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Zero Budget Natural Farming

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INTRODUCTION

Zero budget natural farming (ZBNF) is a process of chemical free agriculture drawing from traditional Indian practices. Zero budget natural farming aims to significantly cut production costs by ending dependence on all outside inputs and loans for farming. The word 'zero budgets' mean no credit or no expenses, without any credit and without spending any money on purchased agricultural inputs. In India, The Padma Shri recipient Mr. Subhash Palekar Ist time modified this zero budget natural farming system in 1990s, which is a substitute to the green revolution. He argued that the increasing cost of these external inputs in farmland was a primary cause of indebtedness and suicide among farmers in India and the impact of chemicals and pesticides burning of residues are on the environment and long-term fertility was devastating. He has converted over 50 lakh farmers into practicing what he prefers to call 'Zero Budget Natural Farming (ZBNF) in various states of India. This method promotes soil aeration, minimal watering, intercropping, bunds, topsoil mulching with crop residues and strictly prohibited intensive irrigation like flooding and deep plowing tillage practices. The basic purpose of natural agriculture or zero budget is high yield on low cost, protection from climate change and better health of soil.

Government Schemes and Plans for ZBNF

India's Legislature is an advancing natural farming in the nation from 2015-16 through the traditional agricultural development plan's committed schemes and the National Agricultural Development Plan. In 2018, Andhra Pradesh started a plan to become the first state in India to practice 100% natural farming by 2024. It aims to carry out chemical farming on 80 lakh hectares of land by converting 60 lakh farmers of the state into ZBNF methods.

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Four pillers of ZBNF

1. Jivamrita/Jeevamrutha: It is a fermented microbial culture to enhance the microbial and earthworm activity in the soil. The bacteria in the cow dung and urine multiply by feeding the pulse flour in the solution during the 48 hour of fermentation process. Virgin soil is added to inoculate native bacteria and the other beneficial micro-organisms. Jivamrita also helps to prevent fungal and bacterial plant diseases. This jivamrita is required in the first 3 years of the transition from traditional agriculture to ZBNF. It requires 20 kg cow dung, 5-10 litre urine, 2 kg dicot flour. These ingredients are well mixed and added in irrigation tank at a regular interval of 15 days. For one acre of land, 200 litres of Jeevamrutha is sufficient. Apply as 10% foliar spray or twice a month with irrigation water.

2. Bijamrita: It is composed of 20 litres water, 5 kg cow dung, 5litres urine, 50 g lime, and a hand full of soil are thoroughly mixed and store in a tank. It is used for the seed treatment to protect young seedlings roots from fungal as well as from soil and seed borne diseases.

3. Mulching/Acchadana: Mulching is of three types and discussed followed:

- **Soil Mulch:** It promotes aeration and water retention in the soil. It also protects topsoil during the cultivation and tilling operations.
- **Straw Mulch:** Covering of top soil with straw material or hey matter of cereal crops like wheat, rice or barley and residues of plant parts. These dry organic materials decompose into the soil and form humus. This humus will help in conservation of water, suppression of weeds, improving the soil health and overall increase in yield and quality.
- **Live Mulch**: These are symbiotic intercrops and mixed crops with monocots and dicots grown in the same field. The symbiotic legumes used as live mulch also adding nitrogen in the soil and reducing the fertilizer need. Monocots supply other elements like potash, phosphate and sulphur.

4. Whapasa/aeration: Conserving water and the precise application of crop water requirement is very essential. Whapasa is the condition where, there are both air molecules and water molecules are present in the soil and encourages reducing irrigation. ZBNF farmers report a significant decline in need for irrigation.

Principles of ZBNF:

- **Low input farming**: The production cost for the farmer is zero as no input needs to be purchased. As 1.5 to 2 % of the nutrients are taken from the soil by the plant, there is no need to add fertilizers. The nutrients provided by nature are totally free of cost.
- **Natural input:** Natural farming does not require chemicals or synthetic inputs. Organic compost like vermin-culture promotes a natural catalyst of biological activity in the soil and provides natural protection from the diseases.
- **Soil mulching:** it is necessary to create the microclimate under which micro-organisms can well develop. It creates darkness and warmth in the soil and also conserves humidity of the soil. It protects soil microorganisms which improve the overall health of soil micro-flora and micro-fauna.
- **Multicropping:** Multicropping is a good way to minimize the risks for the farmer and provides security by maintaining continuity of yield throughout the year. In case of crops failure, he can also rely on the other crops. It increases sources of farmer's income.

Various Production Practices in ZBNF

Crop Rotation: This is the practice of growing different type of crops consecutively on the same piece of land to improve the soil health, optimize soil nutrients and conflict insect-pest and weed infestation.

Tillage: Use of annual tillage, chemical fertilization and pesticides consistently affect the earthworms population. When tillage is avoided, soil moisture content is increased and augments the propagation of earthworms. Earthworms make the soil porous and enrich the soil with their castings. Seeds are scattered and covered by straw before harvesting the previous crop. Seeds are germinated by the onset of next favorable season.

Crop Residues Management: The crop residues are the materials left after the harvesting of crop in an agricultural field. Farmers have been burning large quantities of crop residues, particularly in areas of high yield potential. As the crop residues may interfere with tillage and seeding operations for the next crop, many farmers prefer to burn the residues left in the field that lead to air pollution and wastage of nutrients.

Seed Quality: To reduce the input cost of seeds, traditional seeds are taken as planting material for next season crop and so on.

Outcomes of the practices:

A survey suggests that ZBNF works not just in agronomic terms but also brings about a variety of social and economic benefits. A majority of respondents reported that by adopting ZBNF, over time they saw improvement in yield, soil conservation, seed diversity, and quality of produce, household food autonomy, income, and health. Most experienced farmers reduced farm expenses and a need for credit.

Insect Pest management in ZBNF

1. Agniastra: It consists of 5 litre local cow urine, 1 kg tobacco leaves, 500 g green chili, 500 g local garlic, and neem leaves pulp crushed in 5 litre cow urine, store it in a cool place. Take 2 litre per 100 litre of water and spray on the crops. It is used for the pests like leaf roller, stem borer, fruit borer and pod borer.

2. Bramhastra : It is prepared by 10 litre cow urine, 5 kg crushed neem leaves, 5 kg ipomea leaves, 2 kg dhatura leaves, 2 kg pongamia leaves, 2 kg castor leaves in 100 litre of water. Boil this solution five times and ferment it for 24 hrs. It is used to control all of the sucking pests like pod borer and fruit borer *etc*.

3. Neemastra : It is made up of local 5 litre cow urine, 5 kg cow dung and 5 kg neem leaves and neem pulp. It is fermented for 24 hrs. It is used mainly for sucking pests and mealy bug.

Benefits:

This technique improves soil fertility, yield and quality of product obtained as well helping farmers to get rid of debt. Earthworm decomposes the plants and animals, which enriches the soil with humus. It also improves the soil aeration and water holding capacity by making macro and micro pores in the soil. Pest management method used in this, not only helps to get rid from pest damage but also protect us from the hilarious side effects of chemical methods, such as magnification, pollution, carcinogenic elements and food poisoning. Unlike, chemical fertilizers, it does not causes soil and water pollution and their erosion. Crop rotation and intercropping protect the soil from exhaustion of moisture and nutrients. While, mulching slow down the evaporation and maintains adequate moisture in the soil. It provide favorable environment to the micro organism present in the soil. In short, ZBNF is undoubtedly, economically, socially, biologically and physiologically a profound technique.

CONCLUSION

Zero budget farming is eco friendly. Savings on the cost of seeds, fertilizers, and plant protection measures have been significant. Because of continuous maintenance of crop residues, it helps to maintain the soil health and soil fertility. Management of insect-pest and diseases is also a another key component in zero budget natural farming crop production system.