**Myths about industrial agriculture**

**Organic foods are not healthier or better for the environment – and they’re packed with pesticides, argued Rob Johnston in his article “The great organic myths” published in these columns on August 8. Here is the counter view.**

**Dr Vandana Shiva**

**I**NDUSTRIAL agriculture is an inefficient and wasteful system which is chemical intensive, fossil fuel intensive and capital intensive. It destroys nature’s capital on the one hand and society’s capital on the other, by displacing small farms and destroying health. It uses 10 units of energy as input to produce one unit of energy as food.

This waste is amplified by another factor often when animals are put in factory farms and fed grain, instead of grass in free range ecological systems, Rob Johnston celebrates these animal prisons as efficient, ignoring the fact that it takes 7 kg of grain to produce one kg of beef, 4kg of grain to produce 1 kg of pork and 2.4 kg of grain to produce 1 kg of chicken. The diversion of food grains to feed is a major contributor to world hunger. And the shadow acres to produce this grain are never counted. Europe uses seven times the area outside Europe to produce feed for its factory farms.

**Targeting small farms**Small farms of the world provide 70% of the food, yet are being destroyed in the name of low “yields”. Some 88% of the food is consumed within the same eco-region or country where it is grown. Industrialisation and globalisation is the exception, not the norm. And where industrialisation has not destroyed small farms and local food economies, biodiversity and food are bringing sustenance to people.

The biodiversity of agriculture is being maintained by small farmers. As the ETC report states “peasants breed and nurture 40 livestock species and almost 8,000 breeds. Peasants also breed 5,000 domesticated crops and have donated more than 1.9 million plant varieties to the world’s gene banks. Peasant fishers harvest and protect more than 15,000 freshwater species. The work of peasants and pastoralists maintaining soil fertility is 18 times more valuable than the synthetic fertilizers provided by the seven largest corporations” (ETC Group, “Who Will Feed Us?”).

When this biodiversity rich food system is replaced by industrial monocultures, when food is commoditised, the result is hunger and malnutrition. Of the world’s 6.6 billion, one billion are not getting enough food, another billion might get enough calories but not enough nutrition, especially micro nutrients. Another 1.3 billion who are obese suffer the malnutrition of being condemned to artificially cheap, calorie-rich, nutrient-poor processed food.

**Hunger by design**Half of the world’s population is a victim of structural hunger and food injustice in today’s dominant design for food. We have had hunger in the past, but it was caused by external factors – wars and natural disasters. It was localised in space and time. Today’s hunger is permanent and global. It is hunger by design. This does not mean that those who design the contemporary food systems intend to create hunger. It does mean that the creation of hunger is built into the corporate design of industrial production and globalised distribution of food.

The dominant myth of industrial agriculture is that it produces more food and is land saving. However, the more industrial agriculture spreads, the more hungry people we have. And the more industrial agriculture spreads, the more land is grabbed.

Productivity in industrial agriculture is measured in terms of “yield” per acre, not overall output. And the only input taken into account is labour, which is abundant, not natural resources which are scarce.

A resource hungry and resource destructive system of agriculture is not land saving, it is land demanding. That is why industrial agriculture is driving a massive planetary land grab. It is leading to the deforestation of the rainforests in the Amazon for soya and in Indonesia for palmoil. And it is fuelling a land grab in Africa, displacing pastoralists and peasants.

Industrial agriculture is responsible for 75% biodiversity erosion, 75% water destruction, 75% land degradation and 40% greenhouse gases. It is too heavy a burden on the planet. And as the 2,70,000 farmers suicides in India show, it is too heavy a burden on our farmers.

The toxics and poisons used in chemical farming are creating a health burden for our society. Remember Bhopal. Remember the endosulfan victims in Kerala. And remember Punjab’s cancer train.

A series of media reports have covered another study by a team led by Bravata, a senior affiliate with Stanford's Center for Health Policy, and Crystal Smith-Spangler, MD, MS, an instructor in the school's Division of General Medical Disciplines and a physician-investigator at VA Palo Alto Health Care System, did the most comprehensive meta-analysis to date of existing studies comparing organic and conventional foods. They did not find strong evidence that organic foods are more nutritious or carry fewer health risks than conventional alternatives, though consumption of organic foods can reduce the risk of pesticide exposure.”

This study can hardly be called the “most comprehensive meta analysis.” For their study, the researchers sifted through thousands of papers and identified 237 of the most relevant to analyse. This already exposes the bias. The biggest meta analysis on food and agriculture has been done by the United Nations as the International Assessment of Agricultural Knowledge, Science and Technology (IAASTD).

**Parading junk science**About 400 scientists from across the world worked for four years to analyse all publications on different approaches to agriculture, and concluded that chemical industrial agriculture is no longer an option, only ecological farming is. Yet the Stanford team presents itself as the most comprehensive study, and claims there are no health benefits from organic agriculture, even though there were no long-term studies of health outcomes of people consuming organic versus conventionally produced food; the duration of the studies involving human subjects ranged from two days to two years. Two days does not make a scientific study. No impact can be measured in a two-day study. This is junk science parading as science. One principle about food and health is that our food is as healthy as the soil on which it grows. And it is as deficient as the soils become with chemical farming.

Industrial chemical agriculture creates hunger and malnutrition by robbing crops of nutrients. Industrially produced food is nutritionally empty mass, loaded with chemicals and toxins. Nutrition in food comes from nutrients in the soil. Industrial agriculture, based on the NPK mentality of synthetic nitrogen, phosphorous and potassium based fertilisers leads to the depletion of vital micro nutrients and trace elements such as magnesium, zinc, calcium and iron.

David Thomas, a geologist-turned-nutritionist, discovered that between 1940 and 1991, vegetables had lost – on average – 24 percent of their magnesium, 46 percent of their calcium, 27 percent of their iron and no less than 76 percent of their copper (Ref :David Thomas 'A study on the mineral depletion of the foods available to us as a nation over the period 1940 to 1991'. Nutrition and Health 2003; 17: 85-115).

Carrots had lost 75 percent of their calcium, 46 percent of their iron and 75 percent of their copper. Potatoes had lost 30 percent of their magnesium, 35 percent calcium, 45 percent iron and 47 percent copper.

To get the same amount of nutrition people will need to eat much more food. The increase in “yields” of empty mass does not translate into more nutrition. In fact it is leading to malnutrition.

**Poor nutrition**The IAASTD recognises that through an agro-ecological approach “agro-ecosystems of even the poorest societies have the potential through ecological agriculture and IPM to meet or significantly exceed yields produced by conventional methods, reduce the demand for land conversion for agriculture, restore ecosystem services (particularly water) reduce the use of and need for synthetic fertilisers derived from fossil fuels, and the use of harsh insecticides and herbicides.”

Our 25 years of experience at Navdanya shows that ecological, organic farming is the only way to produce food without harming the planet and people’s health. This is a trend that will grow, no matter how many pseudo-scientific stories are planted in the media by the industry.

**Vandana Shiva is the author of “Violence of Green Revolution” and Director, Research Foundation for Science Technology & Ecology, New Delhi**