

## The new natural economics of agriculture

Farmer **Subhash Sharma** watched the decline of his soil and agricultural yields before he let nature be his teacher and understood the agro-economics of agriculture. He abandoned insecticides and chemical fertilisers and relied instead on the cow, trees, birds and vegetation



### Organic farmer Sharma: Learning from nature

Soil, water and seeds are the strength of farmers. I was able to understand this agro-economics only when I connected with this ground reality. I have been farming since 1975 and, in this time, I have seen two faces of science in agriculture.

In 1975 I began farming like any other farmer, applying plenty of chemical fertiliser and using hybrid seeds. I enjoyed bumper harvests in the initial years, but they could not be sustained for any length of time. Production from my farm started dropping and cultivation costs rose.

This situation continued till 1994, the year I took up natural farming. Nature became my guru and started revealing the reasons for the reduced production on my farm.

In the process of farming with chemicals I had all but destroyed the micro-organism population in the soil, trees, birds, seeds, water. This is what had caused the drop in yields. Nobody should ignore or underestimate the importance of these factors in agriculture. What unfolded on my farm was happening to every farmer like me in India. In pursuit of increased production, we adopted the science of agriculture based on chemicals which resulted in steady low yields and damaged agro-economics.

Of far greater consequence was destruction of the agricultural environment. The labour that was employed on farms was affected by mechanisation, leading to large-scale migration of the rural population to urban areas. The life these people faced in cities and towns turned out to be worse, giving rise to urban crime. Those who could not migrate became Naxalites -- tackling them is now costing the nation enormous amounts of public money.

Loss of soil and water is another serious problem. We have already lost our seeds and

are being forced to depend on genetically modified seeds that are harmful to human health as well as the environment. Such seeds are referred to as 'terminator' seeds as they barely germinate the following season. Wherever farmers have used genetically modified seeds, soils have deteriorated and new diseases have begun to affect the crops.

Rising temperatures have had their own damaging effect on production patterns. In 2008-09, yields from my farm dropped 25% although my profits doubled thanks to market forces (less produce pushed up prices).

We certainly do not want a situation where farm produce is beyond the purchasing capacity of people. That is why a change in agricultural technique is essential. We need to change in order to protect and preserve our soils, water, seeds, environment, and labour, and to strengthen our economics. And that's possible only if we reduce our costs and yet enhance production.

When I first started natural farming I did not know much about it. Slowly, nature became my teacher and showed me the science and economics of agriculture. From 1994 onwards, I began to understand that this is the only constructive science under which all nature's constituents are conserved, and, at the same time, gradually grows. Under chemical-intensive agriculture, growth results from killing off almost everything else. Natural farming put an end to this violent growth. I was able to visualise a strong economics that served the interests of both farmers and our ecological system. It also made me totally self-reliant.

Rejuvenating the soil has strengthened my agro-economics. I have come to realise the potential strength of the country's agricultural economy. Today, I do not need insecticides or chemical fertiliser, as both problems are managed by nature. The four elements of nature that help this process are: the cow, trees, birds and vegetation. Here is a short elaboration on each of these elements:

### ***The cow***

In 1994, based on personal observations, I developed a process of utilising fresh cowdung, cow urine, and jaggery. In Indian villages, fresh cowdung diluted with water is traditionally sprayed on open areas around the house (except during the monsoon). When the rains begin, large numbers of earthworms start emerging. This made me think: if fresh cowdung were sprayed onto the fields, wouldn't it multiply earthworm and micro-organism populations? Moreover, if cow urine were used along with the dung, fungus in the soil too could be controlled.

I prepared a 200-litre drum for each acre, using a mixture of 60 kg of fresh cowdung, 5 litres of cow urine, and 250 grams of jaggery, all diluted with water. The mixture gave

me better yields in the very first year itself, and after four years the micro-organisms had increased to such an extent that there were 6-10 earthworms in every square foot of field. This called for more feed, which was met by another of the four critical elements -- vegetation.

### ***Trees***

During 1990-92, I realised that the temperature increase brought on by industrial pollution would kill off millions of plant species and living organisms within the next 40-45 years. For me, a farmer, this was a serious warning. To check the rise in temperature, I decided to plant trees. I planted 2,000 wild trees on 1 hectare; on the remaining 11 hectares I planted bird-friendly trees such as jamun, goolar, mango, peepul, bargad, neem, imli and arjun. As these trees grew, yields on my farm increased and I realised how trees help agricultural production.

Trees control increase in ambient temperature, which is a great help in the growth of bacteria and friendly insects. Leaf litter is converted into manure. As the number of trees increases, birds multiply and a new economics of agriculture is revealed.

### ***Birds***

The tree growth increased the number of micro-organisms and good manure, as bird populations in and around the farm increased. I noticed that each bird ate at least 50 destructive insects, contributing its excreta to the soil as manure. Where there is good vegetation, this process goes on the whole year round. When bird populations swell to several thousands (it took 8-10 years) their 'management' of insects increases proportionately, and, of course, more manure is added to the soil.

### ***Vegetation***

I started returning crop residue and grass to the farm in 1994. Each hectare of the farm received around 25 tonnes of this wet biomass, encouraging the growth of micro-organisms which, in turn, converted the biomass into manure and simultaneously controlled soil fungi. The increase in micro-organisms and earthworms made our soil porous, helping plant roots get oxygen and rain water. Tens of millions of micro-organisms help improve soil fertility during their short lifespan, and, after their demise, they become the best possible natural manure. Studying these organisms and creatures made me realise that every living being on earth plays an important role in the wellbeing of the human race.

India is faced with a deepening water crisis despite it being blessed by nature with abundant water. Changes in agricultural technologies in the 1960s resulted in large amounts of water being used for farming, along with chemical fertilisers and other poisonous compounds. These destroyed and killed insects and small creatures that

make the soil porous, thereby capable of absorbing water and recharging the water table. Chemical-based farming caused a rapid drop in groundwater levels. At the same time, rainwater was allowed to flow away through drains and canals, carrying with it useful top soil. Worse, the washed-away soil collected as silt in dams and irrigation reservoirs, adding to the water shortage.

Even as more hydro-electricity was being generated, greater quantities of groundwater were exploited for irrigation and drinking purposes. The result was that, in several states, the groundwater dropped to dangerous levels, affecting ground temperatures as well.

This situation is alarming because it directly affects crop productivity as well as human health. Many irrigation projects were built to develop agriculture, but rising urban populations and industrial growth forced the diversion of enormous quantities of water away from farmers and agriculture. Even within the water crisis spiral, the water that is available is polluted thanks to chemical-intensive agriculture and the discharge of poisonous effluents from industries. Today, management of such harmful, unhealthy water consumes ever more resources.

Yet there is a ray of hope. I am sure that if we change our agricultural policies even now we can solve the water crisis forever. I say this because of my personal experiences with natural farming over destructive science. Since I took to natural farming I have come to realise the importance of water. Now, as a result of retaining all the water that falls onto my farm and diverting it underground, the soil is automatically saved from erosion, enhancing its productivity.

This is self-reliance in water. To verify it, I studied the passage of water onto and through my farm in 2003-04.

The sequence is as follows: when 1 hectare of land receives 1 cm (10 mm) of rain, the total precipitation is 100,000 litres; if rainfall during a particular year in that area is 100 cm, the total precipitation per hectare is 10 million litres; a 12-hectare farm like mine receives a total of 120 million litres of rainwater; adjusting for an average evaporation rate of 30% from the surface leaves behind 84 million litres to be diverted to groundwater; thus, if we draw more water than this for irrigation we will not be self-reliant in water.

How much water do I draw? I have two borewells on my farm, each fitted with a 5 hp pump that draws about 36,000 litres of water per hour. Normally, my pumps run for 800 hours a year. That means each pump draws 28.8 million litres per year; together, they extract 57.6 million litres. Since I have recharged 84 million litres in the year, I have a net gain of 26.4 million litres, which reassures me that my farm is fully self-reliant in

water and is recharging the water table.

The farm methods that I adopted in 1994, after realising the importance of the new natural economics, took my produce up to an average of 450 tonnes by 2000, after a low 50 tonnes at the end of the 1975-1994 period. This shows how false the claims of scientists are that chemical fertilisers, poisons and hybrid seeds contribute to higher production.

The increase in production through chemical farming was essentially a result of making more water available and bringing energy to the farm, which was not the case before 1960. From 1975 onwards, chemical-intensive farming was taken up on a large scale. In the first three decades following this dramatic change in method, foodgrain production rose, only to stabilise and then steadily decline from 2002.

In my own case, production dropped steeply during the period 1986-1994: cotton from 30 quintals to 10 quintals, jowar from 50 quintals to 15 quintals, tomatoes from 350 quintals to barely 5 quintals because of mosaic infestation. This happened despite application of the same number of units of electricity, the same amount of water, and increasing doses of chemical fertiliser and pesticides. Contrast this annual disappointment with 1994, the first year of my natural farming, in which I received only 50 tonnes but saved because of lower costs.

Today, with a yield of around 450 tonnes I continue to use electricity and water but chemicals and pesticides have been banished. The day more farmers understand the agro-economics of natural farming is the day they will become strong. Their villages will have abundant water, groundwater levels will rise, and their hard work will genuinely benefit their families, society, and our country.

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