A REVIEW:

Organic farming a tool for sustainable agriculture

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The strides made by by Indian agriculture in the past four decades have been impressive food grain production which increased synchronizing with the growth rate of population. However, the main spurt in production has been in rice and wheat crops. In contrast pulses, oilseeds, coarse cereals which are cultivated mainly in the rainfed sector pushed at marginal areas.The second green revolution should include sustainable agriculture with a spectrum of farming systems that attempt to eliminate the use of synthetic chemical inputs to those involving proper use of pesticides to control specific pests and diseases. The ultimate objective is to maximize the treats to the environment from current practices of intensive agriculture. At this juncture organic farming is a necessary tool for second green revolution (Swaminadhan, 1995).

The growing concern about environmental degradation, dwindling natural resources and urgency to meet the food needs of the increasing population are compelling farm Scientists to examine the alternatives to second green revolution in India. A sustainable agriculture backed up by green technologies in an integrated farming system has been considered a promising and potential pathway(Sandhya Rani,1996).The twin problems confronting agricultural production are all pervasive erosion of natural resources such as land, water and biodiversity and fast declining soil fertility and use efficiency of inputs such as water, fertilizer and energy.

Aims of organic farming:

– To work within a closed system and draw upon local resources.

– To maintain long term fertility of the soil and avoid all forms of pollution caused by agricultural techniques.

– To provide a food stuff of high nutritional quality in sufficiency and to reduce the use of fossil energy in agricultural practices to the minimum tending zero.

– To give to all the livestock the condition of life that conform to their physiological needs and to make it possible for agricultural families to earn a living through their work and to develop their potentials as human beings.

– To maintain the rural environment and also to preserve non-agricultural ecological habits and to use conventional agriculture.

– Organic agriculture systems include approaches and methods like organic, biodynamic, regenerative, nature farming and perm culture.

The key characterization of organic farming in relation to sustainability in agriculture includes:

Protecting the long term fertility of the soil by maintaining organic matter levels, fostering soil biological activity and careful mechanical intervention

– Providing crop nutrients indirectly by using relatively insoluble nutrient sources which are made available to the plants by the action of soil micro organisms.

– Nitrogen self sufficiency through use of legumes and biological nitrogen fixation as well as effective recycling of organic materials, including crop residues and livestock wastes.

– Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic maturity resistant varieties and limited thermal, biological and chemical intervention.

– Excessive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing health, breeding and rearing.

– Careful attention to the impact of farming system on the wider environment and the conservation of wild life and natural habits.

– Organic agriculture is viable alternative to conventional agriculture and essential elements of organic quality assurance are development of standards, inspection and

verification certification and accreditation.

Organic farming can be achieved by a combination of:

– A versatile crop rotation

– Recycling of organic materials and adopting a wide range of methods for the control of pests, diseases and weeds with avoiding the use of synthetic fertilizers, pesticides and herbicides.

– The basis for animal husbandry is the respect for physiological and ethological needs of the animals. This is achieved by a combination of:

– Providing sufficient amounts of good quality organic fodder.

– Providing husbandry systems appropriate to behavioural needs and proper veterinary treatment.

– Animals contribute to closing the nutrient cycles, as they convert organic matter thus contribute to the soil fertility. Ex: Bio gas slurry aids in higher yields.

– Growing forage crops improves the crop rotation, diversification and balance of the farming system and can utilise the by-products from agricultural production and would contribute to higher yields.

– Green manures and cover crop systems *in situ* would improve soil also. They have other uses, of the annual cultivated legumes, *Crotalaria juncea* and *Sesbania cannabina* have been most widely grown by farmers, because of their better adaptability under flooded condition.

– Available potential of organic materials for ex-situmanuring is vast which would be generated from plant or animal origin.Ex:- Livestock wastes (Pathak *et al.*, 1990), human wastes, crop residues, tree wastes and aquatic wastes, urban and rural wastes, Agro-industries bi-products, and waste water from industrial, municipal wastes FAO, 1998) marine wastes etc., high potential as organic wastes.

– Production of composts with traditional additives add bulky organic manures to which would increase crop yields, and improve physical, chemical and biological properties of the soils.(Panda and Sahool, 1989; Kemmier, 1986; Mukherjee and Gaur,1984 and 1985)

– Vermicomposting : earthworms are the major secondary decomposers, forms manure from dead tissue of plant and animals thus is naturally the source of macro and micro nutrients. The presence of high level of oxidisable organic carbon helps in the slow release of nutrients from the manure and curbs the leaching of the nutrients, can say that earth worms are biological indicators of soil fertility.

– Bio-intensive nutrient management is practice of biological management of soil fertility. Biological populations and process will have ameliorating effect on main soil based constraints to productivity.

– Symbionts such as Rhizobia, *Azatobactor* (Pandey and Sushil Kumar,1989), *Azolla* (Hamidi, 1982), mycorrhiza, (Hayman, 1982) increase the efficiency of nutrient acquisition by plants.

– Wide range of fungi, bacteria and animals participate in the processes of decomposition, mineralization and nutrient immobilization and therefore influence the efficiency of nutrient cycles.

– Soil organics mediate both the synthesis and decomposition of soil organic matter and therefore influence cation exchange capacity, soil N,S, and P reserve, soil acidity, toxicity and soil water holding capacity.

– The burrowing and particle transport activities of soil fauna and soil particle aggregation by fungi and bacteria influence soil structure and soil water regimes.

– Management techniques such as tillage and fertilization also influence the activity of the biota indirectly by altering physical and chemical environment of the soil.

– *Ecological pest management* : Due to danger of using chemical pesticides using pest resistant cultivars, biological control agents and cultural methods in pest control are gaining ground. These bio-environmental methods are major components in the integrated management of pests. The practices like cultural control, crop rotation trap cropping, time of planting physical and mechanical control, biological control, conservation of bio diversity.

– *Use of bio-pesticides*: botanicals like lantana, Notchi, Tulsi, adathoda etc. act as natural repellents. Indigenous trees like pungam, wood apple, anona have excellent insecticidal properatioin on diamond block worth, heliothis,whiteflies, leaf hopper and aphid infestation.

– Neem : The panacea for organic farming is excellent pesticide which can affect more than 200 insect species and some nemotodes,fungi,bacteria and viruses. The neem contains active chemicals like azadirachtin, lemonoides, meliantriol, selarin, nimbin, nimbidin and some anti hormones.

Peripherals for sustainable organic agriculture:

Bio diversified agro-ecosystems:

– The agro-ecological objective is to provide a balanced environments, sustained yields, biologically mediated soil fertility and natural pest regulation through the design of diversified agro-ecosystems and the use of low-input technologies intercropping, agro-forestry and other diversification method mimic natural ecological

processes, and that the sustainability of complex agro-ecosystems lies in the ecological models they follow, various strategies to restore agricultural diversity in time and space include crop rotation, cover crops, inter cropping, crop live stock mixtures, and so on. Diversity reduces risk for farmers, especially in marginal areas with more unpredictable environmental conditions. Complementary agriculture is more suitable and remunerative like integration of live stock, integration of aquaculture, indigenous organic farming practices, rainwater conservation by mulching, protection against erosion, Agroforesty systems like alley forming, lay farming and silvipesture, agri-horticulture, wind breaks and shelter belts.

– Interaction between trees and crops are very useful for organic farming as they aid in soil conservation and maintenance of soil fertility.

Economic viability and marketing :

Prices for organic foods reflect many of the same costs as conventional foods in terms of growing, harvesting, transporation and storage. Studies have shown that organic agriculture is economically viable, that farmers can achieve more income as a result of premiums and that they need saver inputs to maintain returns.The challenge of going organic is intensive and requires more design and management.

Farm production and profits *i.e.* absolute yield lends under organic farming are increased over time but at a slower rate than for comparable conventional systems.

– When the micro economic aspects are looked in the output mix tends to widen, mainly as a result of conscious efforts the maximize the synergetic effects of organic farming.

– The out put value is the result of wider output mix because of higher yields.

– The input mix is more diverse when the output mix is widened particularly and the overall input cost by organic forming is considerably higher in many cases. Where as the labour costs are dominant input, compared to conventional methods. The output value of organic systems in most cases is higher, but the same is true for inputs if the labour input is properly valued.

The organic market :

Consumers demand for healthier organic food and has been considered one of the major factors influencing increasing consumer demand for organic food. Marketing with a clearly targetted strategy is a must for organic products.

Constraints and opportunities in marketing of products of organic farming:

– Under the right circumstances the market returns from organic agriculture can potentially contribute to local food security by increasing family incomes, marketing of transitional organics can be developed separately.

– The cost of certification of organics is expensive and only few developing countries have cerfication, organisation within their borders, even when sufficient resources are available to lay for certification farmers often lack the information to find credible inspectors.

– There is growing market for 'Green Food' which according to government grading standards, is produced without certain pesticides and fertilizers and with biological methods.

– In the developing countries organically produced food has not yet gained consumer acceptance, to any appreciable extent despite the presence of harmful chemical residues at higher concentrations inorganic products (*i.e.* > 40 times). This is due to lack of awareness among the people of the developing countries about poisons in the food they are consuming daily.

– Organic agriculture is not only leading the way to viable alternatives to modern development models, but it is also part of the solution to global environmental problem.

– Ecological dumping is becoming more common, and is strongly registered by the organic movement, unfair trends are involved in purely commercial production of natural / biological organic products such as organic cash crops in monocular. The fair trade movement is also joint forces to address social dumping that involves the exploitation of cheap labour and cited child labour.

– Bio-colonialism is one of the major challengers facing the organic moment, given the much greater economic wealth and buying power of mouth, many products of organic quality find their way into their premium markets and become unavailable to the local and regional populations. So, fair trading and priority to local economics is more important.

– Certification of organic produce : Exclusive outlets may be formed for organic products like Econet, CO (Consumers Collective), Nature-live, ME(Megason Exports), RMG (Registered member growers), SIDA (Swedish International Developmental Agency), Tridos (Dutch Government), Lango co-op (Uganga Government) etc.

– Standards and certification : IFOAN (International Federation of Organic Agricultural Movements) is a global umbrella net work of farmers, Scientist, Proforma traders, Agricultural Extension

workers and consumers who share common internet for praides standards without depleting natural resource base. Farm inputs such as fertilizers and pesticides should be labelled organic.

In India APEDA (Agricultural and processed food products export development agency) Coffee board, Tea board or Spices board will be allowed to be packed under a valid organic certificate duly accredited by these agencies. Ecological agriculture that effectively combines use efficiency of inputs and economic yield, maximization will begin to prevent the abuse of national resources.

Adoption and success of organic farming :

Organic agriculture is an alternative as the organic practices are inherently better adapted to prevailing agro-ecological conditions. As integrated intensive farming system (IIFS) provides the pathway to achieve evergreen revolution in agriculture).Adoption in the farming system context jocusson as soil and management where research is initiated by joint disgusts of soil fertility problems , based both on farmers participations and on biophysical and socio-economic characterization of the farming system.

Production technology of organic Research on farming: Research projects in organic farming need emphasize on the following fields:

– Improved utilisation and efficiency of use of organic materials.

– Elucidate potential of cumulative and cross benefits of organic techniques.

– Explore the compatibility of organic and non-organic fertilizers inputs, investigating the charges in soil fertility and crop production.

– Studies on policies of national governs and international agencies to organic farming.

– Comparative studies on the price, value, quality and supply of organic and non-organic fertilisers particularly in areas of intensive agriculture and studies on consumer perception of food, health and environmental issued raised by organic farming is to be done in elaborate manner

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