

STATUS, POTENTIAL AND NEW TECHNOLOGIES IN ORGANIC FARMING

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Necessity of ecologically and economically sustainable organic farming towards crop production and mitigation of climate change is well understood. But the organic movement in the backdrop of global agriculture is insignificant despite considerable effort during the last few years. India also faces several bottlenecks with respect to growth of organic agriculture both at the production and marketing levels. Various issues have been discussed in this article regarding the major bottlenecks in organic agriculture as well as potential of sustainable growth of organic farming. New technologies / package of Practices (POP) for organic farming have also been discussed.

Food scarcity in the sixties had led to the need and initiation of green revolution. However, to augment crop production usage of chemical fertilizers in incremental dose over the years led to the deterioration of soil character, made the plants fertilizer sensitive and disturbed the pest-predator relationships, which automatically generated the necessity for application of pesticides. To further add to the dilemma crop productivity has been going downhill from the fertilizers following the 'Law of Diminishing Return'. Crop production system has become completely dependent on the external support system, at the same time input-output ratio is going low with time. Thus just after few decades of its incorporation, chemical farming has broken the equilibrium of millennia.

Hence, today successful agriculture shall only depend upon how well and fast soil depletion is checked and the soil nutrient balance shifts towards a positive balance. According the IFOAM (2009) organic agriculture has a significant role in addressing two of the world's biggest and most urgent issues – (i) Climate change and (ii) Hygienic food security. The present compulsion has initiated effort even from the government, which has formulated different subsidies, funds, incentives etc. for the incorporation of natural as well as organic inputs in the regular cultivation system. It is now understood that sole application of organic inputs can neither ensure successful



organic cultivation nor enable the much desired speedy restoration of soil health. The answer can be provided only through adoption of comprehensive and scientific organic package of practice, because in order to ensure the desired results under the existing complexities the steps of organic management should work in absolute harmony with each other.

Continuous and indiscriminate use of chemical fertilizers has led to several harmful effects on the soil environment, ground and surface water reducing the productivity of soil by affecting soil health in terms of physical, chemical and biological properties. The excess/indiscriminate use of pesticides has led to the entry of harmful compounds into food chain, death of natural enemies and development of resistance to pesticides. Enhanced use of pesticide resulted in serious health implications to man and his environment. There is now overwhelming evidence that some of these chemicals pose a potential risk to humans and other life forms and unwanted

side effects to the environment (Forget, 1993). No segment of the population is completely protected against exposure to pesticides and the potentially serious health effects, though a disproportionate burden is shouldered by the people of developing countries and by high risk groups in each country (WHO, 1990). The world-wide deaths and chronic diseases due to pesticide poisoning numbered about 1 million per year (Environews Forum, 1999).

Why Organic Farming?

Hence, enhancement and maintenance of system productivity and resource quality is essential for sustainable agriculture. It is believed that organic farming can solve many of these problems as this system is believed to maintain soil productivity and effectively control pest by enhancing natural processes and cycles in harmony with environment. Organic farming is defined as a production system which largely excludes or avoids the use of fertilizers, pesticides, growth regulators, etc. and relies mainly on organic sources to maintain soil health, supply plant nutrients and minimize insects, weeds and other pests. It was felt that organic farming may solve all these problems and has been considered as one of the best options for protecting/sustaining soil health, and is gaining lot of importance in present day agriculture.

Present Status of Organic Farming

India holds a unique position among 172 countries practicing organic agriculture: it has 6,50,000 organic producers, 699 processors,

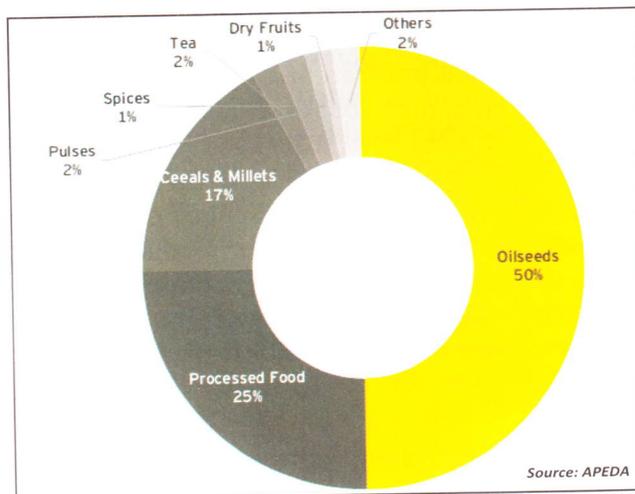


Fig 1 : Export Share of Organic products in India.

669 exporters and 7,20,000 hectares under cultivation. But, with merely 0.4 per cent of total agricultural land under organic cultivation, the industry has a long journey ahead (Bordolo, 2016). India produced around **1.35 million MT (2015-16)** of certified organic products which includes all varieties of food products. The production is not limited to the edible sector but also produces organic cotton fiber, functional food products etc. As per the latest available cross-country statistics, in the year 2015, India ranked first in terms of the number of organic producers among over 170 countries and ninth in terms of the area under organic agriculture. India ranked 11th in organic product exports in 2015 (Mukherjee *et al*, 2017).

India is home to 30 per cent of the total organic producers in the world, but accounts for just 2.59 per cent (1.5 million hectares) of the total organic cultivation area of 57.8 million hectares. However, it has been observed that when it comes to the area under certified organic cultivation, India contributes only 2.59%, i.e., 1.5 million hectares of the total organic cultivation area of 57.8 million hectares. Thus, amongst the regions with the largest areas of organically managed agricultural land, India ranks 9th.

Emerging Challenges in Organic Farming

Organic Agriculture is not a new concept to India and traditionally Indian farmers were organic by default. But, gradually changed to chemical based cultivation since 1950's and chemicals were increasingly applied during the Green Revolution period. In this scenario, proliferation of sustainable organic farming practice or even effort

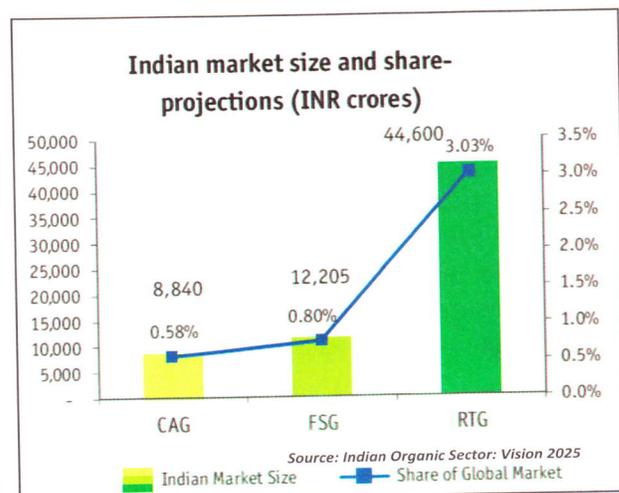


Fig 2 :India Projected Export Market in Year 2025.

towards reduction of chemical load has not been satisfactory. Lack of proper knowledge transfer has been a limiting factor towards large scale organic conversion or reduction in chemical load under conventional farming practice. At the same time farmer's participation in problem identification and solving is inadequate, consequently the technology and innovation uptake were also compromised (Hakiza *et al*, 2004). Besides this, majority of agro-research does not prioritize/focus on dissemination of research outcome at farmers' level. There are limitations like availability of practical guidelines, communication gap with small and marginal farmers and lack of comprehensive approach for integration of technological know-how, better marketing options etc. which led to lesser farmers' participation in large scale demonstration. But above all the single most criteria which was responsible for limited progress of sustainable farming practice is lack of comprehensive and economically viable packages which can offer easy adoptability for the farming community (Maity & Tripathy, 2011).

India is poised for faster growth with the growing domestic market. Success of organic movement in India depends upon the growth of its own domestic markets. With the sizable acreage under naturally organic/default organic cultivation, India has tremendous potential to grow crops organically and emerge as a major supplier of organic products in the world's organic market (Eximbank report, 2002). With this growing demand more and more technological innovation like IRF Technology and their implementation at farmers' field will ensure economically viable organic agriculture and help in its adoption by the common farmers even without any subsidy scheme or guaranteed premium price. Considering the increasing awareness about the safety and quality of foods, long term sustainability of the system and accumulating evidences of being equally productive, the organic farming has emerged as an alternative system of farming which can not only address the quality and sustainability concerns, but also ensure a debt free, profitable livelihood option (Makadia and Patel, 2015).

New Technologies / Package of Practices in Organic Farming in India

There are few organic technologies presently in practice in large scale organic farming,

among which Biodynamic Farming and Inhana Rational Farming Technology are prominent. Apart from that in most of the cases different organic inputs are used to make different organic package of practice for different crops. These combinations can be broadly divided in 4 to 5 category of POP's. These are (i) Vermi compost (soil management) + different herbal concoctions (plant management); (ii) Indigenous compost/manure (viz. FYM etc) + different herbal concoctions; (iii) Vermi/Indigenous compost+Bio-fertilizers (soil management) + different herbal concoctions; (iv) Vermi/Indigenous compost + Biofertilizers (soil management) + different herbal concoctions/Bio-pesticides and (v) Vermi/Indigenous compost + different herbal concoctions / Bio-pesticides.

Inhana Organic Farming (IRF) Technology – A Complete Organic Package of Practice

Taking the essence of Trophobiosis theory of F. Chaboussou (Chaboussou, 1985), a farming technology was developed by an Indian Scientist, Dr. P. Das Biswas. He termed it as Inhana Rational Farming (IRF) Technology which provides a nature receptive pathway for crop production taking into account the interrelated and integrated relationships of all the components of the ecosystem. It blends ancient Indian wisdom with scientific knowledge and ensures healthy plant and soil system which ultimately leads to a successful crop output without disrupting the ecological harmony. This farming technology has already been widely adopted in reputed tea estates in India and has shown its effectivity towards the reduction of chemical / pesticide load and management of recurrent disease problems. In the Agriculture Sector, the technology has been tried out in different crops like paddy, baby corn, green-gram, cabbage, okra, tomato, potato, brinjal etc. (Bera *et al*, 2014) and had turned out to be quite satisfactory. Thus in the backdrop of degrading soil fertility, worsening plant health leading to poor quality and productivity and prevalence of unsustainable agricultural practices, IRF Technology can become one of the weapons to contest against such adversities.

Conclusion

Organic farming is the pre-requisite for enabling wider adoptability, secured livelihoods and ensuring affordability at the consumer's end.

India has a long history of organic farming. At the same time increasing domestic market of organic food can provide the necessary support towards organic movement. Awareness, Training and dissemination programs will help to facilitate the movement but most importantly innovative organic farming technologies like Inhana Rational Farming (IRF) can popularize the practice even among the resource poor farmers by ensuring ecologically and economically sustainable organic crop production in a time bound manner. Case studies of IRF Organic POP also testify the corresponding GHG mitigation and adaptation potential, soil resource regeneration, high energy use efficiency as well as development of plant resilience; but the highlight remains its cost effectiveness and time bound results.

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