Natural capital holds the key

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During 1970's, as a small boy I was witnessing my father's interaction with the share croppers. They were cultivating finger millet as a mixed crop in the upstream land area and local varieties of rice in the command area of the tank in '*Punaji*', located around 35 kms from the city of Bangalore. They raised rice using direct broadcasting of seed and zero water logging method. Two water streams which ran across the land were completely covered by pongamia, neem and tamarind trees. Pongamia dry leaves were mixed with farm yard manure and tank bed soil and applied to the soils in the rain fed upstream. He used to further insist on developing biomass producing trees in the buffer zones. The gliricidia shrubs which he developed in the buffers zones of the land are still green. The crop yield was good, both the family and share cropper's food basket was diverse with three varieties of pulses, oil seeds, finger millets and fodder for livestock. Sufficient hay was stocked in the yard for livestock.

The tag of "progressive farming" seems to have carried away my brother. He switched over to puddling of rice fields. The share croppers switched from mixed cropping to monoculture of finger millet. The circle of disorientation from regular soil physical amendment and amalgamation of both dry and wet biomass was completed in few years. My father seemed to have got worried about the shift and complete disorientation. After the harvest of rice, he was scrapping the whitish powdery substance which was getting accumulated on the soil surface. After my father expired, the farming took a leap from subsistence farming to intense vegetable production and application of chemical fertilizers. In few years, the share croppers began complaining that the pulse crops are not flowering and yielding properly in the up stream area. In the next few years, there was a shift towards bore well irrigation. The first generation of bore wells ranging from 30 to 70 meters depth started drying up.

In 2002, I thought of shifting to rotation cropping and hence planted field beans in the command area and horse gram in the upstream. But the field beans failed to flower properly and the plants had stunted growth, though sufficient quantity of FYM was applied to the soil. Even the horse gram in the rainfed upstream area failed with overgrowth, owing to chemical nitrogen residues in the soil.

In 2009, the second generation of bore wells were drying up. Seeing the sporadic and scanty rainfall, we were contemplating on plant species to green up the land. One day my younger brother arrived with '*melia dubia*' (Great neem) saplings to buffer the farm, but

There is an alarming need to shift from the chemical paradigm to an ecologically sound one.

the 65 meters depth bore well stopped yielding water. We were determined to go ahead. Staggered continuous trenches were constructed across the land and five rain water percolation ponds were constructed. The rain water and soil run off was reduced by 90% and we planted 400 saplings in the buffer zones along with retention of tree cover across the water courses. As the summer approached, we purchased water to protect the saplings. As I watered the plants, my younger brother pruned *glyricidia* shrubs and mulched the plant basins. In a few weeks, the mulching was devoured by the white ants. We thought of meeting the soil hunger at any cost and started mulching with dry *pongamia* leaves and continued to water.

In 12 months, the plants were standing above us with a growth of 4 meters. With the arrival of the monsoon, we started planting mango, guava, citrus, sapota and bamboo; dug up a bore well to meet the water requirement for diverse varieties of plants across the land area. Now the *melia dubia* plants are 8 meters tall yielding 50 kgs of fodder, annually. We witnessed the mango plants not responding to just mulching, mined the childhood memories of my father mixing tamarind husk with FYM to amend sodic soils; the plants started showing resilience in summer.

We hope to integrate the livestock with tree crops and to move in for carbon and nitrogen ratio composting method to combat land degradation. The hidden hunger and chemically induced nutrient antagonism in the soils can thus be quenched and neutralized.

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