South Asia Conference on 'Outstanding Organic Agriculture Techniques'
Bengaluru, India.
10-11 September 2009

Economics of Agriculture under Natural Farming

By Subhash Sharma

Soil, water and seeds are in fact the strength of farmers.

I could understand this ago-economics only when I connected myself with this ground reality. Since 1975 I am in the farming profession and during these years I have seen two faces of science in agriculture.

1. **Destructive face of science:**

During the years 1975 onwards I started farming like others, applying plenty of chemical fertilizers, poisons and using hybrid seeds. During the initial years, there were indeed bumper crops but that could not be sustained for any length of time. Production from my farm started reducing and the cost of cultivation started rising. Growing indebtedness of farmers rendered the entire farming profession almost uneconomical and unviable. Such a situation continued till 1994. This was the year when I adopted natural farming. Nature became my guru (teacher) and started revealing the causes of reduced production on my farm during the previous nine years (1986-1994).

In the process of farming with chemicals I had destroyed almost the entire micro-organism population in the soil, trees, birds, seeds, water, soil and personal energy and that is what caused the reduction in the yields. Nobody should ignore or underestimate the importance of the aforesaid factors in farming. What unfolded on my farm was also happening with all the farmers like me in India. In the pursuit of increased production, the science of agriculture based on chemicals was adopted but it resulted into continuous lowering of production and damaged agro-economics. I questionnow: how can this science help the country achieve a higher rate of growth?

The greater consequence was the destruction of the agricultural environment. The labour power which was affected by mechanization led to large scale migration of rural people towards urban areas. The kind of urban living turned out to be worse than hell and gave rise to enhanced urban crimes. Those who could not migrate turned into Naxalites and terrorists. Tackling them now is costing enormous public money. This is what happened to our human resource.

The loss of soils and water, however, is a more severe problem because that will lead to managing food-grains and water from outside. This in turn will weaken

us (India). One needs to remember that money is not the answer to all the problems.

We have already lost our seeds and are being forced to depend now on GM-seeds which are harmful to human health as well as the environment. Such seeds are to be considered as terminator seeds as they hardly germinate during the following season. Wherever farmers have adopted GM-seeds the soils have deteriorated and many new diseases have started affecting the crops. Also the rising atmospheric temperature has had its own damaging effect on production patterns. In the year 2008-09 my farm production reduced by 25% but my profit doubled because of market forces (lesser availability increasing the prices). But this is not a good indication.

We certainly do not want an economic situation that results in farm-produce going beyond the purchasing capacity of people. That is why change in agriculture is essential.

We need to change in order to protect and preserve our soils, water, seeds, environment and labour-power and to strengthen our economics. This is only possible if we can reduce our costs and yet enhance production.

2. **Constructive science:**

When I first started natural farming, I did not really know much about it. But slowly nature became my teacher and taught me the science and economics of agriculture. From 1994 till date I could understand that this is the only *constructive science* under which all the constituents of nature get conserved and at the same time show gradual growth. In chemical intensive agriculture the growth was the result of killing all others – a violent tendency – but this constructive science ended my violent growth and made me totally non-violent. In this non-violent regime I could visualize a strong economics which is in the interest of farmers as well as the entire human race. This reminded me of Mahatma Gandhi whose ideas could give pleasure only when brought into practice. Times will change but this theory of agriculture will remain intact.

This constructive science also made me fully self-reliant. This self-reliance made me strong by returning to me my power of the soil, water, seeds, environment and labour. Nature made me strong giving me five avenues of success: 1) **Self-reliance of soils; 2) Self-reliance in water; 3. Self-reliance in seeds; 4. Cropping cycle, and 5. Understanding of labour.**

1. SELF-RELIANCE OF SOILS

This has strengthened my agro-economics. With my strong economy I have realized the potential strength of the agricultural economy of the entire nation. This self-reliance taught me love and now I do not need any kind of insecticide or

chemical fertilizer input to my soil. Both these are managed by nature itself. The four constituents of nature which help this process are:

a) the cow; b) trees; c) birds and d) vegetation

a) **The cow:**
In the year 1994 based on personal observation I developed a process of utilizing fresh cow-dung, cow-urine, and jaggery (a local sugar). In Indian villages traditionally, fresh cow-dung diluted with water is sprayed on the open space about our houses (except in the rainy season). As the rains come the earthworms start coming out in plenty. This gave me the idea that if fresh cow-dung is sprayed in the fields, earthworms will increase and thereby other micro-organisms as well. If we use cow-urine along with dung the fungus of the soil can be controlled. Following this, I placed one 200 litre drum for each acre, filled it with 60 kg of fresh cow dung, 5 litres of cow-urine and 250 grams jaggery and used this mixture (diluted with water) extensively on the fields. I named it GO-SANJEEVAK, the application of which gave me better yield in the very first year itself. In four years the micro-organisms were increased. In each sq. ft. area, 6 to 10 earthworms could be found. Increase in bacteria and earthworms demanded more feed which was met by constituent no. 4, i.e., vegetation. The increases in earthworm and bacterial numbers resulted in less input cost along with better yields. This helped me to develop a new agricultural economics.

b) Trees
In the years 1990-92 I had realized that the temperature increase because of industrial pollution will certainly kill millions of plant-species and living organisms within the next 40-45 years. For me, a farmer, this was a serious warning. For checking temperature rise I decided to plant trees. In one hectare I planted 2000 wild trees to create a forest around me and in the rest of the 11 hectares I planted bird-loving trees. These 150 trees included JAMUN, GOOLAR, AAM (mango), PEEPAL, BARGAD, NEEM, IMLI, ARJUN, etc., and I brought them up as children. As these trees grew, production of my farm increased and I could understand how the trees helped in agricultural production.

The trees control the rise of the environment-temperature. This is a great help for the growth of bacteria and friendly insects. Enormous tree-leaves which fall on the earth are converted into manure. As the trees increase birds multiply and a new economics of agriculture is revealed.

c) **Birds:**
The growth of trees within the farm increased the micro-organisms and the gain of good manure. Birds started multiplying. On observation I found each bird eats at least 50 destructive insects and contributes its excreta to the soil as manure. Where there is good vegetation this process goes on the whole year round. Within 8-10 years the number of birds increased to thousands. You can imagine how many insects are being managed every day and how much manure is added to the soil. This also helped me to write a new economics of agriculture.

d) **Vegetation**

In 1994 I had started using crop residues and the grasses of the farm back on the farm itself. Each hectare of my farm started getting around 25 metric tons of this wet bio-mass. This enhanced the micro-organism population within our farm which in turn converted this biomass into manure and simultaneously controlled the fungus on the soils. Growth of microorganisms, earthworms, etc., made our soil porous which helped plant roots to get oxygen and rain water. Millions of such micro-organisms in their life time help the soils and after demise, they become enormous best quality natural manures.

In this way these constituents of soil-self reliance provided me with free manures, insect control and water, making my farming less costly and more productive. A new agro-economics was revealed.

A study of the large number of living organisms and creatures doing the work of soil-self reliance gave me the understanding that every living being on the earth plays an important role in the well being of human race. Soil-self reliance will solve problems related to rise of temperature and scarcity of water.

2. SELF-RELIANCE IN WATER

India has been blessed by nature with abundant water but crisis has started now-a-days. The change in agriculture technology of the sixties resulted into immense use of water in farming along with chemical fertilizers as well as poisonous compounds. These destroyed and killed large numbers of insects and small creatures which used to make the soil porous capable of absorbing water and thus recharging the ground-water table. Chemical-based farming caused rapid lowering of ground water while the rain water on the surface was allowed to flow through drains and rivers. Along with the rapid flow of rain water, useful soil also started getting washed away affecting soil productivity enormously. The washed off soil silts dams and irrigation reservoirs and gives rise to more and more water shortages and crises.

A large number of irrigation projects were built for developing agriculture but the growing urban population and industries forced the diversion of this enormous quantity of water away from farmers and agriculture. Water, on the other hand, is also being polluted by chemical intensive agriculture as well as by the discharge of poisonous effluents from industries. Management of such harmful and unhealthy water is no easy task.

The planning of water should, in fact, have been done as part of the goal of providing good potable and purified water to all citizens and helpful for healthy farming as well as human health.

As production of hydro-electricity increased, more and more ground water was exploited for irrigation as well as for drinking purposes. The result was that in

several states ground water has reduced to dangerous level thereby affecting ground temperatures as well. This situation is alarming because it directly affects crop-productivity as well as human health.

Thus the destructive science promoted after 1960 polluted water and enhanced the water crisis in a big way.

RAY OF HOPE

I am sure if we change our agricultural policies even now we can get rid of the water crisis for ever. This I say because of my personal experience of adopting natural farming in place of destructive science earlier pursued which has shown a ray of hope and a path of comprehensive development in addition to solving the water problem.

Ever since I adopted natural farming I had realized the importance of water. Now when I hold 100% water which falls on my farm and divert it to the underground, the soil is automatically saved from erosion. This tends to enhance productivity of the soil. Thus when I was able to hold 100% water on my farm, I could realize that I had achieved self reliance in water. In order to verify this I prepared a scientific data-study of my 12 hectares in the year 2003-04. This is as follows:

1. When one hectare of farm receives 1cm rain, the total precipitation is 1,00,000 litres.
2. If rainfall during a particular year in that area is 100 cm, the total precipitation per hectare is 1,00,00,000 litres.
3. Thus a 12 hectare farm, like mine, receives a total of 12,00,00,000 litres of rainwater.
4. Average 30% water evaporates from the surface which means nearly 3,60,00,000 litres of water is evaporated.
5. Remaining 8,40,00,000 litres of water were diverted below ground i.e.., ground water was recharged.
6. If we draw more than this water for irrigation this means we are not self-reliant in water.

In order to check this further, I made a data-study as follows:

On my farm I have two bore-wells, each having a 5 hp pump fitted which draws about 36,000 litres of water per hr. Normally my pumps run for 800 hrs per year. That means each motor draws 2,88,00,000 litres of water per annum. The two motors thus draw out 5,76,00,000 litres of water. Since I have recharged 8,40,00,000 litres of water in that year I have a net gain of 2,64,00,000 litres of water. This shows that I am fully self-reliant in water resource. In spite of drawing

ground water I am contributing 2,64,00,000 litres of water to the ground water reserve at least.

In addition to the above, water was conserved by appropriate methods of cultivation following contour system, sowing across the slope, natural absorption because of porosity of the soil, and digging 20ft x 10ft pit/ditch in each hectare to store rain or excess water. With this water I am harvesting 450 mt. vegetables and food-grains while during the years 1975-1986 the maximum production that I got was 400 mt. My production during 1986 onwards started coming down and during 1990-1994 it turned out to be only 50 mts. The cost of production continued increasing those days and I was forced to abandon that system.

The natural farming which I adopted during 1994 and slowly after realizing the importance of GO-SANJEEVAK, trees, birds, biomass and water and properly utilizing them in my production pushed the output upwards from 50 mt to 450 mt by 2000.

A new record was again set.

Looking at my farming prior to 1960, after 1960 and the one after 1994 till date openly falsifies scientists' claim that chemical fertilizers, poisons and hybrid seeds are the factors behind higher production.

The increase in production by chemical farming was essentially because of enhanced availability of water and energy. Prior to 1960 we lacked water as well as energy (electric power), natural farming was not properly developed while increase in population continued. After 1960 water resources were created and availability of energy too went up. From 1975 onwards chemical intensive farming was taken up at large scale. In the beginning that showed higher production but by 2002 the production stabilized and started reducing thereafter. In spite of our enhanced water capacity due to SARDAR SAROVAR etc. the production kept on dwindling. Why that was happening was clear to me because of nature (my GURU)'s teachings.

During the years 1986-1994 why did my production come down? Cotton from 30 Quintals was reduced to 10 Quintals, Jowar from 50 Quintals to 15 Quintals, Tomatoes from 350 quintals to hardly 5 quintals because of mosaic infestation. In this way my production had reduced from 400 mt to 50 mt. Despite same electricity, same water quantity , increased chemical fertilizers as well as insecticide-pesticides the production came down to 50 mt. Cost was increasing but gains were dwindling. In 1994, the first year of my natural farming I received 50 mt only but savings were in terms of much less costs. By 2001 my 10 hectares of farm production increased to 450 mt vegetables as well as food-grains. For this higher production, however, I am using same electricity and the water as before. Only the chemicals have been ousted.

Water locking system is essential for the farmers who work under rain-fed conditions. Under this system all the rains during August and September months

are conserved within the farm. This helps in stopping soils from wash-off and maintaining soil moisture for a longer period to help following crops. In such a way the yield of food-grains also increases by 5-8 quintals per hectare.

The technique of locking system is as follows:

In order to weed out we use small harrow. Within first forty days this process is repeated on each tenth day. In the third round of de-weeding we pack the harrow with a rope which helps in accumulation of soil around the crop. The harrow is lifted and the process continues further. The soil accumulation at that point acts as soil-lock. Such locks are created at every 10 feet of the whole crop. These help in conserving water and yields increase without any additional expenses.

The day when farmers will understand **technology of natural farming** their agro-economics will become strong. Villages will have abundant water, the ground water level will increase and the nation will become powerful on water resource-sector.

Thus I must say that agriculture demands major change today. The new agro-economics based on natural agriculture can only benefit the farmers, society and the nation.