with increasing urbanization, feeding urban India will be one of the biggest challenges to our food systems. It is extremely important to identify ways to transform our food systems to ensure that they meet these requirements while reducing GHG emissions and protecting soil health.

Session B: Summary of Discussion and Action Points

The second session sought to understand the policy gaps that the agricultural sector in India faces, especially through the climate lens.

While the Ministry of Agriculture and Farmer Welfare is the nodal ministry responsible for agricultural policy at the central level, other ministries also have responsibilities in areas that are closely linked to agriculture. At least twelve of the approximately forty ministries at the central level have some responsibility for the formulation, implementation or monitoring of agricultural and food policy. While the central government ministries are largely responsible for the formulation and budget allocation of various policies and schemes, state governments are primarily responsible for the implementation of these policy measures. State governments also have several schemes and missions of their own which further complicate the agricultural policy landscape. With high government procurement and low farmer capacities, the agriculture sector in India is also heavily dependent on agricultural schemes, subsidies, and capacity support for its performance.

The agricultural policy landscape is vast and complicated, and factoring in climate change furthers nuances matters. It is important to understand this space better and identify the policy gaps in order to make change happen at scale.

Some of the key challenges highlighted by the participants during this session were:

Narrative Building

Climate change continues to be a lesser priority for state governments and a climate first approach can often be met with a lack of interest from officials. It is therefore important to understand the priorities of the governments and identify the right narratives through which one approaches state government officials.

Some important points brought up during the conversation include:

- Approaching the climate problem through other angles (including green jobs, livelihoods, development, soil health, lower energy, or water consumption) might have a greater impact. It is critical to link the climate narrative closely with the vision of the state government in question for the issue to be truly picked up and considered important.
- Experience from the ground shows that linking climate change to livelihoods has worked well for a lot of participants in gaining government traction.
- Narratives of resilience works really well in order to engage the government's interest. Highlighting the negative impacts of monocropping for farmer incomes and emphasizing the positive impacts of crop diversification for economic prosperity have been shown to work well.

Siloed approach and lack of coordinated landscape planning

- Bringing together agriculture and climate change can be difficult given the sheer multiplicity of stakeholders involved. This often leads to a siloed approach to implementation, with the efforts frequently resulting in contradictions.

- For example, participant experience from the ground reveals that despite the fact that both MNREGA and the agriculture department are expected to work together on climate change issues in accordance with the State Action Plans on Climate Change in Chhattisgarh, they often end up working at cross-purposes with each other.
- The agriculture department might identify an area of land as suitable for crop diversification while the MNREGA authorities might identify the same area of land as suitable for farm ponds. This leads to contradictions and slows down the process of development.
- Many of the related policies that have an impact on agricultural practices don't speak to each other. For example, the energy or water related policies might end up driving different objectives than the policies or schemes driving sustainable agriculture. A thorough mapping of the agriculture and allied policies is necessary to understand the space and bring forward the importance of aligned policies.
- The role of counter-productive policies repeatedly came up as a massive stumbling block towards scaling sustainable agricultural practices.

Reevaluating the Institutional Architecture

- Chief ministerial buy-in is an important step towards reinforcing the importance of climate change within state governments and ensuring greater success of interventions.
- But experience shows that even if the state government agrees in principle to the importance of climate action, translating it to action across different departments is difficult.
- The State Action Plans on Climate Change are currently housed with the Environment departments and therefore the responsibility for it gets relegated solely to that department. It is critical to ensure that the responsibility for climate action is brought to bear to other concerned departments including agriculture, rural development, energy, water etc.
- Agriculture needs to be looked at in a larger context and integrated holistically with other sectors. It cannot exist in a silo if there is to be a positive transformation for the sector while ensuring it stays climate positive.
- This approach can also unlock greater funding flow for climate-oriented actions.
- Panchayati Raj institutions have the greatest role to play when it comes to implementation climate positive agricultural practices. Climate action, therefore, needs to be appreciated by the sarpanches responsible for the on-ground implementation of the policies and schemes. Sensitizing the on-ground stakeholders to climate change and its impacts is very important.
- The importance of climate action, both mitigation and adaptation, also needs to be woven into the institutional fabrics of other concerned institutions including the agricultural universities, KVKs, ATMA networks among others.

Understanding the emission mitigation potential of agriculture and its contribution to India attaining its net zero targets is important. Agriculture has historically been left out of the mitigation conversation, with no mention of the sector in the original Nationally Determined Contributions submitted by India. The discussion sought to understand whether there has been a shift in government perception with regard to this position. Below are some of the key questions that came up for discussion.

Has the focus shifted towards mitigation post the COP26 announcements?

- Experience shows that when the government realizes that there is a possibility of earning revenue through climate actions, for example, through carbon credits, their interest in mitigation from new sectors like agriculture increases.

Do we need new policies to address the issue of climate change mitigation through agriculture?

- There are many policies and schemes already available in the agriculture space and it is more important to focus on converging and synchronizing those schemes and policies and improving allocations through better budget heads.
- However, there is a strong need to review agriculture and related policies with a climate change lens. Current policies that mention climate change might mention it briefly without paying adequate focus to the issue and might encourage counter-productive actions within the same policy document.
- It would also be important to understand the role of the sectors which use agricultural products for their core operations and the policies for these sectors to assess the distortions in the space. Such an assessment could also provide the basis for influencing cross-sectoral policies to drive economy-wide change in consumption and therefore improve the emissions footprint of agriculture.

Can we leverage carbon credits and other market mechanisms as the solution to emission mitigation from the agriculture sector?

Carbon credits

- Market drives everything and carbon credits have entered the agricultural space in India.
- To say that a particular agricultural practice will lead to a certain level of carbon sequestration and to value and sell it for carbon credits is a very tricky exercise. Certification systems do not benefit farmers even for organic certifications and so it is important to ensure stronger systems for the same.
- Monitoring and evaluating agricultural practices to generate carbon credits from them and identifying the certification mechanisms is a gap and a potential challenge. We don't have the data to measure this across the agricultural systems across the country yet.
- Figuring out lean and effective MRV mechanisms to combat prohibitively high transaction costs has to be a significant focus if one wants to scale up carbon credits for

Indian agriculture. Currently, MRV costs are high, especially when one seeks to ensure farm-to-farm compliance across multiple seasons.

- Further, in order to succeed, MRV mechanism should not turn into a burden for the farmers.
- Additionally, one must consider how a carbon credit mechanism for agriculture can be structured to ensure that the primary beneficiaries of this practice are the farmers and not the intermediary organizations dealing in the credits. Carbon credits should not be used as the primary solution for mitigation from agriculture.
- The intermediary company selling the carbon credit of the farmers from the Indian market in the international market speculate upon the credits and the profits earned from this exercise do not make their way back to the Indian farmer. This model needs to be changed to ensure carbon credits are successful for Indian agriculture.

Market demand

- It is important to create the consumer demand for climate-positive agricultural products to encourage farmers to produce these foods.
- This could be done from a nutrition and health perspective given that both these narratives have greater weightage from a consumer perspective.
- Additionally, focusing on labelling and showcasing the intensive or extensive nature of production, whether from a crop or livestock perspective, can play a crucial role in sensitizing consumers and therefore creating a demand shift.

Can we look at alternative systems to increase carbon sequestration potential of agriculture land use?

- Experience from the ground shows that integrated landscape planning can play a significant role in carbon sequestration from agriculture.
- For example, developing agro-horti-forestry models and incorporating the carbon sequestration potential of the species selected is an important step in the right direction.
- Some corporates are currently funding such initiatives and can be further encouraged also funding such initiatives to offset their carbon footprints.
- We should move beyond looking at agriculture through solely the food provision lens and incorporate a more bioeconomy approach.

How do we address the role of perverse incentives in mitigating emissions from agriculture?

- Adopting a food-water-energy nexus approach is important. The role of water and energy policies cannot be ignored in mitigating emissions from agriculture.
- One cannot just focus on leveraging enabling policies given the way the policy landscape is structured in Indian states. Engaging in conversations around perverse incentives is important if any headway is to be made to scale sustainable agricultural practices.
- For example, organic farming is not succeeding at the market level in India because chemical-intensive farming is far cheaper owing to artificial prices created in the market through heavy subsidies which distort the market.

- It is cheaper at present to purchase chemical fertilizers than organic inputs. The electricity and water subsidies further add to the problem.
- If subsidies can be transformed through mechanisms like direct benefit transfers, for example, the economics would work out better for farmers and incentivize them to grow food using more sustainable practices.

How can the state governments be incentivized to include climate action as part of their agenda?

- Restructuring financial flows is a massive opportunity for driving change in this space
- The finance commission mechanism which decides what share of the budgetary allocations go to state governments is a strong avenue in this respect. If climate change related activities are given greater weightage in the finance commission formula, it can drive greater action in states. For example, when additionally green cover was made a factor in the formula, there was a sudden interest in states to increase green cover because they would get more allocations.
- Payment for ecosystem services is another avenue to consider in driving interest in climate action in this space.

How can state governments support farmers to transition to climate-friendly practices?

- Provision of support for farmers during the conversion period from chemical-intensive to climate-positive practices like organic or natural farming (when crop yields are expected to drop), through subsidies or other mechanisms can be pivotal in encouraging farmers to switch to these practices.
- Changing the support available for technologies can also be beneficial. Currently, machines used for monocropping, and fossil-fuel driven machinery are subsidized and the newer, more climate-positive machines being developed are not getting any sort of monetary support.
- Strengthening certification systems so that there are differential criteria available for different types of practices can further help farmers grow the right kind of produce.
- Organic input development is fast turning into microenterprises. Standards for organic inputs like *jeevamrita* or *beejamrita* inputs also need to be developed to ensure that farmers do not get cheated and therefore lose trust in such climate-friendly practices altogether.
- Supporting the creation of a market pull can also play an important role in incentivizing climate-positive production.

How can emissions from livestock be tackled to feed into climate change mitigation?

Emissions from livestock account for a significant proportion of India's AFOLU GHG emissions. Reducing these emissions can play an important role in helping India meet its climate action targets. Some of the important measures that can be taken to reduce methane emissions from livestock include:

- Increasing the focus on small ruminants which can reduce dependence on large bovine animals since smaller ruminants do not emit as much methane owing to the differences in their digestive tracts.
- Reducing animal product consumption, especially within higher income groups who consume more dairy, to cause a shift in the demand signals which can result in supply side changes
- Making livestock production more intensive by reducing the incidence of non-productive animals in the herd, especially by improving the availability of infrastructure that can improve livestock welfare like veterinary services etc.
- Having more robust district contingency plans that take a landscape level view of contingency planning and include livestock as part of the solution for climate-resilience

However, it is important to ensure that any interventions pertaining to livestock are taken up with extreme caution given that livestock is an important source of additional income for small and marginal farmers, and they often depend upon their livestock in times of difficulty. It is also important to differentiate between livestock bred for commercial versus livestock bred for personal use.

Additionally, it is important to undertake more rigorous studies to understand the actual emissions from livestock for India because there is a possibility that these numbers might be inflated owing to methodologies used.

How can philanthropic capital play a role in heightening ambition around mitigation from agriculture?

- There are many capacity gaps across various levels that need to be addressed urgently for better implementation of agriculture-related programmes, especially centered around climate change.
- One major gap is the lack of a structured, authenticated, and updated database that can provide information to stakeholders about the climate impacts of various agricultural practices across regions. Having such a database could prove instrumental in raising awareness of the mitigation potential of agriculture. Philanthropic capital can play an important role in catalyzing the development of such a national level dashboard.
- Another important capacity gap that needs to be addressed is the low level of capacity available to understand climate change and the ways in which programmes should be implemented to ensure climate positive outcomes. This kind of capacity gap exists across the value chain from the policymakers to the grassroots level.
- Philanthropy can play a role in helping government develop this capacity.
- Governments respond better when there are evidence-backed studies that show the value of one action over the other. Philanthropic capital can play a role in bridging this gap and generating more evidence to prove the economic and developmental viability of mitigation focused agricultural actions.

Conclusion and Next Steps

The workshop threw up a lot of interesting points and drew our awareness to different kinds of challenges within the agriculture space with regard to climate change mitigation. There remains a great amount of work to be done before headway can be made in reducing the emissions from agriculture while making it climate-resilient and people and planet positive. Evidence-generation studies, myth-busting and narrative building, creation of a market demand and analysis of policies and relooking at our incentive and disincentive structures were some of the immediate priorities that emerged from the discussion.

The agriculture sector continues to be the backbone of the Indian economy and it must be included within the frameworks of change that are envisioned for the country. With the declaration of India's net zero target, the role of the sector and the people who earn their living through it will be highlighted. It is therefore important to deliberate deeply on the measures that can be taken to make the sector climate-positive while ensuring a just and equitable transition.