

ORGANIC FARMING AND FOOD SECURITY: SOME KEY ISSUES

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In the recent years, interest in organic farming and organic foods grew manifold all over the world. It is a multidimensional issue having social, political, scientific, health and economic concerns. The growth rate of organic foods in Europe has geared up in the recent years, due to the fear of genetic risk involved in genetically modified crops, and the scare created by the outbreak of 'foot and mouth disease' and the 'mad cow disease'. An organic farming system excludes the use of synthetic inputs such as synthetic fertilizers, pesticides, veterinary drugs, livestock feed additives, growth regulators, genetically modified organisms (GMOs), preservatives, food additives and irradiation. Organic agriculture consciously avoids trying to maximise the yield per unit area.

You will be confronted with a lot of definitions for organic agriculture. National Organic Standards Board (NOSB), the federal advisory panel created in USA to advise the US Department of Agriculture on developing organic legislation defined organic agriculture as: "**Organic** agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony" (Kuepper and Gegner, 2004).

Along with the rise in popularity of organic farming, criticisms on its long-term effects are also rising. Critics argue that the philosophical reasons for supporting organic farming are part of the "back-to-nature" syndrome. Like alternative medicine, they are based on the belief that "nature knows best" and that what is natural must be good. However, such a paradise never existed. In the days before intensive farming, when farmers did not use pesticides or synthetic fertilizers, food supplies were constantly endangered through climatic and environmental

fluctuations and crops were frequently lost to pests and diseases. Traditional organic agriculture was associated with grinding poverty, famines, intensive labour, and low yield.

Variants of organic farming

The beginning of the 20th century saw simultaneous advances in science and technology that rapidly changed agriculture. In the 1920s, a few individuals in England began to speak out against these new agricultural trends. The British botanist Sir Albert Howard, who is often referred to as the father of organic agriculture, was one among them. From 1905 to 1924, he worked as an agricultural adviser in India, where he documented traditional Indian farming practices, and came to regard them as superior to modern agriculture science. His research and further development of these methods is recorded in his famous book, *An Agricultural Testament*, which influenced many scientists and farmers (Howard, 1940).

In Germany, Rudolf Steiner's development of *biodynamic agriculture* was probably the first comprehensive alternate farming system, the apparent beginning of which was a series of lectures Steiner presented in 1924. According to Steiner, spirituality was being lost because of these changes. However, this form of farming with its belief in cosmic forces should not have a place in any scientific discussion, as it is considered occult in character (Kirchmann, 1994). There is nothing to be gained by following Steiner's teachings, and that similar or equal results can be obtained using standard organic farming principles.

In Japan, Masanobu Fukuoka, a microbiologist began to doubt the modern agricultural movement. He developed a radical no-till organic method, now known as **Natural farming** or **Fukuoka farming**. In 1975, Fukuoka released his first book, *"One Straw Revolution"*.

Technological advances during World War II accelerated post-war innovation in all aspects of agriculture, paving way for big advances in mechanization, irrigation, fertilizers, and pesticides. In 1944, an international campaign for food production, later came to be called the **Green Revolution**, was launched in Mexico with private funding from the US. It encouraged the development of hybrid cultivars of crops, fertilizers, pesticides, large-scale irrigation, and heavy mechanization in a big way. The campaign spread to most of the third world countries including India and food production increased manifold. However, along with the plenty, several unattended problems also surfaced.

In 1962, Rachel Carson, a prominent scientist and naturalist, published *Silent Spring*, chronicling the effects of DDT and other pesticides on the environment (Carson, 1962). It was a truly significant event in the history of organics. The book and its author are often credited with launching the worldwide environmental movement.

In the early 1970's, David Holmgren and Bill Mollison started to develop ideas that they hoped could be used to create stable agricultural systems or permanent agriculture. A design approach called '**permaculture**' was the result and was first made public with the publication of *Permaculture One* in 1978.

You will also hear some other variants of organic farming such as Rishi Krishi, Homa farming, and Homeopathic farming based on pseudoscientific notions (Chhonkar and Dwivedi, 2004). However, the concepts such as biological farming, low external input sustainable agriculture (LEISA), low input sustainable agriculture (LISA), and sustainable agriculture have some ideological bases with sustainability of resources as a main concern.

Organic farming vs. Conventional farming

Organic agricultural practices are quite distinct from those of "conventional" farming. **Conventional farmers apply** chemical fertilizers to the soil to grow their crops. They spray plant protection chemicals such as insecticides and fungicides to protect crops from pests and diseases. They also use synthetic herbicides to control weed growth. On the other hand, organic **farmers feed** soil and build soil organic matter with natural manures to grow their crops. They may also use biological agents such as insect predators, mating disruption, traps and barriers to protect crops from pests and disease. Crop rotation, tillage, hand-

weeding, cover crops, mulches, flame weeding and other management methods are followed to control weed growth. Sometimes, organic farmers may apply certain botanical or other non-synthetic pesticides as a last resort.

The meat, dairy products and eggs that organic farmers produce are from animals that are fed on organic feed and allowed access to the outdoors. Unlike conventionally raised livestock, organic livestock must be kept in living conditions that accommodate the natural behavior of the animals. For example, ruminants (including cows, sheep and goats) must have access to pasture. Although they may be vaccinated against disease, organic livestock and poultry may not be given antibiotics, hormones or medications in the absence of illness. Instead, livestock diseases and parasites are controlled largely through preventive measures such as rotational grazing, balanced diet, sanitary housing and stress reduction.

Organic and conventional food must meet the same quality and safety standards. Since the early 1990s, the retail market for organic farming in developed economies has been growing by about 20 percent annually due to increasing consumer demand. As organic farming and marketing entered the 1970s, it began to develop as an industry. Therefore, a clearer definition was needed to distinguish its products from conventional agriculture. In many countries, organic farming is defined by formal standards regulating production methods. Two types of standard exist, voluntary and legislated. As early as the 1970s, private associations created standards, against which organic producers could voluntarily have themselves certified. The International Federation of Organic Agriculture Movements (IFOAM) founded in 1972 prescribes IFOAM basic standards. In the 1980s, governments began to produce organic production guidelines and a trend toward legislation of standards began. In essence, certification is largely about integrity — assuring that the buyer is getting what he or she is paying for.

Organic farming: niche market or viable alternative?

Is it practical and responsible to promote organic agriculture as the dominant approach to farming in the future?

The pioneers of organic farming considered organics the preferred direction for the whole of agriculture to take. However, much of the impetus is tied to its growth as a niche market, not as a serious shift in the direction of mainstream agriculture. Unfortunately, a likely reason for the newfound "tolerance" of organic agriculture in many Universities and other formerly hostile institutes is its perception as a niche market opportunity only.

The world trade in organic products is estimated to be about US \$26 billion. Organic food is always sold at a premium, and currently it ranges from 10-50 per cent or sometimes more over conventional foods. Organic food in the US and European countries is such a profitable business that it has been almost completely taken over by big multinational food corporations. In India too, many multinationals are jumping into the bandwagon for the production of "organic foods". These "industrial organic" farms, while still restricting the amount of chemicals used in production, dispense with such luxuries as crop rotation and free grazing conditions for animals, and increasingly resemble the monoculture of the conventional farm. What they need is certification, and in the business, they forget the real intention of organic farming movement, if at all there is one.

The notion that organic farming is more profitable is a much-debated issue. It is true that currently organic foods command a premium in the markets. However, if organic farming became widespread, that premium would dissipate and takes its higher profitability along with it. Experts anticipate stabilization of premium at 10-25 percent in the international markets. Organic milk commands a premium of only 20 percent in the US. What happens if countries like China or other South Asian countries start producing cheaper "organic foods"? Never forget the fate of cocoa or vanilla. At present, it is very difficult to command an internal market for organic foods charging a premium of 10-50 per cent or more.

The virtues of organic farming: Are they real?

Many tall claims are made about organic agriculture, which are, in fact, merely myths. The validity of these myths has been discussed in detail by Chhonkar (2003), Chhonkar and Dwivedi (2004) and Trewavas (2004). Some of these myths are:

- Organic food tastes better and is of superior quality.

- Organic food is healthier because it does not contain synthetic pesticide traces.
- Organic farming is environmentally better than the other forms, and is free from chemicals.
- Organic farming improves soil fertility and chemical fertilizers deteriorate it.
- Organic farming sustains higher yields.
- Enough organics are available to replace chemical fertilisers.

There is no scientific evidence to suggest that organic food is more nutritious or safer than conventional food. It is true that organic food is less likely to contain pesticide residues than conventional food. Do pesticide residues cause cancer? According to the National Research Council of USA, the traces of pesticides left on conventionally grown products are unlikely to cause an increased cancer risk. Moreover, if fruits and vegetables are properly washed, most of the chemicals can be removed. Cancer experts say our real cancer risks are smoking, too much fat, too few fruits and vegetables, and the genetic cancer tendencies inherited from our own families. Although Trewavas (2004) reviewed several studies on cancer and pesticide use, not one pesticide-residue related cancer case has been found. In fact, farmers had overall cancer rates very substantially lower than general public. Healthier and safer food, together with better health provision, has improved our physical well-being and increased longevity, and modern agriculture deserves much of the credit.

Many taste assessments of organic and conventional foods have shown that the public cannot easily distinguish organic from conventional foods in terms of taste (Hansen, 1981; Basker, 1992). In general, people tend to find that the fresher a food is, the better it tastes, regardless of how it was produced.

Whether the nutrients are from organic or inorganic sources, plants absorb the same in the form of inorganic ions- ammonium, nitrate, phosphate, potassium, etc. Once absorbed, the nutrients are resynthesized into compounds that determine the quality of the produce, for example taste and flavour, which is the function of genetic makeup of plants. Any difference in taste is due to differences in varieties. As Chhonkar and Dwivedi (2004) suggested, the better taste of organically grown food is of psychological nature and could be

attributed to 'placebo effect'.

Trewavas (2004) reviewed the reports of five studies conducted on the nutrient composition of organic and conventional food and found that there were no significant differences between the two foods.

Critics warn that, if organic farming is going to be adopted on a wider scale, per-hectare agricultural productivity would decline sharply. It is established that organic yields are lower than conventional farm yields, but the extent depends on the crop (Leake, 1999, 2000). The yields of organic wheat, beans and peas yield were 60-70 percent where as oats were 85 percent. Maeder *et al.* (2002) reported the results of 20-year long-term experiment in which they compared conventional, organic and biodynamic agriculture. Compared to conventional farming, there was 20 percent yield reduction in organic and biodynamic farming. The studies affirm that in general, about 20-40 per cent yield reduction can be expected in organic farming. Such yield differences indicate that organic farming uses good agricultural lands less efficiently. This shows that to achieve the same yield under organic farming, we need to cultivate less area only under conventional farming, resulting a saving of 20-40 percent land. The saved land could be profitably utilized as woodland or forest plantations.

Borlaug (2001) states that modern farming is more efficient in conservation of resources than organic farming! According to him, Green revolution saved millions of hectares of forests all over the Third World from being cleared for more low-yield crops. For example, the world's grain output in 1950 was 692 million tonnes from 600million ha. About 50 years later, the world's farmers used about the same amount of land, but harvested 2.07 billion tonnes, a threefold increase! We would have needed 1.8 billion ha of land, instead of the 600 million ha used, had the global cereal harvest of 1950 prevailed in 2000 using the same conventional farming methods. Instead, that land was saved to leave it in the natural forest and vegetation that the "environmentalists" talk about. In India alone, at least 53 million hectares of land has been spared. Probably, saving of virgin lands, which would have otherwise been cleared for cultivation to meet the food demand of the country, is the most important contribution.

Modern livestock husbandry also has a conservation effect. Examples include the improved efficiency of meat production due to modern veterinary medicine,

lower animal disease and death rates, improved feed conversion ratios due to more complete nutrition, and confinement meat production that takes less land and makes better use of the animal wastes.

Organic farming lobbyists always argue that the country has enough organics available to replace chemical fertilizers to sustain present level of production. It is a mistaken propaganda. Currently the food grain production in the country is about 210 million tones with a fertilizer consumption level of about 18 million tones. According to the planning commission targets, by 2011-12, total food grains must be 245-248 million tonnes. To achieve these levels of food grains, the estimated NPK fertilizer requirement would be over 36 million tones. However, the total per annum availability of NPK through all the known organic sources is estimated at 6.24 million tonnes by 2010 (Tandon, 1997).

Modern farming and lifeboat ethics

Thomas Robert Malthus, who pioneered the overpopulation debate 207years ago with his essay on population (1798), believed it would be physically impossible for food production to increase faster than population. In the late 1960s, more experts predicted imminent global famines in which millions would perish. William Paddock and Paul Paddock (Paddock brothers), the authors of "Famine 1975" predicted that by 1975, Indians would die in their millions (Paddock and Paddock, 1967). They concluded that by the mid-seventies at least half of Indians would die because of famine and starvation and suggested that the world turn its attention away from this hopeless land. In 1968, Paul Ehrlich published "*The Population Bomb*", warning that the growth of human population threatened the viability of planetary life-support systems. However, Malthus and other prophets of doom were proved wrong. The dramatic increases in cereal-grain yields in many developing countries beginning in the late 1960s averted a great catastrophe as they predicted. This phenomenal increase in food grain production in the developing countries came to be known as "Green Revolution".

Food security achieved in many countries helped to increase life expectancy by over 10 years over the last five decades. What does this indicate?

From one perspective, the green revolution has been humane; it has kept people from starving! However, from another perspective, it has been inhumane and cruel! While humane in the short term, it has only aggravated the long-term suffering, in that it has allowed more people to live and have children than would have otherwise been the case. Some critics take a cruel view. According to them, it would be wrong to increase food supply in the developing world! Let the nature do the work of restraining the human population as in the case of other species!

This argument is based on the notion that the green revolution artificially boosted the **carrying capacity (K)** of earth for humans through unsustainable agricultural practices and food imports, which provided short-term relief. Carrying capacity refers to the number of individuals that can be supported without degrading the natural, cultural, and social environment; that is, without reducing the ability of the environment to sustain the desired quality of life over the long term. According to this argument, the green revolution may have been cruel from a global perspective. This perspective is referred to as "bioregionalism" or "life boat ethics". The latter term was first used by Garrett Hardin in his 1974 essay "*Living on a Lifeboat*" (Hardin, 1974). His earlier essay, "*The Tragedy of the Commons*" first appeared in Science (Hardin, 1968) is also very famous.

Hardin argues that if a lifeboat's carrying capacity is exceeded, everyone dies. What policies should the people on board adopt towards people wanting to board? According to Hardin, helping the drowning people threatens the people on board. Moreover, it is not going to aid the drowning in the long run. For example, if the lifeboat has a capacity of 50 people and that there are now 40 people on board, is it possible to allow anymore individual to board the boat? Suppose there are 100 people in the water. If all are allowed to board, he argues, we get "complete justice, but complete disaster," i.e., everybody will be drowned. There is a possibility to let 10 aboard, but the choice is difficult. Further, it is not proper to fill all berths as a safety factor in case of possible emergencies.

If we divide the world into rich nations and poor nations, two thirds of them are desperately poor, and only one third is comparatively rich. It is estimated that in rich developed nations, human population get doubled in 87 years, whereas in the poor developing nations, doubling take place in 37 years. A nation's

land has a limited capacity to support a population and in most of the developing countries, the carrying capacity of the land has already exceeded. In short, the proponents of lifeboat ethics argue that each region of the world should support only as many people, as it is able to, that is, without food subsidies or technical aid. In other words, each region should support only as large a population as its own resource base will allow. You can make your own conclusions from these arguments and the efforts of the International NGO's in "protecting our environment". Take the case of India. India supports 1.027 billion or 17 percent of the world population (2001 Census) and 484.98 million or 15 percent of the world livestock with a mere 2.4 percent of world's land area. This is made possible by artificially enhancing the carrying capacity through movements like green revolution and white revolution.

THE PARADOX OF POOR COUNTRIES GOING ORGANIC

Most of the natural resources of the earth are being plundered by the rich nations. They consume most of the fossil fuels and water, and still ask the poor nations to shun improved technologies and go organic! Just see the consumption level of fertilizers in some of the rich nations who speak volumes on organic farming. For example during 2002-03, per hectare consumption of fertilizers (NPK) in Japan was 291kg, UK-313kg, the Netherlands-367 kg, Korea-410kg and Germany-220kg. At the same time, it was only 90kg in India (FAI, 2004). (In Kerala, it is a meager 60kg/ha). The average per hectare consumption of pesticides in agriculture also declined from 431g/ha in 1992-93 to 288 g/ha in 199: 2000. Compare this with the level of pesticide consumption in rich nations such as Japan (12kg/ha), Taiwan (17kg/ha), Korea (6.6 kg/ha), USA (7kg/ha) and the European Union (2.5kg/ha). According to Agnihotri (2000), only 25-30 percent of the total cultivated area is under pesticide cover in India. You can see a hidden agenda. The rich nations have already achieved food sufficiency and in many European countries, they are facing the problem of excess production. Now, they need clean food for their rich people by sacrificing the food security of poor nations.

There is one more dimension to the issue. Agriculture in many parts of Africa and Asia are already organic, as they do not use pesticides or

artificial fertilizers because they cannot afford to use them. As mentioned already, the fertilizer consumption in India is only 90-kg/ha and pesticide consumption only 288 g/ha, which are well below the world averages. About 65 percent of India's farmers are "organic by default" and still mostly practicing organic methods, passed down for millennia. Traditional organic fertilizers and natural pest control are the only tools available to most of these farmers, who have always lacked the financial resources to explore chemical solutions. Therefore, there is no need of conversion to organic agriculture. Nevertheless, for these farmers, whose produce is as organic as they come, cannot afford to pay the fees required to gain official certification and will not be able to reap the benefits of a niche market created by the organic hysteria.

IMPLICATIONS OF ORGANIC FARMING ON FOOD SECURITY

It is estimated that the world population was just about 5 million some 10, 000 years ago when humans started farming. The population crossed 1 billion in 1804. It was 2 billion in 1927 after 123 years and 3 billion in 1960 after just 33 years. One more billion was added just within a period of 14 years and in 1974, it was 4 billion. In 1978, after 12 years, the world population was 5 billion. It crossed 6 billion in 1999. There is a near doubling of population just within a period of 39 years from 1960 and 1999. World human population is projected to reach something near 8.3 billion by 2025. In India, the population increased from 43.9 crores in 1961 to 102.7 crores, that is, about 230 percent increase within a period of 40 years.

The growing population and changes in food preferences will result in a strong demand for additional food production. Predictions suggest that in the coming years, overall crop production should thus increase considerably more than that required simply by population growth. Norman E. Borlaug estimates the projected demand for cereals in 2025 at 3.1 billion tonnes than the present 2.07 billion tonnes. To achieve this, the per hectare average yield of food grains must increase from the present level of 2.9 t/ha to 4.1 t/ha (Borlaug, 2001). However, in developing countries, experts are anticipating a near doubling of demand for food over the next 25 years.

All over the world, more than 1.2 billion people currently live below the international poverty line, earning less than US \$1 per day. Out of them, 852 million people suffer from chronic hunger (FAO, 2004). FAO

estimates that everyday 25,000 people are dying of hunger and poverty or 9.0 million deaths every year. Out of these, 6.0 million are children under the age of five who die prematurely as a direct or indirect result of hunger.

Proponents of organic farming argue that the problem is not producing enough food—the problem is getting the food that is already produced to the people who need it. This is a hollow argument. Rich nations who produce more are not willing to spare their excess production, even if they empty them to seas. It is a fact that the world can produce more than enough food for everyone but human action is needed to ensure its fair distribution. The key issue is to increase food security by ensuring that all households have real access to adequate food for all their members and do not risk losing such access. This means not only that the food must be available but also that people can afford to buy it. However, organic agriculture is bound to decrease productivity further. Most alternate agricultural forms consciously avoid trying to maximise the yield per unit area.

Do the efforts of the rich nations in ending hunger is sincere? Who is damaging agriculture in the third world? The highly irresponsible agricultural subsidies in rich countries, now approaching \$1 billion a day (means Rs. 1.5 lakhs/ha per year), are causing irreparable damages. The result is a glut of staple food cereals, export dumping in developing countries, and the destruction of poor farmers, who cannot compete with the subsidies in rich countries. It is now the multi-million dollar business of NGOs in the rich countries to recommend 'traditional', 'organic', 'natural', 'biodynamics' or 'permaculture' crop production systems, all synonyms for lower agricultural production, in the poor countries. Ultimately, all these forms increase the already-massive trade in heavily subsidized crops from the rich countries.

It is obvious that an excess of food production and an increase of wealth enables different but less efficient forms of agriculture to survive. However, organic agriculture has a well-established ideological base and groups of often-vociferous supporters (mostly NGO's) who are usually not farmers. Understand that only less than 4.0 percent of the population in Industrialized

nations and less than 2.0 per cent in the USA are directly engaged in agriculture. Compare this with the hardship faced by the one billion chronically undernourished people of the low income, food deficit nations.

Organic farming may have entirely different perspective in developed and developing countries. Organic farming is not economically or socially viable in poorer countries. For the rich countries having limited population and surplus resources, a consumer can demand enough food of the highest possible quality. Organic farming may satisfy their fancies. The affluent countries can afford to adopt low risk positions towards modern farming methods and pay more for food produced by the so-called "organic" methods. To confound the situation, the affluent in these food deficit nations are also clamoring for "chemical" free food without scant regard to their suffering brethren.

CONCLUSION

For a resource poor highly populous country like India, with ever-growing demand for food and feed, the primary concerns will be enough food for all at affordable prices. It affects the health of low-income families. We should not ignore the importance of cheaper ways of producing food, provided they are not based on unscientific practices or intolerable breeding conditions for animals. Prosperous upper and middle-class consumers may not care about price, but the poorer you are, the more the price of

food matters. Chemical fertilizers and pesticides keep down the cost of food grains, fruits and vegetables, and if the organic lobby prevails they will become more expensive. People in the lower-income groups will buy less, eat less protective food, and drink less milk. Moreover, the more pervasive the propaganda that more expensive organic food is "safer and healthier", the greater the pressures on poorer families to buy food they can ill afford. This may create more problems.

The Green Revolution helped food production to keep pace with population growth. The efforts taken to curb population growth are also showing good results. Many people believe we can have an evergreen revolution through sustainable agricultural practices focusing on the food crops grown by the two billion people lacking food security. What we really need is good agricultural practices. Such a sustainable agricultural system integrates three main goals—environmental health, economic profitability, and social and economic equity. Although increased attention is paid to organic components, particularly in soil fertility management and pest control, integration is the key in sustainable agriculture. Organic farming is not sustainable at least in developing countries. Instead of sustaining resources, it may sustain poverty and malnutrition.



INFO MANIA

1. Which dermatological condition in dogs is otherwise called Collie Nose.
2. What do we call the calves that develop chronic indigestion because milk is deposited into rumen as a result of failure of reticular groove reflex during drinking.
3. What is *pseudorumination*.
4. Name the technique used for maintaining hydration balance in starved pet birds, otherwise called crop tubing.
5. Urine pH in laying hens is alkaline(7.6) and acidic in birds after cessation of egg production. True or false.
6. What does the term ABC TRIAGE mean in emergency patients.
7. Name an infectious disease of cats, caused by a virus, which is antigenically related to TGE virus of pigs, human corona virus and has got an intranasal vaccination route.
8. Expand the abbreviation BA in the BA 7 LN2 cryocans.
9. Which metabolic anomaly is responsible for the sudden death in capture myopathy of wild animals after restraint.
10. What do we call the growing, adolescent rabbits.

(ANSWERS ON PAGE - 41)