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Module On Two days Training for Master Trainers/ Champion Farmers/Extension Officers On Natural Farming



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Disclaimer

The training module is designed to provide information and motivation to our readers for understanding and practicing different aspects of Natural Farming.

Details of Training Programme

Training and awareness on Natural Farming: Natural Farming systems are knowledge based, new entrants and transitional producers must become familiar with sound and sustainable agricultural practices. Transitional producers should be prepared to read appropriate information, conduct their own trials and participate in training programmes and seminars etc. Natural Farming system relies on sound practices focused on preventive strategies. Since there are often few natural remedies available to natural farming producers for certain problems, prevention is the key element in natural farming.

Name of course: Two days training for Master Trainers/ Champion Farmers and Extension Officers on different aspects of natural farming and certification systems.

Implementing Agencies: National/Regional Centre for Organic & Natural Farming will organise the training programme as per annual action plan approved by the DA&FW.

Objectives: Field Functionaries and extension staff as well as progressive farmers will be given technical know-how in the area of natural input production, package & practices based on farmer's experiences, on-farm resource practises, certification and marketing of natural produce.

Programme Duration: Two Days-duration residential training course will be conducted in collaboration with State Agriculture Department and Service providers (SPs) at different districts of the states.

Selection of participants: 20 No. of participants will be invited through State Agriculture Department, and Service providers (SPs). The nominations of the participants will be invited 15-20 days prior to schedule of the training programme. The selection of the participants will be done based on their experience in the field of organic as well as natural farming.

Eligibility for participation: Participants will be Lead resource persons (LRPs), Master Trainers or Champion Farmers working for natural farming, RCs, registered under PGS-India Programmes, service providers, extension officers and field workers of central and State Govt. Sectors and private/NGO sectors, FPOs/ FPCs, SHGs and progressive farmers.

Course Content for training programme

Natural farming principles, practices and its integrated approach.

On-farm cattle based nutrient & pest management approaches including traditional practices & natural production management planning.

Standards and Certification systems in natural farming and jaivik kheti portal scopes and marketing.

Implementation frame work of current Govt. Schemes related to natural farming and mission natural farming.

Visit to field for demonstration

To gain practical knowledge the transitional producers should be prepared to visit Natural Farming fields of nearby Krishi Vigyan Kendra, Agricultural universities or progressive natural farmers' field and collect all relevant information and photographs related to farm operation, yield, products, certification and processing information etc.

Guest Speakers

Two guest speakers will be invited for delivering lectures from expert panel of the country working on natural farming. Experts will be invited from State Govt./SAUs/SUs/CUs/KVKs/ natural farming progressive farmers and entrepreneur or from various ICAR institutes etc.



Schedule for Two Days Training Programme

Day	Component	Speaker	Timings
1 st	Registration, Welcome of participants	NCONF/RCONF Officers	10:00 to 10:15 am
	Natural farming principles, practices and its integrated approach	NCONF/RCONF Officers	10:15 to 11:15 am
	Components of natural farming	NCONF/RCONF Officers	11:15 to 12:15 am
	On-farm & Off-farm input based nutrient management along & Pest Management with traditional practices & natural production management planning in natural farming	Experts from State Govt./SAUs/SUs/CUs /KVKs or from various ICAR institutes and progressive farmers or entrepreneur.	12:15 am to 1:15 pm
	Discussion and queries	-	1:15 to 1:30 pm
	Standard Certification Systems in natural farming and jaivik kheti portal scopes and operations including marketing	NCONF/RCONF Officers	2:30 to 3:30 pm
	Implementation frame work of current Govt. Schemes related to natural farming/ natural farming mission.	NCONF/RCONF Officers	3:30 to 4:30 pm
	Discussion and queries	-	1:15 to 1:30 pm
2 nd	Visit to model natural farm & demonstration	Experts from State Govt./SAUs/SUs/CUs /KVKs Start Ups/Agri-Entrepreneurs or from various ICAR institutes etc.	10:00 am to 2:00 pm
	Discussion and queries	-	3:00 to 4:00 pm
	Certificate distribution and Valedictory function	-	4:00 to 5:00 pm



Course Curriculum for Two Days Training for Extension Officers and Staff

Pioneers and scholars of Natural Farming

- **Krishi-Parashar:**

Systematically wrote the first textbook on Agriculture in the world (c. 400 BCE). It deals with prediction of rainfall models on the basis of movement and position of planets, Rainfall & its distribution, Indicators of drought, Management of farming and cattle, Nutrient management, Seed collection & Preservation, Agriculture tools & plough mechanics, Agronomic practices, Useful in modern agriculture.

- **Sitadhyaksha chapter in Kautilya Arthashastra by Acharya Kautilya (321 BC):**

It addresses importance of animal husbandry particularly of cows, measuring rainfall, seed treatment and seed procurement, cropping pattern and method and timings of harvesting the crop, etc.

- **Kashyapiya Krishi Sukti: By sage Kashyap (c. 800 CE):**

A book deals excellent text on agriculture with details of rice production in irrigated areas of India, cattle management, soil quality, growing pulses on high land as well as vegetables, fruits, spice crops, ornamental plants. The emphasis was given on growing trees, preparing gardens, marketing and mining.

- **Vrikshayurveda: (c. 1000 CE):**

This book by Vaidya Surapala is a repository of agricultural knowledge, includes information on garden construction, importance of plants, details of plantation near buildings, procurement of seeds and plantation material, testing, treatment, preparation of pits for planting, selection of land, methods of irrigation, nutrition, manures, etc. Surapala has described a unique fermented liquid fertilizer-cum-plant protection material called Kunapajala, which happens to be the first fermented natural liquid manure in the world. Further, important information is given about plant nutrition, plant diseases, plant protection with natural products/formulations, construction of gardens, miracles related to agriculture and horticulture, use of plant species as an indicator of crops and animal production and description of religious plants.

- **Upavanavinod (a text on arbori-horticulture) by Sarangadhar (1283–1301 CE):**

Explained Sarngadhara-Paddhati. the topics viz. benefits and losses from trees near the house, soil, planting of trees, sowing of seeds, pits, distance between trees, auspicious and inauspicious plants, irrigation (watering), garden construction, digging wells, *kunap* (liquid manure), miracle of plants (amazing plants), natural signs for growth of cereal crops, natural signs of animals and signs of reproduction of animals, etc.

- **Vishwavallabha by Chakrapani Mishra (1577 CE):**

An eminent manuscript describing various aspects of agriculture keeping in mind deals, region includes information on groundwater detection, soil testing, plantation, water management, nutrition, disease and treatment, miracles of plant and seeds etc. in dry, semi-arid and moist areas and hills.

- **Brihat Samhita by Varahamihir (600 AD):**

Deals with widely ranging subjects as astronomy, Physics, geology, horticulture, archaeology, etc including Vrikshayurveda as one of the major subjects.



- **Lokopakara;1000-year-old manuscript:**

Deals with methods and criteria for water divining, Vrikshayurveda and methods for insect control, Perfumery, Veterinary medicine.

- **Krishi Gita (Agricultural Versus) ;(15th century by Vidwan C GovindaWarriar):**

Includes useful crops on the coasts of India, large number of rice varieties (124) for different areas described, many other crops with their varieties are described.

It is well documented in literature that Indian agricultural history was rich, diverse and high yielding before the advent of the Green Revolution, through the ages.

Pioneers of Natural farming in Modern India

- There is also a broad tradition of 'natural farming', propounded by advocates such as Shri Narayana Reddy (in Karnataka), Shri Shripad Dabholkar (Maharashtra), Shri G Nammalvar (Tamil Nadu), Shri Deepak Suchde (Madhya Pradesh) and Shri Bhaskar Save (popularly referred to as the 'Gandhi of Natural Farming', working in Gujarat).
- Natural Farming based on 'Zero-Budget' input cost, is a system developed in the 1980s by Indian farmer, agricultural scientist and extension agent Subhash Palekar who established Zero budget Natural Farming (ZBNF) after a period of self- study of vedas, organic farming and conventional agricultural science, testing methods on his own farm.
- The credit of the Shaping 'Natural Farming' movement in the country goes to former Governor of Himachal Pradesh Shri Acharya Devvrat, who is presently the Governor of Gujarat. It is the result of his sheer efforts that natural farming has reached all the Panchayats and villages of the state in a small span of three years.
- Evolution of ZBNF as a grassroots social movement and evolving into a major policy initiative in Andhra Pradesh.
- Himachal Pradesh under Prakritik Kheti Khushal Kisan Yojnastarted Natural Farming under the nomenclature Subhash Palekar Natural Farming (SPNF) in 2018 and now it is implemented at large scale.
- Govt. of India coined the terminology for natural farming 'Bhartiya Prakritik Krishi Paddhati' (BPKP), though the roots of all kinds of terminologies exists in Vrikshayurveda, a broad based knowledge of natural farming, which is completely in harmony with nature.
- Hon'ble Finance Minister Nirmala Sitharaman mentioned Natural Farming in her speech on the occasion of union budget in the year 2019- 20 and invoked the need to replicate this innovative model.
- Hon'ble Prime Minister of India Sh. Narendra Modi while addressing a conference on Natural Farming on 16th December 2021 emphasised to go for adoption of Natural Farming in India.
- Prakrutik Krishi Vikas board was established in 2021-22 in Gujarat by the Government of Gujarat.
- Hon'ble Finance Minister Nirmala Sitharaman made announcements in her budget speech 2022, about promotion of chemical free natural farming throughout the country, with focus on farmers' land in 5km wide corridors along the river Ganga in the first stage. Budget also mentions that states will be encouraged to revise the syllabus of agriculture universities to meet the needs of natural, zero- budgetand organic farming, modern day agriculture, value addition and management.

These indicate the agricultural strength of various parts of India at a time when all



type of farming that encourages use of low cost locally sourced inputs, reduces crop water requirement, eliminates the use of industrial pesticides and has the potential to minimize the cost of cultivation.

Major Objectives of Natural farming

- Preserve natural flora and fauna
- Restore Soil fertility and production and biological life
- Maintain diversity of crop production
- Efficient utilization of land and natural resources (light, air, water)
- Promote inbuilt natural insects, animals and microbes in soil
- Promotion of local breeds of Livestock integration
- Use of Natural / local based inputs
- Reduce input cost of agricultural production
- Improve economy of farmers

Definition of Natural Farming

- The natural way of farming" or "do-nothing farming", is an ecological farming approach established by Masanobu Fukuoka, a Japanese farmer and philosopher. He introduced the term in his book *The One-Straw Revolution*, the four principles of natural farming. No cultivation that is, no ploughing or turning of the soil. The earth cultivates itself naturally by means of the penetration of plant roots and the activity of microorganisms, small animals, and earthworms. No chemical fertilizer or prepared compost- For fertilizer, Mr. Fukuoka grows a leguminous cover of white clover, returns the threshed straw to the fields, and adds a little poultry manure. No weeding by tillage or herbicides. No dependence on chemicals: Mr. Fukuoka grows his grain crops without chemicals of any kind. On some orchard trees, he occasionally uses machine oil emulsion for the control of insect scales. He used no persistent or broad-spectrum poisons, and has no "pesticide" programme.
- The Ministry of Agriculture and Farmers' Welfare - Definition of Natural Farming (NF) A chemical-free natural farming system wherein use of low-cost inputs (cow dung/urine and plant extract based) coupled with recommended agronomic practices like mulching and intercropping are promoted.
- According to NITI Aayog, Natural Farming can be defined as "chemical- free and livestock based farming". This definition is based on the prevailing practices. Soundly grounded in agro-ecology, it is a diversified farming system that integrates crops, trees and livestock, allowing the optimum use of functional biodiversity.

Concept of Natural Farming

Natural Farming can be defined as "chemical- free farming and livestock based". Soundly grounded in agro-ecology, it is a diversified farming system that integrates crops, trees and livestock, allowing the optimum use of functional biodiversity. Natural Farming holds the promise of enhancing farmers' income while delivering many other benefits, such as restoration of soil fertility and environmental health, and mitigating and/or reducing greenhouse gas emissions. Natural Farming builds on natural or ecological processes that exist in or around farms.

The 10 Elements of Agroecology

The 10 Elements of Agroecology framework was launched at the Second FAO International Symposium on Agroecology held in April 2018 and continues to evolve. In October 2018, the 10 Elements of Agroecology were supported by the FAO Committee



on Agriculture (COAG) at its 26th Session as a guide to one of the ways to promote sustainable agriculture and food systems. Following the review, revision, and clearance process through FAO's governing bodies, the 10 Elements of Agroecology were approved by the 197 Members of FAO to guide FAO's vision on agroecology by the 163 sessions of the Council on 2-6 December 2019.

- **Diversity:** diversification is key to agroecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources.
- **Co-creation and sharing of knowledge:** agricultural innovations respond better to local challenges when they are co-created through participatory processes.
- **Synergies:** building synergies enhances key functions across food systems, supporting production and multiple ecosystem services.
- **Efficiency:** innovative agroecological practices produce more using less external resources.
- **Recycling:** more recycling means agricultural production with lower economic and environmental costs.
- **Resilience:** enhanced resilience of people, communities and ecosystems is key to sustainable food and agricultural systems.
- **Human and social values:** protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and agricultural systems.
- **Culture and food traditions:** by supporting healthy, diversified and culturally appropriate diets, agroecology contributes to food security and nutrition while maintaining the health of ecosystems.
- **Responsible governance:** sustainable food and agriculture requires responsible and effective governance mechanisms at different scales - from local to national to global.
- **Circular and solidarity economy:** circular and solidarity economies that reconnect producers and consumers provide innovative solutions for living within our planetary boundaries while ensuring the social foundation for inclusive and sustainable development.

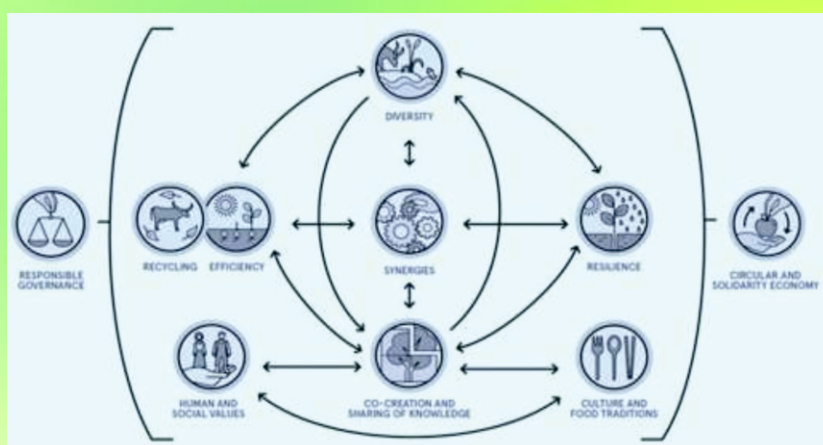


Fig : Interaction of the 10 Elements of Agroecology (Source: ATMA Gujarat)



Components of Natural Farming

● Eco-balance

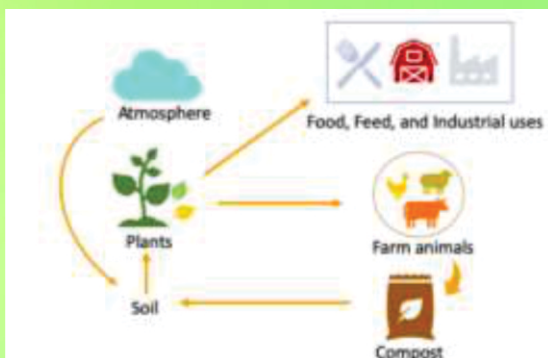
The impact of natural farming on natural resources favors interactions within the agro-ecosystem that are vital for both agricultural production and nature conservation. Ecological processes derived include soil forming and conditioning, soil stabilization, waste recycling, carbon sequestration, nutrients cycling, predation, pollination and habitats. By opting for natural farming farmer promotes a less polluting agricultural system. The hidden costs of agriculture to the environment in terms of natural resource degradation are reduced.

● Diversity

Natural farming produces more biodiversity than other farming systems. Traditional and adapted seeds and breeds are preferred for their greater resistance to diseases and their resilience to climatic stress. Optimization of nutrient and energy cycling for agricultural production occurs by diverse combinations of plants and animals. The maintenance of natural fields and absence of chemical inputs create suitable habitats for wildlife. The frequent use of under-utilized species (often as rotation crops to build soil fertility) reduces erosion of agro-biodiversity, creating a healthier gene pool - the basis for future adaptation. The provision of structures providing food and shelter, and the lack of pesticide use, attract new or re-colonizing species to the natural area, including wild flora and fauna (e.g. birds) predators. and organisms beneficial to the organic system such as pollinators and pest



role



Nutrient Cycling & Nutrient Management through various on farm inputs

Natural agriculture ecosystems rely on the of biodiversity for the recycling of nutrients through soils rather than supplementing the nutrients through use of off- farm inputs. Various on inputs stich Jeevamrut, Ghanjeevamrut etc, are used for nutrient management.

Minimal Soil disturbance & Whapasa

Reducing or suppressing the number of tillage Operations decreases fuel costs, increase the economic efficiency of agricultural activity. Direct. seeding has direct implications for sustaining soil structure, reducing vulnerability to erosion that occurs when plowing. Advantages of implementing these techniques includes reduction in the loss of soil and nutrients and increasing biodiversity. The no soil disturbance allows edaphic fauna to be more diverse and the food chain to be more complex. This is particularly relevant for soil quality, as these organisms cause its aeration and promote water infiltration. means the mixture of 50% air and 50% water vapour in the cavity between two soil particles. It is the soil's microclimate on which soil organisms and roots depend for most of their moisture and some of their nutrients. It increases water availability, enhances water-use efficiency and builds resilience against drought.



- **Mulching**

Soil surface is covered with both live crops and straw (dead plant biomass) for conservation of moisture, it lowers down soil temperature around plant roots, reduces run-off, prevent soil erosion and reduces weed growth. Mulch material decomposes gradually, which in-turn enhances the soil organic matter.



- **Use of Indigenous seeds**

Natural farming emphasizes on the use of indigenous locally adapted varieties of seeds because of their high sustainability, better pest/ disease resistance, economical suitability and limited requirement of inputs.

- **Pest management by natural methods**

Natural farming promotes pest management through better agronomic practices (as enshrined in Integrated Pest management) and through botanical pesticides (only when necessary).

- **No synthetic inputs**

Use of synthetic fertilizers and other synthetic inputs is harmful to the process of regeneration and is not allowed in natural farming.

- **Ensuring live roots all around year**

Soil may be covered with crops for maximum period of the year. The soil across a farm or larger field/collection of fields should have diverse crops, a minimum of 8 crops over the year.

- **Integration of Livestock**

Role of livestock is more critical in natural farms than in conventional farms. Integration of livestock and crop allow nutrients to be recycled more effectively on the farm. Excreta contain several nutrients (including nitrogen, phosphorus and potassium) and organic matter, which are important for maintaining soil structure and fertility. Adding manure to the soil not only fertilizes it but also improves its structures and water retention capacity. On an average well decomposed farmyard manure contains 0.5 % N, 0.2 % P and 0.5 %K. Excreta of sheep and goats contain higher nutrients than cattle manure and compost, on an average it contains 3 % N, 1 9/0 P and 2 % K. The average nutrient content of droppings of bird is: 3.03 % N; 2.63 % P205 and 1 % K2O.

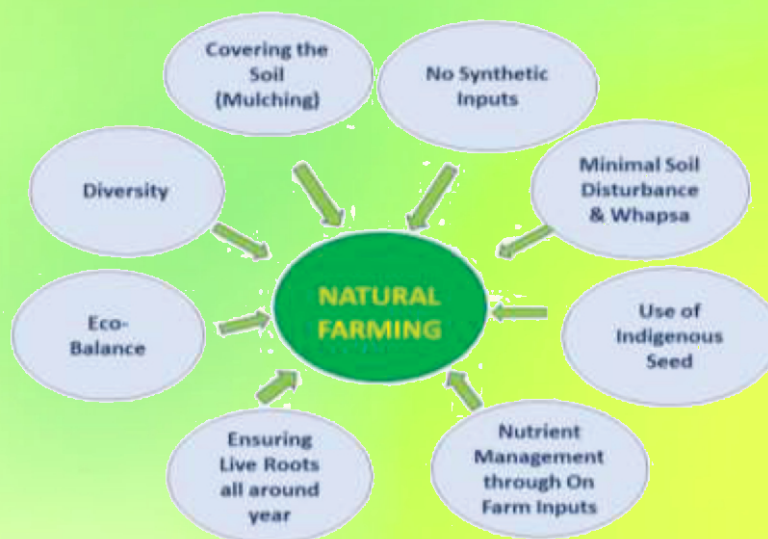


Fig: Components of natural farming



Benefits of Natural Farming to the Farmers

- **Improve Yield:** Farmers practicing Natural Farming reported similar yields to those following conventional farming. In several cases, higher yields per harvest were also reported.
- **Ensures Better Health:** As Natural Farming does not use any synthetic chemicals, health risks and hazards are eliminated. The food has higher nutrition density and therefore offers better health benefits.
- **Environment Conservation:** Natural Farming ensures better soil biology, improved agrobiodiversity and a more judicious usage of water with much smaller carbon and nitrogen footprints.
- **Increased Farmers' Income:** Natural Farming aims to make farming viable and aspirational by increasing net incomes of farmers on account of cost reduction, reduced risks, similar yields, incomes from intercropping.
- **Employment Generation:** Natural farming generates employment on account of natural farming input enterprises, value addition, marketing in local areas, etc. The surplus from natural farming is invested in the village itself.
- **Reduced Water Consumption:** By working with diverse crops that help each other and cover the soil to prevent unnecessary water loss through evaporation, Natural Farming optimizes the amount of 'crop per drop'.
- **Minimized Cost of Production:** Natural Farming aims to drastically cut down production costs by encouraging farmers to prepare essential biological inputs using on-farm, natural and home-grown resources.
- **Eliminates Application of Synthetic Chemical Inputs:** The overuse of synthetic fertilizers, especially urea, pesticides, herbicides, weedicides etc. alters soil biology and soil structure, with subsequent loss of soil organic carbon and fertility.
- **Rejuvenates Soil Health:** The most immediate impact of Natural Farming is on the biology of soil—on microbes and other living organisms such as earthworms. Soil health depends entirely on the living organisms in it.
- **Livestock Sustainability:** The integration of livestock in the farming system plays an important role in Natural farming and helps in restoring the ecosystem. Ecofriendly bio-inputs, such as Jeevamrit and Beejamrit, are prepared from cow dung and urine, and other natural products.

Steps for Transition from Conventional to Natural Farming

The transition from conventional to Natural Farming requires numerous changes. One of the biggest changes is in the mindset of the farmer. Conventional approaches often involve the use of quick-fix remedies that unfortunately, rarely address the cause of the problem. Transitioning farmers generally spend too much time worrying about replacing synthetic inputs to inputs derived from naturally occurring sources and considering management practices based on preventive strategies. Here are a few steps which a farmer should follow when making the transition to natural farming.





- **Training and awareness on Natural Farming and visit to nearby demonstrations:**

To gain practical knowledge the transitional producers should be prepared to visit Natural Farming fields of nearby Krishi Vigyan Kendra, Agricultural universities or progressive natural farmers' field and collect all relevant information and photographs related to farm operation, yield, products, certification and processing information

etc.

- **Start with at least one acre or part of your field:**

Transitional producers should start Natural farming in atleast one acre area or some part of their field and conduct their own trials based on visited fields of Krishi Vigyan Kendra, Agricultural universities or progressive natural farmers' field. Successful natural farmers continuously try new and/or innovative natural practices. Natural practices such as multiple cropping, cover cropping, intercropping and use of various soil and pest control, natural preparations, needs to be evaluated regularly by natural farmers and be prepared to try new approaches.



- **If fully convinced can think about converting whole farm into natural farming:**

To convert whole farm the plants should clearly identify various steps to be taken in making the transition to natural farming and be sure to include realistic timeframes. Identify your strengths and weaknesses. Include all pre-requisites to begin the transition, such as mechanical weeding equipments, composting equipments, additional handling equipments dedicated to the natural products and processing equipments. Although, the demand for natural products is continuously growing, grower needs to make sure they have a reliable market for the natural products they plan to produce.

- **Arrange Cow or Cattle for natural farming:**

Cow is basis of natural farming and dung from a single cow is sufficient for 05 acres of land. It is affordable, at the same time it prevents land degradation and maintains soil fertility. Cow's urine is the best natural insecticides that is used to kill insects and pests that can damage our crop. Be ready to attend trainings on On-farm Input preparation based on cow dung, urine and green leaf.



- **Maintain habitat and biodiversity in natural farm:**

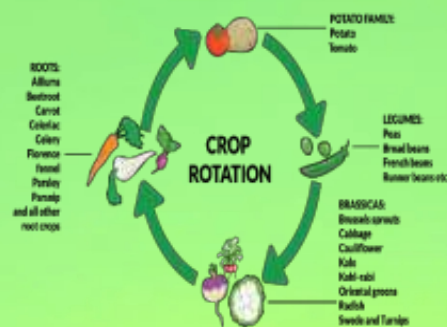


Management of an appropriate habitat for sustenance of different life forms is an essential component of natural farming. This can be achieved by ensuring crop diversity and by maintaining a wide variety of trees and bushes as per climatic suitability. These trees and bushes will not only ensure the nutrients from air and deep soil layers to surface layer but also attract the birds and predators, friendly insects and also provide the food and shelter. There may be some loss of productivity due to shading effect but that

loss can be compensated with reduced post problems and natural biological pest control system. In the plains, for a 10-acre farm, plant at least five to six neem trees (*Azadirachta indica*), one to two tamarind (*Tamarindus indica*), two fular (*Ficus glumerata*), eight to ten ber (*ZizyphusSp*) bushes, one to two aonla (*Emblica officinalis*), one to two drumstick and 10-15 wild bushes.

- **Crop rotation:**

Crop rotation is the back bone of natural farming practices. To keep the soil healthy and to allow the natural microbial systems working crop rotation is must. Crop rotation is the succession of different crops cultivated on same land. Follow 3-4 years rotation plan. All high nutrient demanding crops should precede and follow legume dominated crop combination. Rotation of pest host and non pest host crops help in controlling soil borne diseases and pest. It also helps in controlling weeds. It is better for improving productivity and fertility of soil. Crop rotations help in improving soil structure through different types of root system. Legumes should be used frequently in rotation with cereal and vegetable crops. Green manure crops should also find place in planning rotations. High nutrient demanding crops should always be followed by legume crops and returned back to soil.



- **Prepare Concoctions for enriching soil fertility, seed treatment and pests diseases control:**

A fertile and live organic soil ideally should have organic carbon between 0.8-1.5%. At any point of time, it should have adequate quantity of dry, semi decomposed and fully decomposed organic matter for the use of micro-flora and fauna. There should be at least 3-5 earth worms/cubic ft of soil. There should be enough quantity of small life forms and insects such as ants etc. use of some preparations of liquid manures like sanjivak, jivamrut, amritpani and panchgavya helps to increase the fertility of the soil.



- **Seeds/planting material Treatment:**



In natural management, protection measures are used only in the case of problematic situations. Use of disease-free seed stock is the best option. There is no standard formulation or treatment methodology, available as on today, but farmers use different methods.

- **Soil enrichment:**

During conversion period, soil fertility can be improved and maintained initially through use of natural inputs like well decomposed compost and green manure in appropriate quantity. These inputs are used for feeding the soil. Well-fed healthy soil rich in microflora and microfauna takes care of the crop nutrient requirement.



- **Follow mulching and moisture conservation:**



A mulch is a natural spread layer of plant residues or other materials on the surface of the soil. Natural mulches are from natural origin materials which can decompose naturally like agricultural wastes which are used as mulch such as grasses, weed plants, wheat or paddy straw, plant leaves and saw dust etc. It decays over time and it increases the water holding capacity of soil. It also provides the soil with nutrients as it breaks down. It also improves water use efficiency indirectly. A mulched layer restricts the weed growth by obstructing light penetration to the soil surface.

- **Follow good agricultural practices:**

The production of food, fibre, and other plant or animal products by the natural techniques that protect the environment, public health, human communities, and animal welfare.

- **Post-Harvest Management:**

Post-harvest management is a system of handling, storing, and transporting agricultural commodities after harvest. For some commodities such as coffee and cocoa, post-harvest activities may include drying and fermenting as well. The importance of post-harvest management has been established over the years—it strengthens the action chain that produces, transports, and processes food and all other related products that give sustenance to the world population.



- **Maintain a record and photo of each and every activity:**

Record keeping is one of the most important requirements in natural farming. Farmers are expected to keep all detailed information and photographs regarding farm operation, yield, products and processing information. Once the record keeping



requirements are understood, the reporting procedure established and paper work becomes routine. This will help in certification process documentation.

Seed Selection



Mixed seed can lower the market value of the crop. Hence, the source from which the seed is obtained is critical. Good quality seeds are pure, with high germination capacity, uniform seed size, colour and weight, besides being free from seed-borne diseases. The seed viability determines the germination capacity, the stand of the crop and its ultimate yield.

Soil Health Management through Natural Techniques

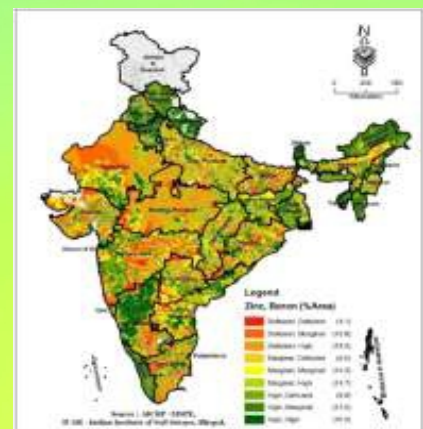
Soil is a fundamental and essential natural resource for the existence of all living organisms. Soil health or quality is defined as the capacity of soil to function as a vital living ecosystem that sustains plants and animals. Intensive crop cultivation using broadly using imbalanced fertilizer, high nutrient mining through monoculture, decline in organic matter status, deficiencies of secondary and micronutrients, etc. have deteriorated the soil health across the region in India resulting in declining crop productivity growth.

Nutrient deficiency in Indian soils

Overall, about 59 and 36 percent of Indian soils are low and medium in available N, respectively. Similarly, soils of about 49 and 45 percent area are low and medium in available P, respectively; while soils of around 9 and 39 percent area are low and medium in available K, respectively (5). Among various soil characteristics that affect the availability and uptake of micronutrients, soil pH and organic carbon content are the two most important factors.

Micronutrient deficiency in Indian soils

On an average, 36.5, 23.4, 12.8, 11.0, 7.1 and 4.2 percent soils are deficient in zinc, boron, iron, molybdenum, manganese, and copper, respectively, across the country. (5). Our soils are very low in organic matter content and thus have poor soil fertility. Organic carbon is an index of good soil health and application of organic manures helps in maintaining high organic carbon content of the soil. Soil organic carbon (SOC) is the key constituent which dictates soil physical condition, chemical properties including nutrient status and biological health of a soil (3). Management practices that reduce organic matter in soils, or bypass biologically-mediated nutrient cycling also tend to reduce the size and complexity of soil communities. Soil organisms, both animals (fauna/micro-fauna) and plants (flora/micro-flora), are important for maintaining the overall soil quality, fertility and stability of soil (15). Organic matter helps soils hold onto water and nutrients and supports soil microbes that recycle nutrients. They are intimately associated with biological and biochemical transformations occurring in soil (9)(10). According to the estimates, there is a large variation in SOC stock across states. The SOC stock of Indian soils is 10 to 12 percent of the tropical regions and about 3 percent of the total carbon mass of the world.



Role of soil microorganisms

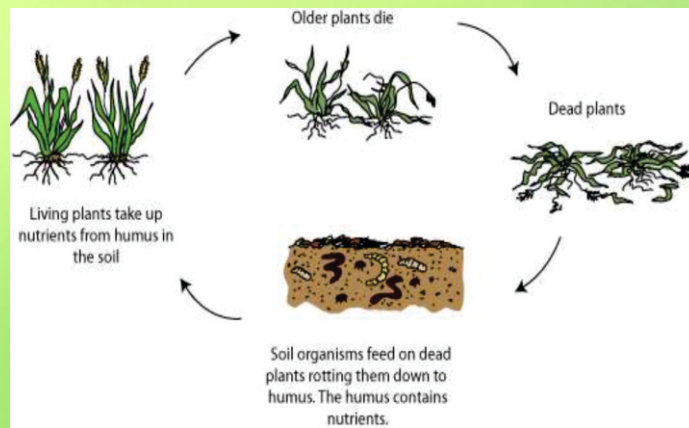


Fig. :- Formation and role of organic matter in the soil

For sustainable farming, healthy soil is the most important factor. Soil microbiologists believe that healthy soil means living soil, which involves trillions upon trillions of living microorganisms consuming first organic matter, then each other, and releasing nutrients in the process. There are some 150 species of arbuscular mycorrhizal fungi (MF) that colonise the root systems of plants. Plants offer photosynthetic sugars to MF, which in turn assist the plant by facilitating the uptake of mineral nutrients and water. In healthy soil, mycorrhizal fungi grow immensely which works like a sponge. It helps in improving soil aggregate stability, build soil carbon, improve water use efficiency and increase the efficiency of nitrogen, phosphorus and sulphur. To increase the mycorrhizal fungi, it needs to reduce/eliminate chemical use, reduce/eliminate tillage, reduce/eliminate synthetic fertilisers and living plant cover as long as possible. Cover crop also reduces soil temperature, which improves soil moisture condition and in turn helps in soil bacterial growth. Thus, it also helps in building a soil carbon sponge, which absorbs water and makes it available to the plants (13). Further, (9) studies state that 95 percent of the bio-fertility of soils is about these microbial processes, not the actual nutrient content in the soil or how much we put on as fertiliser. The application of chemical fertilisers, biocides, tilling of lands, etc. is detrimental to these soil microorganisms, and consequently roots of the plants act simply as straw sucking mainly those nutrients, which has been supplied externally in the forms of chemical fertilizers. Through biological processes, all kinds of 15 nutrients are made available to the plants through decomposition of root biomass of previous crops or mulches.

Evidence suggests that crop residues are good sources of plant nutrients and can increase yield and water use efficiency, while decreasing weed pressure. Long-term studies of the residue recycling have indicated improvements in physical, chemical and biological health of soil Biological sciences (e.g. microbiology, ecology, soil science) with their increasingly symbiotic and "probiotic" understandings of soil and plant life are also an inspiration for the ecological renewal of agriculture. "Wallenstein" (16) argues that to restore soils, we need to feed the soil microbes. It can be done by adding organic material back to soil, minimizing tillage and stopping use of synthetic fertilizers and chemicals. Initially, a Japanese farmer, Masanobu Fukuoka proposed natural farming, which is based on the philosophy of working with natural cycles and processes of the natural world. It is contemplated as a solution to end reliance on purchased inputs, improved family health & nutrition, stable crop yield, consequently reduced indebtedness and suicides among Indian



farmers.

Natural farming promotes soil health and improves soil organic carbon and helps in attaining sustainable agriculture with reduced carbon footprint. There are several variants of Natural Farming, under which the farmers do local customization and adaptation according to their local conditions. However, the most popular form of Natural Farming in India is the advocacy by its chief proponent Sh. Subhash Palekar.

This form of Natural Farming is now known by millions of farmers across India through training programmes for the farmers at different locations in the country for promotion and propagation of its practices.

Nutrient Management & Practices to Maintain Soil fertility in Natural Farming Systems

Practices	Impact on soil quality and crop production
Legumes in rotation	Nitrogen fixation, contributions to soil organic matter, fibrous root systems contribute to loosening soil and quality
Manure application	Provides nitrogen and other nutrients, increases level of soil organic matter, improves soil tilth and quality
On-farm cycling	Use of primarily green manure crops and animal manure produced by feeding grain or forage on same farm helps in nutrient balance
Cover crops	Provide cover over the ground surface during much of the year to prevent erosion, trap nutrients, contribute organic matter
Timely seeding	Synchronize crop planting and growth cycle with availability of nutrients from soil reserve
Reduced tillage	Maintains crop residues on top of soil, where they break down more slowly and provide nutrients when needed by later crops
Crop–Alley rotation	Rotation of crops with perennial pastures and grazing animals provides manure, fixed nitrogen, and green biomass to soil
Contour planting	Seeding crops on contours or terraces reduces soil erosion and thus, reduces nutrient losses with eroding soil
Crop–animal systems	Integration of a diverse array of animal enterprises provides an internal market for forages and helps cycle nutrients

Integrated Farming System

Integrated Farming System Model

MPKV Results:
Area : 1.00 Ha
Gross Return
Rs. 7,13,353 /-
Cost of
Production Rs.
2,63,299 /-
Net Return
Rs. 4,50,054/-



Integrated Farming System (IFS) refers to diversified farming practices where plant cultivation is preferred in combination with animal/birds/insect rearing, dairy production and or fungal propagation (mostly mushroom production). It is also an essential feature of organic and natural farming and is aimed to maximize the net profit out of intensive use of available natural resources. IFS has been adopted and practiced across the globe since the eras as a main source of livelihood. It may also be seen in the wild life with natural integration of flora, fauna, wild mushrooms and microorganisms. Integration of lives in turn proves to be symbiotic, sustainable, complementary, economic and creditable. In the modern time it is being adopted with systematic approaches relying more on scientific evidences of net monetary benefits, sustainability, social obligation and ease of work with use of modern technology, improved inputs and market driven requirements.

Advantages of IFS:

- Higher food production to equate the demand of the exploding population of our nation
- Increased farm income through proper residue recycling and allied components
- Sustainable soil fertility and productivity through organic waste recycling
- Integration of allied activities will result in the availability of nutritious food enriched with protein, carbohydrate, fat, minerals and vitamins
- Integrated farming will help in environmental protection through effective recycling of waste from animal activities like piggery, poultry and pigeon rearing
- Reduced production cost of components through input recycling from the byproducts of allied enterprises
- Regular stable income through the products like egg, milk, mushroom, vegetables, honey and silkworm cocoons from the linked activities in integrated farming
- Inclusion of biogas & agro forestry in integrated farming system will solve the prognosticated energy crisis
- Cultivation of fodder crops as intercropping and as border cropping will result in the availability of adequate nutritious fodder for animal components like milch cow, goat / sheep, pig and rabbit
- Firewood and construction wood requirements could be met from the agroforestry system without affecting the natural forest
- Avoidance of soil loss through erosion by agro-forestry and proper cultivation of each part of land by integrated farming
- Generation of regular employment for the farm family members of small and marginal farmers.

Insects & Pest Management

1. Selection of varieties which are well adapted to the local environmental conditions (temperature, nutrient supply, pests and disease pressure), as it allows them to grow healthy and makes them stronger against infections of pests and diseases.
2. Selection of safe seeds/ planting material which have been inspected for pathogens and weeds at all stages of production.
3. Mixed cropping systems can limit pest and disease pressure as the pest has less host plants to feed on



and more beneficial insect life in a diverse system. Crop rotation reduces the chances of soil borne diseases and increases soil fertility and green manuring and cover crops: increases the biological activity in the soil and can enhance the presence of beneficial organisms (but also of pests; therefore, a careful selection of the proper species is needed).

4. Moderate fertilization: steady growth makes a plant less vulnerable to infection. Too much fertilization may result in salt damage to roots, opening the way for secondary infections.
5. Input of organic matter increases micro-organism density and activity in the soil, thus decreasing population densities of pathogenic and soil borne fungi. It stabilises soil structure and thus improves aeration and infiltration of water.
6. Application of suitable soil cultivation methods facilitates the decomposition of infected plant parts, regulates weeds which serve as hosts for pests and diseases and protects the micro-organisms which regulate soil borne diseases.
7. Use of good water management:
8. Conservation and promotion of natural enemies
9. Most pests or diseases attack the plant only in a certain life stage; therefore, it's crucial that this vulnerable life stage doesn't correspond with the period of high pest density and thus that the optimal planting time is chosen. Sufficient distance between the plants reduces the spread of a disease. Good aeration of the plants allows leaves to dry off faster, which hinders pathogen development and infection.
10. Remove infected plant parts (leaves, fruits) from the ground to prevent the disease from spreading and eliminate residues of infected plants after harvesting.

On Farm Input Production and Methodology for Natural farming

On farm inputs enable a stable level of organic matter in the soil, which provides many benefits such as:

- Improvement of the soil structure
- Stimulation of the biological activity
- Increase in water retention
- Tillage facilitation
- Plant health

They can also play a role in protecting crops from pests and diseases (repellent, stimulator of the plant natural defence mechanisms etc)

The contribution of on farm inputs is an important agroecological lever to preserve the agricultural soil quality.

There are number of formulations which farmers can prepare on their farm such as:

Beejamrut

- Cow Dung- 5kg
- Cow urine- 5L
- Cow milk- 1L
- Lime- 50g
- Water- 20L
- Healthy soil-50g

Methodology:

1. Take 20 litres water.
2. Then take 5 Kg Desi cow dung. Mix it by the fingers.
3. Take it in a cloth and bound it by small rope as a small bundle
4. Hang this bundle of cow dung in the taken 20-litre water for a night.



5. Take one litre water and add 50 gm lime in it, let it stable for a night.
6. Then next morning, squeeze this bundle of the cow dung in that water thrice continuously, so that all essence of cow dung will accumulate in that water.
7. Then add a handful of soil in that water solution and stir it well.
8. Then add 5 litre Desi cow urine or human urine in that solution
9. Then add the lime water and stir it well.
10. Keep it overnight for proper fermentation.
11. Now Beejamrita is ready to treat the seeds.

Jeevamrut

- Cow dung- 10kg
- Cow urine- 10L
- Jaggery- 2kg
- Flour of gram (Tur, Moong, Cowpea, Urad) – 2kg
- Live soil (Healthy soil)- one handful
- Water- 200L

Methodology:

1. Take 200 litres water in a barrel for one acre crop utilization.
2. Add 10 kg Cow dung in that water. Mix the desi cow dung in that water by the tips of your fingers well.
3. Stir it well by a stick clock wise. Then add broken small pieces of Jaggery.
4. Again, stir it well. Then Add Pulses flour in that solution.
5. Then add Desi cow urine Add handful soil from the bund or forest in that solution.
6. Stir it well. Keep the cover of jute bag on the barrel.
7. Keep this solution quite stable for three days to ferment.
8. During fermentation, the poisonous gases like Ammonia, Methane, Carbon-mono-oxide, Carbon dioxide, are emitted. Through the holes of jute bag these gases are evacuated in the atmosphere and aerobic fermentation process is going on with the high speed. For that purpose, we have utilized jute bag to cover the barrel.
9. Stir this solution by the branch of tree thrice a day.
10. Keep the barrel in shade or shadow. Do not expose Jeevamrit to straight sunlight or rain.
11. Now Jeevamrit is ready for utilization.



Uses

- Promoting growth and flowering along with acting as a yield enhancer (@5-10% spray with water)
- Soil fertility enhancer (applied along with irrigation water)

GhanJeevamrit

- Cow dung- 100 kg
- Cow urine- As needed
- Jaggery- 1kg
- Flour of gram (Tur, Moong, Cowpea, Urad) – 2kg
- Live soil (Healthy soil)- one handful

Methodology:

1. Take 100 Kg Desi cow dung. Take 1 Kg Jaggery and Make its powder.
2. Then mix it well in that cow dung.



3. Then take 2 Kg flour of pulse and mix it in that cow dung properly.
4. Then mix handful soil from the bund of the farm in it. Then mix this mixture properly.
5. Add some desi cow urine in it if required. Keep it in the shadow for drying for 48 hours.
6. Cover it by gunny Jute bag. Do not expose it to sunlight while drying. Dry it in the shadow.
7. After 48 hours let it to dry in the shadow. After drying crush it properly and then sieve it and store in the gunny bags.
8. Utilize this 200 Kg GhanJeevamrit per acre either by spreading out before sowing OR by sowing it with the seeds.

Brahmastra (broad spectrum botanical pesticide)

- Crush 3 kg neem leaves in 10 L cow urine.
- Crush 2 kg custard apple leaves, 2 kg papaya leaves, 2 kg pomegranate leaves and 2 kg guava leaves in water. Mix the two and boil 5 times at same interval till it becomes half.
- Keep for 24 hours, then filter squeeze the extract. This can be stored in bottles for 6 months.
- Dilute 2-2.5 litre of this extract to litre to 100 litre for acre.
- Benefits: Useful against sucking pests, pod/fruit borers.



Neemastra (Broad Spectrum Botanical Pesticide)

- Crush 5 kg neem leaves in water. Add 5lit cow urine and 2 kg cow dung
- Ferment for 24 hrs with intermittent stirring. Filter squeeze the extract and dilute to 100 lit
- Use as foliar spray over one acre. Useful against sucking pests and mealy bugs

Agneyastra

- Crush 1 kg Ipomea (besaram) leaves, 500 gm hot chilli, 500 gm garlic and 5 kg neem leaves in 10 lit cow urine.
- Boil the suspension 5 times till it becomes half. Filter squeezes the extract.
- Store in glass or plastic bottles. 2-3 lit extract diluted to 100 lit is used for one acre.
- Useful against leaf roller, stem/fruit/pod borer.

Some Other Pest Control Formulations

Cow urine:

Cow urine diluted with water in ratio of 1: 20 and used as foliar spray is not only effective in the management of pathogens & insects, but also acts as effective growth promoter for the crop.

Fermented curd water:

In some parts of central India fermented curd water (butter milk or Chaach) is also being used for the management of white fly, jassids aphids etc.



Dashparni extract:



Crush neem leaves 5 kg, Vitex negundo leaves 2 kg, Aristolochia leaves 2 kg, papaya (Carica Papaya) 2 kg, Tinospora cordifolia leaves 2 kg, Annona squamosa (Custard apple) leaves 2 kg, Pongamia pinnata (Karanja) leaves 2 kg, Ricinus communis (Castor) leaves 2 kg, Nerium indicum 2 kg, Calotropis procera leaves 2 kg, Green chilly paste 2 kg, Garlic paste 250 gm, Cow dung 3 kg and Cow Urine 5 lit in 200 lit water ferment for one month. Shake regularly three times a day. Extract after

crushing and filtering. The extract can be stored up to 6 months and is sufficient for one acre.

Neem-Cow urine extract: Crush 5 kg neem leaves in water, add 5lit cow urine and 2 kg cow dung, ferment for 24 hrs with intermittent stirring, filter squeeze the extract and dilute to 100 lit, use as foliar spray over one acre. Useful against sucking pests and mealy bugs.

Mixed leaves extract: Crush 3 kg neem leaves in 10 lit cow urine. Crush 2 kg custard apple leaf, 2 kg papaya leaf, 2kg pomegranate leaves, 2 kg guava leaves in water. Mix the two and boil 5 times at some interval till it becomes half. Keep for 24 hrs, then filter squeeze the extract. This can be stored in bottles for 6 months. Dilute 2-2.5 lit of this extract to 100 lit for 1 acre. Useful against sucking pests, pod/fruit borers.

Chilli-garlic extract: Crush 1 kg Ipomea (besharam) leaves, 500 gm hot chilli, 500 gm garlic and 5 kg neem leaves in 10 lit cow urine. Boil the suspension 5 times till it becomes half. Filter squeezes the extract. Store in glass or plastic bottles. 2-3 lit extract diluted to 100 lit is used for one acre. Useful against leaf roller, stem/fruit/pod borer.

Broad spectrum formulation: 1 - In a copper container mix 3 kg fresh crushed neem leaves and 1 kg neem seed kernel powder with 10 lit of cow urine. Seal the container and allow the suspension to ferment for 10 days. After 10 days boil the suspension, till the volume is reduced to half. Ground 500 gm green chillies in 1 lit of water and keep overnight. In another container crush 250gm of garlic in water and keep overnight. Next day mix the boiled extract, chilli extract and garlic extract. Mix thoroughly and filter. This is a broad spectrum pesticide and can be used on all crops against wide variety of insects. Use 250 ml of this concentrate in 15 lit of water for spray.

Broad spectrum formulation: 2 Suspend 5 kg neem seed kernel powder, 1kg Karanj seed powder, 5 kg chopped leaves of besharam (Ipomea sp.) and 5kg chopped neem leaves in a 20lit drum. Add 10-12 lit of cow urine and fill the drum with water to make 150 lit. Seal the drum and allow it to ferment for 8-10 days. After 8 days mix the contents and distil in a distiller. Distillate will act as a good pesticide and growth promoter. Distillate obtained from 150lit liquid will be sufficient for one acre. Dilute in appropriate proportion and use as foliar spray. Distillate can be kept for few months without any loss in characteristics.



Water Conservation Techniques

Soil and Water Conservation

Biological measures (agronomic/agricultural and agroforestry) are applicable in the landscape of ≤ 2 percent slope. These measures reduce the impact of raindrops through the covering of soil surface and increasing infiltration rate and water absorption capacity of the soil resulting in reduced runoff and soil loss through erosion. These measures are cheaper, sustainable, and may be more effective than structural measures. Important agronomic measures favouring soil and water conservation are described below:

Contour farming



Contour farming is the most common agronomic measures for soil and water conservation in hilly agro-ecosystems and sloppy lands. All the agricultural operations viz. ploughing, sowing, inter-culture, etc. are practised along the contour line. The ridges and furrows formed across the slope build a continual series of small barriers to the flowing water which reduces the velocity of runoff and thus reduces soil erosion and nutrient loss. It conserves soil

moisture in low rainfall areas due to increased infiltration rate, whereas in high rainfall areas, it reduces the soil loss. In both situations, it reduces soil erosion, conserves soil fertility and moisture and thus improves overall crop productivity. The effectiveness of this practice depends upon rainfall intensity, soil type and topography of a particular locality.

Choice of crops

The selection of the right crop is crucial for soil and water conservation. The crop should be selected according to the intensity and critical period of rainfall, market demand, climate and resources of the farmer. The crop with good biomass, canopy cover, and extensive root system protects the soil from the erosive impact of rainfall and creates an obstruction to runoff and thereby reduces soil and nutrient loss. Row or tall-growing crops such as sorghum, maize, pearl millet, etc. are erosion permitting crops which expose the soil and induce the erosion process. Whereas, close growing or erosion resistant crops with dense canopy cover and vigorous root system viz. cowpea, green gram, black gram, groundnut, etc. are the most suitable crops for reducing soil erosion. To increase the crop canopy density, the seed rate should always be on the higher side.

Crop rotation

Crop rotation is the practice of growing different types of crops in succession on the same field to get benefits for soil and crop systems. Beneficial effects include lower incidence of weeds, insects, and plant diseases, as well as improvements of soil physical, chemical, and biological properties. Monocropping results in exhaustion of soil nutrients and deplete soil fertility. The inclusion of legume crops in crop rotation reduces soil erosion, restores soil fertility, conserves soil and water and helps supplement atmospheric nitrogen to the soil. Further, the incorporation of crop residue improves organic matter content, soil health and reduces water requirement. A suitable rotation with high canopy cover crops helps in sustaining soil fertility, suppresses weed growth, decreases pests and disease infestation, increases input use efficiency and system productivity while reducing the soil erosion.



Cover crops



The close-growing crops having high canopy density are grown for protection of soil against erosion, known as cover crops. Legume crops have better biomass to protect soil than row crops. The effectiveness of cover crops depends on crop geometry and development of canopy for interception of raindrops which helps in reducing the exposure of soil surface for erosion. The legumes provide better cover and better protection to land against runoff and soil loss as compared to cultivated fallow and sorghum crops. The most effective cover crops are cowpea, green gram, black gram, groundnut, etc.

Intercropping

Cultivation of two or more crops simultaneously in the same field with definite or alternate row pattern is known as intercropping. It may be classified as row, strip, and relay intercropping as per the crops, soil type, topography and climatic conditions. Intercropping involves both time-based and spatial dimensions. Erosion permitting and resisting crops should be intercropped with each other. The crops should have different rooting patterns. Intercropping provides better coverage on the soil surface, reduces the direct impact of raindrops and protects soil from erosion.



Strip cropping

Growing alternate strips of erosion permitting and erosion resistant crops with a deep root system and high canopy density in the same field is known as strip cropping. This practice reduces the runoff velocity and checks erosion processes and nutrients loss from the field. The erosion resistant crops protect soil from beating action of raindrops, reduce runoff velocity and thereby increase time of concentration which results in a higher volume of soil moisture and increased crop production. Strip cropping is practised for controlling the run-off and erosion and thereby maintaining soil fertility. In natural farming our five layer model is an example of this type of cropping.



Types of strip cropping

- **Contour strip cropping**

The growing of alternate strips of erosion permitting and erosion resisting crops across the slopes on the contour is known as contour strip cropping. It reduces the direct beating action of raindrops on the soil surface, length of the slope, runoff flow and increases rainwater absorption into the soil profile.

- **Field strip cropping**

In this practice the field crops are grown in more or less parallel strips across fairly uniform slopes, but not on exact contours. It is useful on regular slopes and with soils of high infiltration rates, where contour strip cropping may not be practical.



- **Wind strip cropping**

It consists of the planting of tall-growing row crops (such as maize, pearl millet and sorghum) and close or short growing crops in alternately arranged straight and long, but relatively narrow, parallel strips laid out right across the direction of the prevailing wind, regardless of the contour.

- **Permanent or temporary buffer strip cropping**

It is the growing of permanent strips of grasses or legume or a mixture of grass and legume in highly eroded areas or in areas that do not fit into regular rotation, i.e. steep or highly eroded, slopes in fields under contour strip cropping. These strips are not practiced in normal strip cropping and generally planted on permanent or temporary basis.

Mulching

Mulching is defined as covering of soil surface using either live crops or straw (dead plant biomass) to conserve moisture, increase infiltration, lower soil temperature around plant roots, prevent soil erosion, improve soil structure, reduce runoff and weed growth. Mulching prevents the formation of hard crust after each rain. The use of blade harrows between rows or inter-cultural operations creates 'dust mulch' on the soil surface by breaking the continuity of capillary tubes of soil moisture and reduces evaporation losses. Mulching also reduces the weed infestation along with the benefits of moisture conservation and soil fertility improvement. Hence, it can be used in high rainfall regions to reduce soil and water loss and in low rainfall regions for soil moisture conservation.



The natural farming initiatives show promise for transformation at scale and open up a new frontier in thinking about agriculture with efficient utilisation of soil and water resources. Intensive irrigation and deep ploughing is not promoted in Natural Farming. This farming system also promotes soil aeration, minimal watering, intercropping and buds and topsoil mulching. Aachhadan, associated with natural farming which is mulching either by crop residues or live mulch through intercrops, does not allow soil evaporation and transpiration. Whapasa, is a condition where there is a presence of both air molecules and water molecules in the soil. This condition helps in reducing irrigation requirements and promotes water availability to the crops through soil capillary actions. The drought conditions can be mitigated through Intercropping and Aachhadan. This intercropping and Aachhadan conditions enhance the activities of soil earthworms from top to bottom soils and vice-versa. Earthworms maintain the physico-chemical properties of the soil by converting biodegradable materials and organic wastes into nutrient-rich products, emerging from their burrows to deposit the faecal matter (vermicast) on the surface. Earthworms stimulate microbial activity, mix and aggregate the soil, soil water content and water holding capacity. Earthworm burrows act as a channel for plant growth and as pathways for root elongation, especially in compacted zones typically found in deeper soil layers. It makes the soil porous, increasing the water infiltration rate and reducing soil erosion. During drought conditions, they provide water to the plants/crops by capillary



action through their burrows.

Standards for natural farming and scope of certification for natural produce

National Standards for Natural Farming (NSNF):

National Standards for Natural Farming for certified Natural Farming Products are made to all agricultural, horticultural, medicinal & herbal and agroforestry crops, wild harvest (Non-timber minor forest produce), livestock / fisheries/Beekeeping systems and their products. Processing under NSNF is limited to on-farm processing at individual or at group of producers. Multi-ingredients processing, where raw material from different sources and from different certification systems are derived is not part of natural farming standards.

Why Natural Farming certification required

- To build Trust
- Identity and differentiate products from non-certified products
- To ensure Quality and Guarantee of the product
- Uniqueness of any product is similar to identity which enables specific differentiation among the certified product which is unique for the claimed product which cannot be replicated in any way by any person.
- Any product which comes under certification mechanism with proper labelling, i.e., by logo or UID no. enables any producer / sales person to build their brand which will lead to ownership for using specific logo.
- Promote branding for easy acceptance of products

Marketing of natural produce



Picture: Ima Keithel Imphal (Mothers Market)

The demand for the organic or natural products is growing in the country. The Covid situation in the country has also impacted on consumers in India to go for organic and safe, healthy and immunity booster products. The organic market in the couple of years has rapidly grown 25 to 30 % a year. There are several states practicing Natural Farming. Prominent among them are Andhra Pradesh, Chhattisgarh, Kerala, Gujarat, Himachal Pradesh, Jharkhand, Odisha, Madhya Pradesh, Rajasthan, Uttar Pradesh and Tamil Nadu. The NCOF has been renamed as NCONF and it has started its promotional work in natural farming, website has been updated and information on all aspects of natural farming—from area coverage, trainings, videos, media coverage, its various components, methods and techniques and more. The website also details the numerous benefits of natural farming, success stories, research papers, and similar international practices. There is a scope for natural Farming and certification and marketing in India.

- The indicative possible standards and system of certification which may be implemented in future after approval is summarised in this chapter. There may be slight variation in the



system and structure but for overall documentation and understanding the natural farming stakeholders may keep in mind the following:

- Natural farming major practices may include :No external inputs, Local seeds (use of local varieties), Microbial Seed treatment, Microbial inoculants for soil health, Cover crops for biomass mulching and bio-mass incorporation for creating a suitable micro-climate for maximum beneficial microbial activity, Mixed cropping, Integration of trees into the farm, Integration of livestock, especially of native breed for cow dung and cow urine as essential inputs for several practices, Water and moisture conservation. Natural farming aims for restoring Soil Health, maintenance of diversity, animal welfare, Efficient use of natural/local resources and ecological fairness and balances.
- Scope: The NFC (Natural Farming Certification) may be voluntary in nature and non-binding. It is based on continuity and recognizes the farmers adopting natural farming systems as unique to the area and crops. NFCS may be based on producer's declaration of the practices adopted against the standards followed by the physical peer appraisal by group peers and finally declared themselves certification decision. "NFC standards may be applicable to crop production, livestock production and processed products made thereof. NFC" certification standards may provide traceability to ensure that Certified Products are grown/ produced, handled, processed and packed throughout the value chain through documented and verifiable chain-of-custody. "NFCS may be voluntary and non-binding. "it may be granted on cropping season basis and requires continuity of certification
- Agricultural marketing is mainly the buying and selling of agricultural products. In earlier days when the village economy was more or less self-sufficient the marketing of agricultural products presented no difficulty as the farmer sold his produce to the consumer on a cash or barter basis.
- Today's agricultural marketing has to undergo a series of exchanges or transfers from one person to another before it reaches the consumer. There are three marketing functions involved in this, i.e., assembling, preparation for consumption and distribution. Selling on any agricultural produce depends on some couple of factors like the demand of the product at that time, availability of storage etc. The products may be sold directly in the market or it may be stored locally for the time being. Moreover, it may be sold as it is gathered from the field or it may be cleaned, graded and processed by the farmer or the merchant of the village. Sometime processing is done because consumers want it, or sometimes to conserve the quality of that product. The task of distribution system is to match the supply with the existing demand by whole selling and retailing in various points of different markets like primary, secondary or terminal markets. (TNAU website).



Picture : Children in U-Pick Farm Farm Stands



- Most of the agricultural products in India are sold by farmers in the private sector to moneylenders (to whom the farmer may be indebted) or to village traders. Products are sold in various ways. For example, it might be sold at a weekly village market in the farmer's village or in a neighbouring village. If these outlets are not available, then produce might be sold at irregularly held markets in a nearby village or town, or in the mandi.
- In India, there are several central government organisations, who are involved in agricultural marketing like, Commission of Agricultural Costs and Prices, Food Corporation of India, Cotton Corporation of India, Jute Corporation of India, etc. There are also specialised marketing bodies for rubber, tea, coffee, tobacco, spices and vegetables. Under the Agricultural Produce (grading and marketing) Act of 1937, more than forty primary commodities are compulsorily graded for export and voluntarily graded for internal consumption. Although the regulation of commodity markets is a function of state government, the directorate of marketing and inspection provides marketing and inspection services and financial aid down to the village level to help set up commodity grading centers in selected markets.
- As we have a tradition of agricultural production, marketing and allied commercial activities, now it is the time to come out with new ideas of value-added services and bringing demand based safe and healthy food products. These value-added services and products will give the existing agricultural engine a new dimension. Another dimension could be food-processing which not only could be another revenue generating area but also can provide lots of full-time employment to our youths. With the changing agricultural scenario and global competition, there is a need of exploiting the available resources at maximum level.
- Recent times, all over the world many farmers have transformed from conventional farming to organic farming to chemical free or Natural farming. Chemical free producers are facing many problems in marketing their produce like getting optimum price, supply chain etc. The processing/marketing firms should go the Natural farming way proactively. This will be similar to agricultural input firms moving from chemical to organic inputs instead of perceiving organic as a threat. The agribusiness firms should look at Natural farming and trade as an opportunity which is in accordance with the larger developmental goal of sustainability. This is one more historic opportunity for the industry to contribute to human progress substantially as they are best placed to tailor the chain naturally. They should implement and promote Good Farm/Agricultural Practices.
- Farmers approach direct marketing in a variety of ways using single or multiple channels. The goal generally is to develop a strategy to sell the entire product they produce.
- This can be through one marketing channel or several. Farms may also add additional direct market channels as the business grows. For instance, many farmers begin with selling through a farmers' market or a roadside stand. As the business grows, they can add other direct channels such as a CSA, grocery or restaurant sales. Direct sales channels for specific crops or a segment of a crop may be combined with wholesale channels. The options are nearly endless. Following are the approaches for marketing strategies for Natural Farming Produces.
- Marketing strategies for Natural Farming at Farmers level
- Community Supported Agriculture (CSA)
- Subscription base marketing.



- Farmers Markets
- U-Pick farms
- Farm Stands Restaurants
- Farm to School and Institutions
- Agritourism
- Natural Seed Bank.
- Online Marketing

Natural Farming Mission:

Nation mission on natural farming aims at creating institutional capacities for documentation and dissemination of best practices, make practicing farmers as partners in promotion strategies, ensure capacity building and continues hand-holding and finally attracting farmers to the natural farming willing on the merit of the system.

Mission Objectives

- i. To promote alternative system of farming for freedom from externally purchased inputs, cost reduction and thereby increasing income of farmers
- ii. To popularize integrated agriculture-animal husbandry models based on desi cow and local resources.
- iii. To collect, validate and document Natural Farming practices being practiced in various parts of the country and to encourage participatory research with farmers on further up scaling
- iv. To undertake activities for awareness creation, capacity building, promotion and demonstration of Natural Farming.
- v. To create standards, certification procedure and branding for Natural Farming products for national and international markets.

Current Scenario of Natural Farming of different states in India

There are several states practicing Natural Farming. Prominent among them are Andhra Pradesh, Chhattisgarh, Kerala, Gujarat, Himachal Pradesh, Jharkhand, Odisha, Madhya Pradesh, Rajasthan, Uttar Pradesh and Tamil Nadu. Till now 6.5 lakh ha. area is covered under natural farming in India. Different State governments are promoting natural farming through various schemes.

Andhra Pradesh: The Government of Andhra Pradesh turned to farming approaches that are in harmony with nature, as they build on ecological science, rather than input economics. By improving the ecological conditions in each and every site, it is witnessed that Natural Farming reduces the need for synthetic inputs and deliver instead a form of farming that costs less, in financial terms, and is climate resilient.



The Andhra Pradesh Community-Managed Natural Farming (APCNF): This programme is being implemented by Rythu SadhikaraS amstha (RySS), a not-for-profit company established by the Department of Agriculture, Government of Andhra Pradesh. RySS's mandate is to plan and implement programmes for the empowerment and all-round welfare of farmers.



Gujarat: In Budget 2020–21, special financial assistance was announced for promoting Natural Farming practices under the Gujarat Atma Nirbhar package. Further, on 17 September 2020, two schemes were launched—Sat Pagla Khedut Kalyaan and Pagala for Natural Farming—by the Government of Gujarat.

Details of Scheme 1: Rs 900 monthly subsidy for the maintenance cost of one cow to a farming family practising Natural Farming. Details of Scheme

2: Provision of Rs 1248 subsidy to farmers for purchase of a Natural Farming kit to prepare Jeevamrit.

Himachal Pradesh: Himachal Pradesh practices Natural Farming under the Prakritik Kheti Khushhal Kissan (PK3) Yojana. The scheme aims to reduce the cost of cultivation and enhance farmers' income. The scheme was announced by the Chief Minister in the Budget speech of 2018–19. The scheme seeks to promote the production of food grains, vegetables, and fruits without the use of synthetic chemicals/pesticides and fertilizers.



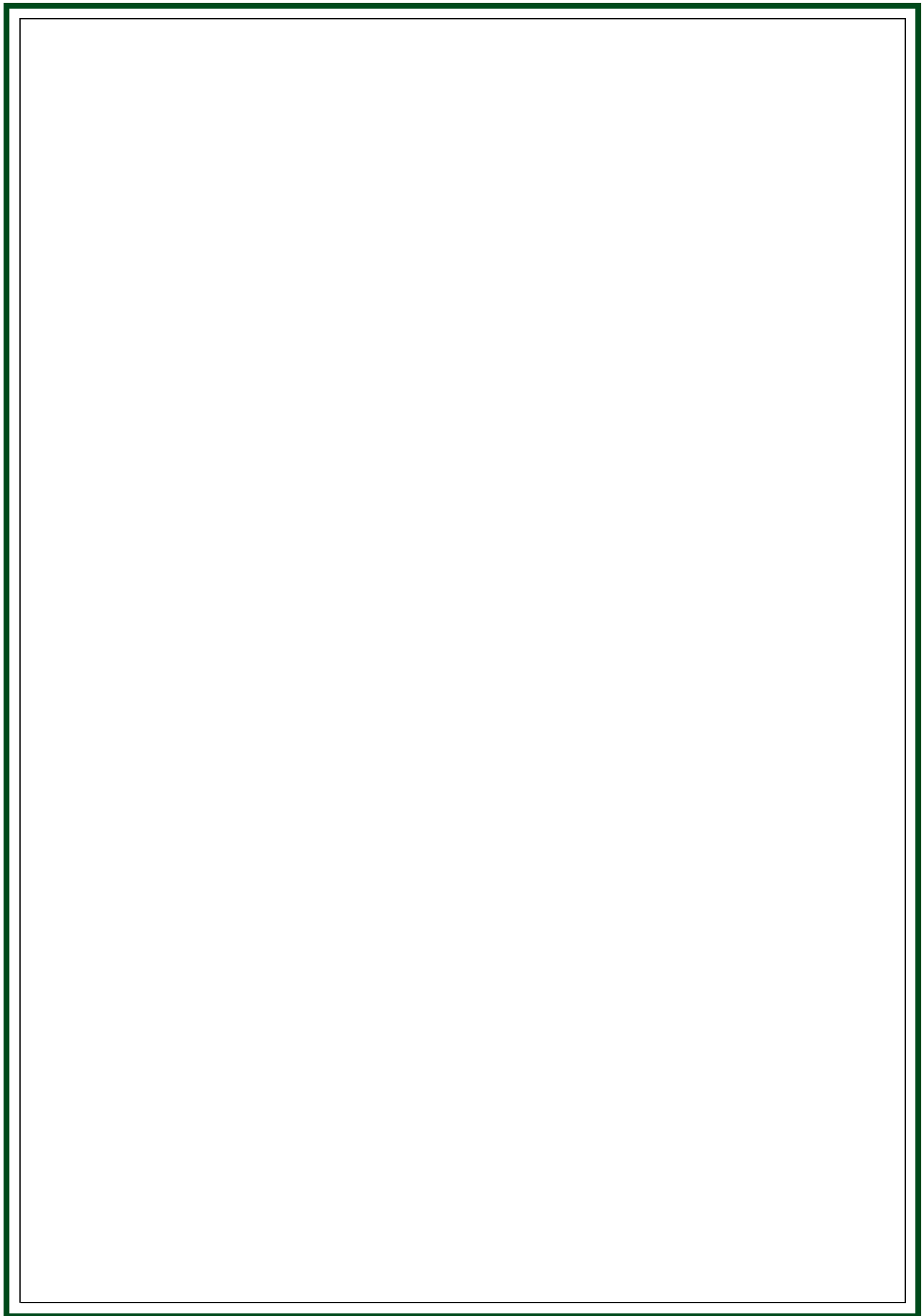
The scheme went beyond its target of covering 500 farmers to 2669 in 2018–19. By 2019–20, 54,914 farmers were practicing Natural Farming on 2,451 hectares of land. The scheme has now targeted to bring more farmers under its ambit and cover 20,000 hectares.



Rajasthan: Honourable Chief Minister of Rajasthan during the budget speech of FY2019-20 declared support to natural farming to reduce input costs with a view to empower farmers through remunerative agriculture – Kheti Mein Jaan Toh Sashakt Kisan. The scheme in the form of a pilot project was initiated in three districts of the State viz. Tonk, Sirohi and Banswada.

Under the scheme, 18,313 farmers were trained in a two-day long workshop conducted by master-trainers of the Department. 10,658 farmers were provided with drums, buckets, jugs and sprayers at a subsidy of up to 50% of their costs but limited to Rs 600 per farmer for preparing the organic inputs.







शाश्वतम्, प्रकृति. मानव.सङ्गतम्।
 तत्त्व.सर्व धारकंसत्त्व.पालन.कारकवारि.वायु.व्योम.वह्नि.ज्या.गतम्।
 शाश्वतम्, प्रकृति.मानव.सङ्गतम्।।(ध्रुवम्)
 प्रकृति और मनुष्य के बीच का संबंध शाश्वत है। रिश्ता शाश्वत है।
 जल, वायु, आकाश के सभी तत्व, अग्नि और
 पृथ्वी वास्तव में धारक हैं और जीवों के पालनहार।
 दश कूप समा वापी, दशवापी समोह्वद्रः।दशह्वद समः पुत्रों, दशपुत्रो समो द्रमुः।।
 एक पेड़ दस कुओं के बराबर, एक तालाब दस सीढ़ी के कुएं के
 बराबर, एक बेटा दस तालाब के बराबर, एक पेड़
 दस बेटों के बराबर।

सन्ति निरतं जीव.जगतां प्राण.दाने, तरु.लतानां विविध.वर्गाः शं दधाने।
 वन.गिरि.नदी.पशु.विहङ्गाः रात्रि.दिन.ऋतु.शशि.पतङ्गाः,
 सर्वमास्ते जन.हितार्थं संहतम्।

रक्षति प्रकृतिः सतीसौख्य.राशिं तन्वतीवन्य.सम्पद् रक्षणीया सन्ततम्।
 शाश्वतम्, प्रकृति. मानव.सङ्गतम्।। रिश्ता शाश्वत है
 विभिन्न प्रकार के पेड़ और लता हमेशा जीवन देने में व्यस्त और
 कल्याण की पेशकश करने वाले मामलों में चेतन
 प्राणियों की दुनिया के लिए।जंगल, पहाड़, नदियाँ, पशु और पक्षी, अगला
 रातें, दिनए ऋतुएँ, चाँद और सूरज, सब एक साथ लगे लोगों की
 भलाई के लिए। प्रकृति अच्छी तरह से रक्षा करती
 है और सभी प्रकार के सुखों को प्रदान करता है।तो सभी प्राणी जो धन हैं
 वन क्षेत्र होना चाहिए हमेशा ठीक से संरक्षित।
 रिश्ता शाश्वत है प्रकृति और मनुष्य के बीच।

यया सर्वमिदं व्याप्तं जगत् स्थावरजङ्गमम्।
 तां धेनुं शिरसा वन्दे भूतभव्यस्य मातरम्॥

जिसने समस्त चराचर जगत् को व्याप्त कर रखा है।
 उस भूत और भविष्य की जननी गौ माता को मैं मस्तक झुका कर
 प्रणाम करता हूँ॥



NATIONAL CENTRE FOR ORGANIC AND NATURAL FARMING

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Ministry of Agriculture & Farmers Welfare

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