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## ORGANIC FARMING AND AGRO- ECOLOGICAL PRACTICES

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*“Read More, Grow More”*



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# ORGANIC FARMING AND AGRO-ECOLOGICAL PRACTICES

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## SUMMARY

- Stable Agriculture in sync with the environment
- Dreadful Chemical Agriculture
- Why a switch over to Organic Farming
- Vermicomposting – The Golden Rule
- Other agro-ecological practices
- Our objective:- Sustainable Agriculture

**A**s it is very well quoted by Richard Harwood, “**A stable Agriculture is an Agriculture that can evolve indefinitely towards greater human utility, greater efficiency of resource use, a balance with the environment that is favourable both to humans and to most other species**”. Agriculture or the food production industry is the top ranking industry in the entire global perspective in all accountable aspects. It is a product of the interactive processes, diverse relationships and cycles operating between all the natural elements such as soil, water, climate, seed and biodiversity. Hence, it

becomes quite an important matter to show generous concern about, that practice of Agriculture should be in a synchronised fashion with the broadened network of the ecosystem that would facilitate symbiosis amongst its components, consequent upon which stomachs would be filled and environment engulfing varieties of lives would stay healthy.

In the present scenario, a chemical/intensive corporate driven Agriculture, in a long run is destroying the earth and its resources and harming the animation it beholds as well. It is now high time already, when we should promote Agriculture without the use of agro-chemicals and go for organic/ecological/living farming which in turn would arrest and reverse environmental destruction and degradartion in the food generating agro-ecosystems. Reasons why agro-chemicals should not be used:-

Chemical fertilisers harm the consumers in many ways like,

1. Excess Nitrogen, particularly nitrate in blood cause methaemoglobinaemia in man, and in soil, prevent proper uptake of Potash components by crop plants.
2. Excess Phosphorus applications cause deficiency of Copper and Zinc in food, hence, need be supplemented in food.
3. Excess Potash applications cause deficiency of Vitamin A (carotene) and Vitamin C (ascorbic acid) in food, hence, are needed to be added to diet to make up their deficiencies.
4. Addition of paper mill sludge to crop field soil cause deficiency of vital micronutrients such as manganese, nickel,



cobalt in crop plants, hence in food so produced.

5. Paper mill sludge is often recommended to be added to acidic soils to change the soil pH towards alkalinity. But it brings in more problems than solution, hence farmers are advised to desist from adding this dangerous end product of the paper mills to their farm soil. People exposed to sufficient PCDF, a component of paper mill sludge, for years produce symptoms of fatal liver cancer.

Organic farming and agro-ecological practices rejuvenate soils and enhance soil fertility, conserve the biodiverse plants, animals, insects, pollinators and soil organisms, save water and retain soil moisture thus aid to climate resilience and adaptation, hence contributing to socio-economic conditions of the farmers and the country. The four major pillars, which the whole resolute structure of organic farming stands on, are Vermicomposting, Green Manuring, Liquid Jeevamrit and Solid Jeevamrit.

When there is application of bio-fertilisers or chemical fertilisers in the crop field for enhancing the productivity, a set of aerobic bacteria (Nitrifying bacteria, Phosphorus Solubilising bacteria and Potash Solubilising bacteria) derive plant nutrients from these substances and make them available to the plants. Chemical fertilisers are applied in two to three doses (initial top dressing, the basal dose and final top dressing) those have huge gaps in between the duration of application, this indicates that the plants are fed profusely with nutrients at one point of time and then are made to starve for the other till they are fed next. Chemical nitrogenous fertiliser release fast in the soil,

hence all are not taken up by the plants, some gaseous forms like ammonia evaporate off and cause air pollution where as compounds like nitrates and nitrites leach up or percolate through layers of soil and contaminate the ground water table (aquifer). Such pollution of air and water cause hazardous problems like eutrophication and acidification effects on ecosystems and fatal health disorders like blue-baby syndrome. Meanwhile, vermicomposting can be done by culturing earthworms and feeding them with biodiversity based organic matter. The soil naturally contains fewer microflora (bacteria, fungal hyphae, etc.) for the solubilisation and mobilisation of nutrients to the plants. Chemical fertilisers are so added to enrich the microbes population in the rhizospheric zone that would in turn help the plants to obtain nourishment. But vermicompost is a better alternative of chemical fertilisers, since, the microflora those come from natural sources get into the digestive system of earthworms through ingestion of food, food stays for a longer period of time in their gizzards, so they multiply there as gut microflora (gut bacteria) and come out in their granular faecal pellets. Thus, their droppings (granular faecal pellets) can be used as organic manure/bio-fertiliser in fields which would enhance the soil status in microflora population and help the plants in nutrient absorption. The vermicompost has a delayed release action in soil once applied to the field, hence nutrients don't get evaporated off or leached up and no pollution is there. The granular faecal pellets are found to have a slimy layer of coating over them which has plant growth hormones like auxin and cytokinin and adds to the growth of plants when applied to the soil. That slimy layer of coating is the reason why vermicompost does



not disintegrate easily in soil after application and shows delayed release action.

Incubation of harvested vermicompost till one fortnight is prescribed for increasing its nutritional efficiency. A cement chamber covered with thatch can be used to incubate the compost where it should be exposed to temperature but not to direct sunlight. Under a mild high temperature microflora present in the compost multiply well but direct sunlight may cause death or encystment of those organisms resulting in lower performance. Incubation with temperature makes the compost semi-dry, light weight and convenient to use. It can be done in gunny/plastic bags too, but, since the slimy layer coating has corrosive properties and corrodes the material of the bag, this method is generally not advised. Incubated vermicompost can be used well in rice fields for high yield, but as the slime layer coatings are a bit dried up due to incubation, they might not provide adequate amount of PGRs to the plants and simultaneously the water logged condition of rice fields may denature the properties of the compost. Whereas for vegetable crops freshly harvested vermicompost that has not undergone incubation can be used, because it gets incubated in the field itself, no threat is there for denaturation of the compost due to water logging as vegetables are very slightly irrigated at lengthier intervals and it supplies full fledged doses of microflora and PGRs to them.

We can also use the vermicompost in a liquid form known as “**Vermiwash**” or “**Vermitea**”. The vermicompost is taken in a 200 litres round base cemented water tank with a tap fitted at the bottom end to drain out water. The bottom, up to a height of 4 inches is filled with small pieces of broken bricks,

above it a 2 inches layer of coarse sand is given and the rest 16 inches is made up with chemical free soil mixed with decomposed biomass. Fresh cow dung balls are placed separate from each other on the top. Cow dung balls are covered with water soaked toxic free hay mass. A water pot is hung at least a foot above the centre of the tank which has many holes plugged with coir fibre or cotton roll plugs so as to allow release of water by droplets. The whole apparatus must not be exposed to sun and rain. The pot above is filled with water once in the morning and evening and 50 earthworms are released under the hay. The yellow colour water drained out from the tank by opening the tap, a week or two or as observed after that, is stored in a suitable pot in dark and used as an effective pesticide (concentrated) or as foliar spray for plant growth (1:9 dilution) that would stick to the leaves, in twilight hour, to avoid bleaching effect by sunlight.

Secondly, **green manuring** includes a total of 3 categories which prescribe the supplementation of extra nitrogen to cereal crop plants like Rice. Plants such as Sesbania (Dhaincha/Dhanicha), Glaricidia, Hemp or any other leguminous plants, to be cultivated and soil incorporated before they flower-fruit, preferably in rainy cultivation. The ideal seed requirement of Sesbania per acre is 12KG. The Nitrogen contribution to be received through its soil incorporation is 25KG per acre. Glaricidia being perennial can be cultivated on the crop boundaries. Aquatic floating fern Azolla is to be cultured in an on-field nursery and released in the crop field, preferably in summer cultivation. Fresh cow dung dissolved in water must be added to help their population growth. The ideal requirement per acre is 80KG and its Nitrogen contribution is 25KG. Azolla being a floating material is recommended for



summer/winter cultivations only. Blue-Green-Algae (BGA) in dry powdered form need to be hand broadcasted in the crop fields having stagnated water. The ideal requirement per acre is 4KG and its nitrogen contribution is 14KG per acre. It can be used in rainy cultivation. Also the soil incorporation of Neem/Pongam oil cakes at the rate of 1.5 quintal per acre achieve 2 advantages simultaneously, make the soil porous and light and eliminate all pests by killing their grubs and destroying their eggs. This should be added to the crop field soil at the time of final soil preparation, 1 week preceding transplantation.

Moreover, on field preparation of “**Liquid Jeevamrit**”, its timely and proper use can enhance beneficial aerobic bacteria populations in crop field in a direct way without much fuss. A 200+ litres capacity cement concrete container is taken having a tap at the base and a lid to cover its top. 200 litres of water is filled in that container, 10KG fresh cow dung, 10 litre fresh cow urine, 2KG pulse powder and 1KG jaggery is added and stirred well to mix the components in to solution. The stirring procedure is followed 10 times clock wise and 10 times anti clock wise once in the morning and evening. It is done for 4 days in summer and for 7 days in winter, and the material well diluted with water is used on the next day. In paddy fields, Liquid Jeevamrit is used after transplantation of seedlings as it can withstand water logged conditions (Stagnation of water is necessary for synthesis and spread of Liquid Jeevamrit.) The time limit must be strictly adhered to for better results. However, broadly Rhizobium is necessary for pulses, Azotobacter and Azospirillum for cereals for supplementing Nitrogen and PSB with VAM for Phosphorus supplementation. In order to achieve higher

returns from organic agriculture, it is essential to ensure enhanced microbial biomass in the rhizosphere soil through suitable bacterial and fungal (VAM) inoculations.

Further, farmers having large area under cultivation but subsequently producing inadequate amount of vermicompost can go for the application of “**Solid Jeevamrit**” in their fields. Ordinary compost (Heap compost or Nadep tank compost) along with suitable amount of jaggery and pulse powder are added to the quantity of harvested vermicompost and mixed well, water is sprinkled over the mixture, then it is covered with black polyethene sheets and left for incubation. The mixture is blended or stirred with mild water drizzles under the polyethene sheets at least for 2 times in summers and 3 times in winters. Then the cultured Solid Jeevamrit is used up in agro-ecosystems in the same way as manure is applied.

Even **bio-enzymes**, also called **garbage enzymes** are excellent sources of plant nutrition. 3KG of vegetable peels are taken (excluding all leafy and potato/onion peels), 1KG jaggery, 1KG papaya cut into bits and 15 litres of water are added to it in an adequate container, stirred well and the lid is fixed. Every 4-5 days the lid must be opened to blend the solution and put back on it. This procedure is repeated for 3 months, then the materials are squeezed and filtered. The filtrate is the stock solution of enzyme with 3 months effective life. This can be added to any aquatic media like water stagnated rice fields/ponds for wide range of rich benefits. Foliar spray of 10% enzyme solution improves fruit growth, size and colour, stops undue shedding of flowers and young fruits and improves taste of fruits. This liquid can



also be used in wash room cleaning and car wash.

Sustainable agriculture is possible only when the farmers stop using purchased inputs and replace them with farm generated alternatives. As our (the farmers' and the agriculturists') major objective is food security of the country and availability of safe and quality food that not only keeps the mankind healthy and going but also conserves biodiversity based assets and runs all the coordinated parts of the surrounding environment in a smooth and harmless manner, it becomes our prime responsibility to spread awareness, follow paths, culture practices and varied Indigenous Technical Knowledge (ITK) those would revert the trend of spending money to buy poison named agro-chemicals for higher yield, polluting the environment and its valuable resources by their use, achieving huge productivity entangled with health hazards and other predicaments and again spending money to rectify them, arrest the damage caused by synthetic or non-organic farming systems and make Agriculture contribute to the socio-economic conditions in a better way.



Poisons you buy to enhance  
your yield,

Are devastating, so  
resources need to get a  
shield,

Go for organic farming and  
bio-fertilisers, for the crop  
lands you build,

Conducive to plants, animals  
and human, let health and  
wealth in life be filled!!!

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