



**CELEBRATING  
BIODIVERSITY, AGROECOLOGY  
AND ORGANIC FOOD SYSTEMS**



**Navdanya** was founded 30 years ago by environmentalist Dr. Vandana Shiva in India to defend Seed and Food sovereignty and small farmers to save, exchange and evolve seeds. Navdanya promotes a new agricultural and economic paradigm, a culture of food for health where ecological responsibility and economic justice take precedence over today's consumer and profit based extractive food production systems. The promotion of biodiversity-based agroecology for economic security and the mitigation of climate change, together with seed and food sovereignty are central to Navdanya's vision of an Earth Democracy.

Navdanya's learning centre **Earth University (Bija Vidyapeeth)** offers training in agroecological farming and biodiversity conservation to farmers across India as well as annual month-long courses for citizens' organizations from across the world on the principles and practice of diversity and sustainable ecological farming combined with hands on and practical experience. Farmers and students learn how agroecology not only increases farmers' incomes, but also increases nutrition and health while rejuvenating soil, water and biodiversity and at the same time mitigate climate change and enhance resilience.

**Navdanya International**, based in Italy, helps strengthen Navdanya's global outreach through campaigns, advocacy work, on the ground training, and mobilization at the grass-roots and community level, nationally and internationally with network representatives, partners and communities across the globe. In addition our work has focused on exploring the context of our food systems and their inherent connection with soil, climate resilience, biodiversity, equity and social justice.



*Seed Savers in Vidarbha - ©Manlio Masucci*

Navdanya International launched its global **Seed Freedom Campaign** in 2012 to bring to citizens' attention the crucial role of seed in the battle to defend food sovereignty and food safety and help strengthen the movement to save and exchange seeds.



Seed Freedom Caravan 2014

©Aris Pavlos



Seed Freedom Workshop in Greece, 2016

©Manlio Masucci



Seed Freedom Network Latin America, 2016 - Mexico

©Red de Guardianes de Semillas Ecuador



"Pact for the Earth" launch at COP21, 2015 - Paris

©Navdanya International



Local Seeds in Jember – Indonesia, 2017

©Manlio Masucci



Seed Exchange Festival, 2016 - Greece

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## Living Seeds: Navdanya's Community Seed Banks

Over the last 30 years, Navdanya has been conserving biodiversity through a network of seed keepers and organic producers spread across 22 states in India and Bhutan. It has helped set up more than 124 community centered, decentralized indigenous seed banks across the country, which are freeing farmers of dependence on costly commercial seeds and helping them move from vulnerability to resilience in the context of climate change.

More than 4000 rice varieties have been collected, saved and conserved by Navdanya. Forgotten food crops such as millets, pseudo-cereals and pulses, which were pushed out by the green revolution and expanding monocultures, have been conserved and promoted by Navdanya.

Navdanya's research in different agro-climatic situations confirms that even in the most adverse climatic conditions, biodiversity based organic farming (higher crop diversity) is better capable to minimize the crop losses than that of monoculture-based industrial farming. With the increasing number of disasters, Navdanya started conserving climate resilient seeds and encouraged farmers to grow and multiply native climate resilient varieties, starting a program **"Seeds of Hope"** to help the disaster affected farmers. Since 1998, farmers affected either by floods or droughts have been able to cope with extreme conditions with flood tolerant, salt tolerant and drought tolerant seeds saved by the program seed saving network.

Navdanya continues to collect and conserve climate resilient seeds in the seed banks in Uttarakhand, Odisha, Maharashtra and now most recently in Rajasthan, Bundelkhand and Madhya Pradesh. In 2016-2017 a total of over 15000 farmers received seeds from different seed banks of Navdanya such as cereals, millets and other seasonal crops and vegetable seeds.



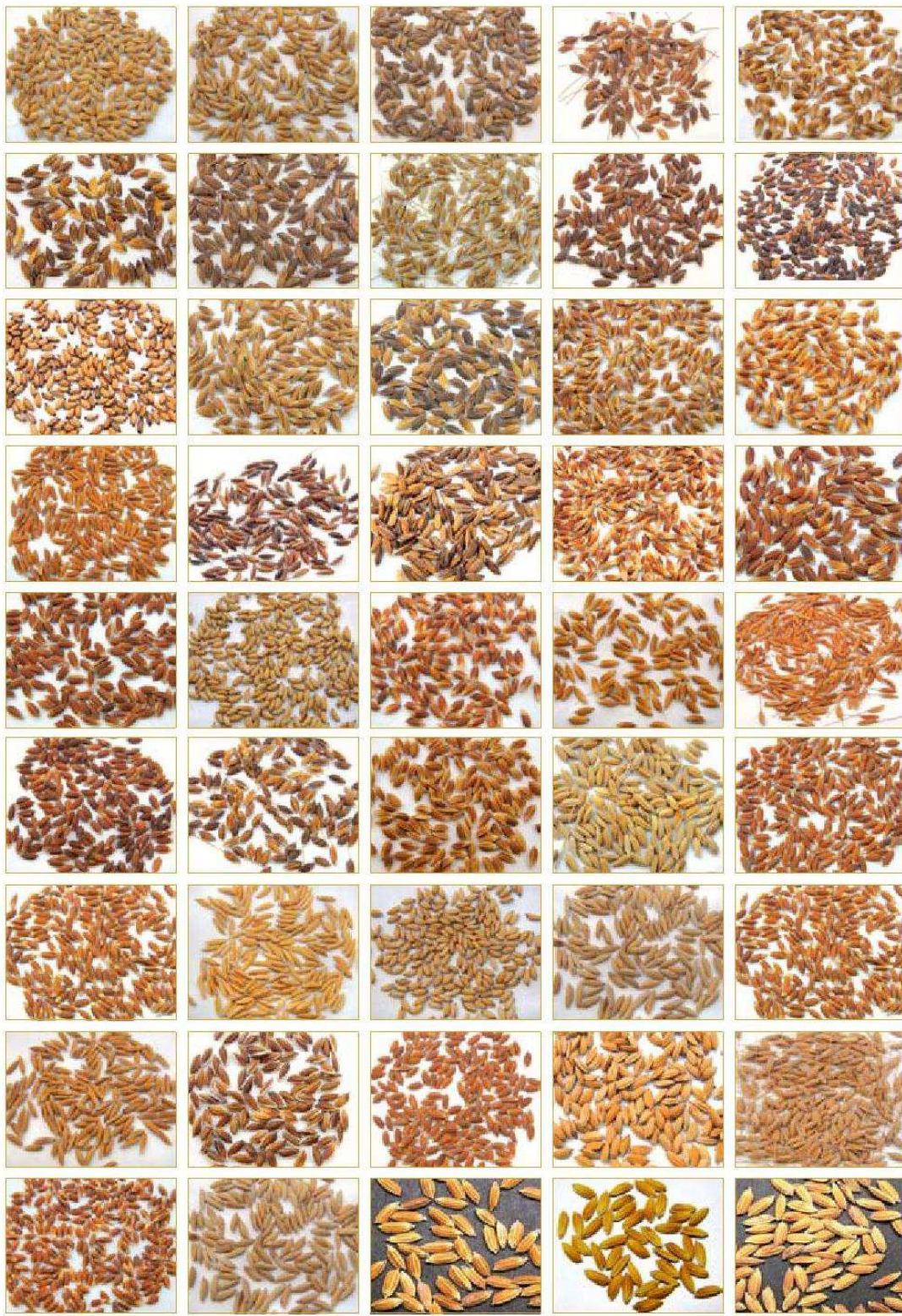
Navdanya Seed Bank in Dehradun  
©Navdanya



Community Seed Bank in Odisha  
©Navdanya

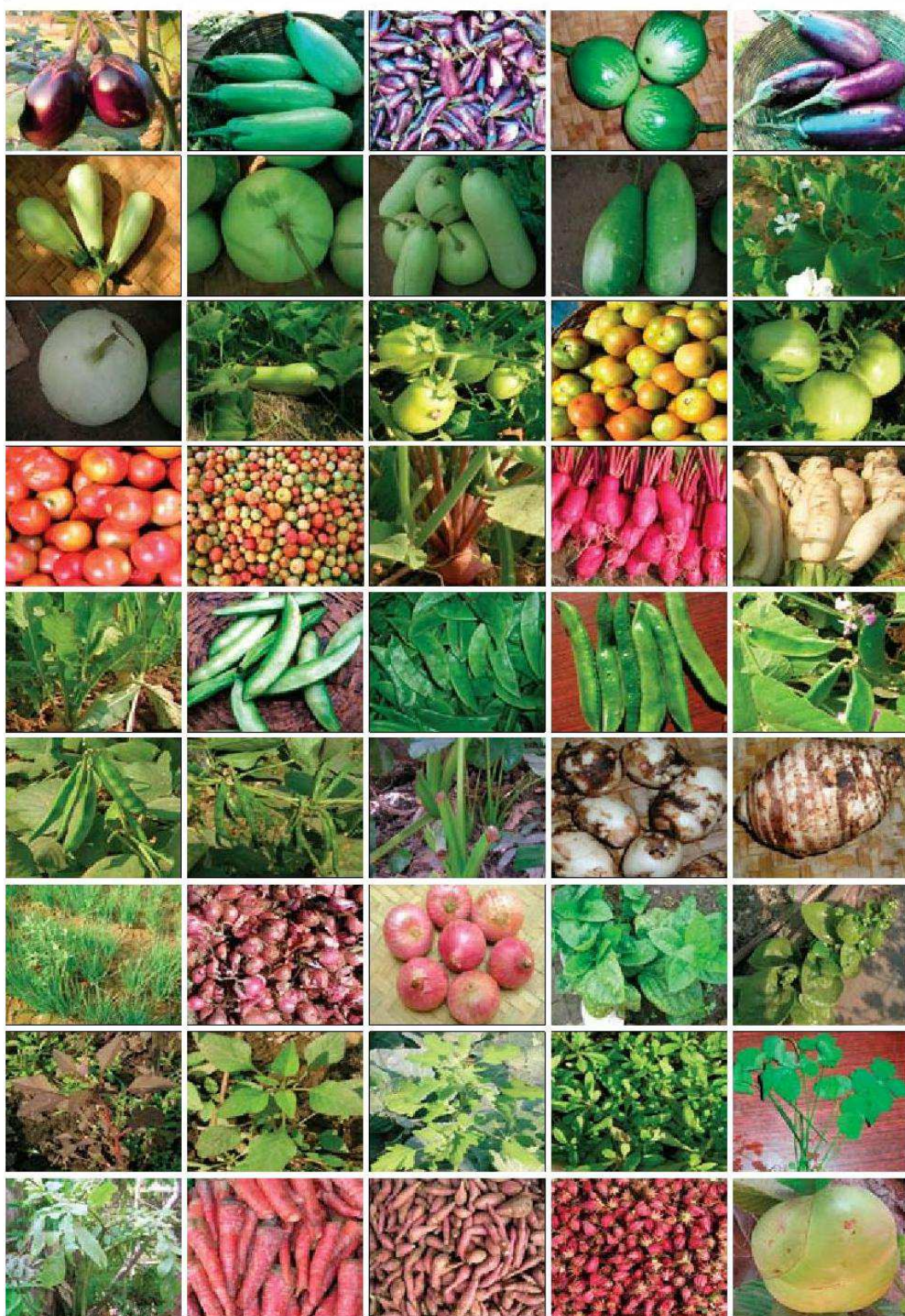


## RICE DIVERSITY





## VEGETABLE DIVERSITY





### Community Seed Banks across India

- ✓ 124 Community Seed Banks
- ✓ More than 7000 different crop varieties
- ✓ In Orissa: 873 rice varieties, which include climate resilient varieties: 58 drought resistant, 50 flood resistant, 33 saline resistant 2 therapeutic and 55 aromatic rice varieties.

### Navdanya's Biodiversity & Food Heritage at Biodiversity conservation farm

- ✓ 4000 indigenous rice varieties
- ✓ 2650 different species of crops and multipurpose plants species including medicinal plants
- ✓ 2200 varieties of seeds of millets, pseudo cereals, pulses, oilseeds, vegetables,
- ✓ 205 varieties of wheat,
- ✓ 151 species of trees and orchard fruits,
- ✓ 44 species of pollinators
- ✓ 78 bird species

### Farmers' self-reliance based on biodiversity intensive organic farming

In addition to preserving and distributing indigenous seeds, Navdanya has been working with small farmers and communities to work towards a transition to an agroecological food system. Navdanya's farmers' training takes places both at Navdanya's learning centre and through field trips across India and is based on experience, research and knowledge exchange developed through the years and in continuous evolution. The programme provides practical skills in seed conservation, soil fertility enhancement, pests and weeds natural management, and is also committed towards raising awareness on the importance of seed and food sovereignty as well as on uncovering strategies put in place by big agricultural companies in compliance with governments, which make farmers depend on commercial seeds, chemicals and loan sharks.



Farmers' training across India - ©Navdanya

Navdanya has been actively collaborating with communities, schools, government officials, representatives of national as well as international NGOs, Voluntary Organizations with programs on transitioning towards biodiversity conservation and organic farming. Navdanya is helping the Government of Bhutan in their initiative of converting the entire country to organic by providing training to farmers and agriculture officers, as well as helping in documenting the transition from a chemical to an organic system. Along the same lines, Navdanya is working in Ladakh and Sikkim, which has already taken major steps to promote organic agriculture. Navdanya has also trained secretaries and extension officers of the Tibetan government in exile and now their settlements across the country are in conversion to organic.

In order to amplify its work on biodiversity conservation and agroecology, Navdanya has been working on agroecology programmes internationally, which includes the creation of an International network of agroecology practitioners and researchers together with health and nutrition movement to spread awareness that agroecology provides a solution to malnutrition.

In October 2017, commemorating World Food Day, Navdanya and JAGA Indonesia organized an agroecology mobilization tour in collaboration with local partners. The Navdanya team experts met with students and farmers to inform and explain global agribusiness industrial policies and agroecology practical training workshops which covered, among other practices, seed saving, natural seed treatment, soil fertility management and natural pest management. The Navdanya team showed how in any natural environment it is possible to find the resources and ingredients to both control pests and weeds, as well as to regenerate soil fertility.

The tour represented an important opportunity to strengthen ties between the associations dealing with agroecology in the territory and the international seed and agroecology movement catalyzed through Navdanya International campaigns.



*Agroecology Workshop*  
©Manlio Masucci



*Seed saving and organic pest management*  
©Manlio Masucci



## Women's Food Sovereignty

**Mahila Anna Swaraj** is Navdanya's programme for women's food sovereignty. It is based on celebrating and rejuvenating women's knowledge and skills in biodiversity conservation, sustainable agriculture and food production and in artisanal organic food processing. Currently over 300 women's groups of Navdanya are operating in different states of India including Uttarakhand, Jammu and Kashmir, Rajasthan, Bihar, Jharkhand, Odisha, Maharashtra, Madhya Pradesh. Navdanya organizes a Mahila Anna Swaraj gathering and Grandmother's University to celebrate women's traditional knowledge at its learning centre every year.

Traditionally, women have been the keepers and breeders of seed, as well as the food producers and processors. Mahila Anna Swaraj reclaims women's seed sovereignty and seed knowledge by creating Community Seed Banks. It also reclaims food sovereignty, and in so doing empowers women economically and gives society healthy, safe, tasty and nutritious food.

Navdanya promotes kitchen gardens both in schools and in the framework of the women's food sovereignty program. All beneficiaries are growing different seasonal vegetables and saving their own seeds, which is enabling them to meet the daily requirements and also sell the surplus amount in local markets and through Navdanya's fair trade network.



*Pulse of Life celebration with women in Varanasi*  
©Navdanya



*Mahila Anna Swaraj gathering, 2015*  
©Navdanya



*Women Farmers in Tehri Garhwal*  
©Navdanya



*Women Farmers in Tehri Garhwal*  
©Navdanya

At the international level, Mahila Anna Swaraj is organized as Diverse Women for Diversity. **Diverse Women for Diversity** echoes women's voices from the local and grassroots level to global fora and international negotiations. Its focus is biodiversity, food and water. It seeks to strengthen women's grassroots movements and provide women with a common international platform.

## Navdanya Biodiversity Conservation Farm

The **Navdanya Biodiversity Conservation Farm** is where the actual practice of Navdanya's methods of agroecology and organic farming takes place.

The beginning of the Navdanya farm dates back to 1995, a time when the soil was left barren and degraded due to prior eucalyptus and sugarcane plantations. Since then the soil has been regenerated. Organic matter has increased up to 99%, Zn has increased 14 %, Magnesium has increased 14%, not through external inputs. They have been produced by the billions of soil microorganisms that are in living soils. Healthy soils produce healthy plants. Healthy plants then nourish humans. The farm is constantly carrying out experiments in agroecology and has its own soil ecology lab which helps combine the best of traditional knowledge with the best of new knowledge on agroecology and soil ecology.

The farm functions as a living system from which farmers, school groups, course participants and interns can learn. Navdanya's practical experience and training programs span across all production needs of farmers – seeds, soil fertility, pest control, and water conservation. Practice and programs cover the entire food chain-from farmers' fields to the tables and kitchens of consumers.

While working with farmers in seed sovereignty, food sovereignty and sustainable agriculture, the work flowing from the farm has helped more than 200,000 hectare land to switch to organic and established the largest direct marketing, fair trade organic network in the country.



Navdanya Biodiversity Conservation Farm  
©Navdanya



Navdanya Biodiversity Conservation Farm  
©Manlio Masucci



## Earth University: Navdanya's Learning Center dedicated to education for sustainable living

Navdanya established a learning center, **Bija Vidyapeeth** (School of the Seed) a center of excellence for Organic farming on its biodiversity conservation and organic farm, which is serving small and marginal farmers, students, scientists and researchers from across the globe.

Because Biodiversity conservation is at the heart of the Navdanya's work and the learning center is located at the biodiversity conservation farm, participants learn about crop diversity and the interactions between different aspects of agroecological systems through observation and experiential learning.

For citizens' organizations and movements from across the world Navdanya offers the course **A-Z of Agroecology and Organic Food Systems**, a one month Global Capacity Building workshop with eminent scientists and environmentalists, an opportunity to learn from nature and farmers as teachers, as well as from the cutting edge ecological research combined with practical experience and participation in community activities.



*Exploring soil microorganisms*  
©Hummingbird Project



*Indoor Learning session*  
©Circuitos de Sementes



*Enhancing Soil Fertility through mulching*  
©Nissa Wargadipura



*Workshop on participatory Plant Breeding*  
©Nissa Wargadipura

Among the programs of the course:

**Living soil** – The Soil Food Web, Renewal of Soil Fertility; composting and other methods to rejuvenate living soils.

**Living Seed** – Seeds and biodiversity, difference between traditional open pollinated seeds, Green Revolution varieties, hybrids, GMOs, Why save seeds, participatory and evolutionary breeding, seed conservation, creating community seed bank and seed libraries.

**Living Food Systems** - The health hazards of the industrial food system, pesticides, GMOs, Junk food, health and nutrition and ecological agriculture; the economics of local organic systems vs industrial global systems; Economic diversity and biodiversity of markets, issues of certification and participatory guarantee.



*Students from Portugal improved their agroecology programme and brought it to Ilha do Principe (Sao Tome and Principe) and Mozambique. - ©Circulos de Sementes*



*Isaac Pabia (Ghana) has started his "Navdanya Inspired" farm. - © Navdanya*



*Latin American and Indian seed savers and farmers knowledge exchange workshop. - ©Navdanya*



*Students from Indonesia are doing research on biodiversity erosion and have started a national agroecology network. - ©Manlio Masucci*



The course on A-Z of Agroecology & Organic Food Systems is an opportunity to learn about the links between Seed Sovereignty and Food Sovereignty and issues of Intellectual Property Rights, Patents, Seed Monopolies and Farmers Rights, as well as about living seed, living soil, self-reliant sustainable local living food economies both at the scientific level and through participation in seed conservation and breeding, composting & soil fertility renewal, cooking classes with forgotten foods and interaction with local community and farmers.

## **Seeds of Resilience in times of Climate Change: solutions, mitigation, adaptation, resilience and regeneration**



Navdanya's scientific work has shown, through research finding reports on Biodiversity Based Productivity, that Biodiverse Intensive Agroecological farming and food systems are not just ecologically beneficial, but offer solutions to hunger and malnutrition, improve farmers' incomes and local economies and provide tools for climate mitigation and adaptation through resilience and regeneration.

### **Seeds of Resilience**

There are 4 ways in which Biodiversity and Seed Freedom create climate resilience:

1. Farmers have Bred Climate Resilient seeds and varieties that are contributing to resilience.
2. Diversity of crops increases the resilience of farming to climate change. If you have only one crop in a monoculture, it is more vulnerable to changing climate. Farmers growing monocultures of commodity crops are also more vulnerable to exploitative markets.
3. Biodiversity intensification allows more carbon to be absorbed from the air, returned to the soil, thus decreasing excess carbon in the atmosphere while also increasing the resilience of soils to drought, floods and climate change.
4. When farmers have their own renewable, regenerative seed, they can replant after a climate disaster, which contributes to both climate resilience and economic resilience.

## Health per Acre and Seeds of Resilience

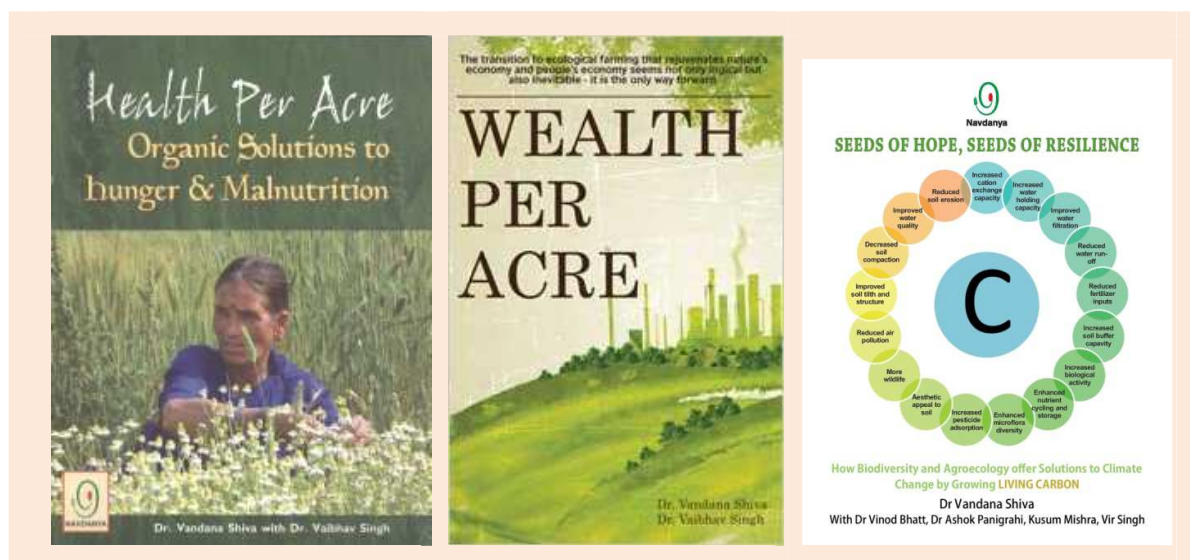
Abundant production of rice, wheat, corn, or soybean monocultures are not designed to solve the crisis of hunger and malnutrition. On the other hand, a wide and properly designed variety of local crops produced and consumed at local level, can cover the entire profile of essential nutrients required for human health, while ensuring access to food and equitable distribution. This entails a paradigm shift from monocultures to diversity, from chemical intensive agriculture to ecologically intensive, biodiversity intensive agriculture, from external inputs to internal inputs, from capital intensive production to low cost, zero cost production, from yield per acre to health and nutrition per acre, from food as a commodity to food as nourishment and nutrition.

When agriculture output is measured in terms of “Health per Acre” and “Nutrition per Acre” instead of “Yield per Acre”, biodiverse ecological systems have a much higher output. Navdanya’s “Health per Acre” has shown that organic biodiversity based mixed cropping and ecological intensification increase output of nutrition, while addressing the multiple crises related to food systems. It shows how we can protect the environment, while protecting farmers’ livelihoods and the right to food and health of all people, as well as lowering costs of food production and distribution.



*Seed Savers in Dehradun - ©Manlio Masucci*





The publication **Seeds Of Hope, Seeds Of Resilience – How Biodiversity and Agroecology offer Solutions to Climate Change**, describes experiences on the ground with communities across India, which conserve Biodiversity and practice Agroecology based on Biodiversity intensification. Diversity of living systems are an expression of their capacity to evolve and adapt. Agro-biodiversity in natural ecosystems has been adapting naturally or autonomously to changing conditions.

As the magnitude of climate change increases with time, the need for co-evolution for adaptation through agrobiodiversity conservation and evolutionary breeding becomes more acute. The report shows that not only can we address climate change and rejuvenate the planet, one seed at a time, but also that, in so doing we produce more and better food which could provide enough nourishment for two times the world population.

## A study on Effect of continuous farming on Soil under organic and chemical mode

**Table 2: Showing effect of continuous farming on Soil under Organic and Chemical mode**

Nutrient	Change under Chemical Farming	Change under Organic Farming
Organic Matter	-14%	+29-99%
Total Nitrogen (N <sub>2</sub> )	-7-22%	+21-100%
Available Phosphorous (P)	0%	+63%
Available Potassium (K)	-22%	+14-84%
Zinc (Z)	-15.9-37.8%	+1.3-14.3%
Copper (Cu)	-4.2-21.3%	+9.4%
Manganese (Mn)	-4.2-17.6%	+14.5%
Iron (Fe)	-4.3-12%	+1%

Navdanya has carried out a comparative study of soil microbes and nutrients both in chemical and organic farming through a survey conducted in various states in India. Results show that the microbial population especially fungi, bacteria was significantly higher under organic farming areas. A reduction in organic matter content was observed in the soil under all the crops growing in chemical farming, whereas an increase in organic matter content between 26-99% was found in the soil where crops are grown with ecological methods, along with a significantly higher total N and available K content.

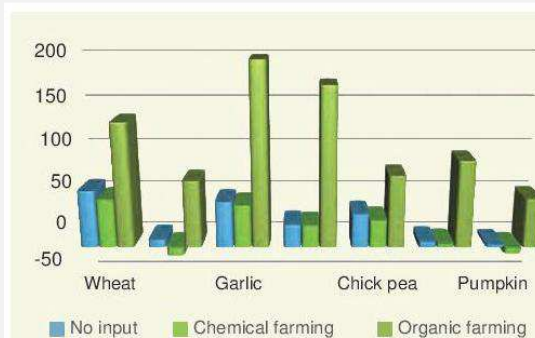
## Organic Matter in Soil under Organic and Chemical Mode

The build up of organic matter was much higher under different crops when organic farming was continuously practiced. In general, chemical farming resulted in reduction of organic matter build up by -14% under different crops, than no input land. The results showed 29-99% build up of organic matter over no input land due to organic farming practiced for a long time under different crops

**Table 3. Organic matter (%) content under different crops and farming practices.**

Crops	Control*	No input	Chemical farming	Organic farming
Wheat	0.80	1.20	1.14	1.67
Potato	0.80	0.86	0.74	1.27
Garlic	0.85	1.19	1.17	2.21
Mustard	1.12	1.35	1.34	2.68
Chick pea	0.90	1.17	1.12	1.47
Chilli	0.92	0.97	0.95	1.62
Pumpkin	0.85	0.93	0.85	1.29
LSD (p=0.05)	0.11	0.18	0.15	0.21

\*barren land, no crops



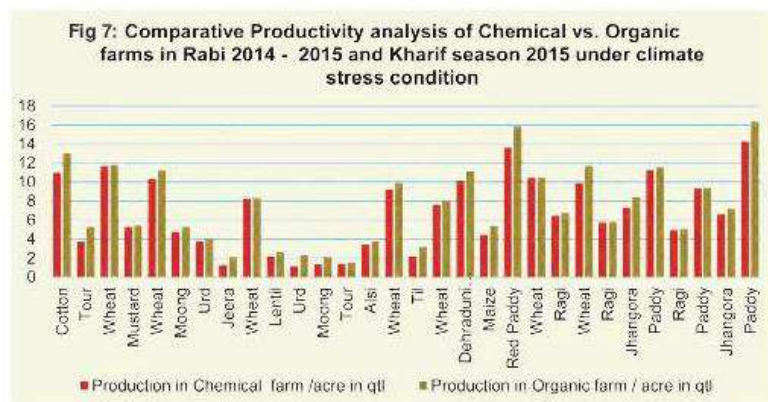
**Fig 5. Status of Organic matter (%) under different crops and farming practices**

## A study on changes in biological soil health under Bt cotton growing areas in Vidharbha, Maharashtra

A detail survey was conducted to entire Vidharbha Bt cotton growing areas where at least ten different villages were selected for sampling under each districts of where both Bt and non-Bt cotton growing fields for last 10-12 years. A comparison was made on biological soil health under Bt, non-Bt and no crop lands. The results clearly indicate that under every district where Bt cotton was growing, a significant decline in all biological activities contributing to soil health like acid phosphatase, alkaline phosphatase, esterase, dehydrogenase, fungi, bacteria, nitrosomonas, nitrobacter and azotobacter population. The decline ranges between 6 and 77% of different parameters, which indicate the severe adverse effect of Bt cotton on soil biological health. Sometimes the activity under Bt cotton growing soils was less than the control soils (no crop soil) after continuous cultivation of 10-12 years, which was really alarming situation and needs to address the prompt remedy.



## A study on resilience in extreme climate conditions: droughts and heavy rains



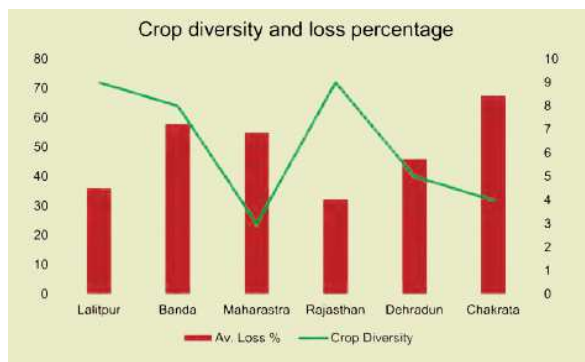
A study done by Navdanya in the Rabi season of 2014-2015 and Kharif season of 2015 in 9 different regions of 5 states of India clearly reveals that in climate stress conditions including drought or heavy rains organic farming is far better than the chemical farming. All the 9 regions are different from each other. Where Rajasthan is arid zone and

Bundelkhand and Maharashtra are drought prone areas, whereas Odisha is flood prone area. Within Uttarakhand Dehradun is a valley at an altitude of about 500m amsl and Purola valley is situated at an altitude of 1500m amsl. Rudraprayag and Tehri are amongst the hill districts of the state. Results shows that crops grown in organic farms have performed better than that was grown in the chemical farms. Average percent increase varied from 0.85% to 106.25%. Everywhere organic farms performed better than chemical farms even in the climate stress condition which clearly confirms that organic farming is much better even in the climate stress conditions irrespective of the area or crop.



Seed Savers in Vidarbha - ©Manlio Masucci

## Agro-biodiversity, climate resilience and sustainability



Recently Navdanya did a study on the impact of Crop diversity in food security and economic sustainability in 5 regions of Uttarakhand, 2 regions in Bundelkhand and one region each in Maharashtra, and Rajasthan. Crop loss due to untimely rainfall occurred during crop ripening and harvesting period was observed. Results clearly reveal a positive correlation between decreasing agro-diversity and quantitative increase in crop loss. Increasing diversity within the species coupled with

use of traditional open pollinated strains show increased food and economic security against climate change related crop damage. As per Government reports over 2 million tons of pulse crop production is reduced due to changed weather condition during the rabi crop season. In Rajasthan, Maharashtra, Uttar Pradesh, Dehradun and Uttarakhand, production of major wheat reduced by 30 to 70%. Within the wheat varieties wheat lokman (Lokone) in Lalitpur (Bundelkhand, U.P.) and wheat 306 in Rajasthan, affected marginally as both varieties are old selection varieties. In pulses only traditional variety of lentil called Teen Fool wali masoor could survive, whereas all other lentil varieties could not sustain in the changed weather conditions. Higher diversity of crops in Rajasthan and Lalitpur also showed correlation with less crop loss. While in Maharashtra, Banda and Chakrata area where diversity was less farmers suffered heavy crop loss.



Seed Savers in Dehradun - ©Navdanya



## Celebrating Biodiversity



Celebrating Biodiversity is celebrating life, its abundance, its resilience. It is celebrating our membership in the Earth Community. Biodiversity weaves the web of life-from the forests to the oceans, from our farms, to our plates, and our gut. It provides alternatives to fossil carbon and the climate havoc it is causing. Through Biodiversity we can build an ecological civilisation.

Join us in September-October 2018 for a series of Biodiversity events in Doon Valley and beautiful Uttarakhand to explore the potential and promise of Biodiversity.



## Celebrating Biodiversity

- |                      |   |
|----------------------|---|
| 1st - 30th September | A-Z of Biodiversity, Agroecology & Organic Food Systems           |
| 2nd - 3rd October    | Women's Biodiversity Festival co-organised by DWD, MAS & Navdanya |
| 4th - 6th October    | International Biodiversity Congress with                          |



- |                     |  |
|---------------------|--|
| 7th - 8th October   | Activists workshop on Biodiversity & Regenerative Agriculture as a Climate Solution at the Navdanya Biodiversity Conservation Farm |
| 10th - 17th October | Biodiversity Journey to Uttarakhand  |

Register at: [earthuniversity@navdanya.net](mailto:earthuniversity@navdanya.net)  
For more information: [www.navdanya.org/site](http://www.navdanya.org/site); @Navdanya\_Navdanya  
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Celebrating Biodiversity, Agroecology and Organic Food Systems

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