

Women and Agroecology



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The editors encourage readers to photocopy and circulate magazine articles.

Dear Readers

Women are increasingly being recognized as key propellers of development and change – be it space science or scientific innovation. They have proven their capacities in handling any challenge – ranging from defence preparedness to excellence in sports as well as emerging as change makers and development leaders. Long overdue processes are being initiated, increasing their representation in democratically elected institutions, as well.

If and when given an equal opportunity, the rural women's resilience in handling multiple tasks and challenges successfully is being recognized world wide, whether it is social movements or collective enterprises. Their unseen and unheard contribution to family welfare as well as nation's well being is increasingly being appreciated.

As we know, women play a central role in agricultural development, especially in small holder families, who constitute the farming majority. Be it food and nutritional security at household level, as well as custodians of collective wisdom of the communities, their contribution is immeasurable. Very often the success of a development intervention, be it through mainstream institutions or civil society organisations depends on involvement of women. They achieve spectacular results not only for themselves but also inspire the whole communities. Several such inspiring stories exist. We are grateful to those who came forward to share some through this issue. Hopefully, women centric development focus and celebrating Women Farmer's day would lead to robust and sustainable development as well as rapid progress in development goals pursued by our nation and the globe as well.

Please continue to share your practical experiences on ecological agriculture through this magazine as well as strengthen the initiative with your voluntary contributions as you have been doing now.

The Editors

LEISA is about Low-External-Input and Sustainable Agriculture. It is about the technical and social options open to farmers who seek to improve productivity and income in an ecologically sound way. LEISA is about the optimal use of local resources and natural processes and, if necessary, the safe and efficient use of external inputs. It is about the empowerment of male and female farmers and the communities who seek to build their future on the bases of their own knowledge, skills, values, culture and institutions. LEISA is also about participatory methodologies to strengthen the capacity of farmers and other actors, to improve agriculture and adapt it to changing needs and conditions. LEISA seeks to combine indigenous and scientific knowledge and to influence policy formulation to create a conducive environment for its further development. LEISA is a concept, an approach and a political message.

MISEREOR founded in 1958 is the German Catholic Bishops' Organisation for Development Cooperation. For over 50 years MISEREOR has been committed to fighting poverty in Africa, Asia and Latin America. MISEREOR's support is available to any human being in need – regardless of their religion, ethnicity or gender. MISEREOR believes in supporting initiatives driven and owned by the poor and the disadvantaged. It prefers to work in partnership with its local partners. Together with the beneficiaries, the partners involved help shape local development processes and implement the projects. This is how MISEREOR, together with its partners, responds to constantly changing challenges. (www.misereor.de; www.misereor.org)

AME Foundation promotes sustainable livelihoods through combining indigenous knowledge and innovative technologies for Low-External-Input natural resource management. Towards this objective, AME Foundation works with small and marginal farmers in the Deccan Plateau region by generating farming alternatives, enriching the knowledge base, training, linking development agencies and sharing experience.

AMEF is working closely with interested groups of farmers in clusters of villages, to enable them to generate and adopt alternative farming practices. These locations with enhanced visibility are utilised as learning situations for practitioners and promoters of eco-farming systems, which includes NGOs and NGO networks. www.amefound.org

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Women and Agroecology

With growing rural to urban migration by men, there is ‘feminisation’ of agriculture sector, with increasing number of women in multiple roles as cultivators, entrepreneurs, and labourers. Economic Survey 2017-18 says that 70% of all women engaged in cultivation are from households witnessing migration.

Women are the backbone of present day agriculture, but largely remain unseen and unheard. The Indian agriculture sector employs a whopping 80 per cent of all economically active women; comprising 33 per cent of the agricultural labour force and 48 per cent of self-employed farmers. According to The Indian Council of Agricultural Research (ICAR) the participation of women is 75 per cent in the production of major crops, 79 per cent in horticulture, 51 per cent in post-harvest work and 95 per cent in animal husbandry and fisheries. The union government too has admitted that agriculture, the largest production endeavour in India which contributes substantially to the GDP, is increasingly becoming a female activity.

Men are into farming when there is sufficient land, irrigation and availability of credit. Small and marginal farming is thrust on the shoulders of women as men migrate to cities in search of jobs leaving behind families. Lack of operational rights for land, unequal wages, lack of access to extension, training and credit and confinement to labour-intensive jobs are some of the challenges which women continue to face. Also, conventional chemical input intensive farming often has a negative impact on women.

Agroecology, the way forward

Agroecology is the model best suited to overcome gender barriers in agriculture. Women’s knowledge

on seeds and agricultural biodiversity holds a central place in agroecology. The participatory, farmer-to-farmer knowledge-sharing methodologies embedded in agroecology provide an excellent platform to recognise and value women’s contributions to farming and biodiversity and make them visible.

Besides promoting diversified, resilient, and sustainable production system agroecology helps boost the livelihoods of family farmers and reduces farmers’ dependence on external inputs. For example, the shift to agroecological farming started with a small step in Kalamunda in Odisha. Women farmers through Farmer Field Schools, learnt the techniques of natural farming and made the transition towards safe food production. Launched by just 20 farmers in 2018, in a span of 4 years, six hundred women farmers had joined the safe food campaign. (Amar Kumar Gouda and K C Sahu, p.33). Similarly, women farmers in Madhya Pradesh, together prepared Jeevamrit, Amritpani and Dashaparni ark etc. to improve microbial count in the soil, promote growth of the crop and avoid the pest infestation. (Prithviraj Gaikwad et al., p. 18)

Adaptation is fundamental given the precarious nature of smallholder livelihoods. Traditionally, women farmers have adaptive capacities, in terms of knowledge, networks, and management practices to cope with vagaries in the weather. Adaptive measures undertaken by smallholder women farmers in Odisha included on-farm diversification, adoption of water technologies and management, choice of crop varieties to sow, and strategies to reduce risks.

Including millet crops is fundamental to help increase climate resilience. The local women innovators in a brief span of three years became Master Trainers on Natural

Farming. Not only they introduced millet cultivation in their fields, but also promoted consumption of a range of millets by creating new recipes. They have shown how to produce more and diverse food while nurturing the ecosystem. They have further spread agroecology and natural farming by building and sharing of knowledge through HimRRA Network and different media. (D K Sadana et al., p.15).

Women's knowledge and skills are invaluable in promoting the sustainable farming practices that align with their community's needs and cultural values. Empowering women in the field of agroecology can not only transform the status of family but also their pattern of predominant farming system. Rehana's story serves as an inspiring example of how passion, dedication and creativity can transform lives. Through agroecology, she not only transformed her farm's productivity but also contributed to environmental conservation and community well-being. Her journey from learning the art of mushroom growing to creating an agroecological farm, showcased the power of turning challenges into opportunities and making a positive impact on community. (Mahak Khatri et al., p.24)

The extensive knowledge of local ecosystem, traditional farming techniques and seed preservation method has been passed down through generations. Certainly, women have made significant contribution in creating sustainable and inclusive food systems. They are also good at integrating various systems which result in multiple benefits. The integration of agroecological practices with beekeeping provided a unique opportunity for women in Maharashtra to promote sustainable farming methods that nurture biodiversity and generate income. Fostering bee flora as a major aspect of the Beekeeping programme has helped women beekeepers economically and ensured increase in bee population and agriculture yields. a substantial increase in yields of fruits and vegetables within one year of beekeeping have been reported (Natasha Sharma Dogra, p.27).

Women have an innate nature of working together in groups and reaping benefits not only for themselves but for the community as a whole. Shifting towards collective farming, women are gaining access to land, learning agroecology, acquiring food autonomy, and turning into independent, bold, leaders and farmers of

today. Seven women in Maharashtra developed a *Group Kitchen Garden*, wherein various SHGs came together, divided responsibilities and harvested safe vegetables for the communities. These experiences have also changed their position in the household (Natasha Sharma Dogra, p.27).

Providing the necessary support systems in terms of generating awareness, training and initial funding helps women in kick starting their initiatives. For example, *Maa Hingula* women's SHG in the Mayurbhanj district, with financial support and technical guidance of Jashipur Farmers Producers Company Limited (JFPCL) started a bio-input unit in the year 2020. Also, Odisha Millet Mission set up support systems for researching farmers' preferred landraces through participatory varietal trials. Production and consumption of millets were decentralised. To ensure the accessibility of superior quality seeds of different landraces community-managed seed centres (CMSCs) were set up in each block. An alternative millet food system has been successfully developed by creating market demand along with highly successful behaviour change campaigns. This has been achieved by making policy shifts for procuring millets in bulk and including them in state nutrition programmes. Women SHGs were supported to be entrepreneurs to cater to private markets. WSHGs serve millet-based street food and supply ready-to-cook or ready-to-eat millet items to state nutrition centers as well as to private outlets. (Bindu Mohanty, p.6)

Driving investments towards skill development, enterprise forming, and income enhancement can help women engage in more profitable activities and add value to their productivity. Such investments have the potential to create avenues for income enhancement and encourage agricultural entrepreneurship. Also, recognising the contribution of women in food production and ecology conservation is of utmost importance. Celebrating 15 October of every year as Women Farmer's Day as declared by the Ministry of Agriculture and Farmers Welfare, is just a beginning of this long journey towards women's empowerment in agriculture.



Engineering just transitions

Women's empowerment and adaptation through agroecology

Bindu Mohanty

When empowered by the system, women can be active agents of change, who can shape their own destinies and that of their households for the better. The Odisha Millet Mission (OMM) is a fine example as a model of agroecology which not only helps farmers to adapt to climate change but also systematically empowers women to play a pivotal role in this transition.

Cycle weeders were made available to women farmers through custom hiring centers



Small-scale farmers in the Global South are vulnerable to climate change in ways that other farmers are not. The predicted decrease in food production due to climate change combined with prevalent factors in these landscapes such as nutritional deficiencies, natural resource degradation, and insecure land tenure compound the risks and vulnerabilities of this demographic sector. Women, in particular, besides facing social vulnerabilities, will disproportionately bear the major burden of climate-change impact in such landscapes. Distress migration, an increasing phenomenon in such landscapes, poses greater risks for women than men.

International climate change discourse in the agricultural sector is predominantly shaped by a Western technocratic approach and oriented towards the needs of the globalised industrial food system. This systematically increases the vulnerabilities of the agrarian communities in the rainfed regions of the Global South in general, and women in particular. Climate policies and funds are predominantly geared towards mitigation and not adaptation measures.

Adaptation is the need of the hour given the precarious nature of smallholder livelihoods. Traditionally, owing to the ecological and social evolution of rainfed agroecosystems, smallholder farmers had adaptive capacities, in terms of knowledge, networks, and management practices to cope with vagaries in the weather. Women have been the custodians of indigenous knowledge (eg., seed varieties or agricultural practices), given their responsibilities to secure food for the households. Adaptive measures undertaken by smallholder farmers included on-farm diversification, adoption of water technologies and management, choice of crop varieties to sow, and strategies to reduce risks. Many of these traditional principles are now incorporated into the growing movement of agroecology.

Elements of agroecology

Agroecology, or the application of social and ecological principles for the design and management of sustainable food systems, is now recognised as a promising pathway to transform our current unsustainable food systems. Since 2019, UN FAO has popularised “10 Elements of Agroecology” as an operational framework for the transformation of food systems towards adaptation and

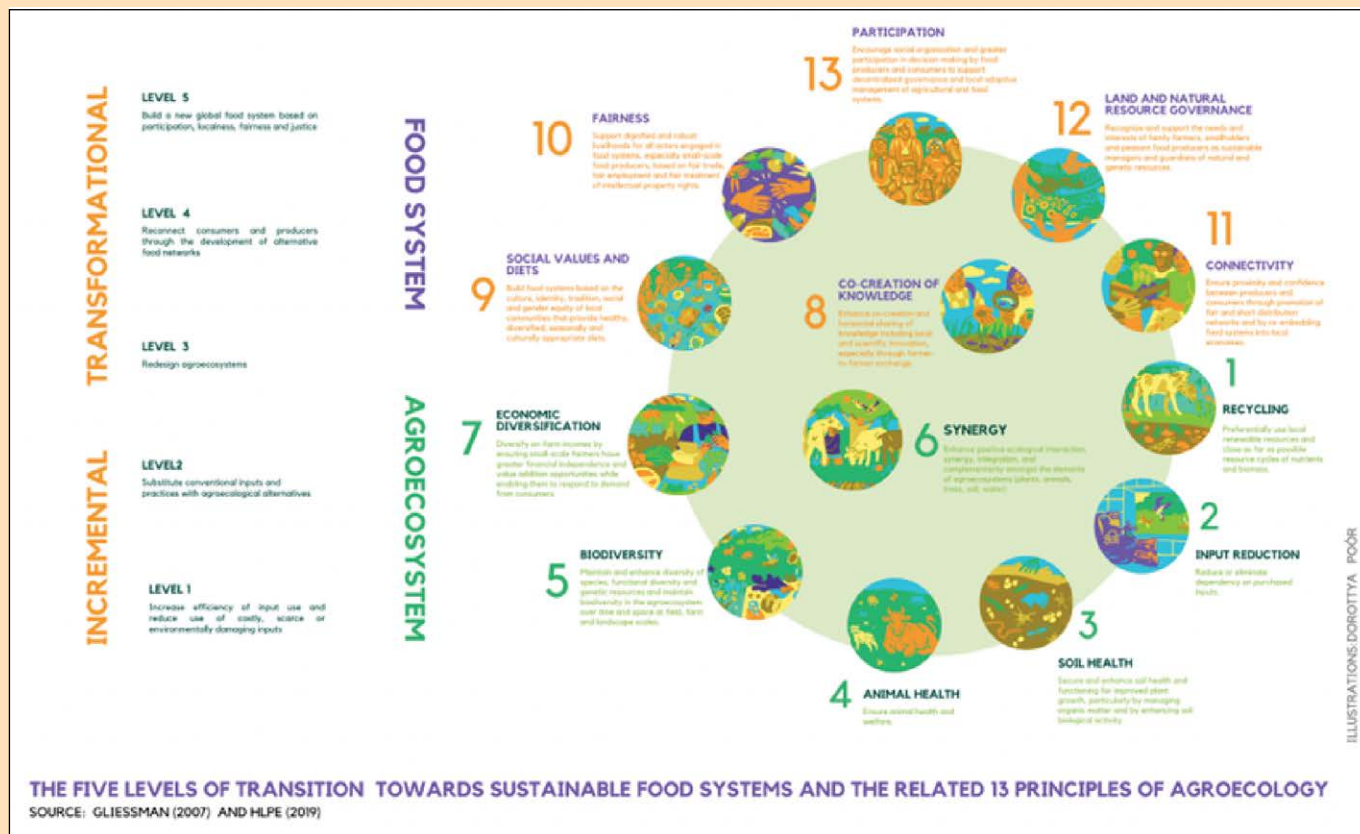
resilience. Of these 10 elements, “recycling, efficiency, diversity, resilience and synergies” are central ecological features, while an additional five elements, namely “co-creation of knowledge, human and social values, culture and food traditions, responsible governance, and circular and solidarity economy” cover the social and political aspects of agroecology. “Agroecology Europe,” a European association, has further added to the FAO framework by suggesting interventions needed to scale agroecology. Gender inclusion in agroecology is not explicitly mentioned but is implicit in its social and political principles. While field evidence has conclusively proved that farming systems using an agroecological framework have increased resilience and adaptation capacities, there are still not enough instances on the ground of how to scale agroecology. The Odisha Millet Mission could well be a singular example in the world that has successfully incorporated all the elements of agroecology in its operational framework. Recognizing this, UN-FAO is studying the agroecological framework of Odisha Millets Mission for its applicability to other countries in the world.

Odisha Millets Mission

Odisha Millets Mission (OMM) is a flagship initiative of the Government of Odisha, started in 2017, to revive millets with a plate-to-farm approach across the state.¹ It is a pioneering initiative by the Department of Agriculture and Farmer’s Empowerment in which consumption is central to the food system to address nutritional deficiencies. It is aimed to achieve by increasing household consumption of nutrition-rich finger millet as well as procuring and distributing it in state nutrition programmes, including the Public Distribution System. OMM is currently operational in all 30 districts of Odisha. As of March 2023, the OMM has covered 264,000 hectares, benefitting 202,784 millet farmers.² This paper documents the agroecological features and

1. Updated facts and figures about women’s enterprises pertaining to OMM have been provided by Prakash Mallick Associate State Coordinator, WASSAN. WASSAN is part of the OMM secretariat as its technical design and implementation partner. All other facts are taken from the official website of OMM is <https://milletsodisha.com>
2. At the time of writing this paper, detailed disaggregated information about the impact of OMM on women was not available, but it can be safely assumed that at least half of the farmers benefitting from OMM are women.

Figure 1: Agroecological levels and principles³



Box 1

Jyoti, a landless labourer in the Sundergarh district, took to share-cropping of one acre of land in her village that was lying fallow. Having got trained through OMM, she followed the agronomic practices and also prepared and used her own bio-inputs. She reported an increase in yield over time. With enhanced income, she brought more fallow land into cultivation and planted other crops along with the main millet crop for the market. She further diversified her agricultural income with backyard poultry and selling vermicompost to other farmers in the locality. This progressive farmer inspires other farmers to follow suit, and she personally encourages other women farmers to diversify food production, pointing to the benefits of better nutrition and increased income.

includes. The five hierarchical levels identified by Agroecology Europe allow us to determine the scale of an agroecological system (Figure 1).

How women have benefitted at each level

Documented below is an analysis of some of the design features of OMM at each of these levels, with examples of how women have been empowered at each of these levels.

a) Level 5 (Agroecological principles: Participation, Localness, Fairness, and Justice)

According to Tittonel et al (2020) recognize that scaling agroecological systems from fields to the entire sector requires that the number and complexity of integrating stakeholders at each level increases. The very aim of this government programme to promote healthy public diets with multiple stakeholders ensures that, as an agroecological initiative, the design of OMM, incorporates the highest levels in the agroecological framework (Figure 1) i.e. levels 4 and 5.

the impact of OMM in reducing the vulnerabilities faced by rural women.

Agroecology is defined by principles and not by ordained practices. The extent to which any food or farming system is agroecological can be evaluated by determining the number of agroecological elements and/or levels it

3. Taken from <https://www.agroecology-europe.org/the-13-principles-of-agroecology/>

OMM integrates the participation of stakeholders at different levels through a decentralised approach. Stakeholders include national and international institutes for research and training purposes, government departments for channeling public investments, SHGs, FPOs, and NGOs as Facilitating Agencies in each of the 143 Blocks of the programme to help with implementation. As of March 2023, 116 FPOs (all of which included women farmers and some of which were run solely by women) and 1,869 women SHGs (WSHGs) were part of OMM. Fair and assured prices, local procurement of millets, inclusion of small and marginal farmers, and gender sensitivity, are all hallmarks of the OMM, which has resulted in a widescale shift of the entire food system to climate-resilient millets. With financial support for capital expenditure and training provided by the government, women farmers have emerged as entrepreneurs in this millet value chain and operate primary and secondary millet-processing enterprises. As of August 2023, there were 1382 millet processing units and 229 food outlets run by women, which earns them a steady monthly income, contributing to their social and economic empowerment.

b) Level 4 (Agroecological principles: Development of alternative food networks)

An alternative millet food system has been successfully developed by creating market demand along with highly successful behaviour change campaigns. This has been achieved by making policy shifts for procuring millets in bulk and including them in state nutrition programmes. Women SHGs were supported to be entrepreneurs to cater to private markets. WSHGs serve millet-based street food and supply ready-to-cook or ready-to-eat millet items to state nutrition centers as well as to private outlets.

WSHGs operate 4 different types of food outlets of different sizes, catering to different segments of the population. Start-up capital for these outlets is provided by the government, while the WSHGs take care of all operational costs. For the smallest food outlet, a millet tiffin center, the monthly turnover is Rs. 30,000 per unit while that of a Millet Shakti Café, the largest type of food outlet in OMM, is Rs. 200,000 per unit. Millets have been piloted for inclusion in Anganwadis or state nutrition centers for children in 2 districts under OMM. In one of the districts, Keonjhar, all the



Opening of Millet Shakti Outlet



Millets on Wheels reaches consumers directly

Anganwadis serving 27,000 children are provided with 8 millet ladoos (sweetmeats) every month. 59 WSHGs, currently involved in supplying the millet flour for the ladoos, report a monthly profit of Rs. 30,000/- through this venture. The WSHGs who make and sell ladoos to Anganwadis make an average monthly profit of Rs.16500.

c) Level 3 (Agroecological principle: Redesign Agroecosystems)

Reviving the biodiversity of ecosystems is an agroecological element and key to building resilience to climate change. OMM set up support systems for researching farmers' preferred landraces through participatory varietal trials. Production and consumption of millets were decentralised. To ensure the accessibility of superior quality seeds of different landraces community-managed seed centres (CMSCs) were set up

in each block. These CMSCs are managed by registered Farmer Producer Organisations (FPOs) that procure seeds from individual farmers. Standard operational protocols for seed purification, treatment and multiplication for the market have been established. Women farmers and WSHGs are involved in the processes of treating the seeds with bio-inputs, procurement and sale.

d) Level 2 (Agroecological principle: Agroecological alternatives)

OMM provided the necessary support systems in terms of generating awareness, training and providing start-up capital that allowed farmers to switch to use of bio-inputs. Looking into the growing market demand, *Maa Hingula* women's SHG in the Mayurbhanj district, with financial support and technical guidance of Jashipur Farmers Producers Company Limited (JFPCL) started a bio-input unit in the year 2020. At that time, the market in the Block (local administrative unit) for these bio-inputs was estimated at 5000 liters and projected to grow further. Looking at this increasing demand for bio inputs, the SHG is ready to scale up its production. As JFPCL takes the responsibility of marketing, SHG members are quite hopeful of a secure income stream in the future. They are also happy that people are using their inputs not only in millet cultivation but also in paddy and vegetable cultivation.

e) Level 1 (Agroecological principle: Increase efficiency of input use)

OMM trained farmers in agroecological practices to improve yield productivity and increase the efficiency of inputs. Farm implements, such as cycle weeders, needed for such practices were also made available to farmers through custom hiring centers. Farmers have reported several benefits such as decreased input costs, greater productivity, lower GHG emissions, reduced water usage, and improvement of soil quality. In their independent evaluation, the World Food Programme commended OMM for its gender inclusion, particularly noting that the cycle weeder was gender friendly in its design.

Conclusion: Large-scale agroecological systems as adaptive measures

OMM promoting a large-scale agroecological system, has helped thousands of agrarian households to develop

better resilience to climate change. The adaptation measures of OMM encompass the technological, ecological, social and governance principles of the agroecology framework. These adaptation measures have led to increased livelihood opportunities, increased income, and better nutrition. OMM has resulted in co-benefits in terms of women's socio-economic empowerment.

It is important to include women's knowledge, experience and perspectives as traditional caregivers in climate change policy and investment frameworks. As demonstrated by OMM, agroecological systems that empower women to play a pivotal role in food and farming build resilience against climate change.

References

<https://www.agroecology-europe.org/the-13-principles-of-agroecology/>

Tittonell P, Piñeiro G, Garibaldi LA, Dogliotti S, Olf H and Jobbagy EG (2020) **Agroecology in Large Scale Farming—A Research Agenda**. *Frontiers in Sustainable Food Systems*. 4:584605.

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Women-led farms

Case studies from mid-hills of Himachal Pradesh

Chhavi Bathla and Sai Nikam

Women farmers intuitively practice principles of agroecology. Their focus is not just on soil and crops by adopting sustainable practices, but also on the health of their family. Presented are two cases from Himachal Pradesh, which prove that with access to knowledge and technology, women chose to diversify their livelihoods, making their farms sustainable.

Atti Ji harvesting Chamomile flowers from the farm



In India, women play a paramount role in agriculture. However, the decision-making power always remained in the hands of men or the elder women. Customarily, their roles are gender as well as technology biased. Activities that need the use of terrain-specific technology such as plowing with tractors or bulls are traditionally carried out by men while the activities with more drudgery like sowing seeds, removing weeds, harvesting yield, etc., are usually taken care of by women.

In hilly terrains of Himachal Pradesh, men farmers with limited livelihood opportunities on scattered and marginalized landholdings, have been migrating towards plains to explore other sources of income. This has resulted in women taking up farming responsibilities. With increased autonomy, women are found to make decisions that are more desirable for the family, beyond mere crop sustenance. The following cases belonging to our project area in the district of Kangra in Himachal Pradesh, highlight this.

Case of Attiji

Atti Ji is a 40-year-old farmer living in Sukarna village of Sakri Panchayat. She belongs to the Schedule Caste category. Her husband works as a daily wage labourer. She owns 27 kanals (8 kanals equals one acre) of

Livestock at Atti Ji's house



agricultural land, of which cultivation is done on 25 kanals. While 18 kanals of the land is adjacent to her house, 7 kanals of land is located at a distance.

Until 2017, the 18 kanals of land adjacent to her house, was covered with thorny shrubs, trees and vines. She says, “*aadmi aar se paar nahi dikhta tha, yahan poora jungle tha*” (it was so dense that no one could see from one side to the other of the land). To clear it, she invited local pastoralists - the Gaddi community, to graze their herd on her land. The livestock gave her a headstart on clearing the land. She then proceeded to cut down shrubs and vines with the help of hand tools. In cases where trees and more stubborn shrubs posed a challenge, she received help from Electricity department staff who were installing electricity poles on the adjacent plot. Season by season, she cleared small patches of land and started cultivating a variety of crops for which she was earlier dependent on other villagers and markets.

As the land was covered with trees for years, the freshly cleared land was extremely fertile. The output from this land was twice compared to other agricultural land, that her family had been cultivating for generations. Higher yield also allowed her the opportunity to sell the surplus in the local market and generate additional income. Next season, she grew soybeans on that land and then moved towards kitchen gardening called “*Suadu*” in the local language. Attiji never felt the need to use chemicals in

this new plot as the land was extremely fertile. Apart from cereals and a kitchen garden, she also planted assorted fruit trees such as Mangoes, Indian Blackberries, Big lime, Indian gooseberry (Amla), Mulberry, and Guava. Attiji also owns 4 cows, out of which one is desi and 3 are hybrid. As she produces value-added products such as curd, ghee, and cheese at home, she usually doesn't have enough milk surplus to sell in the market.

In 2022, under the Agricultural Technology Management Agency (ATMA) project, Attiji moved from traditional farming



Brahmi Devi raised kitchen garden adjacent to her house

to organic farming. The project was introduced to her by a local NGO, Rural Technology Development Centre (RTDC). She underwent various on-field trainings, and exposure visits to learn contemporary farming techniques. In the last Kharif season, she cultivated vegetables like peas, onion, garlic, radish, potato, beetroot, field pea, grass pea, arugula, broad bean, and turmeric; and, cereals such as barley, finger millet, wheat, paddy and landrace seeds such as mustard and flaxseed.

Apart from vegetables and cereals, she also cultivated medicinal plants such as Chamomile and Spikenard. Dried Chamomile flowers can be used for tea. It also has medicinal value. The mature roots of Spikenard, 2 years or older, are used for making ayurvedic medicine. Furthermore, she started beekeeping in November 2022. Honey harvested from bee boxes not only helped her

augment her income but bees helped pollinate the crop which impacted the yield.

Case of Brahmi ji

Brahmi ji lives with her husband and a son in the remote corner of Rajodu village of Kudail Panchayat in Kangra district. At the age of 22, after estrangement from extended family, Bramhi ji and her family left the ancestral house and started everything from scratch. At that time her husband used to work as a labourer in a nearby factory earning Rs 250 per month. While looking for better opportunities, her husband moved to Saudi Arabia to work as a mechanic, but in the next 3 years, he ended up losing all their savings. Brahmi ji became the sole earner for a family of 5 members.

The first issue that Brahmi ji tackled was to reduce her expenses by reducing market dependency. She started cultivating 4 *kanals* of land adjacent to her house. She started the kitchen garden - locally known as *Suadu*, with potato and radish. Over the years, the diversity of vegetables in her kitchen garden has grown to include spinach, turnip, turmeric, cauliflower, cucumber, and other seasonal leafy vegetables. Moreover, she now cultivates some rare and wild vegetables such as Snake gourd “Padol” and Winged Yam “*Dioscorea alata*” (local name- Tardi), that give better returns than other vegetables. She claims that the taste of her own vegetables is much better than the taste of what she used to get from the market. Initially, when she established her kitchen garden, she started getting a surplus of many vegetables and used to distribute it among family and friends free of cost. But then on the suggestion of one of her friends, she collected all the radishes, washed them and started selling them from household to household. This was the first time that she sold her vegetables and got a profit out of it. This small success motivated her to sell the surplus from her kitchen garden to villagers on a regular basis.

Later she planted various trees like mango, plum, big lime, orange, guava, and pomegranate on her field. However, this endeavour didn't result in immediate success. The first challenge Brahmi ji faced was attack by wild monkeys. They destroyed the harvest multiple times. This did not deter Brahmi ji. She started collecting fruits and vegetables that were damaged by monkeys and salvaged some of them to make chutneys and pickles for



Long Cardamom cultivated by Brahmi Devi

household consumption. Over the last three years, the number of monkeys visiting her farm reduced.

In 1999, she got a job as a helper in Anganwadi. Despite the new job she continued to work in her fields and learn new techniques and methods. In 2003, she was selected for training in vermicomposting by a regional agricultural block officer. Post-workshop, she started using cow dung and urine on her farm to increase soil fertility. Then in 2019, the Rural Technology Development Centre (RTDC) team introduced her to other farming techniques and learnt about Shri. Subhash Palekarji's, natural farming method. She started practising Natural Farming principles with all the resources available to her. Instead of using cow dung and urine, she used buffalo dung and urine and got good results from that as well. During the pandemic, she hardly had to put much effort into selling the produce. Villagers would come to her house and buy good quality organic vegetables at 3 times the market price. With increased demand due to scarcity of resources, she also ended up selling leaves of turnips and radishes, which otherwise would have been discarded.

This year she has started growing large cardamom and finger millet. She has diversified her sources of income by producing value-added products like curd and ghee,

from 2 buffaloes and a cow that she owns. In the month of March, she initiated the backyard poultry project with the support of the RTDC team.

Conclusion

When given the opportunity, women farmers intuitively practiced principles of agroecology. In both cases, women chose to reduce their market dependency by growing their own food. They also focused on the health of their family, crops and soil by adopting sustainable agri-practices. Taking into account the agroecological aspects, these women worked with the traditional system but didn't restrict themselves from adopting new technology and knowledge. When given access to new knowledge and technology, they chose to diversify their sources of income, by providing a bundle of different products to local communities.

These women were not restricted by their social status or financial difficulties. Atti ji worked hard and capitalised on all the knowledge and support provided to her, to provide a better healthier life for children. Whereas, Bhramhi ji, beyond adopting the prevalent practices in natural farming, also experimented to generate new results. Both women showed exceptional success in achieving sustainable development through agroecology with their own efforts and understanding.

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Nurturing family, biodiversity and agroecology

D. K. Sadana, Sukhdev Vishwapremi and Anoop Kumar

Meet these local innovators who in a brief span of three years became Master Trainers on Natural Farming. Not only they introduced millet cultivation in their fields, but also promoted consumption of a range of millets by creating new recipes.

The women of Himachal Pradesh, having small lands (as terraces), cultivate a series of crops and crop-combinations suitable for their local ecosystem. Generally following the traditional combinations, they are now entering rows of millets in the regular crops. Until a couple of years ago, they knew only *Ragi/ Koda/ Kodra* (Finger Millet, *Eleusine coracana*) – locally also named as ‘Mandal’. They have now started cultivation of *Kangni/ Kauni/ Saunk* (Foxtail Millet, *Setaria italica*), Barnyard Millet/ *Sanwa* (*Echinochloa esculenta*) and Little Millet/ *Kutki* (*Panicum sumatrense*).



These women have been practising agriculture for several years in the relatively small fields they own, and have consciously shifted to natural farming in the recent years. Now they are master agriculturists already well-aware and caring for biodiversity in their farms, experimenting and building new knowledge and confidently sharing it during the millet events and in the network meetings. Promotion is largely through spreading the word in the HimRRA Network, the Himachal chapter of the RRA_Network [<https://www.rainfedindia.org>].

Inspiring innovators

Bimla Devi of Chawari village in Mandi district owns only one Bigha land [or one fifth of an acre] but grows a range of crops. Presently, in *kharif*, she is growing maize, soybean, brinjal, marigold, okra, green chilli, ginger, cucumber, bitter gourd, colocasia (*arbi*), sunflower, lemon-grass, withania (*ashwagandha*), turmeric to primarily meet her domestic requirements. She has added 3 millet crops viz. *ragi*, *kangni*, and *sanwa* since last 4 years. “I sow seeds of the millets in lines now as it saves seeds and also makes weeding much easier”, she said. Now as a Master Trainer on natural farming, she

Shift to natural farming through millet recipes

Some of them expressed the reason how they shifted to natural farming: “unlike the daily diet that would make the children lethargic, whenever we fed ‘dalia’ [pounded grains cooked in water or milk] or ‘kheer’ (dense sweet dish of kangni or ragi made with milk), the child would be more active and generally behave better. We had observed this in our families. We also noted the harm done by chemicals in food” expressed Rita Devi during a meeting in September, 2022. She created new recipes that the children liked and even asked for the same - time and again. Initially shy of being expressive, slowly over two years, Rita Devi and Vandana, now Community Resource Person with RTDC tell how well the millet in new recipe is accepted by the children. Adults in the family who did not take millets (except probably during their childhood), now find themselves interested.

has been invited to provide training on millet cultivation and millet recipes to *Pashu Sakhis* and *Krishi Sakhis*. She has been maintaining old seeds since 2013 - mainly of paddy and barley; has five varieties of paddy. “Department has purchased 5 quintals of ragi seeds from me for distribution, and 20 kg kangani (foxtail millet)”, she told.

Self-trained in millet preparations, now she prepares several items from millets (*ragi-idli*, *ragi-dosa*, *kheer* of ‘*nanga jaun*’ (‘naked barley’), popped *jowar* (sorghum). She trains others in the preparation of *ragi* and *bajra khichdi*, *ragi-dalia*, *ragi-soup*, *ragi-laddu* (sweet balls), *jaun-laddu* (sweet barley balls). She narrated “I prepare millet-tea and it is much in demand in all my trainings; at my house also I use millet preparations for children. In addition, i have also tried *ragi-halwa*, *ragi-papad*, *bajra-laddu*, (sweet balls made from pearl millet), *jowar* (sorghum) popcorn. This time we also prepared *millet-chat* (a sour and salty snack)”. She was offered a stall in a fair (*Shivratri Mela* in Feb., 2023) under the state sponsored ATMA project where she prepared *ragi-chapati*, ‘*sabut jaun ke laddu*’ (barley balls), ‘*jowar ke laddu*’ (sorghum balls) and ‘*kangni ke laddu*’ (sweet balls made from foxtail millet).

A Training session



Kala Devi of Katheo village in Mandi district has 4 Bigha of terraced agricultural land. With apple as the main crop, presently she grows crops like beans, red rice, maize (*sathu-makki*), horse gram, pomegranate, jowar, soybean, a local pulse ‘*bharath*’ (looks like cow-peas), and a creeper ‘*jhumru*’. She has planned



to add pear (*nashpati*) too. Conscious about the benefits of millets, she has started cultivation of *ragi*, *kangni*, *cheena*, *seunk*, *kutki* (Little Millet) and *ramdana* (amaranthus). “Earlier we used to grow peas only, and have added beans for nitrogen fixation. In the last 3-4 years, we have started cultivating millets as well.”, says Kala Devi.

Having received training on seeds from the Seed Group of RRA_N in 2021, she has put up a Bio-Diversity Block [BDB] in her land with the purpose to identify the particular seed variety that grows better in local ecosystem.

She has improvised recipes of the ones already locally prevalent. Now she has developed new ones with *ragi* or *kangni* flour. “I prepared a dosa-like item using *ragi* flour - what we locally call as ‘*chilrha*’ in our language. With *lassi* and *kodra* flour we prepare another item ‘*khobru*’ – a hot drink”, says Kala Devi.

Reena Devi of Panela village in Chamba district never cultivated millets except *ragi*. Three years ago she started growing *kangni*, *kutki*, and a special variety of red rice termed as *sukhara dhan* [more suitable for rainfed conditions]. She presently cultivates horse gram, amaranthus [*ramdana* / *seoul* / *cholai* / *bithu*], and sesame (*til*). She is now following mixed farming with diverse crops. She has provided *ghanjeevamrit* to others in the SHG formed by her own efforts. She trains others in millet cultivation. Reena Devi expressed “Maize has been our main crop and it is grown with kidney beans (*Rajmash*, a nitrogen fixing legume). Now, we have added *ragi*, *kangni* and *kutki* in line-sowing”.

She introduced hot millet beverage ['millet tea'] for those who visited her stall Chamba Minjar Mela held in July 2023. This is the first time in the history of the Mela, that such a tea was offered. In the Dharamshala 'Millet Food Festival', she has, for the first time, popularised a traditional ragi item - locally termed as 'pindri' in Chamba district.



Veena Devi of Nagrota Bagwan in Kangra district is presently growing turmeric, ginger, okra, soyabean, brinjal, green chilli, capsicum ('shimla mirch'), bottle gourd, bitter gourd, cucumber, strawberry and black pepper as well - testifying mixed and diverse farming. She explained "We have now added horse gram in the maize fields for nitrogen benefits; we are growing kodra for the last 3 years, kangni for the last 2 years. I have started cultivating cheena also. We grow kangni on bunds of these crops. We have also planted apple and mango saplings on outer bunds". She has 10 kanal (one acre) land.



For the consumption of millets, she has innovatively prepared 'kangni ki kheer' and 'chulai ki lassi' besides ragi-idli, kangni-pulao (kangni cooked with few vegetables), ragi-babru (chapati like, made after fermentation of flour) and ragi-halwa (sweet dish). In her own Self Help Group, she recommends addition of sorghum,

black wheat and ragi in the wheat flour for daily use and prepares 'ragi tea' in earthen pots only.

Conclusion

These women in Himachal Pradesh have a fair and practical understanding of agricultural biodiversity which is a prerequisite for transition to agroecology. Their approach to raising the consumption of millets through new but locally relevant recipes has the twin benefits - improving health of family-members and their own empowerment as well. Including millet crops is fundamental to help increase climate resilience. They have shown how to produce more and diverse food while nurturing the ecosystem. These are fit cases where the transition towards natural farming and agroecology is building their confidence and strengthening the womenfolk. Building and sharing of knowledge through HimRRA Network through different media (especially WhatsApp) enables further spread of agroecology and natural farming. Whether this also brings about gender equality is a matter of research, but their control over farming and their independent decisions in the day-to-day farming activities are the new dimensions visible on the ground.

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Nurturing climate resilient agriculture by women farmers

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Climate Resilient Agriculture is a comprehensive approach designed to ensure the sustainable use of a given ecosystem's natural resources, incorporating both crop and livestock production systems. The ultimate goal is to maintain and enhance productivity and farm incomes in the face of climate variability. Watershed Organisation Trust (WOTR) in India encourages women to adopt of Climate Resilient Agriculture (CRA) practices to address the issues arising in agriculture due to climate change.

This multifaceted concept encompasses a number of strategies and technologies, to make farmers, especially women, more resilient to climate variability. These include

1. Promoting crop varieties suitable for the region.
2. Efficient water management
3. Adopting of various in-situ moisture conservation techniques

5. Adopting Integrated Nutrient Management and Integrated Pest Management (IPM)
6. Promoting Farm Precise app for making informed decisions about crop management practices.

Women participation was ensured through capacity building and awareness programmes for improving household food security and enhance the climate resilience of their farms. Women were made aware of several concepts like Integrated Nutrient Management, Integrated Pest management, Livestock management, multilayer farming, crop planning and kitchen gardens. Awareness sessions on how to start all these activities were organised. Exposure visits also gave them an opportunity to see live model farms and interact with farmers .

Following is a series of activities taken up by women which has enhanced their confidence to deal with the effects of climate change on agriculture.



Women promoter conducts Farmer Field School on Climate Resilient Agriculture, with a group of women farmers. Farmer Field Schools (FFS) is a platform to help farmers promote a healthy crop. This is achieved by understanding the crop ecosystem, appropriate use of farming techniques and exchange of knowledge and ideas about good agricultural practices amongst farmers.



Success in Farmers



Preparation of organic formulations to help improve the crop yield with the reduction in input cost- Women farmers together prepared Jeevamrit, Amritpani and Dashaparni ark etc. to improve microbial count in the soil, promote growth of the crop and avoid the pest infestation to some extent. Some women from SHGs prepared Amritpani and Dashaparni ark and sold at the village level.



Manjubai Gurjar, Bisali, Chhipa Baroud (Rajasthan) creating awareness in villagers regarding Climate Resilient Agriculture at night meeting. The image shows her standing confidently in front of a group of mostly male farmers, delivering her message with assurance.



Some of the women farmers have become good entrepreneurs and are inspiring others to take up entrepreneurship. In Karjat, Ahmednagar area, women farmers share their experience on Onion processing unit with women farmers from neighbouring area.



Women farmers are taught about the use of bio inputs under the Nutrient Management. Vasundhara Sevika during a FFS session demonstrates the preparation of organic formulation to be used as nutrient application to crops. Women learn to identify the local biomass that can be used for preparing the organic formulation. Its use and application rate is also discussed with the group members.



Women have not only learnt the climate resilient practices, but also are actively engaged in influencing others through rallies and campaigns. Women farmers seen organising a rally to advocate for the adoption and promotion of Climate Resilient Agriculture practices.



The principles of agroecology - focus on creating sustainable and resilient farming systems, align closely with the practices and benefits of multilayer farming. Multilayer farming enhances biodiversity, adapting to climate variability, optimising resource use, and building resilience in farming systems. It also contributes to food security by providing a variety of crops and a continuous supply of fresh produce throughout the year, improving dietary diversity and nutritional intake. It helps farmers to become more self-reliant, better-equipped and resilient by raising the adaptive capacity of farmers by ensuring food and nutrition security especially during crises – such as drought and pandemic.



WOTR has carefully chosen 45 women as Pashusakhis in Madhya Pradesh to address the issue of scarcity of veterinary doctors in the project area. The government veterinary doctors have provided foundational training, encompassing vaccine administration and pharmaceutical knowledge to Pashusakhis. Pashusakhis are equipped to navigate the village effectively, possessing excellent communication skills and serving as proficient trainers. Pashusakhis conduct livestock surveys, administer essential vaccinations, maintain comprehensive livestock and medicine records, and extend their services to the community at a nominal fee. From July 2023 to August, these Pashusakhis have successfully vaccinated around 13,000 livestock animals.



◀ Awareness on ecological alternatives is being imparted at a young age by involving school students. Girl students installed bird perches as an ‘integrated pest management’ activity in soybean crop to control leaf eating caterpillar. It is an eco-friendly way to control agriculture crops from invading pests. It prevents economic losses to farmers.

▶ System of Rice intensification: In another project area, women farmers have come forward to practice System of Rice Intensification (SRI). This requires lesser inputs and yields better than the conventional system of rice growing. Also the precious water resource use is drastically reduced, thus resulting in better resource management.



◀ Women farmers installing Yellow sticky traps in Cotton crop. In one of the project areas in Gangapur, Aurangabad, women farmers are made aware of Integrated pest management. They have learnt to use yellow sticky traps to control sucking pests.



▶ In Jharkhand, women farmers are transitioning towards the cultivation of millet crops due to the inadequate rainfall conditions. Traditionally, they have been engaged in cultivating rice crops. Shifting to millets is a climate resilient practice, as millets requires very less amount of water to grow as compared to paddy. This is a commendable initiative towards celebrating The International Millet Year 2023.

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Agri tech-off: Madhya Pradesh farmers queue up to buy drones

Farmers of Madhya Pradesh, the country's agri powerhouse, are aspiring to become drone pilots to take their farming to new heights. In a sign of how farmers are eager to embrace technology, the suggestion for drone-assisted farming came up at a meeting of sugarcane growers with government officials.

Around 120 farmers have applied to the MP government's directorate of agriculture engineering to be allowed to use drones. The government is scrutinizing the applications to see if any of them already has a drone licence from the Director General Civil Aviation (DGCA). If they do, they will immediately get the green light for takeoff, said an official. The government will subsidise the purchase of drones, as per central government norms, and even the cost of training.

"There are certain norms for using drones for agricultural use. First, the farmer buying one should have a drone pilot license from DGCA and he/she should also have a passport," joint director, directorate of agriculture engineering, Pawan Singh Shyam told TOI, confirming the 120 applications.

"We have not fixed any deadline so far. We will scrutinize the applications, and if any of the farmers are found to have drone pilot license, we will immediately help them in getting a subsidy. We will help train those who do not have a license," he added.

Meghalaya thrust on organic farming

The government recently adopted the "Meghalaya State Organic and Natural Farming Policy 2023" to turn the hill state into a "national leader" in organic farming, even as 15,000 hectares of area in the state are organically certified and another 2,000 hectares are in the process of being certified.

"Our target is to increase the total area under organic certification to 1 lakh hectares in the next five years and the process for this will be initiated in the next financial year through the launch of a state organic mission," chief minister Conrad K'ongkal Sangma said in the assembly while presenting the budget (<https://timesofindia.indiatimes.com/business/budget>) for 2023-24 recently even as he allocated Rs 25 crore for this ambitious

Farmers to be provided subsidy to buy drones: The directorate has an MoU with Indira Gandhi Rashtriya Udan Academy, Amethi, an autonomous body under ministry of civil aviation, to train farmers, Shyam said. *"The fee for training under the MoU is subsidized at Rs 30,000 per farmer. But farmers will need to pay only half of it. The government will bear the rest. For the training, we have infrastructure at the IT park in Bhopal where IGRUA experts will train them. We are also opening a training facility in Jabalpur and talks are on with Anna University to train farmers,"* he said.

Once the farmers get the licence, they will be provided a subsidy to buy drones. The ministry of agriculture gives farmer producer organisations (FPOs) a subsidy of 75% up to Rs 7.5 lakh, women and SC/ST farmers get 50% subsidy up to 5 lakh and other farmers get 40% up to Rs 54 lakh.

"We constantly meet and interact with stakeholders. This demand came up at a recent interaction with sugarcane farmers. We told them that the process is already in place. Drones are helpful in hi-tech farming. It is an effective technology for sprinkling fertilizers and pesticides on crops. It saves time and labour and is more efficient, especially for large farms," Shyam added.

Source: <https://timesofindia.indiatimes.com/city/bhopal/agri-tech-off-madhya-pradesh-farmers-queue-up-to-buy-drones/articleshow/102959794.cms>

programme, which he said would "make Meghalaya the national leader in organic cultivation".

Stating that marketing of agricultural produce and protecting farmers against price fluctuations was an important priority for the government, he said, *"We are working with a network of 500 collectives, including cooperative societies, farmer producer organisations and village organisations to provide decentralised agri-marketing support."*

Sangma explained that at each production cluster, a collective marketing centre comprising an aggregation-cum-mini-processing facility is being constructed and handed over to a local collective, adding that interest free working capital loans of up to Rs 50 lakh are also

provided to the collectives to directly buy the produce from the farmers.

“About 200 such collective marketing centres have already been set up in clusters producing turmeric, pepper, ginger, areca nut, cashew nut, broom grass and potatoes. We target to handhold and strengthen the

existing 200 collective marketing centres and establish another 200 centres in the next financial year,” he said

Source: <https://timesofindia.indiatimes.com/city/shillong/meghalaya-thrust-on-organic-farming/articleshow/99160976.cms?from=mdr>

Embracing sustainable agriculture: A virtuous cycle of prosperity

India is the new economic powerhouse as currently, it is the fifth largest and targeting to become third shortly. However, economic growth may be hampered if the key industries, such as agriculture, are not paid attention to. Most of the population depends on agriculture, which is vulnerable to climate change impacting productivity and food quality. According to the Ministry of Agriculture and Family Welfare, 69 million hectares of crop area were lost from FY 2015-16 to FY 2021-22, which is alarming for the Indian agriculture sector. In this challenging period, embracing sustainable agriculture can help improve farm incomes and nutrition security for the present and future generations.

Sustainable farming is an economically viable, socially supportive, and ecologically sound crop-growing method. The Council on Energy, Environment and Water (CEEW) has identified 16 sustainable agricultural practices (SAPs), including organic farming, natural farming, integrated farming systems, agro-forestry, etc. Although only some SAPs have been adopted by more

than 4% of farmers in India, the transition towards sustainable farming is increasingly visible across the country. For instance, Sikkim has already become 100% organic by adopting organic farming, while Andhra Pradesh aims to move towards 100% zero-budget natural farming by 2027.

Today, the Indian agriculture sector is at crossroads of transformation. The modern resource-intensive farming techniques introduced during the green revolution have reached their limits. On the other hand, there is growing awareness about food safety, nutrition, and the ecological impact of current farming practices. Corporates are now reimagining farming and actively participating in its growth to make it world-class. Thus, this is an opportune time to scale up sustainable agriculture practices that will further contribute towards this goal while improving yield, environment, and human health.

Source: <https://timesofindia.indiatimes.com/blogs/voices/embracing-sustainable-agriculture-a-virtuous-cycle-of-prosperity/>

Sikkim to get organic agriculture university, CM Prem Singh Tamang lays foundation stone

Chief Minister Prem Singh Tamang on Sunday laid the foundation stone for the Sikkim Organic Agriculture University (SOAU) at Mondegaon in Soreng district.

Stating that Sikkim has established itself as the country's first organic state, Tamang said SOAU will be a centre of excellence where subjects related to organic farming will be taught.

Hundreds of students from the state go outside to study agriculture, horticulture and forestry, he said, adding that he had met over 500 students in Dehradun itself who were doing undergraduate and post-graduate courses in these subjects. With the SOAU coming up in Sikkim, the students of the state will no longer have to travel outside for studying these subjects, Tamang said.

He directed officials to identify temporary spaces for the commencement of courses at the earliest.

The Sikkim assembly passed the Sikkim Organic Agriculture University Act, 2023 earlier this year. The varsity will also boost economic activities in the remote Mondegaon area, the chief minister said.

“The SOAU will become a hub of economic activities, generating employment opportunities for the local people once the infrastructure is developed within a year,” Tamang said.

Source: <https://economictimes.indiatimes.com/news/india/sikkim-to-get-organic-agriculture-university-cm-prem-singh-tamang-lays-foundation-stone/articleshow/102699507.cms?from=mdr>

Cultivating success in agroecology

Mahak Khatri, Yogranjan Singh and Khushbu Khatri

Rehana's story serves as an inspiring example of how passion, dedication and creativity can transform lives. Through agroecology, she not only transformed her farm's productivity but also contributed to environmental conservation and community well-being. Her journey from learning the art of mushroom growing to creating an agroecological farm, showcases a positive impact made on the community.

Women, the guardians of agroecological knowledge, have played a fundamental role in agriculture for centuries, often as a primary producer of food and caretaker of land. In agroecology, women's knowledge and skills are invaluable in promoting the sustainable farming practices that align with their community's needs and cultural values. The extensive knowledge of local ecosystem, traditional farming techniques and seed preservation method has been passed down through generation. Certainly, women have made significant contribution in creating sustainable and inclusive food systems but sometimes it goes unnoticed. Despite their involvement, women's contributions have been overlooked in society. Empowering women in the field of agroecology can not only transform the status of family but also their pattern of predominant farming system.

Our story begins with Rehana, a hardworking and resilient woman who lived in a small town with her in laws. Rehana being a poor woman, faced several restrictions and had limited opportunities. All the farming decisions were taken by the male members of her family. They struggled with conventional farming methods facing several constraints resulting in low yields. They literally lived from hand to mouth and facing financial challenges owing to high production costs and low incomes from agricultural activities. Despite facing numerous challenges and limited resources,



Rehana produced several types of mushrooms

Rehana always dreamt of providing a better life for her family.

Every morning after her routine work, she would head to the barn to tend to the cows and goats. She not only took care of the animals but also the plants in her field. Caring of these animals and plants was an essential part of her farming life but her dedication to farming and close connection with nature was unnoticed.

One day in her neighborhood she observed some women pursuing farming. They were the members of a Self-Help Group. They have collectively established a small unit of mushrooms production and rewarded for their work. Their remarkable achievements challenged Rehana to question the limitations placed upon her. She thought if they can do it, why can't I?

In fact, she possessed an innate drive and an unyielding passion for farming. Her family has been in farming for generations. She had inherited a deep understanding of agriculture from her ancestors. Motivated by her surroundings, Rehana embarked on her own path of creating a Self Help Group (SHG) called "Hamari Ekta."

She attended a training of mushroom cultivation at KVK, Tikamgarh and established her mushroom production unit at her residence. Initially, she started producing oyster mushroom cultivation on small scale by getting spawn from KVK. Later she started growing other varieties also. She motivated other women of her SHG to learn the production techniques of mushroom growing. Word got spread about the fresh mushrooms she grew and people started visiting her home to buy them. There were so many ups and downs. Some days, there was an overwhelming demand, and other days there was surplus production. Rehana being resourceful, decided not to let anything go waste. She began preserving the surplus mushrooms by drying and grinding them into a fine powder. She combined this powder with various ingredients to create unique papads (crispy snacks). These papads turned out to be incredible. However, she faced challenges in marketing her produce. Being highly determined, she approached the experts of KVK to find out the nutritive value and to certify her produce. This experience infused new confidence in her.



Members of Hamari Ekta SHG

Feeling motivated, she turned her attention to farming. This was a turning point. She along with her husband, experimented by shifting towards integrated farming. She advised other members of her SHG to diversify their crops, integrating vegetables, fruits, grains, poultry and goatery, creating a balanced ecosystem that increased resilience to pest and climate fluctuations.

Some of the members of SHG started adopting companion planting, crop rotation, natural manurial methods like composting, cover cropping and mulching to enhance soil fertility and water retention. She also got trained on goat rearing and poultry farming, where she learned the scientific ways of goat and poultry management. She integrated livestock with crop production, promoting natural processes, thus minimizing negative environmental impacts and reducing environmental impacts. This integration led to increased biodiversity and a sustainable farming system.

Rehana adopted sustainable agricultural practices on her farm



Her efforts were always directed towards enhancing sustainable and ecofriendly food systems by combining the empirical knowledge of traditional methods with scientific approaches. She gained new perspectives and insights in dealing with day to day challenges. Once a kid of her goat was sick and one of the members of her SHG advised her to offer the milk of cow because it contains immunoglobulin that can be effective as means of providing passive immunity to protect from diseases. She immediately followed the advice with the kid becoming healthier. Collaboration is valuable in the field of agroecology. I also believe agriculture is not just a way to make a living, it is a way to make a life.

Rehana's farm is a model of symbiotic farming system under a single roof, where she experienced reduced dependency on external inputs, greater resilience to climate variability, improved soil quality and increased crop yields. Not only did she produce higher quality produce but also started selling her surpluses at premium prices in local markets. This ecological balance allowed her to restore harmony between humans and farming, thus promoting sustainable agriculture. Rehana's story serves as an inspiring example of how passion, dedication and creativity can transform lives. Through agroecology, she not only transformed her farm's

productivity but also contributed to environmental conservation and community well-being. Her journey from learning the art of mushroom growing to creating an agroecological farm, showcased the power of turning challenges into opportunities and making a positive impact on community.



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Call for articles

Farmer Producer Organisations

Vol. 25 no 4. December 2023

Farmer Producer Organisations (FPOs) have been formed and are functioning in India for over 20 years now. FPOs were promoted to serve as powerful catalysts for change, addressing longstanding challenges faced by farmers such as limited access to markets, lack of bargaining power, and inadequate infrastructure. The emergence of Farmers' Producer Organisations (FPOs) in India's vast and diverse agricultural landscape has led to a profound shift, redefining the dynamics of the agricultural ecosystem. FPOs, comprising groups of farmers united by a common goal, have become a game changer for Indian agriculture by empowering smallholder farmers and driving inclusive growth. The government, meanwhile, has introduced various initiatives, such as the Formation & Promotion of 10,000 FPOs Scheme, PM-Kisan Scheme, and e-NAM, to support farmers and increase their income.

Several case studies and success stories have been documented demonstrating the benefits realized by the farmer-members from the FPOs in the form of reduced input cost and market linkage as aggregation allows better bargaining power for the FPOs. Advisory

services and value addition services offered by the FPOs have also benefitted the farmers in timely decision making. In our December issue of LEISA India, we would like to showcase successful experiences, innovative approaches, and learnings from successful FPOs. By sharing ideas and strategies, these successful FPOs can inspire and guide thousands of aspiring farmer collectives, empowering them to emulate similar models of success.

Despite the transformative potential of FPOs, only a few are able to survive and grow to become commercially profitable entities. This is because FPOs face numerous challenges like access to credit at the right time, lack of infrastructure, and, most importantly, lack of handholding support on at least three key fronts- managerial support, financial support, and capacity building. In our forthcoming issue, we would also like to include stories of those FPOs who are facing several challenges and the way they are trying to overcome them. Such experiences will motivate and inspire other FPOs to tackle challenges and move forward.

We invite articles for the December 2023 issue of LEISA India. Kindly send your experiences to the editor at leisiaindia@yahoo.co.in before 31st October 2023.

Buzzing like bees

Women smallholders in beekeeping

Natasha Sharma Dogra



Maintenance of bee box

Integration of agroecological practices with beekeeping provides a unique opportunity for women to promote sustainable farming methods that nurture biodiversity and generate income. Women beekeepers in Gujarat, Madhya Pradesh and Maharashtra have benefitted economically and ensured increase in bee population and agriculture yields.

Beekeeping is considered an integral part of agroecology as it supports pollination and enhances crop yields while maintaining the ecosystem health. It is also important to consider that sustainable beekeeping contributes towards attaining 15 of the 17 Sustainable Development Goals (SDGs) of the United Nations to be achieved by 2030. It specifically impacts the goals of food security (SDG 2) and biodiversity (SDG 15). This has been hailed as triumph solution for agriculture and promotes sustainable food production while also building climate resilience especially for smallholders. The approach has emerged as one of the leading strategies to achieve sustainable agriculture, whereby holistic approaches such as diversified farming are adopted towards reorienting agricultural systems for farmers. However, over the past few decades, human activities such as land-use changes, intensive farming and the use of pesticides, pollution, alien pests, diseases and climate change have all had a negative impact on indigenous bees and pollinator populations. This has had a significant impact on our biodiversity and our food security.

The integration of agroecological practices with beekeeping provides a unique opportunity for women

to promote sustainable farming methods that nurture biodiversity and generate income. Whether it is planting seeds and saplings that support bees and pollinators (commonly referred to as Bee flora) or sustainable honey extraction especially from rockbees or *Apis dorsata*, all these agroecological practices support sustainable livelihoods. Bee flora is essential to beekeeping/other pollinators since it offers bees and other pollinators a varied and adequate food supply. Bee health and productivity are supported by maintaining bee-friendly plants, which results in successful pollination services. It is necessary for protecting bee colonies and encouraging sustainable beekeeping methods.

Beekeeping programme: *Under The Mango Tree* runs an innovative beekeeping programme that focuses on indigenous bees among tribal communities in the states of Maharashtra, Madhya Pradesh and Gujarat since 2009. Initially, in these areas, due to lack of skilled personnel and training institutes, lack of knowledge of scientific beekeeping practices, unsustainable means of extracting honey, the lack of bee flora, the shortage of the bee colonies, and marketing problems, beekeeping was considered to be male specific and difficult.

The program's focus is on indigenous and local bees, their health and preservation. While strengthening communities by imparting knowledge about bees, it seeks to empower women through a knowledge-driven, long-term professional training. It also spreads awareness of the value of all bee species as pollinators. The aim is to generate long-term income for the women beekeepers and their communities and capability to train other women as beekeepers. Their transmission skills are an essential part of the programme in order to maintain this knowledge and expertise.

Beekeeping as a gender inclusive activity

Traditionally, women have been actively engaged in various farming activities, including crop cultivation, livestock rearing and agroforestry. In many regions, women are primary food producers, especially in smallholder and subsistence farming systems. Since ages, Beekeeping has been an integral part of cultural heritage in India. Traditionally, honey has been used for medical ailments, culinary delights, and spiritual rituals. Women, in particular, have played key roles in harvesting honey and passing indigenous knowledge of beekeeping practices from one generation to the next. With this programme, a large number of women population have stepped out and opted to train as beekeepers to improve their livelihood status. These rural women's associations have broken gender stereotypes, boosted gender equality and provided resources that facilitate family and community well-being. In the programme, female representation across all the project beekeepers is surpassing all expectations. *"Investing in agricultural inputs is vital for any farmer family, as it serves as their main source of income. Among all the investments I have made, I believe beekeeping has been the most advantageous. It is easily accessible, affordable, and has no significant drawbacks, except for a few initial stings"*, narrates Jasvanti Gharat, a 42-year-old Master Trainer (MT) from Baratpada village, Palghar district. Like Jasvanti, many women beekeepers have adopted various income-generating activities related to sustainable agriculture, such as beekeeping, honey processing, making inputs necessary for beekeeping like bee veils and value-added products, and selling organic produce.

Impact of Beekeeping programme on agricultural productivity

Currently, due to weather aberrations (changes in rainfall patterns, droughts, floods), resource use and

land management practices, the crop yields have declined negatively affecting small farmers household income. Beekeeping is a proven practice recognised to improve farm productivity and livelihoods without significant capital costs. Pollination by bees ensures better yields and improved quality. By placing the bee boxes in the vicinity, the pollination efficiency has improved, subsequently increasing the crop yields. Bees being best pollinators for many crops transfer pollen between flowers, leading to cross-pollination and significantly enhanced crop yields and improved the quality of fruits and seeds. Bees are a natural resource that can be found in the environment. Beekeeping is not especially labour-intensive when done on a small scale, and it can be limited to times outside of peak work hours therefore, profitably supplement rural livelihoods, notably farming. Fostering bee flora as a major aspect of the Beekeeping programme has helped women beekeepers economically and ensured increase in bee population and agriculture yields.

Based on various agricultural surveys conducted for different projects in these three states, a substantial increase in yields of fruits and vegetables within one year of beekeeping have been reported.

The farmers say, *"...post placing beehives on my farm, I saw very less pests...avoided pesticides. The crop production of cashew, nagli and mango approximately increased to 30%, marking an improvement in quality and quantity of crops, this has been the best production so far. To my fellow beekeepers, I would just say that having bees is important to improve the crop production"*, says Madhu, a beekeeper from Mokhada block, Palghar district, Maharashtra.

"... I'm pleased with the positive effects on beekeeping. The honey harvest reached 20 kg, and Khursani (Niger), chana, and bajra (millet) yields increased significantly, benefiting my family. The training was informative for newcomers like me, and the post-training support was vital. Beekeeping eliminated the need for pesticides, saving Rs. 4,000 – Rs. 5,000 annually. With bees preventing pests, our crops thrive. Moreover, we now store surplus urad and tur dal, serving as a safety net for emergency cash needs or home consumption", shares Rekha Padvi, 28 years, beekeeper, from Avdha village of Dharampur block in Valsad district.

Bee Keeping Programme's impact on Rural women Building human capacities: The programme trains

Nutritious food systems through kitchen gardens

Mokhada – a case of Kitchen Gardens as Sustainable Food Systems: In Mokhada, the percentage of malnourished population is high. The children are deprived of education, nutrition and good health. Large numbers of people are socially excluded from mainstream. We know that vegetables play a vital role in improving household nutrition. Kitchen gardens were designed as integral component of the bee-flora initiative of UTMT Society. The main objective in introducing kitchen gardens during summer was to build on beekeeping and ensuring a continuous supply of vegetables for families during the dry periods of the year. Kitchen gardens focusing on vegetable cultivation are cost-effective, practical and easily can meet the balanced dietary requirements of rural households, besides supplementing family income.

Under The Mango Tree Society (UTMT Society) trained women farmers in developing kitchen garden plots- designing the plots, utilizing household grey water (water from washing utensils and bathing). Lesser/ or no dependence on chemical fertilizers and pesticides automatically made it an environment friendly initiative. The choice of vegetables was made based on the prevailing food habits and climatic conditions of within the larger goal of ensuring better nutrition. An attempt was made to provide the project farmers with an assorted mix of vegetables for a considerable period. In February 2020, women farmers from Mokhada block, began their training in developing kitchen garden plots through an exposure visit to the neighbouring Talasari block. *“Before project intervention, our kitchen garden set-up was scattered and unplanned. We didn't really consider it for sourcing vegetables continuously for household consumption and mainly practiced it during monsoon and winter, till the time when water was available”,* says a woman farmer-beekeeper from Mokhada block, Palghar district, Maharashtra. In August 2019, UTMT society conducted awareness programs on beekeeping and in October 2019, nine women farmers got involved in a 2 day basic training in beekeeping. Initiating kitchen garden intervention, women were trained and seeds were distributed. (phase-I).

Seven out of nine women came together to develop a common Group Kitchen Garden in a plot of size 35*35 sq. ft. as a pilot in 2020. *“To reduce the chances of failure, we decided to take it up in group, though we belong to different SHGs, we came together for our families' welfare”,* says one of the members. The group divided duties amongst themselves to maintain the kitchen garden and for the first harvest decided to utilize vegetables grown for self-consumption, primarily. Further, keen to scale it up commercially, the group consulted UTMTS more frequently to ultimately reduce our migration frequency from the village in search of work and income. *“Especially, during the lockdown due to COVID, kitchen garden was the only source of our vegetable supply. It was a difficult period when the daily wage from labor was lost and we had no money to buy directly from market”,* says a woman farmer signifying the importance of kitchen garden intervention. With restrictions in the supply of vegetables to

interior villages the kitchen garden produce was shared with those needy belonging to neighbouring families in the hamlet. The harvest of Group Kitchen Garden continued till June 2020 (for phase-I). During the next monsoon (between July and August 2020), using their own home-grown seeds, the women continued developing kitchen garden plots in following winter of 2020 and in later years up-scaled it to sell the produce in local market at Mokhada. Post the preliminary implementation in 2020, the seven women planned to expand the activity to two separate plots (of 25*30 sq. ft. each in 2021. In second phase, the produce was sold in local market and approximately 30% of the produce was utilized for home-consumption by members.

Presently, all nine women trained in beekeeping are engaged in kitchen garden activity along with beekeeping and have formed three different groups (with group size of three). Kitchen garden combined with beekeeping is seen as not just a micro-solution. The women farmers are also efficiently engaged in maintenance of filled beehives kept on kitchen garden plots with regular technical guidance from UTMT society staff. The women collectively share, *“we derived our motivation from bees, to work collectively each day. The presence of bees did impact the overall harvest, we harvested 20%-30% more than what we had estimated”.* A member shares, *“Beekeeping combined with kitchen garden has opened new avenues of livelihood for us. We now regularly set-up a stall in Mokhada market to sell the kitchen garden produce, which has increased our income”.* The women' group look up to beekeeping and kitchen garden interventions as not only as livelihood opportunities but also as a way to get in touch with their own indigenous cultivation methods and traditional food habits. They say, *“with beekeeping we are tracing back our original association with bees and nature that is more sustainable and symbiotic”.* The women lastly mention, *“before kitchen garden (intervention) foregoing certain vegetables from our regular diets was our routine as we neither had any means to source them from market- as it would incur expenses and neither we had any direct access to them- as we were not cultivating it. Kitchen garden intervention has supported us on all fronts- nutrition and livelihoods”.*

Kitchen gardens have helped in increasing household income either by sale of the food products grown in the gardens or by the consumption of the same food items that the families would have otherwise purchased from markets using a significant portion of the family income. While significantly improving nutritional access, promotes entrepreneurship amongst women farmers.

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women in sustainable beekeeping, relying on indigenous bee species to support their skills and knowledge. Then, it develops technical support by building a network of female beekeepers that are supported in setting up bee boxes. Furthermore, they receive handholding support at farm gate by the technical cadre employed by the organisation. If interested, beneficiaries are trained in Advanced modules in beekeeping and appointed as Master trainers and receive monthly stipend. The beneficiaries are provided with bee flora which they cultivate in their own land. Access to modern beekeeping technologies, trainings, financial assistance, handholding support at farm gate round the clock, and market linkages have helped them to improve their beekeeping practices and increase their income. The women beekeepers in this programme built a collaborative relationship around beekeeping with other members of family which helps them to continue the process and overcome any hardships that they experience.

Building Incomes: *“Beekeeping project has added approximately Rs.2,000 to my monthly income. Prior to this, I had always feared bees and did not know about beekeeping at all. After my participation in one of the exposure visits conducted by society in nearby village, I saw another women beekeeper handling bees, which inspired me. Today, I am in-charge for the maintenance of bee- apiary established in village which helps me in meeting the household expenses and supporting my husband”*, mentions Paru Malavkar, 34 years, Master Trainer from Aaptolpada village, Palghar district, Maharashtra.

Training others: *“..Getting trained as beekeeper, I always wanted to reach maximum women farmers in my area and train them in beekeeping, as I believed this practice supported agricultural yields and ultimately our pockets. I always feel women play a lead role in preserving these natural resources and conserve the declining bee population”*, says Surekha Pawar from Gujarat who works as a Master Trainer (advanced trainee in beekeeping) and supports 20 women farmers in her region.

Conclusion

Based on several case studies, we can come to the conclusion that Beekeeping plays a crucial role in restoring and resurrecting rural economic activity, particularly for women. Increased economic activity would help address socio-economic issues such as unemployment and poverty.

In beekeeping, a variety of by-products are produced in addition to the primary product – honey, such as bee wax which contains more than 300 molecules and are rich in vitamins, as well as medicinal (healing). *“..it is important for me as a women beekeeper to encourage other women in my village to embrace beekeeping, as I believe it is a suitable activity for women, which provides cash in hand. I wish to change the traditional dependency on family for finances and start saving and supporting my family through the income generated by selling bee colonies, bee flora, honey, etc.”* says Poonam Bhoje, 32 years, beekeeper from Nadagdhari village, in Dharampur block of Valsad district (Gujarat).

Women beekeepers thereby, play a crucial role in supporting agroecology through beekeeping efficiently in a sustainable manner. In this context, strengthening the women cadre and intensifying opportunities with respect to beekeeping programme in order to safeguard the beekeeping practices and declining bee population is essential. Maintaining beekeeping industry in rural areas plays an important role in supporting local economies and in ensuring the continuity of the ecological services that honey bees provide for a healthy environment.

References

- Hanley, N.; Breeze, T.D.; Ellis, C.; Goulson, D. **Measuring the economic value of pollination services: Principles, evidence and knowledge gaps.** *Ecosyst. Serv.* 2015, 14, 124–132.
- Patel, V.; Pauli, N.; Biggs, E.; Barbour, L.; Boruff, B. **Why bees are critical for achieving sustainable development.** *Ambio* 2021, 50, 49–59.
- Goulson, D., Nicholls, E., Botias, C., and Rotheray, E.L.. 2015. **Bee declines driven by combined stress from parasites, pesticides, and lack of flowers.** *Science*: 347: 1255957

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Organic Farming - Global Perspectives and Methods

D K Meena, Sabu Thomas, Sarath Chandran, Unni M.R., 2023, Elsevier Science, 625 p., Paperback £202.73, ISBN 9780323991452

Organic Farming: Global Perspectives and Methods, Second Edition provides the core definition and concepts of organic farming the expands to address current challenges and goals. The book provides a comprehensive resource, from sustainability, to its influence on the ecosystem, including the significance of seed, soil, water and weed management, and other important aspects. It provides readers with a foundational overview of organic farming that presents advancements in the field and insights on the future.

Fully revised and updated to present the latest insights from basic principles to emerging practices and future prospects New chapters on emerging organic farming practices and opportunities address animal agriculture, vertical and indoor farming Expanded to include coverage of standards, certification and accreditation and present insights including economics and marketing.

Transformations of Global Food Systems for Climate Change Resilience - Addressing Food Security, Nutrition, and Health

Preety Gadhoke, Barrett Brenton, Solomon H Katz, 2023, CRC Press, 310 p., Paperback £52.99, ISBN 9780367857622

Transformations of Global Food Systems for Climate Change Resilience: Addressing Food Security, Nutrition, and Health provides poignant case studies of climate change resilience frameworks for nutrition-focused transformations of agriculture and food systems, food security, food sovereignty, and population health of underserved and marginalized communities from across the globe. Each chapter is drawn from diverse cultural contexts and geographic areas, addressing local challenges of ongoing food and health system transformations and illustrating forms of resistance, resilience, and adaptations of food systems to climate change.

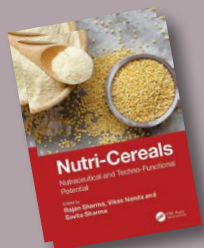
Fourteen chapters present global case studies, which directly address the United Nations Sustainable Development Goals and the Food and Agriculture Organization's global call to action for transforming agriculture, addressing food security and nutrition, and the health of populations impacted by climate change and public health issues. They also integrate reflections, insights, and experiences resulting from the COVID-19 Pandemic.

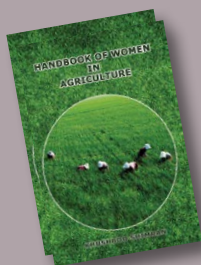
Nutri-Cereals- Nutraceutical and Techno-Functional Potential

Rajan Sharma, Vikas Nanda, Savita Sharma, 2023, CRC Press, 390 p., Paperback £170, ISBN 9781032135847

The term "Nutri-Cereals" has been dedicated to ten cereals due to their unique nutritional benefits. *Nutri-Cereals: Nutraceutical and Techno-Functional Potential* covers these cereal grains, with each chapter focusing on nutrient composition and bioactive characterization followed by associated bio-functional properties and health benefits. Further, it covers techno-functionality of nutri-cereals including rheological properties, emulsification and foaming potential, gelation behavior, color profile and others which dictate the suitability of cereals in finished products.

Key Features includes diverse biological and functional features of nutri-cereals to dictate their potential as functional ingredients in value-added products, Discusses the nutraceutical potential of ten cereals: sorghum, pearl millet, finger millet, foxtail millet, barnyard millet, kodo millet, little millet, proso millet, black wheat and Amaranthus. Explains how these grains are ideal ingredients for gluten free food formulations with enhanced bio- and techno-functional characteristics.





Handbook of Women in Agriculture

Khushboo shimran, 2018, *Educreation Publishing*, 207 p., Paperback £ 4.13, ISBN 9789388381154

The book is more interesting learning tool for undergraduate and postgraduate students focusing on women in agriculture course. The major task has been to be selective to include pertinent new materials to emphasize women work in agriculture and allied sectors. Among these are encounter in investigating different aspects related to women, gender concepts, status of women, issues and challenges of women in agriculture, role, responsibilities, access and control over productive resources, program for women in agriculture, extension needs and preferences of women in agriculture, women-friendly agricultural technologies, gender-related data and information sources, etc. With these innovations and systematic understanding, students find this book illuminating since this as rewarding and enriching.

Women Farmers: Unheard Being Heard

Madhulika Singh, Sugandha Munshi, 2023, *Springer Nature Singapore*, 182 p., eBook £113.52, ISBN 9789811969775

This edited volume celebrates the positive stories and small changes happening with respect to gender equality in the field of agriculture. This book identifies crisis which a woman faces in the field of agriculture as a farmer. The book shares unsung stories of women farmers who are bringing change at the grassroots. It puts together the positive developments experienced by the experts, researchers, professionals while working for and with women farmers, to highlight the challenges to bring equity in agriculture.



Women in agriculture often lack identity where either they are recognized as farmer's wife or a farm labourer. Women farmers who contribute 60 percent in to farm practices like sowing, transplanting, fertilizer application, weeding, harvesting, winnowing are merely recognised and provided an equal level playing field. Women are also found participating in the various forms of processing and marketing of agriculture produce, along with the cultivation but system has failed to protect their rights and offer them a platform to voice their concerns. This book shares the process, challenges, experience, strategy from the narrative of progressive women farmers so as to highlight and understand what it takes to bring changes for achieving the goals of an equitable farming ecosystems. The book is a relevant reading material for students, researchers, professionals and policy advocates in agriculture and gender research.

Routledge Handbook of Gender and Agriculture

Carolyn E. Sachs, Leif Jensen, Paige Castellanos, Kathleen Sexsmith, 2023, *Routledge*, 486p., Paperback £ 39.99 ISBN 9780367563561

Gender relations in agriculture are shifting in most regions of the world with changes in the structure of agriculture, the organization of production, international restructuring of value chains, climate change, the global pandemic, and national and multinational policy changes. This book provides a cutting-edge assessment of the field of gender and agriculture, with contributions from both leading scholars and up-and-coming academics as well as policymakers and practitioners.



The handbook is organized into four parts: part 1, institutions, markets, and policies; part 2, land, labor, and agrarian transformations; part 3, knowledge, methods, and access to information; and part 4, farming people and identities. The last chapter is an epilogue from many of the contributors focusing on gender, agriculture, and shifting food systems during the coronavirus pandemic. The chapters address both historical subjects as well as ground-breaking work on gender and agriculture, which will help to chart the future of the field. The handbook has an international focus with contributions examining issues at both the global and local levels with contributors from across the world.



Developing a seasonal learning calendar for FFS

Women led Farmer Field Schools

Amar Kumar Gouda and Krushna Chandra Sahu

The shift to agroecological farming started with a small step in Kalamunda in Odisha. With multiple agencies support, women farmers learnt the techniques of natural farming and made the transition towards safe food production. Farmer Field School was the stepping stone for this change to happen.

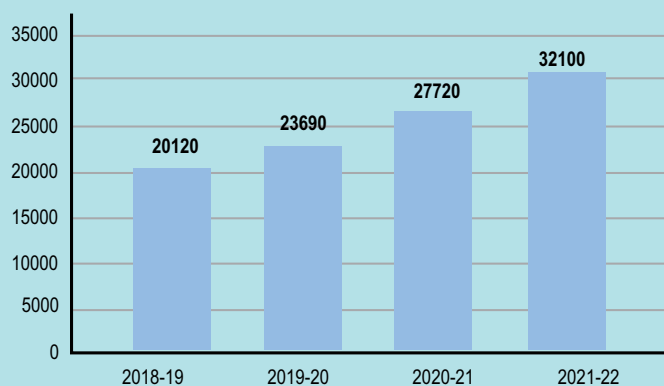
Droughts and flash floods are two main climatic events that occur during alternate years in Kalamunda in Odisha. Insufficient and unevenly distributed rainfall, transition from millet cropping system to cash cropping, increased use of fertilisers and pesticides have resulted in reduced crop yields and biodiversity, enhanced cost of cultivation and indebtedness. Chemical input intensive farming especially excessive use of chemical fertilisers, insecticides, and pesticides in crops often has a negative impact on women.

There was a need to shift towards agroecological farming methods. Agro-ecological farming is a holistic

and integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems. It promotes diversified, resilient, and sustainable production system with year-round integrated production of healthy and nutritious foods. It helps boost the livelihoods of family farmers and reduces farmers' dependence on external inputs.

In this backdrop, IGSSS implemented a project "Climate Resilience Adaptive Farming in Tribal Communities in Kalahandi" (CRAFT-K). The overall aim is to build resilience of small and marginal farmers against drought and other climate variability through adoption of agro

Year wise production of Compost, Pest Repellent & Hormone (Kg/Ltr)



ecological farming practices. The main objectives of the project are:

- Reducing the costs of cultivation and risks, and stabilising productivity of the small and marginal farmers and generating year-round livelihood opportunities and the flow of income by reducing climatic risks in farming.
- Producing more healthy and nutritious food that are free from chemical residues.
- Enhancing soil health, water conservation and regenerating biodiversity.

The Farmer's Field School was envisioned as a means to improve the abilities of women farmers and to exchange knowledge on agro ecological farming. The programme strategy included Knowledge dissemination and handholding support regularly through farmer-driven extension system (FFS) led by champion women farmers as master trainers. Setting up Bio Pesticide Production Units was also a part of the strategy to enhance the use of biological inputs.

Critical reflection

During 2017, IGSSS organized a series of knowledge exchange campaigns and demonstration cum trainings on climate resilient farming system. Most of the farmers, through their critical reflection brought forth many issues, like lack of awareness on traditional techniques for pest and disease management; youth no more interested in farming etc. They also listed down the reasons for this change, like, easy accessibility of pesticides; belief that chemicals can control pests effectively; chemicals being pushed by traders and government through various schemes; lack of awareness on biologicals and how to prepare them etc.

Based on the community's reflections and the need to shift to natural farming methods, IGSSS initiated Farmers Field School for interactive and participatory learning on integrated insect pest and nutrient management.

Falguni Bhoi and Jayanti Bhoi started this farmer's field school. Around 10 women farmers interested in ecological farming were identified and groups formed. Initially, social, cultural and environmental issues were mapped. The members met regularly during the growing season/productive cycle – often on a weekly basis. Carried out experiments where farmers identify production problems, brainstorm potential solutions, then set up study plots to compare chemical input intensive farming practices and ecological farming practices.

In the first phase, two FFS with 20 women farmers were established in Dhanrakhman and Kansil villages. Ten women farmers from each FFS selected 20 sample patches of land for critical observation of chemical input intensive farming and natural farming. During the land selection process, priority was given to the land type, soil type, irrigation facilities, crop variety, seed variety seasonal crop calendar, and agricultural equipment to be used.

The women farmers experimented with the techniques they had learned for integrated pest and disease management of crops in the FFS. These two farmer's schools started experimenting with integrated pest and disease management for high-yielding paddy, traditional paddy, green gram, black gram, arhar and seasonal vegetables.

In a joint effort of 20 women farmers with experienced farmers of the village and Krushak Sati of Agriculture Department, a manual cum Package of Practices was prepared. This included topics like preparation and use of compost, liquid manure, pest repellent, natural hormone and impact assessment of integrated insect pest and disease management. An action plan was developed for field demonstration with techniques such as protection for beneficial insects as well as prevention of secondary pest outbreaks and resurgence through biological control, habitat manipulation, changing of cultural practices, and use of resistant varieties.

By 2022, six hundred women farmers had already joined the campaign, launched by just 20 farmers in



Processing locally available bioresources for preparing bio-inputs



Marketing of biological pest repellents and hormones at District Level Farmers Fair

2018. Odisha Livelihood Mission, Kalahandi (Odisha) provided business capital and eco-friendly machinery to make this effort of women farmers a collective, through the formation of farmer producer groups.

IGSSS supported 600 women farmers to produce vermicompost and bio pesticides. Representatives of the Karlamunda block agriculture and horticulture department provided technical know-how at the field days being organised at farmers field school. This joint effort and cooperation have helped in the marketing of vermicompost, pest repellents, hormones, vegetable saplings and seasonal crops through the farmers producers' group.

Impacts

The first year's effort brought many successes to the farmers. Firstly, farmers stopped buying chemical fertilizers, pesticides and hormones from the market. Bhanumati Bhoi, principal of the Sabuja Farmers Field School, says, "We had been buying chemical fertilisers and pesticides from shopkeepers for many years. A farmer used to buy fertilizers and pesticides worth around Rs. 12,000 to Rs. 18,000 a year. After learning integrated pest and disease control in a natural way in the farmers' field school, we used organic manure, disease and insect repellents that we prepared. So, we first closed the credit register (Baki Khata) that we had opened at the shopkeeper. This success doubled our courage. More than 600 farmers joined us after hearing our success."

The impact is clearly visible in terms of the increasing number of farmers adopting organic methods for pest control. Around 600 farmers have adopted organic methods for pest control after visiting the bio pesticide

learning centres, getting trained on preparation of different types of manures and bio-pesticides and sharing of experiences.

As per the data collected during the FGD conducted by VDC, every year Sabuja Farmers Field School has produced 20120 kilograms/ liters of compost and pest repellents. It is found that 310 farmers have not at all applied chemical fertilizer or pesticide in their paddy crop of kharif season and pulses and vegetables of rabi season and 290 have applied chemical fertilizer and pesticide partially.

A small farmer spends between Rs. 12,000 and Rs. 18,000 a year to buy chemical fertilisers, pesticides, and hormones during the kharif and rabi seasons. Based on this estimate, around 310 farmers who did not use chemicals, saved around Rs.55,80,000/- in a year. Farmers having acquired new knowledge, can now prepare green manure, vermicompost, pest repellants and hormones, using locally available materials. After applying these on their own land, he or she can earn Rs. 4,000 to Rs. 5,000 by selling 20 to 30 percent of

Box 1 - The FFS approach

- Builds on local knowledge systems while testing and validating scientific concepts developed elsewhere.
- Enhances participants' skills for critical analysis and problem-solving.
- Develops observation skills transforming them into scientific evidence.
- Promotes collective action, fostering group cohesion and community decision-making to improve agriculture and livelihoods.
- Helps farmers transform current production systems, driving changes towards more sustainable practices and systems.

the inputs produced. The Farmers Field School has therefore helped in making the farmers self-reliant besides producing safe food and conserving agricultural biodiversity.

During the Covid-19 lockdown, farmers understood even more of the good impact of the farmers field school. Shops selling agricultural inputs and materials were often closed during this period. The 310 organic farmers have not faced any difficulty in collecting materials for vegetable cultivation in their Gharbadi (kitchen garden) and farmland. The data clearly shows that the production of compost, liquid manures, bio pest repellents and hormones produced, increased over a period of four years by the Sabuja Chai Pathashala.

These four-year efforts of women farmers are slowly becoming successful. The women farmers, who are part of the farmers' school, are now exchanging knowledge with various NGOs and interested farmers on integrated pest management, soil health improvement and conservation of agricultural biodiversity. Now the block and district administrations have also appreciated this achievement and have given due recognition to the farmers.

Acknowledgement

We acknowledge the cooperation of the staff, the community representatives and the farmers in the intervention areas for their cooperation. The observations are from the field visits and interaction with the farmers.



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Remembering Dr. M S Swaminathan

Dr. M S Swaminathanji, one of the all time greatest internationally acclaimed scientists, visionary, humanist, and our nation's pride and honour left us all in deep sorrow on Thursday, 28th September 2023.

Beloved Dr. M S Swaminathanji, we remain eternally indebted to you for your constant encouragement. We fondly remember your kind words of appreciation.

"...I wish you great success in making LEISA India an instrument for the promotion of sustainable agriculture in India", Professor M S Swaminathanji, Chairman, MSSRF.

For ever we shall miss your serene smile, simplicity and unwavering affection towards all working for farmers well being.

