What is happening to our Food?
Food Safety, Food Security and Agriculture

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We are what we eat.
But what are we eating?
What are we growing on our farms? How are we growing it?
What impact does it have on our health and on the planet?

Food safety, food security and agriculture are intimately inter-related. How we grow our food and what we grow determines what we eat and who eats. It determines the quality and safety of our food. Yet food safety, food security and agriculture have been separated from each other. Food is being produced in ways that is robbing the majority of people of food, and those who are eating are eating bad food. One billion people on the planet are hungry. Another two billion are suffering from food related diseases such as obesity, diabetes and hypertension. Those who are not getting access to food are victims of the malnutrition related to being poor. Those who can buy food in the global supermarket are also victims of another kind of malnutrition, the malnutrition of the rich.

Third World countries are carrying a double burden of food-related disease, hunger and obesity. The WHO / FAO have predicted that by the year 2020 it is projected that 70% of ischaemic heart disease deaths, 75% of stroke deaths, and 70% of diabetes deaths will occur in developing countries. These diseases, called non-communicable diseases, are directly linked to diet.

The roots of hunger

The world is producing enough food for all. However, billions are being denied their right to food. The globalised industrialized food system is creating hunger in many ways.

Firstly, industrialized agriculture is based on destruction of small farmers. Uprooted and dispossessed peasants join the ranks of the hungry.

Secondly, industrialized agriculture is capital intensive. It is based on costly external inputs such as purchased and non-renewable seeds, synthetic fertilizers, pesticides, herbicides. Peasants get into debt to buy these inputs. To pay back debt they must sell all they grow, thus depriving themselves of food. If they cannot pay their debts they loose their land. And they are increasingly loosing their lives. More than 150,000 farmers in India have committed suicide as costs of inputs have increased, and the price of their produce has fallen, thus trapping them into debt.

Malnutrition and hunger is also growing because farmers are being pushed into growing cash crops for exports.

The nature of agriculture, and the nature of food is being transformed. Agriculture, the care of the land, the culture of growing good food is being transformed into corporate, industrial activity. Food is being transformed from being a source of nutrition and sustenance into being a commodity. And as a commodity, it will first flow to factory farms and now cars. The poor will get the left over.

Factory farms are a negative food system. They consume more food than they produce. Industrial beef requires 10 kg of feed to produce 1 kg of food. Industrial pork requires 4.0 – 5.5 kg of feed to produce 1 kg of food. Factory farmed chicken requires 2.0 – 3.0 times more feed than it produces as food.

Industrial biofuels are putting a new pressure on food. Food prices in Mexico have doubled since corn, the staple for Mexican tortillas, is being increasingly used to make ethanol for fuel. Corn, soya, canola are all being diverted to feed cars while people starve.

Food Safety: Freedom from hazards or imposition of industrial uniformity?

Food safety is a growing concern with the industrialization and globalisation of food. Food related diseases have spread.

As Tim Lang, Professor of Food Policy at City University, London reports, "incidence of food-borne disease has in fact risen during the era of the productionist Paradigm. In West Germany cases of infections S.Enterites rose from 11 per 100,000 head of population in 1963 to 193 per 100,000 in 1999, in England and Wales formal notifications of the same disease rose from 14,253 cases in 1987 to 86,528 in 2000."

Food hazards have increased with industrialization of food production and processing. As Colin Tudge observes "the modern food supply chain is convoluted and so long that it allows endless opportunities for malpractice of all kinds – including many that beggar the imagination of those who are not criminally inclined. The supply chain is impossible to police because it is so complex, and because policing is so expensive (and nobody wants to pick up the bill – certainly not the governments who win votes by keeping the price of food down). Sometimes though, it is not at all easy to draw a line between outright villainy (like the adding of contaminants) from the standard, legitimate practices of the modern food industry.

On a global scale, new diseases are emerging and more virulent forms of old diseases are growing as globalisation spreads factory farming and industrial processing and agriculture. Disease epidemics and food hazards are the outcome of food production methods based on hazardous inputs and processes.

In the U.K., more than 2 million cattle were found to be infected with Bovine Spongiform Encephelopathy (BSE) -- the mad cow disease. By August 2002, 133 people had died from variant Creutzfeldt-Jacob Disease (VCJD) - the human equivalent of BSE .

New strains of Ecoli 0157 have led to 75 million cases of food poisoning annually in the US, resulting in 325,000 hospitalisation and 5000 deaths.

The Swine fever in Asia led to killing of millions of pigs. A newly emerged Nipah Strain killed 100 pig farm workers, infected 150 with non-fatal encephalitis and led to the slaughter of a million pigs to control the disease .

The Avian flu has already led to human deaths and the killing of millions of ducks and chicken. The first sightings of the H5N1 virus behind the Avian influenza came in November. The epidemic has spread to 10 countries. The disease has jumped from chickens to humans and killed eight people in Vietnam and Thailand. In 1997 the H5N1 Strain killed six people in Hong Kong .

Food production technologies have undergone two generations of changes over the last few decades. The first shift in food production technologies was the introduction of chemicals in agriculture under the banner of the Green Revolution. Toxic chemicals used in warfare were deployed in agriculture in times of peace as synthetic fertilizers and pesticides. Agriculture and food production became dependent on "Weapons of Mass Destruction". The Bhopal disaster in which a leak from a pesticide plant killed thousands in 1984, and has killed nearly 30,000 since then is the most tragic reminder of how agriculture has become dependent on war technologies designed to kill.

Genetic Engineering will introduce new food hazards.

New traits of viral promoter, antibiotic resistance markers being introduced in GM foods need public approval and strict monitoring for safety.

Dr. Mae-Wan Ho in “Genetic Engineering: Dream or Nightmare? (1999) has identified the following risks to human health from genetically engineered foods.

- Toxic or allergenic effects due to transgene products or interactions of transgene with host genes.

- Vector-mediated spread of antibiotic resistance marker genes to gut bacteria and to pathogens.

- Vector-mediated spread of virulence among pathogens across species by horizontal gene-transfer and recombination.

- Potential for vector-mediated horizontal gene transfer and recombination to create new pathogenic bacteria and viruses.

- Potential of vector-mediated infected cells after ingestion of transgenic foods, to regenerate disease viruses, or for the vector to insert itself into the cell’s genome causing harmful or lethal effects including cancer.

While Toxic and GM foods need stricter laws, local, natural processing in small dhabas, small outlets cannot be subjected to industrial regulation, both because they are not a source of toxic threat and because they are not centralized producers needing centralized regulation.

Whose Safety Rules? Whose Standards?

However, while food hazards grow, food safety laws are being shaped which deregulate large corporations and over-regulate the small scale self organized economy. Such industrial food safety standards promote large scale globalised production, and act against local foods. These laws are also the basis of the Sanitary and Phyto Sanitary Agreement of WTO.

Food safety is no larger defined as safe for health and good for nutrition. It is being defined industrially – as the size of produce, the capital investment in processing. This is a Cartesian definition and chemical definition of safety. It is creating uniformity and it is creating food hazards through chemical additives and industrial processing. It is destroying diversity, artisanal production and the real sources of good, healthy food – local and indigenous food systems.

Beyond Monocultures of the Mind

Humanity has eaten more than 80,000 edible plants through its evolution. More than 3000 have been used consistently. However, we now rely on just eight crops to provide 75 percent of the world's food. And with genetic engineering, production has narrowed down to three crops – Corn, Soya, Canola.

Monocultures are destroying biodiversity, our health, and the quality and diversity of food.

Monocultures have been promoted as an essential component of industrial isolation and globalisation of agriculture. They are assumed to produce more food. However, all they produce is more control and profits – for Monsanto, Cargill and ADM. They create pseudo surpluses and real scarcity by destroying biodiversity, local food systems and food cultures.

In 1998, India's indigenous edible oil made from Mustard, Coconut, Sesame, Linseed, Groundnut processed in artisanal cold press mills were banned using "food safety" as an excuse.

The restrictions on import of soya oil were simultaneously removed. 10 million farmers livelihoods were threatened. One million oil mills in villages were closed. More than twenty farmers were killed while protesting against the dumping of soya on the Indian market, which was leading to fall in prices of domestic oil seed crops. And millions of tons of artificially cheap GMO soya oil continue to be dumped on India.

Women from the slums of Delhi came out in a movement to dump soya and bring back mustard oil "Sarson bachao, soyabean bhagao" (save the mustard, drive away the soyabean) was the women's call from the streets of Delhi. We did succeed in bringing back mustard through our "sarson satyagraha" (non cooperation with the ban on mustard oil).

I was recently in the Amazon, where the same companies that dumped soya on India – Cargill and ADM, are destroying the Amazon to grow soya. Millions of acres of the Amazon rainforest, the lung, the liver, the heart of the global climate system

are being burnt, to grow soya for exports. Cargill has built an illegal port at Santaren in Para and is driving the expansion of soya in the Amazon Rainforest. Armed gangs take over the forest and use slaves to cultivate soya. When people like Sister Dorothy Stang oppose the destruction of the forests and the violence against people, they are assassinated.

People in Brazil and India are being threatened to promote a monoculture that benefits agribusiness. People in U.S and Europe are threatened indirectly with 80% soya going to cattle feed to provide cheap meat. Cheap protein to feed factory-farmed animals is destroying both the Amazon Rainforest as well as people's health in rich countries. One billion people are without food because industrial monocultures robbed them of their livelihoods in agriculture and their food entitlements. Another 1.7 billion are suffering from obesity and food related diseases. Monocultures lead to malnutrition – for those who are under fed as well as those who are over fed.

Corporations are forcing us to eat untested food such as GMO's. Even soya, which is now in 60% of all processed food, was not eaten by any culture 50 years ago. It has high levels of Isoflavones and phyto-oestrogens which produce hormone imbalances in humans. Traditional fermentation as in the food cultures of China and Japan reduce the levels of isoflavones. The promotion of soya in food is a huge experiment promoted with US $ 13 billion subsidies from the U.S Government between 1998 and 2004, and US $ 80 million a year from the American Soya Industry. Nature, Culture and people's health are all being destroyed. Local food cultures have rich and diverse alternatives to soya. For protein we have thousands of varieties of beans and grain legumes – the pigeon pea, the chick pea, mung bean, urud bean, rice bean, azuli bean, moth bean, cow pea, peas, lentils, horse gram, faba bean, winged bean. For edible oils we have sesame, mustard, linseed, niger soffola, sunflower, groundnut.

In depending on monocultures, the food system is being made increasingly dependent on fossil fuels – for the synthetic fertilizers, for running the giant machinery, for the long distance transport, which adds "food miles". With the spread of monocultures and the destruction of local farms, we are increasingly eating oil, not food threatening the planet and our health.

Moving beyond monocultures of the mind has become an imperative for repairing the food system. Biodiverse small farms have higher productivity and they generate higher incomes for farmers. And biodiverse diets provide more nutrition and better taste.

Bringing back biodiversity to our farms goes hand in hand with bringing back small farmers on the land. Corporate control thrives on monocultures. Citizen's food freedom depends on biodiversity. Human freedom and the freedom of other species are mutually reinforcing, not mutually exclusive.

The Not so Green Revolution

The so-called green revolution was neither green, nor revolutionary. It has dispossessed small peasants, pushed our rich agro biodiversity to extinction, mined our aquifers, desertified our soils and undermined our nutrition and health. It was supposed to create peace, but sowed the seeds of terrorism, extremism and

violence in Punjab (Ref. V.Shiva, Violence of the Green Revolution). It was supposed to create prosperity, but it left farmers steeped in debt. Both in financial and ecological terms, industrial agriculture and chemical farming is based on a negative economy – it uses more inputs than it produces. The consequence is impoverished eco-systems and impoverished and indebted farmers.

The high ecological costs of industrial / chemical agriculture

Humanity has farmed ecologically for 10,000 years. The last half century has been a short lived experiment with non-sustainable, chemical intensive, water intensive and capital intensive industrial agriculture. The five most important ecological costs of industrial farming are:-

1. Destruction of biodiversity
2. Toxic pollution
3. Pollution and depletion of water resources
4. Erosion of soil and soil fertility
5. Emission of green house gases inducing climate change.

1.1 From biodiversity to monocultures

Industrial agriculture based on high external inputs of chemicals and water creates a push for uniformity and monoculture. This leads to erosion of biodiversity at three levels

a) ecosystem level
b) crop diversity
c) varietal diversity

Each agroclimatic zone has evolved farming systems based on species adapted to it. Industrial agriculture destroys ecosystem and farming diversity. It also pushes crops to extinction. Thus rice and wheat monocultures have replaced diverse millets, pulses and oilseeds, often grown as mixtures and in rotation. Finally, industrial farming destroys diverse varieties of crops and replaces them with uniform varieties adapted to chemicals, not to ecosystems and climate.

The Real Green Revolution : Biodiverse Organic Farming

Industrial agriculture has been promoted, financed, subsidized in spite of its high negative environmental externalities. The argument used is that these ecological costs are a necessary part of increasing productivity. However, the productivity of industrial agriculture is actually negative. More resources are used as inputs than are produced as outputs. Usually labour productivity is of labour displacing machinery and chemicals are therefore, by definition, increasing “productivity”. However, labour is not the scarce input. Land and water are. If instead of labour, energy and natural resources and external inputs are taken into account, industrial agriculture does not have higher productivity compared to ecological alternatives. The shift from internal input to high external input agriculture reduces productivity from 20 to 0.33, a sixty six fold decrease in the productivity ratio over the last fifty years.

We need to make an ecological transition to produce more food using less resources.

This productivity analysis is based on a study comparing traditional polycultures with industrial monocultures shows that a polyculture system can produce 100 units of food from 5 units of inputs whereas an industrial system requires 300 units of input to produce the same 100 units. The 295 units of wasted inputs could have provided 5900 units of food. This is a recipe for starving people, not for feeding them.

A usual argument used in promoting industrial agriculture like the Green Revolution earlier and genetic engineering in agriculture now is that only industrial agriculture and industrial breeding can keep up increased food productivity for feeding a growing population. However, increased mouths to feed imply more efficient resource use so that the same resources can feed more people. Since resources, not labour, are the limiting actor in food production, it is resource productivity, not labour productivity, which is the relevant measure. A sixty-fold decrease of food producing capacity in the context of resource use is not an efficient strategy for using limited land, water and biodiversity to feed the world.

Not only is the measure of productivity of industrial agriculture partial because all inputs, including resource and energy inputs are not taken into accounts, it is also partial because not all outputs are taken into account.

Ecological agriculture is based on mixed and rotational cropping, and the production of a diversity of crops.

Biodiversity Organic Farms Produce More

Studies have shown that the common organic agricultural combination of lower input costs and favourable price premiums can offset and make organic farms equally or often more profitable than conventional farms. Hundreds of farmers in Andhra Pradesh who grew cottonseeds supplied by multinational companies, applying chemical fertilizers and pesticides, committed suicide because they could not control the pests. At the same time Tamilnadu farmers practising organic methods were able to get cotton yield of more than 15 quintals an acre (The Hindu, 2004). The studies showed that the average yield of sugarcane is 40 tonnes an acre in chemical farms as compared to 60-70 tonnes an acre in organic farms in the Erode District of Andhra Pradesh ((The Hindu, 2004). Like wise other crops also record higher yields inorganic farming as compared to chemical farming.

A number of research studies have shown that organic farming ensures better yield and fetches more income. For instance, in 1998, a paper, "The Greening of the Green Revolution" (David Tilman, Nature 396), showed that not only were the yields of organic maize as high as those of maize grown with fertilizers and pesticides, but also the soil quality in the organic fields improved dramatically.

Field trials in Hertfordshire (United Kingdom) reported consistently higher yields in the case of wheat grown with manure than wheat grown with artificial nutrients.

Prof. Jules Pretty of Essex University ("Feeding the World", *SPLICE - a genetic research magazine*, Volume 4, 1998) has shown how farmers in India, Kenya, Brazil, Guatemala and Honduras have doubled or tripled yields by switching to organic or semi-organic techniques.

Cuba, forced into organic farming by the economic blockade, has now adopted it as policy, having discovered that it improves both productivity and the quality of the crops ("Castro Topples Pesticides in Cuba", Renee Kjartan, *Washington Free Press*, August 2000).

Table 13.7 Summary of scale and impacts of certified and non-certified organic projects and initiatives

	Country	*Project*	*Number of farm households*	*Area under organic agriculture (ha)*	*Changes in productivity*
1.	Bolivia	Prodinpo integrated development programme	2000	1000	Potato yields from 4 to 10-15 t/ha
2.	Brazil	AS-PTA alternative agriculture	15000	60000	Bean yields up 50-100%
3.	Brazil	Agroecology in Zona da Mata	215	50	Coffee - nd
4.	Cameroon	Macefcoop organic coffee	600	300	Coffee - nd
5.	Chile	CET organic vegetable gardens	10	5	Vegetables, 20-30 kg per month
6.	Cuba	Organic urban gardens	26000	8000	Total production up from 4000 to 700000 t/yr
7.	Dominican Republic	Plan Sierra soil conservation	2000	1000	Maize - nd
8.	Egypt	SEKEM biodynamic cotton	150	2000	Cotton from 2.25 to 3.0/t ha
9.	Ethiopia	FAO Freedom Hunger	2300	2150	Sweet potato yields up from 6 to 30 t/ha
10.	Ethiopia	Cheha integrated rural development	12500	5000	Cereal yields up 60%
11.	Guatemala	San Jose Poacil ADECCA	1450	1260	Mixed crops - nd
12.	India	SPEECH, Tamil Nadu	500	409	New rice crop in dry season
13.	Kenya	Manor House Agriculture Centre	70000	7000	Maize yields from 2.25 to 9 t/ha; new vegetable crops
14.	Kenya	C-MAD programme	500	1000	Maize from 2 t/ha to 4 t/ha
15.	Kenya	Mumias Education for Empowerment project	2069	217	Beans/groundnut yields from 300 to 600 kg/ha
16.	Kenya	Push-pull pest management	300	150	Maize yields up 60%
17.	Lesotho	Machobane farming systems	2000	1000	Whole system productivity improved
18.	Malawi	Small-scale aquaculture	200	10	New fish crops
19.	Mexico	ISMAM organic coffee	1200	1000	Coffee - nd
20.	Mexico	UCIRI fair trade and organic coffee	4800	5000	Coffee yields from 300-600 kg/ha to 601-1200 kg/ha
21.	Nepal	Community welfare and development	600	250	Maize and rice yields up citrus up from 1.2 to 1.6 t/ha
22.	Nepal	Jajarkot permaculture Programme	580	350	Maize and rice yields up (nd), new vegetable crops
23.	Pakistan	Sindh Rural Women's Uplift Group	5000	2500	Mango yields from 7.5 to 22.5 t/ha; citrus up from 12 to 30 t/ha
24.	Senegal	Rodale Regenerative Agriculture Research Centre	2000	2000	Millet/sorghum yields from 0.34 to 0.6-1.0 t/ha
25.	Senegal	ENDA organic cotton	523	233	Cotton yields - no change at 300 kg/ha
26.	Tanzania	GTZ organic cotton	134	778	Cotton yields - no change at 300 kg/ha
27.	Zimbabwe	Chivi Food Security Project	500	600	Sorghum/millet yields doubled; new vegetable crops
28.	Zimbabwe	Silveira House	1211	735	New vegetable crops
29.	Zimbabwe	Zambezi Valley organic cotton	400	2000	Cotton - nd
		Total	154742	106 197	

(nd = no confirmed data on yields)

Mr. Balbeer Singh, a Navdanya member in Utircha who was amongst the first farmer converted to organic reduced the chemical inputs in his field as given in the table below :

Year	**Urea / Bigha**	**DAP / Bigha**	**Potash / Bigha**	**Cow Dung Manure/Bigha**
1994 – 1995	10 kg (100%)	10 kg (100%)	2 kg (100%)	2 qt (20%)
1995 – 1996	8 kg (80%)	8 kg (80%)	20%	3 qt (30%)
1996 - 1997	4 kg (40%)	4 kg (40%)	Nil	20 qt (100%)
1997 - 1998	Nil	Nil	Nil	40 qt (200%)
1998 – 1999	Nil	Nil	Nil	20 Qt (100%)

(Source Balbeer Singh, Village Utircha and Navdanya Records)

Yield analysis of his one bigha field was done continuously during his conversion period. Following table shows that how Mr. Balbeer Singh reduced the inputs, saved money and got better yield, which is now stable. He has more diversity in the field as well as of food.

Year	**Wheat Yield / Bigha**	**Cost of Agrochemicals**	**Rice Yield / Bigha**
1994 – 1995	1.60 qt.	100	1.8
1995 – 1996	1.08	68	0.90
1996 – 1997	0.98	32	0.92
1997 – 1998	1.8	Nil	2.00
1998 – 1999	2.2	Nil	2.50
2004 – 2005	2.5	Nil	3.0

(Source : Balbeer Singh, Village Utircha, and Navdanya Records)

The yields of our farmers and their incomes have doubled and tripled by giving up the negative economy of chemical farming and shifting to biodiverse organic agriculture. The organic project in Madhya Pradesh has also led to increased yields as reported by Dr. G.S. Kaushal, Ex-Director, Agriculture of Madhya Pradesh, who spread organic farming in 21 districts for 11 crops using 12 treatments in the period 2001-2002.

Since organic farming produces more food and higher incomes for farmers there is absolutely no justification for not adopting it as the national policy to address the agrarian crisis threatening the livelihoods of our small farmers, two thirds of our population.

Organic agriculture does not merely produce more food at lower financial and ecological cots, it produces healthier, more nutritious, better quality food.

It has been demonstrated that organically produced foods have lower levels of pesticides and medicinal and hormonal residues and in many cases lower nitrate

contents. Nitrates are significant contaminants of foods, generally associated with intensive use of nitrogen fertilizers. Studies that compared nitrate contents of organic and conventional products found significantly higher nitrates in conventional products. Quality after storage has been reported to be better in organic produce relative to chemical based produce after comparative tests.

According to an International report from Journal of Applied Nutrition, 1993, the organically grown food averaged 63% higher in Calcium, 78% higher in Chromium, 73% higher in Iron, 118% higher in Magnesium, 178% higher in Molybdenum, 91% higher in Phosphorus, 125 % higher in Potassium and 60% higher in Zinc. The organically raised food averaged 29% lower in mercury than chemically grown food.

Here are a few examples of the mineral that were found in higher levels in organic foods in different studies.

Nutrient	**Property**	**% Nutrient found more in organic food**
Iron	Required for blood haemoglobin formation	21% more in organic food
Phosphorus	Required for bone formation	14% more in organic food
Chromium	Its deficiency is associated with the onset of diabetes and atherosclerosis (hardening of arteries)	78% more in organic food
Selenium	Antioxidant that protects us from damage by environmental chemicals. It is also protective against cancers and heart diseases.	390% more in organic food
Calcium	Needed for stronger bones.	63% more in organic food
Boron	Works along with calcium to keep bones strong.	70% more in organic food
Magnesium	Reduces mortality from heart attacks, keeps muscles from spasming	138% more in organic food

Heavy Metals		
Aluminium	Aluminium has been found to be associated with Alzheimer's disease	40%less than that in commercial food
Lead	Lead can adversely affect children's IQ, can cause impaired neurobehavioral development, decreased stature and growth	29% Lower than that in commercial food
Mercury	Mercury is associated with neurological damage, autism and Alzheimer's disease.	25% lower than that in commercial food.
Cadmium	Cadmium has been linked to lung, prostrate and testicular cancers.	
Tartrazine(the yellow food colouring E102)	Linked to allergic reactions, headaches, asthma, growth retardation and hyperactivity in children.	
Vitamins levels		
Vitamin C	Antioxidant	27% more
Vitamin E & Beta carotene	Antioxidant associated with a reduced incidence of coronary heart disease and some cancers.	10% to 50 % more

Source: soilassociation.org,lookwayup.com, landofvos.com

The seed / chemical package of the not-so-green revolution is justified on the basis of higher productivity and higher incomes, which in turn are supposed to reduce hunger and poverty.

However, both in terms of productivity and incomes, for the small peasant in Asia and Africa, costly non-renewable seeds and costly chemicals create a negative economy, with farmers spending more on inputs then they can earn from the

produce. This is made worse by globalised free trade and dumping of susbsidised products on markets of the South, which further lower prices, and rob farmers of incomes. Indebtedness and farmers suicides are rooted in this crisis of falling incomes due to rising costs and falling prices.

The solution to hunger and poverty is to increase food output per unit acre and reduce inputs. Biodiverse organic farming increase output per unit acre while reducing costs of inputs. Across Asia and Africa small organic farms based on biodiversity are producing more food than chemical monocultures.

Organic producers of wheat using native varieties are getting 6.2 tonnes per ha is Western U.P in India. Under all agro-climatic zones, biodiversity intensification increases output while reducing input costs.

Navdanya's member Rajender Singh of Village Pulinda in Uttaranchal is earning Rs. 90,000/- per ha growing diversity of 35 crops organically on his 0.5 bigha ($1/10^{th}$ of an acre) farm. Yogambar Singh is earning Rs. 69500/- per ha growing 13 crops. Chemicals are intolerant to diversity. They need monocultures.

In Uttaranchal, biodiverse farms give the farmers Rs. 24,000 per acre and yields of 14 quintal / acre. While monocultures give Rs. 6720 / acre and yields of 12 quintal / acre.

In Rajasthan, monoculture farms give 10 quintals / acre and Rs. 1805 as income while biodiverse give 11.9 quintal / acre and Rs. 5835 as income.

Navdanya member has obtained 6.3 tonnes of wheat from a hectare using native seed sand ecological methods.

Biodiverse organic farming, based on indigenous crops, using participatory breeding, is the solution to hunger and poverty.

We need to promote biodiversity intensive agriculture, not chemically intensive agriculture as the Green Revolution model promotes. The Real Green Revolution based on biodiverse organic farming is already happening in the fields of farmers. These small-farmer centered, ecologically sustainable initiatives need scaling up to protect the environment, protect the land and livelihoods of small farmers, and produce more food.

Biodiverse organic small-scale farms are the solution to malnutrition and hunger. For the environment, public health and for our farmers livelihoods, ecological agriculture is the real green revolution.