

Climate Emergency **The future is ecological and biodiverse farming**

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It is an overcast July afternoon here at Kolunji Ecological Farm in Pudukkottai district in the heart of Tamil Nadu in Southern India. I have to remove my footwear as I step into the field. The red earth beneath my feet is soft. It has been tilled neatly into geometric patterns. This is the handiwork of around eight women farmers who are now bent over, preparing this small patch of land within Kolunji's 30-acre farm. In most farms, we see one or two crops, but here the women will sow not one but at least 3-4 crops including groundnuts and millets.

Usha Nandini: I can keep earning an income for six months or more. The insect might eat some of the crops, but I will have another crop to get an income from. We are able to protect the main crops in a mixed farm.

Kolunji has created many such model farms that are emulated by other farmers across Tamil Nadu and other states. This is a way of low-input rainfed farming that takes agrobiodiversity into account. But what is the role of agrobiodiversity in times when farmers are pushed to practice resource-intensive agriculture, when there is farm distress?

Welcome to this episode of Climate Emergency on Suno India. I am Mahima Jain, your host for this episode and today we will be looking at the importance of agrobiodiversity for the farmer and the environment. Indian farmers have been demanding reforms to alleviate farm distress for decades. Some of this distress is because of poor soil fertility, climate change, erratic rains, poor irrigation and several other environmental factors. In 2020, the Indian government passed three farm laws with the promise of reforming the agricultural sector. But what do those laws mean for agrobiodiversity?

First let's take a close look at agrobiodiversity and what it means. Agrobiodiversity refers to the many and dynamic ways in which farmers use the natural diversity of the environment for livelihoods. The farmers consciously choose a mix of crops and the specific methods of farming. Often these are local crops suited to their region. Agrobiodiversity includes aspects of management of land, water and animals around as well.

In contrast, the practice of monoculture farming is where the same crop is grown every season year on year. This is what most farmers follow now. Often, they will grow a single crop such as wheat or rice on the same land year after year. This practice can result in the extinction of local breeds.

I spoke to Dr GV Ramanjanyelu, Executive Director of Centre for Sustainable Agriculture in Secunderabad, Andhra Pradesh to understand what agrobiodiversity and monoculture farming look like in India. He is a former bureaucrat who now works on public policy. He also works with farmers to establish ecological and sustainable agriculture models.

Dr GV Ramanjaneyulu: One of the major threats today is climate change. And agrobiodiversity, if you look at it, is about reducing the number of crops which are grown, say if you take nationally it's just about four crops which have really about 70% of the cropped area and the states. Also it's the same situation if you take Tamil Nadu or if you take Andhra Pradesh, Telangana, it's just about two three crops occupying most of the area. And within the crop also the diversity is very little, say rice for example, which is sown and grown in Telangana, Andhra Pradesh or even Tamil Nadu if you take most of the rice nearly 80% of the rice comes from just one or two varieties. So varietal diversity and crop diversity both are very important for adapting to the climate, changing climate and moving towards that meets kind of assistance and support from the public systems. In 2020, the government passed three laws on farming. I will not get into the laws in particular. But broadly the discussion around the laws - especially among protesting farmers -have been about how it does not ensure minimum support price, the push towards contract farming, and the lifting of regulations around storing of essential grains, which can lead to hoarding. The laws do not mention either conservation or promotion of agri diversity or even seem to consider it. We need to understand these laws in the context of the Green Revolution where the Indian government promoted high yielding varieties of mostly rice and wheat to deal with the food insecurity of the 1960s. It has to be understood in the context of globalisation of the economy where mono cultures were promoted.

I spoke to Oswald Quintal, the co-founder of Kudumbam who helps contextualise the farm laws.

Oswald Quintal: Before the Green Revolution, we had 1000s of different rice varieties, we had 1000s of different millet varieties, pulse, oil seeds, we had 1000s of different vegetables. Now, it is the market that determines or determines what should be cultivated. It is the multinational who controls the food industry that determines what should be cultivated. So, today farmers do not decide what to cultivate, what variety to cultivate, the farmers cannot think of an intercrop. Now, the intercrop the crop diversity, the species diversity is what determines drought-proofing. Now, if there is a drought, if one species does not perform well, the others there's another species that will perform. But in the case when you have only one piece of species, if there is a drought, you may lose that species and then you lose the whole crop itself. That is one one issue. The other issue is now if there is a pest problem, if you have only one single species the whole crop is gone. Now, the farmer depends on that crop. So losing that crop is a nightmare for the farmer.

Oswald Quintal started Kolunji Ecological Farm with the late Dr. Nammalvar, an organic farming expert and renowned agricultural activist, who encouraged thousands of people to take up sustainable farming practices. Oswald Quintal has more than four decades of experience in biodiverse farming, water conservation and sustainable agriculture. He says that the laws are set to destroy what is remaining of the people's attachment to land.

Oswald Quintal: Now these farm laws further destroy farmers and their children's very little attachment to the land, it is destroying that attachment to land. Now it's so difficult to get youth in agriculture from 1982 till today, if you ask me we can see a drastic decline in youth in agriculture. FAO study says that 80% of our land is not fit for cultivation soil, we are lost on soil fertility. So, if we do not give confidence, our laws today do not give confidence to farmers that farming is possible, that the state understands the magnitude of the problem, the pathetic condition the farmers are in and that the state needs to be supportive in at least giving a minimum support price to the farmer. If the state doesn't understand the situation, we will face a very very serious crisis. we will have land but we will not have youth to be involved in that land. I think the state needs to understand the magnitude of this issue.

Farm activists and experts like Oswald Quintal point out that the direction in which Indian agriculture is headed does not take into account its environmental impact and basic principles of agroecological farming.

In India, 86% of farmers cultivate small lands that are less than 2 acres. Most of these farms are rainfed, which is an added uncertainty as the climate changes. Farms like Kolunji provide an alternative to monocultural farming.

Usha Nandini: We are cultivating rye, foxtail millet, kodo millet, barnyard millet, kodo millet, corn, several varieties of pulses, grams and groundnuts. There is a passage around the farm for rainwater to flow. This connects to the main water flow where we have cultivated moong dhal. And in smaller passages we have cultivated urad dhal. For some farm models we have sowed foxtail millet mixed with horse gram, and another millet and groundnut. For instance, when we cultivate groundnuts, yellow flowers will bloom. The insects will attack the groundnut so when we grow other plants which attract the same insects, the insects will eat such plants and the groundnut will survive. It will mature for harvest. Since this farm started, we have not used pesticides or insecticides. We should not kill the insects but we have to provide food for the insects also.

That's Usha Nandini, a coordinator at Kolunji who has helped create several models of ecological farms. She explains what such a biodiverse farm looks like. In a nutshell, farming models that Kolunji promotes have a combination of crops suited to the local climate, they require fewer external inputs, and are surrounded by different tree species. Kolunji help farmers to focus on water conservation and soil health too. Farmers will take into account the roles and services provided by livestock, microorganisms and birds. Experts say as farmers face the impacts of climate change, many such models have been developed across the country in the last few years. Dr GV Ramanjaneyulu explains why these models work well as climate change adaptation measures.

Dr GV Ramanjaneyulu: One of the major impacts of climate change is the variations in the weather. So, the temperature rainfall variations have increased. So, to adapt to these conditions moving towards sustainable agricultural practices particularly improving the soil organic matter and also going for multiple cropping systems, so, that adaptation is better. So, these two are seen as contributing for better adaptation. And in the process across the country, there are a number of different number of models which are tried out in terms of having multiple crops both to hope, the cropping patterns, which suit the local soil conditions and local ecological conditions and also in terms of economics, which one can compensate another and biologically synergistic crop combinations, which means both the two species are more more inward to species when they're grown together, there could be a competition between the two and there could be a synergistic relationship between the two. So called combinations are worked out in a way that there is a more synergistic relationship between the two. So, one can support other crops kind of so that are models which are evolved across the country. Yet these models remain on the fringes. Mainstream adaptation of farming models like the ones Kolunji promotes is the exception, not the norm. Farmers rely on market forces that promote monoculture or use only a few varieties of crops for products. For instance, companies such as Pepsi Co ensure that a particular variety of potatoes called FC-5 is grown. This is used for making Lay's chips.

Karthik Gunasekar, an activist with Chennai Climate Action Group explains.

Karthik Gunasekar: So basically if, for example, why do we need homogenization in open markets, because these large producers or large retailers will need one selling point for those consumers. So, that means, lack of agrodiversity and food diversity, the food culture of people is also being lost. So, everybody eats one variety of meat, one variety of rice, one variety of dal, irrespective of whether they're in Punjab, Chennai or in the Northeast region. So, that itself is a huge implication on the consumer side as well as one of the bigger organizations like the FAO and various others are talking about it locally, the need for localizing the production system and the market depending on the agro ecological zone of that particular place. So, which might not be a very viable thing for a larger corporation to come into and enter and succeed.

On the way to Kolunji Ecological Farms in Pudukkottai district, I saw acres and acres of either rice or banana fields. Rice is procured by the public distribution system or PDS for a fixed rate called the minimum support price or MSP. This system ensures that those who are poor get heavily subsidised wheat or rice from the government. The banana, on the other hand, becomes raw material in the processed foods industry as well as the fast-moving consumer goods sector.

Both rice and banana are highly energy and water intensive crops. There is high risk, but also high returns. Despite these risks, it is hard for farmers to switch to biodiverse, climate friendly and sustainable agricultural models. Dr Ramanjaneyulu explains why.

Dr GV Ramanjaneyulu: One of the difficulties in growing from multiple crops is that these farmers have too many types and harvest many types and operations altogether different types because there is a multiple cropping multiple crops in the farm. Second, also in terms of yield, there could be each crop yield if you take if it is for home consumption, that's perfectly fine the multiple cropping model works, but if it is for the market, if there is a too little yield, which can be taken to market and more than what they can consume, always there will be a problem.

The government, on the other hand, incentivises the farmers for growing rice and wheat, which are high energy and water intensive crops. As I said, it is procured under the PDS system and the farmers are mostly assured a price for it.

Dr GV Ramanjaneyulu: Farmers themselves may not be able to change particularly in a situation where entire public policy encourages monoculture of crops. So, that's where the problem lies. Say for example, entire government procurement is only on Paddy. So obviously most of the farmers will transit towards Paddy production, whenever there is water they will transit towards Paddy. Similarly, the growing market in the commercial crops is only for cotton. So, most of the farmers are growing towards cotton. Currently, all the subsidy schemes of the government are supporting only high input intensive farming models. So for example, if I'm using more water, I'm more incentivized because my entire power is subsidized. And there's a dam built and then water is given freely. And if I, if I economize on my water and use less and less water, have no incentive at all, and the entire procurement system in this country, if you take, whether it is about Paddy or wheat or cotton or high water and so, the price security, which government provides the minimum support, price and procurement operations are all high water intensive crops. So, obviously, there is every incentive for farmers towards moving towards high water intensive crops, high chemical intensive production, because all the agro chemicals are subsidized. So, chemical fertilizers for every bag of urea there is a subsidy of nearly 1500 rupees and for every bag of DAP there is a subsidy of nearly 2000 rupees. Whereas, a farmer has to move towards organic farming or a natural farming farmer has to make it on their own.

Recent estimates show that Central government subsidies amount to rupees One lakh twenty five thousand five hundred (125,500) crore. The annual state government subsidies are nearly equal - about rupees One lakh fifteen thousand five hundred (115,500 crores). This includes fertilizer subsidies that Dr Ramanjaneyulu pointed out. There are also credit subsidies, crop insurance subsidies, and expenditures towards price support. These figures have been culled out from a study submitted to the fourteenth Financial Commission. We will put the reference in the show notes.

Dr GV Ramanjaneyulu: We were trying to make a calculation in terms of how much subsidy Punjab farmers get for growing rice and wheat and why they are not actually transiting from Punjab, farmers are not transiting from the rice and wheat system. So, nearly they get about one and a half lakh rupees per acre kind of support, and the net income they get from one acre will not be that much. So, the main support, which is coming in the form of subsidies, and then the entire assurance of procurement 100% of procurement. These two are the drivers which are driving the current cropping pattern. So that if that has to change, farmers themselves cannot change on their own unless the subsidy schemes are also reconsidered. So that's an important issue otherwise, farmers will be at the losing end.

Unsustainable agricultural practices are the main source of water pollution, the largest contributor to biodiversity loss, and a significant contributor to greenhouse gas emissions. In Europe, centuries of industrial agriculture has led to loss of biodiversity of crops and insects such as butterflies, earthworms and livestock. In 2019, the European Court of Auditors noted that because of this loss of biodiversity farms have been less productive overtime. Despite the many cautionary tales, local and global, India may be set to repeat these mistakes by pushing an agricultural model which is resource intensive and unsuitable for a warming planet. Dr Ramanjeylu highlights some steps forward.

Dr GV Ramanjaneyulu: Transition towards organic and natural farming needs.... First and foremost is the equitable subsidies. So like I mentioned, whether it is about fertilizer subsidy, whether it is about power subsidy, we need to quantify the entire subsidy given and give it to the farmers. I think that's directly given to the farmers and electronics makes a choice. That's the first thing we need to look at. Second, we also need to look at evolving new mechanisms of supporting this transition in terms of ecological benefits which organic farming brings in. Unfortunately, the Indian agricultural system was fixed in the 1960s so they are not moved forward. Second, or more important thing is about when it comes to the farmers, farmers are desperately looking for alternatives, but what is promoted in the name of organic and natural farming today is also a very outdated belief based system, we need to move into modern scientific agro ecological approach towards organic and natural farming. So, if something which worked 60 years back is not working today as green revolution, something which worked 3000 years back or 2000 years back also is not going to work today, because there is a changing situation. So both the climate is changing, market is changing. People's habits are changing. So in that situation we need to modernize and adapt to the changing situations, it needs a lot of research and a good quality expression which is knowledge based that is a transition. So that's where investments from the government are very, very critical.

Women at Kolunji Ecological farms go village to village, door to door to explain the benefits of alternative models of farming. Sometimes, people hear them out. At other times, they shut their doors. Usha Nandini recalls how she was dismissed by farmers in the early days of her career. What would she know about farming, they said. Today, many of those farmers have adopted these very alternative models. Apart from consistent outreach by Kolunji, watching the climate change in front of their eyes was a wake up call for many farmers.. Oswald Quintal is hopeful more people will join.

Oswald Quintal: The future is organic agriculture, the future is biodiversity based ecological agriculture, the trying to upscale unsustainable practices is no longer possible. Now, these practices were introduced because the state subsidized them, chemical fertilizers, in 60s were subsidized and 70, 80, 90 gradually the subsidy reduced the subsidy in chemical pesticides has also reduced. So now farmers are desperately looking for alternatives. Now, the state should understand that. So farmers now I've started realizing that the state is not understanding their problem, and that they have to come together. They have to establish alternatives, and in establishing and upscaling alternatives lies their future.

Thank you for listening to this episode of Climate Emergency, you can listen to more episodes on our website www.sunoindia.in or on any other podcast app of your choice. This episode was supported by Earth Journalism Network. It was written and edited by me, Mahima Jain, edited by Menaka Rao and produced by Rakesh Kamal.