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ORGANIC FARMING, SCENARIO OF INDIA- A BIBLIOGRAPHICAL REVIEW

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Abstract

Green revolution alleviated hunger but this alleviation of hunger also manifested in emergences of various vices and adversities like; environmental degradations and human health challenges. In consequence, adverse impacts on natural resources and human health alarms us! These adversities mandate cherishing and accomplishing alternative sources of agriculture. In context, organic farming has emerged as a successful choice on the scene. Organic farming is holistic and focuses on use of green manures, manures which are organic, composts, bio fertilizers, crop production utilizing pest management and restricting or banning use of synthetic fertilizers, chemical fertilizers and feed additives. In first *Mann Ki Baat* programme after assuming office for the second term Prime Minister of India spoke on water and its quality as biggest challenge of India in recent times and stressed upon the need of having knowledge of traditional methods of water conservation (Editorial; The Hindustan Times Dt. 02 July, 2019).Therefore, traditions matters. Organic farming has positives but not without negatives. Means; all positives like eco and bio friendly scenario of organics it(organic farming) has in it minuses like; limited availability threatening food buffers (security) of the nation, reduced profitability of farmers and affordability of the customer/consumer (end users). Hence, complete shift from inorganic to organic ways is neither desirable nor practically possible, especially in high input agro arenas very quintessence organic farming. Nevertheless, organic farming matters!

Keywords: Organic, Context, advantages, Chemical hazards.

Introduction

Degrading standards of environment due to pollutants and alarming need for health standards compel humans again to think of alternative means of agriculture. Organic farming is one of the most practically viable options. It is holistic form of agriculture because it balances and justifies positive of agro output by optimizing and balancing most naturally its production equation i.e., Input natural+ process applied naturally=Output nature harmonious. Organic farming has suitability and removes adverse effects of modern agriculture on environment; soil health. It eliminates pesticide residues in human and animal food chain. Modern agriculture is factory farming which focuses on scientific methods to increase crop yield and productivity. In other words, modern agriculture is quantity focused ignoring quality of what it gets in term of fitness and consumption standards equivalence.

Crop rotations, green manures, biological pest management, avoidance of synthetic fertilizers and chemical fertilizers are some of the characteristics of organic farming.

Modern agriculture: Genesis

Without nomenclature modern agriculture was organic in the before 19th century and was having usage of organic manures and practiced using horses and human powers in the US and oxen in Asia (White, 1970).Agriculture revolution in England began in early 19th century when horse- drawn hoe and a seed drill by Jethro Tull followed by the classical monograph on agricultural chemistry by Liebig in 1840. The establishment of Rothamstad Experimental Station in 1843 was profoundly influenced by the Liebig tradition (Howard, 1940). In mid-19th century there was manufacturing of superphosphate fertilizer in England and in the US in 1910 there was advent of tractor with an internal combustion engine (Rasmussen, 1973). Fritz Haber's process of ammonia synthesis led to the manufacture of nitrogenous fertilizers in Europe and the US (Collings, 1955). The discovery of insecticidal properties of DDT (Dichloro, diphenyl trichloro acetic acid) by P. Muller in Switzerland in 1939 was followed by the discovery of BHC (Benzene hexachloride) in France and UK (Brown, 1951). In 1933 Nitrophenols, the first group of selective herbicides, was developed and in 1940s it was followed by the development of 2, 4-D (2, 4-dichloro phenoxy acetic acid) and MCPA (2-methyl, 4-chloro phenoxy acetic acid) herbicides. Thus, in the developed world, by the mid-20th century, the most of the components of modern agriculture, i.e. farm machinery, chemical fertilizers and agrochemicals were in vogue.

In India, the establishment of Department of Agriculture in 1881 followed by Imperial Agricultural Research Institute (IARI) at Pusa, Bihar and Regional Research Stations at Coimbatore, Pune and Phalmpur are the shifts to modern agriculture (Howard, 1926).

The establishment of in the 1960s of State Agricultural Universities on the model of 'Land Grant Colleges' of America and were primarily based on the American model rather than the Indian model of agriculture were witnessed (Veeresh, 2006). Indian Agriculture and Organic farming systems are very much native to each other. In India population growth rare and agriculture growth rare were not able to keep pace and virtually 'ship to mouth' situation prevailed. It was the major driving force for introducing and large-scale popularizing high yielding varieties (HYVs) of crops, highly responsive to the chemical fertilizers and use of water finally resulting in usher of Green Revolution. Resultantly, the total food grain production increased phenomenally from mere 50.82 million ton in the start of first five year plan (FYP) in 1950-51 to 264.0 million ton in the beginning of twelfth five year plan (FYP) 2013-14, a fivefold increase. Large-scale adoption of HYVs combined with other green revolution technologies (GRTs) in cereal crops, expansion of gross irrigated area (22.56 million ha in 1950-51 to 89.36 million ha in 2010-11) and increase in fertilizer use (0.07 million ton in 1950-51 to 25.54 million ton in 2012-13) are the contributors to aforesaid increase. This substantial increase in the crops productivity, especially food

grains (from 522 kg/ha in 1950-51 to 2125 kg/ha in 2012-13), transformed India from a food importer to net food exporter (presently contribution of agriculture in total export value is 14.1%). There was rapid use of chemical fertilizers and very fast replaced organic manures. Reason being; their easy availability, ease in handling and storage plus quick response of crops to their application. Modern components resulted in an unprecedented increase in agricultural production and a new term 'Green Revolution' was coined to describe this success in agricultural production. Though, green revolution technologies (GRTs) alleviated hunger from the world and kept the 'Malthus predictions' at bay but on scene brought some adverse effects on environment and appearance of pesticide residues in agricultural produce (Kalra and Chawla, 1980; Chahal *et al.,* 1999; Singh, 2002).

Organic Farming: Resurgence

Organic farming is limiting the use of chemical in agriculture production plus caring of ecological balance towards nature called "favorable agro-system". Technically every product is chemical constituted but organic farming focus on organics in process starting from value chain of inputs, process employed, output, storage, warehousing, marketing for end users. India's National Programme for Organic Production (NPOP) defines organic farming as, 'A system of farm design and management to create an ecosystem, which can achieve sustainable productivity without the use of artificial external inputs such as chemical fertilizers and pesticides'. However, International Federation of Organic Agriculture Movements (IFOAM) defines organic farming as, 'A production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic farming combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved'.

Organic farming origin dates back in Asia Vedic period of 1000 BC -600 BC' (Randhawa, 1986 and Pereira, 1993). The approach adopted was to live in harmonious partnership with nature. The precautions and style by default were not to exploit Mother Nature. This trend was groomed and nurtured continued for centuries. Albert Howard, a British botanist who worked in India from 1905 to 1924, is called the father of organic farming. In his book 'An Agricultural Testament' he documented developments and furtherance of his work. In England, in 1939 lady Eve Balfour compared organic and traditional farming through Haughley Experiments on farmland. She published a book, 'Living Soil'. Germany scientist Rudolf Steiner in 1940 introduced trade mark 'Demeter' for the food produced on biodynamic farms. Peter Rush, Hon's Muller promoted 'Biological Agriculture' in Switzerland. 'Fukuoka Farming' of Masanabu Fukuoka, a microbiologist in Japan, developed a no-till organic system of grain growing.

However, Lord Northbourne (1940) in his book 'Look to the Land' for the first time used the term organic in relation to farms. He writes that "The farm itself should have a biological completeness; it must be a living entity, it must be a unit which has within itself a balanced organic life." He referred not just organic inputs but farm management as an integrated, whole system (Lotter, 2003). Rodale in US in 1950s through organic gardening popularized the term organic farming. The criticism of ill effects of DDT by Rachel Carson in 1962 and in 1970 Global movements concerning environmental degradation and chemical hazards culminated into establishment of International Federation of Organic Agriculture Movements (IFOAM) in 1972 in France.

In India, the foundation of modern organic farming founded with the establishment of National Programme for Organic Production (NPOP) in 2001 and National Project on Organic Farming and Network Project on Organic Farming during 2004.

Soil Health Management

The philosophy of soil health management is based on the rule that 'feed the soil and not the plants' and it means giving back to the nature what has been taken from it (Funtilana, 1990). Soil organic matter and humus are the important components of soil health philosophy as it strongly influence soil bulk density, water holding capacity, infiltration rate, hydraulic conductivity and aggregate stability (Shepherd *et al.,* 2003). Mentioning; the importance of goat dung, cow dung and vegetation (green manure) in raising the fertility of soil it is emphasized that organic manures are soil organic matter and are important .This has been documented as early as 400 BC in *Krishi Parashara*. Kashyapa in *Kashyapiyakrishisukti* (800AD) (Nene, 2010). Ancient and old age management traditions are logical and matters. Nutrient management aims optimized use of on-farm resources and loss minimizations (Kopke, 1995). Chemicals are scientific permutations and combinations with high speed turbulent effects. Restriction on use of chemical fertilizers is due to the reasons of high solubility of Nitrogen, Phosphorous and Potassium in soluble form leading to the pollution of ground waters, addition of heavy metals as impurities of chemical inorganic fertilizers (Aulakh and Ravisankar, 2017). Organic farming conceptualizes on nature and natural balance maintenance. Waksman (1938) emphasized on the need of the microbes and categorically said that 'without soil microbes, life on planet would come to standstill'. Natural process and natural advents are basics and lifeline of organic farming. Microbes mobilize nutrients in the soil and make healthy soil and in consequence health plants (Veeresh, 1990). Soil microorganism like earthworm and termites are very important part of soil decomposition. They redistribute soil profile. Aristotle compared earthworms as 'intestine of earth' and Darwin as 'builders of civilization'; 'beneficent gardeners' and 'industrious ploughman'. Darwin said earthworms are more ancient than ancient plough. A population of three ton of earthworms per hectare pass soil equivalent of 10 cm soil layer through their system in one year (Edward and Lofty, 1972). Termites and dung beetles are equivalent to the earthworms of temperate regions as far as turning over the soil is concerned. Dung beetles decompose animal dung and incorporate about 40 to 50 thousand ton of dung into the soil every day in India (Hingston, 1923).On the importance of Leguminous green manure crop it is elaborated that it in available form fixes the atmospheric nitrogen in the soil, the soil health improves, prevention of nutrient leaching and consumption of excess soil moisture is done (Virdi *et al.,* 2005). Parshurama in *Krishi Gita* had recommended green manuring for rice as early as 1500 AD (Nene, 2010). Green manuring saves 45-120 kg N/ha (Ladha *et al.*, 1988; Beri *et al.,* 1989). Legumes in crop rotation is not a new concept, in the *Harappan* phase of Chalcolithic period at *Nausharo* in late 3000 BC the

legumes like peas and chickpea were included in crop rotation involving cereals (Mehra, 2004). In cereal-legume system yields of cereals following legumes are 30-35% higher (Peoples and Craswell, 1992). Due to their deep root system, ability of nitrogen fixation (Table 1) and suitability in varied rotations and inter cropping systems, legumes has got a unique role to play as far as organic farming systems is concerned.

Table 1 : Nitrogen fixation capability of different legumes

Crop	Nitrogen fixed (kg/ha)	
Green gram	50-56	60
Pigeon pea	4-200	100
Cowpea	9-125	80
Soybean	49-450	100
Chickpea	23-97	40
Lentil	35-147	40
Field pea	46-99	65

Source: Sekhon *et al.* (2002); Ahlawat and Gangaiah (2004)

The recycling of crop residues has great to do in organic farming. Crop residues may be recycled through their soil incorporation, composting, vermicomposting and mulching. Crop residues have the potential to improve soil and water conservation, sustain soil productivity and enhance crop yields (Das *et al.*, 2003). Bio fertilizer usage atmospheric nitrogen is fixed, solubilizes/ mobilize soil phosphorus and enhances the decomposition of crop residues. They increase the crop yields by about 6-25% (Dahama, 1999). The bio fertilizer inoculation increases the yield of chickpea by 13-76%, pigeon pea by 10-46%, green gram by 9-95%, mash by 32-54% and cowpea by 25-30% (Kler *et al.,* 2001). Azospirillum inoculations increase the grain productivity of cereals by 5-20%, millets by 30% and of fodder crops by over 50% (Dahama, 2003). Traditional knowledge and wisdom of farmers should be used in nutrient management programmes (Acharya *et al.,* 2001). *Panchgavya* Organic preparation (made of five cow products-dung, urine, milk, curd and *ghee*) reportedly has growth promoting effect on plants (Sreenivasa *et al.,* 2009; Natarajan, 2003). *Jeevamrit,* Organic preparation prepared from dung and urine of one Indian cow has been reported to be sufficient for organic cultivation of 12 ha (Palekar, 2009).

Pest Management

Organic farming systems lay stress on creating a formidable combination for creating an ecosystem in which insect-pests, diseases and weeds successful cultivation of crops. The arbitrage balance between the harmful and beneficial organisms is tilted in favour of beneficial organisms. Biodiversity of fauna and flora is mandatory at the farm to ensure proper functioning of the ecological system and that is why organic standards require a minimum percentage of farmland to be kept and maintained as semi-natural habitats. Moreover, fewer incidences of insect-pests have been reported on crops raised with organic sources of nutrition (Surekha and Rao, 2000; Venkateswara Rao *et al.*, 1989).

Insect-pest Management

Single crop fails to hold natural balance, therefore, suitable crop rotations functions in preventing intercrop carryover and transfer of pests. Undoubtedly, man has destroyed the built-in checks and balances which nature held to keep species within bounds (Carson, 1962). Crop rotation with non-grass crops reduces the borer population (Alvares, 1999). A typical tropics rice field supports about 800 species of friendly insects like spiders, wasps, ants and pathogens that if recognized and protected can control 95% of insect-pests (Alvares, 1999). Stem borer attack does not decrease rice yield, as the number and/or size of grains increase in the remaining stalks (Fukuoka, 1992). Lighting powerful crackers in infested spots of rice control Brown plant hopper (Alvares, 1999). Running a rope in rice fields manages Rice leaf folder (PAU, 2017). American bollworm's eggs, larvae and adults are lesser in number in cases of cotton under organic farming than under the conventional method (Sharma, 2003). Secondary metabolites of certain plants produces like terpenoids, alkaloids, flavonoids and phenolic compounds which have insecticidal properties and can be exploited as botanical pesticides (Aulakh and Sankar 2017), Neem seed kernel extract (NSKE) @ 5% is quite effective against *H. armigera* and seed treatment @ 10 ml/kg seed and drenching with 10% solution @ 4 litre/ ha of Aonla (*Emblica officinalis*) is effective in controlling termite in chickpea (Gaur and Sharma, 2010). Neem pesticide reduces fruit borer (*Earias* spp) attack on okra (Ambedkar *et al.*, 2000), has antifeedant and insecticidal effects against *Achaea janata* on castor (Babu *et al.*, 1997), has low toxicity to spiders in rice (Baitha *et al.*, 2000a) and controls the leaf roller in rice (Baitha *et al.*, 2000b). Cow urine repels sucking pests. Spraying a preparation of 4 litres of cow urine and 10 g of asafoetida in 10 litre water (Alvares, 1999). The biological methods usage is not new. For pest management there are Biblical references when *Oecophylla* ant is used for controlling the date palm caterpillar. Biological control originated by trial and error and is practiced in agriculture long before the nomenclature term itself came into use (Baker and Cook, 1974). Trichogramma, a parasitoid, application reduces damage by stalk borer (Singh *et al.,* 1997). Six releases of *T. chilonis* or *T. japonicum* manages stem borer in rice (Jain and Bhargava, 2007). Bt formulations have been found effective against *H. armigera,* leaf webber (Gujar *et al.*, 2000) and other pests of crops. A predator *Cryptolemus montrouzieri* has proved effective in controlling mealy bug, a pest of citrus and coffee in south India (Kaul and Dhaliwal, 2000). Organic farmers use on-farm preparations for pest management as preference over commercial biopesticides (Aulakh *et al.,* 2009). Planting methods also affect incidence of insect-pests. Manipulation in planting or sowing times and crop geometries created an unfavourable environment for the potential insect-pests. Late sown maize is less damaged and winter maize escapes stem borer attack. Ridge sowing reduces the incidence of pod borer in Tur (Agrawal *et al.*, 2003) and cut worm in sunflower (Bakhetia *et al.*, 1995). Cotton and potatoes when sown early experiences less attack of infectants. Promotion and conservation of natural enemies done by providing artificial structures like nesting boxes for wasps and predatory birds; planting or retaining food or shelter plants on the boundary; placing bundles of rice straw for attracting spiders and other predators and by using trap crops can be advantageous.

Disease Management

Proper crop rotation designs are important preventive measure to check transfer and carryover of inter crop-specific diseases. Diseases can be reduced by crop rotations and systems adopted like intercropping and mixed cropping. Spread of rusts and significant control of *Ascochyta* blight can be had by Barley + chickpea and wheat + chickpea intercropping systems. Organic crop management practices cause a reduction in the relative abundance of plant parasitic nematodes (Surekha *et al.,* 2010). Sheath blight is managed by green manuring with sunnhemp or sesbania (Alvares, 1999). Chickpea: mustard (5:1) and chickpea : barley (2:1) intercropping experiences less attack of blight (*Ascochyta rabiei*) (Gaur and Sharma, 2010). Cotton + moth mixture helps check the root rot of cotton. Late sowing of chickpea reduces root rot, wilt and blight diseases. Early planting of mustard manages white rust. The yellow vein mosaic disease in okra is less if sown during Feb-March. Deeper sowing of chickpea reduces the incidence of *Ascochyta* blight. *Trichoderma viride* use control root and stem rots, wilts, blights and other fungal diseases (Vinale *et al.,* 2008). Garlic extract @ 10% checks growth of *R. bataticola* and *Fusarium oxysporum* of chickpea (Gaur and Sharma, 2010). Raw cow milk controls downy mildew of bajra (Kumar and Mali, 2010). Cow urine applied is effective in controlling sclerotinia rot caused by *Sclerotinia sclerotiorum* of cucumber (Basak *et al.,* 2002). Arbuscular myorrhizal (AM) fungal minimizes sheath blight (ShB) disease incidence (Hazra *et al.,* 2015). In sugarcane intercropping of green gram, black gram and cowpea reduces the incidence of early shoot borer (Venugopala Rao, 2010).Red rot in sugarcane can be reduced by drip irrigation (Rajeev *et al.,* 2003). Green manuring of dhaincha reduces red rot incidence in sugarcane (Sezhian, 1999). Planting methods and cultural practices also affect the incidence and spread of diseases. Late blight in potato and smut diseases in wheat can be reduced by Ridge sowing (Sood, 1998; Hassabnis *et al.,* 1997) and flat sowing reduces leaf rust in wheat (Hassabnis *et al.,* 1997). The *tikka* disease of groundnut can be controlled by wider spacing (Ghewande, 1982). In India dusting of cow dung ash is done to control various fungal diseases of plants. Foliar application of vermiwash, neem oil, aqueous garlic and annona leaf extract reduces Gundhi bug population (*Leptocoryza varicornis*) Mishra *et al.* (2015). Smearing of seeds followed by root dipping of seedlings with *T. harzianum* controls diseases in basmati rice (PAU, 2017). Soaking of seed in water from 8 am to 12 noon on any calm and sunny day during May-June followed by complete sun drying controls Loose smut (*Ustilago tritici*) of wheat (PAU, 2016).

Produce Quality

Answer to questions whether organic produce is better in quality than the conventional produce; can be both 'Yes' and 'No'. The expert opinion also varies as far as quality of organic and conventional foods is concerned. Usually, organic produce is considered to be healthier, safer and tastier than the conventional (chemical) produce (Stockdale *et al.*, 2001). But the US Secretary of Agriculture while announcing the National Organic Programme during 2000 had stated, "Let me be clear about one other thing. The organic logo is a marketing tool. It is not a statement about food safety. Nor is 'organic' a value judgment about nutrition or quality (Hollyer *et al.,* 2013). Better taste, improved quality and higher nutritive value, generally attached with organically produced foods is a myth, it lacks a scientific basis (Chhonkar and Dwivedi, 2004; Woese *et al.,* 1997). However, several studies (Walia and Kler, 2009; Kaur et al., 2006) have reported the better quality of organic products than conventionally grown products.

In a study at Chicago, it is found higher level of minerals, like (Calcium 63, Iron 73, Magnesium 118, Molybdenum 178, Phosphorus 91, Potassium 125 and Zinc 60%) in organically grown than in the conventionally grown food. There is ample, circumstantial evidence that on an average, organic vegetables contain more of defense related compounds such as minerals, vitamins, protein and carbohydrates, allowing for the possibility that organic plant foods may in fact benefit human health more than conventional ones (Brandt and Molgaard, 2001). Organically grown vegetables has in it more vitamin C, iron, magnesium and phosphorus (Worthington, 2001). Organic rice had better physical grain quality (Surekha *et al.*, 2010) and straw berries, black berries and corn had 19, 50 and 58% higher anti-oxidants, respectively than conventional crop (Duram, 2007). Vora (2009) reported higher amounts of Ca, Mg, K, Na, Mn, Fe and Cu in organically grown garden vegetables than the commercially grown which had only 13% of the minerals of the organically grown vegetables. The quality of organic produce in terms of aroma, essential oil content, texture, taste and shelf life have been reported to be superior by Leclare *et al.* (1991) and Sharu and Meerabai (2001). High protein and sulphur with amino acids were reported in organic soybean by Singh *et al.* (2011). Higher protein and mineral content were found in okra grown with FYM as compared to commercial manures (Bhadoria *et al.*, 2002). Organic management improves quality (higher vitamins and nutrients) of fruit and crops and also helps minimize the toxic chemical load (Lairon, 2010). Few researchers have concluded that the organic production improves the quality of rice (Bourn and Prescott, 2002; Saha *et al.*, 2007), while others have failed to establish any significant change in quality parameters. However, (Dixit and Gupta, 2000) believe improved rice quality under organic farming Gupta (2000). Generally, organic rice has got low in protein content when compared with conventionally grown rice (Worthington, 2001). Saha *et al.* (2007) and Kharub and Chander (2008) too reports reduction in grain protein in organic practices when compared to inorganic fertilization. Organic rice are preferred over high protein conventionally grown rice (Tamaki *et al.*, 1989; Kaur *et al.*, 2015), the palatability of organic rice low due to its reduced protein content.

In essence it is said that it is futile to swallow chemicals added as inputs in crops value added chains. Hence, organic farming using lesser chemicals as input is rational proposition and should have lesser debate as an adherence and common jurisprudence.

Organic framing: An economic view

The profitability of organic farming depends upon value chain adopted in factors employed like skill of individual, climate, general price level, amount of land available and price premiums (Offermann and Nieberg, 2002). Definitely the economics of organically produced crops face to face conventionally grown crops does not follow a consistent trend. It varies from crop to crop and region to region. Low cost production system with limited on-farm inputs can be

there in organics but due to lower yield may not be as remunerative as the conventionally grown crops. If crops in organic farming are to be supplied with proper required nutrition; cost of production becomes prohibitive (Narayana, 2011). Organic farming in spite of the reduction in crop productivity but due to the availability of premium price (20-40%) provides profitability (Ramesh *et al.,* 2010). But, Kumari *et al.* (2010) and Kharub and Chander (2008) reported higher profit from conventionally grown crops compared to the organically grown crops. Baishya *et al.* (2010) reported higher net returns from potato under recommended chemical fertilizers than organic source were reported in Meghalaya. However, incorporation of crop residues of crops + green manuring + phosphorus solubilizing microbes + poultry manure 5 t/ha + neem cake 0.2 t/ha, resulted in higher yield and net returns than inorganic management in rice wheat system (Yadav *et al.,* 2009). Panneerselvam *et al.* (2011a) reported lower production cost in a comparative study of organic and conventional farming systems in Uttrakhand, Madhya Pradesh and Tamil Nadu. Due to labour cost production costs of organic crops are generally higher in comparison to conventional crops reason being cost of labour involved in application of organic manures and manual weedings. The cost of manual weeding in rice is about 6 times and wheat about 1.5 times more than that with herbicides (PSFC, 2008).

Prospects in India

India, with 142 million ha area under cultivation and 68% area under rainfed cultivation spreading to 177 districts covering 86 million ha has lesser use of synthetic fertilizers. It not only increases water demand of crops but also reduces water holding capacity of already light soils (Faroda *et al.,* 2008). The rate of fertilizer application, is very low (36.4 kg/ha) as compared to national average of 76.8 kg/ha (FAI, 1998). Thus, low fertilizer use and diversification in farming systems favour organic going in these areas; which is also not likely to affect the national food security. Rich traditional wisdom for restoration of soil fertility and for pest control further strengthens organic system (Sharma and Goyal, 2000). Diversified cropping systems pre-requisites organic farming systems and thus organic farming has the potential to diversify rice wheat. Withdrawal of subsidies and shrinking fossils reserves will certainly make a positive case for influencing a conventional farmer towards organic farming. But, keeping in view the contribution of food grains to central pool, complete shift to organic farming is neither desirable nor possible in high input use areas. Systematic phasing out agrochemicals and synthetic fertilizers may be a step in right direction. Effectively Good Agricultural Practices (GAP) is the right solution. Also, there is a need to have a certification mechanism such as India GAP certification so that the farmer may get small premium on this certified food and consumer safe food at affordable price.

Conclusion

Organic farming is necessity. It has emerged on the scene due to miss and non- judicious use of modern technologies at the disposal of agriculture mankind. To satisfy the greed there is in gross violations of research mandates regulations; overuse of chemical inputs for greater quantitative output advantages. There are pesticides chemical residues in output produced. There has to be conscientious willingness on the part of agro community to adhere to compliance standards for quality outputs, clean, clear and green ecology biosphere. Human must understand that the excessive mis(use) of chemical has hazards which are cancerous. Agriculture practices means eco-friendly practices like integrated crop and pest management to conserve and enhance the ecological foundations such as soil, water and biodiversity essential for sustained advances in agricultural productivity and profitability (Swaminathan, 2010). It is also clear that the use of organics and inorganics has to be blended for feeding ever increasing population from limited capacitated infrastructure (Tarafdar *et al.*, 2008). Total factor productivity (TFP) growth score prepared by National Institute of Agricultural Economics and Policy Research has concluded that technology-driven growth has been the highest in Punjab and the lowest in Himachal Pradesh. It is inferred from this that some of the states like Himachal Pradesh, Uttarakhand, Madhya Pradesh, Rajasthan, Jharkhand and north-eastern region of India are not much influenced by the modern inputs of agriculture like chemical fertilizers and pesticides and to gross advantages towards organic farming can be the potential areas for organic farming (Aulakh and Ravisankar 2017). So far organic farming is choice and better it is that we agricultural community and brotherhood understand it well before it becomes a compulsion, we must apply all out efforts to keep the balance of scale tilted in fovour of organic farming than towards inorganic ones. Fine tuning of organic concepts and innovations to the advantage of crop yields. Farming certificated and creation of market mechanism in term of demand and supply management is need of the time. Differential region approach using tradition, science *de facto* organic areas (hills) and rain fed/dry land regions will contribute to safe food security besides increasing the farm household income and climate resilience (Aulakh and Ravisankar 2017). Organic standards and certifications have a lot to do with organic farming. National Accreditation Policy and Programme in India is an institutional mechanism for ensuring organic standards implementation. Nevertheless, organic farming is *sine quanon* for human, livestock and eco health system.

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