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A controversial and multidimensional organic farming

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Abstract
Lack of effective, economic crop protection strategies is one of the key factors limiting expansion of organic agriculture, particularly where novel or horticultural crops are being considered. India being the most resourceful land with enriched local or long-established farming system known as traditional farming credited to the existing range of agro-ecological area and to the groups of local ethnic people practicing age-old farming in these specific locations. Management of crops and pests are carried out by integrating indigenous knowledge and traditional ecological knowledge of the communities. This twin knowledge have been recognized by the world scientific communities and scientists are showing keen interest in traditional agriculture because indigenous farmers and their system may be of great help to remedy the deficiencies of pest management in modern agriculture Plant pathogens are the most important factors that cause major losses to agricultural products every year. Different itks like use of wood ash, kerosene, table salt, lime, cow urine, cow dung, some unique indigenous plants and indigenous techniques like insertion of bamboo pegs were used by the farmers for the management of various insect pests and diseases occurring in Sikkim. Besides, people also use some indigenous pest and disease resistant varieties. To minimize these losses peoples are dramatically used pesticide and fungicide that will cause toxic effect of human health. Thus, the most sustainable and environmentally acceptable control may be achieved using biocontrol agents the need of sustainable agriculture will increasingly rely on the integration of biotechnology with traditional agricultural practices.

Keywords: organic farming, conversion, indigenous traditional technology, concerns

Introduction
Organic farming is a new alternative of conventional farming which excludes the use of chemical fertilizers, pesticides and rely wholly on the utilisation of the different aspects of biological surroundings, indigenous technology and natural environment. A farmer who cultivates his farm land grows loads of rice, vegetables, fruits and other crops without the using any chemicals to improve his produce and sells his produce in the local market, this type of farming is called natural farming. Whereas Organic is more than a farming practise, it is a legal conversion procedure which is govern by law and continuous monitoring, proceeding through the conversion results you in giving a "label" organic. Basically organic farming is a conversion phenomena in which its the soil which is converted to no chemical use for a duration of time which is fixed and it is the product which gets the title organic ultimately increasing the value of the product.

There has been a time period when all the talks about the organic farming started, 1920s to 1960s and 1970s was time of institutionalization of the idea of organic farming where revolutionary studies about organic farming was seen been reflected in different literatures portrayed as alternative form but was rejecting its practicability (Lampkin and Stolze, 2006) [30] (Besson, 2007) [5]. From the agronomical aspect, organic farming is justified and considered on the bases of its performances (Sebillotte, 1972, 1974) [46, 52], which resulted in visions which over looked organic farming as a authentic agricultural alternative. Where as in the USA, the limits of modern agriculture was been questioned over organic agriculture which was well thought-out as a, promising version (USDA, 1980) [57], and other qualifications and definitions for agriculture also emerged, in particular "sustainable" (Harwood, 1990) [25] and "alternative" agriculture. The National research council in 1989 tried to put an end to the

debate on practicality and feasibility of organic farming but ended in enlarging it, assisted by Biological and agricultural scientists suggested an approach that was away over from the limited and constrained visions of agronomical ground and to the best to farm, the approaches provided guidance to encompassing natural conditions such as changes in climatic conditions (Flessa *et al.*, 2002) [14] and aspects of social beliefs which is linked with food consumption (Gliessman, 1997; Francis *et al.*, 2003) [21, 15]. In the present time of 21st century of growing specialisation of organic farms (Allard *et al.*, 2001) [3], resulting in stress and pressure on the technical aspects such as weed control and fertilisation supervision and that pressure Is creating an equivalent pressure on the specialisation of research, development and extension works to lead a way on focusing a commodity specialised approach to organics, as required for livestock (Hovi and Garcia Trujillo, 2000; Roderick, 2004) [28, 42] and fruit production (Gigleux and Garcin, 2005) [20]. This literature discusses different aspects of organic farming and the conversion process and the duration that conversion takes. There are some concerns that limits the acceptance of organic farming which can be mitigated by combining the idea of organic and the knowledge of traditional Indigenous technology, which the literature highly aims for. Integrated pest and nutrient management systems and certified organic agriculture techniques can lessen dependence on agrochemical inputs as well as make agriculture perfectly environmentally and cost-effectively.

Comparison and conversion

Comparison

The so called Modern farming techniques or more appropriately known world wide as conventional farming, mainly focuses on increasing the yield of the crops at a immensely faster rates relying completely on the use of synthetic pesticides and fertilizers, that traces its way as greenhouse gases or finds it's way into different water bodies contrary to that Organic farming which boycotts /strictly prohibits the use of synthetic crop remedies, emphases the use of natural methods that are guaranteed to be more healthier and safer for the environment and for consumption (Bengtsson *et al.* 2005). Recent research and approaches made by (Drinkwater *et al.* 1995), toward organic farming have suggested that no chemical agriculture results in less leaching of nutrients and the works of Reganold (1993) [45] showed that there is higher carbon storage (Mäder *et al.* 2002) [38] concluded that organic farming causes less erosion and the works of added that it lower levels of pesticides in the system of water. Heavy agricultural reliance on synthetic chemical fertilizers and pesticides is having serious impacts on public health and the environllment (Pimentel *et al.* 2005) [40]. Other than causing severe adverse impact on the environment conventional farming impose an immense threat human health and the ecosystem as in the works of Frankenberger and Turco in 2003 through his work has reflected the deterioration of some large fisheries in north America and runoff of top soil and nitrogen fertilizer from agricultural field production area into the Corn Belt has contributed in creating the so called "dead zone" in the Gulf of Mexico. It also affects the economic system of farmers wits the high price tags of fertilizers and pesticides. Organic or conventional it all works around the soil life and the biodiversity surrounding the production and thus a well balanced and abundance supports the organic agriculture.

Soil

When we talk about soil its very important to manage the soil fertility to keep the constant productivity rate in all farming system and it plays an important role in sustainable management. According to the works of Swift & Palm in the year (2000), through their remarks suggested that it is additive to sight soil fertility as an conceptual ecosystem integrating with the various soil functions, consisting of nutrient supply, that upholds plant production. During the 1996s, 1997s many discussed the theory of SMO which stands for Soil organic matter and soil structure that it promotes, which ultimately establishes soil workability in a broad sense and generates the availability of water and nutrients to the growing plants. Where Conventional farming uses chemical supplements, organic farming generally relies in the farm manures and FYMs for supplements. A very close association between SOM and soil structure is observed: as in organic matter that is added to the soil binds the mineral particles present into aggregates and helps in reducing the propensity of the soil to slaking (Tisdall & Oades 1982) [56]. These aggregates improves the physical protection of SOM against putrefaction under grassland or reduced tillage when compared with conventional tillage systems (Six *et al.* 1998). Organic farming maintains well balanced carbon and nitrogen levels, other nutrient elements such as potassium and phosphorous, which Mader and his co-workers in 2002 observed that these elements are not found in extreme quantities in organically managed soils, which enhances the efficiency of soil since chemical herbicides and pesticides are not applied on organic farms, leaching and run-off effects are likely not to occur. Soils with secure aggregates have an elevated resistance to water and wind erosion and nutrients leaching. Organic matter is more unwavering in microaggregates than in macroaggregates. Organic farming increases the use of practices like crop rotation, crop residues, animal manure, legumes, green manure, off-farm organic waste and biological pest control to sustain soil productivity, (USDA, 1980; cited in Lampkin, 1990) [57]. Organically managed ones show a higher organic matter content, higher biomass, privileged enzyme activities of micro-organisms, enhanced aggregate stability, better water infiltration and withholding capacities, and are less incidences of erosion (Siegrist *et al.* 1998 & Mader 2002) [48, 38] to water and wind Soil is the most important part of the organic mission and its role in the conversion process has been studied and pointed out by several different authors thought of organic as an keen alternartive among them are Liebhardt *et al.*, 1989 [31]; & MacRae *et al.*, 1990 [36] these authors have talked about an "organic transition effect" caused when one is attempting the conversion. This effect causes a decline in the social and most importantly in the technico-economic performances in the early phases of organic conversion as in for all essential functions previously it was provided by chemical supplements and organic depends on ecological processes in its early phase that being inadequate to supply nutrients, to control pests and diseases (MacRae *et al.*, 1990) [36]. Afterwards later stages of conversion shows elevated, enhances soil properties and abundance in biological organism and their activity in years of organic management, which in turn would give higher yields. The organically-farmed or cured soil has appreciable amount of organic matter content, thicker topsoil depth, advanced polysaccharide content, lesser modulus of rupture and minus soil erosion than the conventionally-farmed or worked up soil. These studies indicate that, organic system is much more effective in the long term race, than the

conventional farming system in reducing soil erosion, maintain soil health and soil fertility and, therefore, in maintaining soil productivity.

Biodiversity and Farming Systems:

The higher abundances in biodiversity refers to abundance of different taxonomic groups, that ilncludings micro-organisms, earthworms, weeds and wild flora and fauna (Bengtsson *et al.* 1995), insects, mammals and birds (kragten *et al.* 2005). Freiben in 1995 observed the area where there has been an increase in organic farm lands and found that there has in turn been an increase in the diversity and abundance of bees due to which the pollination of those areas grew considerably. It has always been insighted that there is a common tendency for higher earthworm abundance in the organic farming system and species richness, although some literatures have shown poorer abundance in the arable organic fields, which could be the result of excessive tillage and was discussed by Hole *et al.* in 2005 [26]. Huge diversity of crops and wild plants over larger greater floral species opulence and abundance within the crop, not only the production area the mesmerizing abundance can also be seen under the crop land margins and non-farmed areas surrounding the organic farms (Roschewitz *et al.* 2005; Shepherd *et al.* 2003; Bengtsson *et al.* 2005; Hole *et al.* 2005; Fuller *et al.* 2005; Gabriel *et al.* 2006) [44, 49, 50, 26, 23]. Shepherd *et al.* In 2003 [50] described this data in ration and stated that there six times more species within the crop on organic farms when compared to that of the conventional farms. Hole *et al.* in 2005 [26] stated that there is More recurrent incidence of rare arable species on organic farms. The abundance and diversity in species maintain and helps in protecting crops and landscape. Organic farming not only supports the increase in population of species (like micro-organisms predators etc) that favours the system but its also reported (Mader *et al.* 2002) [38] that the average activity density of certain species like carabids, staphylinids, spiders (improved abundance of spiders by 62% compared to conventional systems, Schmidt *et al.* 2005) [49] and ground beetles (hole *et. al.* 2005) [26] is twice that of the conventional system. Organic farming appears to be associated with not only increase species richness of animals but also with the abundance for plant species, predatory invertebrates and birds which could be referred in the works of Bengtsson *et al.* in 2005. Smith *et al.* In 2010 [51] studied the increase in Species richness of passerine birds, especially of invertebrate feeders, and observed that their number was higher in organic systems in simple landscapes as compared with that of the conventional farms. On the other hand he observed that Species richness of non-passerine birds was on the positive side as it was related to organic farming but independent of landscape convolution. He concluded that the organic systems in simple landscapes favour the increase in the numbers of invertebrate feeders due to amplified food resources. Kerbs *et al.* in 1999 stated that organic farms may have elevated levels of habitat heterogeneity than conventional farms, and potentially present one route to restoring farmland biodiversity.

Difference in addressing problems

The way one choices to solve the situation make a difference in one hand conventional farming system opts for the quick fix mentality depends on chemical fertilizers and pesticides which give desirable results within short period of time but the deals lasts for only a short period of time Conventional agriculture habitually relies on besieged short-term solutions a very good example is the application of a soluble fertilizer or herbicide. But its different for Organic farming systems Stockdale *et al.* in 2001 explained that organic farming uses a tactically different approach, these approaches relies wholly on longer Term period solutions which are preventive rather than being reactive. A very good example is the importance of Crop rotation designs for balanced nutrient cycling and maintenance and weed, pest and disease control (Stockdale *et al.* 2001) (Atkinson & Watson 2000) [2].

The Plan

The conversion process is a tedious job. Its not as simple as it sounds, there is complexity and understanding that involves. We are talking about conversion complete transition from conventional methods to complete organic methods taking into consideration all the technologies, and the social behaviour towards the conversion there is a complete layout that one needs to follow, the one who desires the label ”organic” for his product. Wyne in 1992 stated that conversion requires Moving away from the inputs and techniques that is used in conventional farming system and towards those used in organic agricultureso one should be prepared personally and financially ready for the change. Robyn Nesson in 2010 described the process stating that Conversion to organic farming is a long-term process. And there are no preset methods to be applied for organic conversion. Each farm unit that in involved is looked as an individual system and for successful conversion it requires a careful evaluation of the resources available in the unit and the interactions between components in that is involved in the system considered for conversion. First step towards conversion begins with personal conversion – mind-set and approach. Initially, it is very much adviced to collect as much information and facts about organic farming as possible. A layout plan which is called Organic Management Plan (OMP) has to be worked out with the service provider agencies, these agencies guarantees a full conversion with regular internal and external exception audits for the farmers and for the consumer they follow the Trace-net system using which a consumer can get the ancestral history of its product with assurance of certification and the consumer can trace back the farmer and how it became a organic produce as this plan allows for changes in production technologies and balance out the financial consequences to be considered and outlines your plans for ongoing devotion to organic standards and also helps in the certification.

Organic Combined Traditional Indigenous Technology

Indigenous knowledge refers to knowledge of and contained within the indigenous people occupying diverse geographical regions of the world and is with their own language, culture, tradition, belief, folklore, rites and rituals that the knowledge is stored (Singh and Sureja, 2008) [53]. This knowledge is developed over time in course of their intimate interactions with nature and natural resources for food, fodder and fibre surrounding their habitat, these knowledge becomes technology when they try to make a certain decisions as solutions to their problems that they come across in their day to day life while controlling the land and environmental resources needed for their survival. That is gripping situations motivate them to engender knowledge out of their necessities (Thurston, 1992) [55]. Indigenous knowledge cannot be made fixed rather its is more appropriate to describe it as an unwritten body of knowledge. It is not stored in pages (or else the knowledge would have been well earsed) It is held

acquainted in different brains, languages and skills as many as the different groups, stored in folk songs and environments and are available in the present time (Atte, 1989) [1]. Kumar *et al.* 2009 studied the traditional farming systems and technologies in the north east regions of India plus the prevailing uncertified organic or natural farming and stated that this twin combined knowledge of organic and indigenous farming has been accepted by the world scientific of all communities and now scientists are showing their keen interest in traditional farming because indigenous farmers and their system that they use may be of huge help for cure of the deficiencies of pest management in organic agriculture. In organic farming there are diversity in the different traditional farming practices conducted all around the world weather its is Management of crops in the field or the management of disease and pest different particular are different among traditional farmers practicing traditional techniques systems in different regions of the country (Chhetry and Belbahri, 2009) [7]. Stratigies for Crop protection in organic agriculture and horticulture plays an important role to prevent pest, disease and weed problems which is most concerned part of organic with the exclusion of chemical pesticides so optimisation of proper Cropping system as a whole is required (litterick *et al.* 2000) [2]. Some states like the north east regions of India and Sikkim which has been declared India's first organic state uses this twin knowledge to practices a no chemical use farming system or more appropriately a sustainable agriculture. Indigenous knowledge prevailing in Sikkim is an fundamental part of the culture and history treasured by the local community and restored in the life of local people and we need to discover and learn from local communities to enrich our knowledge to speed up the development process (PongeI, 2011). Sikkim being the first organic state of India. Indigenous traditional pest and disease managing practices plays a very significant responsibility in organic farming in Sikkim. Gopi *et al.* in 2016 carried out a study in India's first organic state and interacted with 300 farmers from different communities in different locations of Sikkim during 2013−15 with an aim to be able to record information about ITKs used in the state to make it a successful system. Chandola *et al.*, in 2011 reported this traditional techniques in which involves the Use of ashes of fire wood, lime, neem, lemon, pomelo seed powder, peels of citrus, for both the management of storage and field pests are very common among the people of Himalayan regions. Debanand and Mayuri, 2010 observed a very unique technique in which the indigenous people uses Kerosene oil and salt for management of pest and diseases in the North Eastern regions like Assam. He also decribed how among the plants, titeypati, chilouney, banmara, neem, lantana, datura extracts are used to manage pest and diseases especially ants and borers. In Sikkim Mulching is one of the important methods in cultivation of one of its most important cash crop ginger. Rahman *et al.*, in 2009 reported how Mulching suppresses the incidences of weeds and how it protects the crop from pests and diseases and improving the germination in ginger. In many Himalayan and north east regions of India Cow dung is generally mixed with mud and the trunk of the tree are coated with it, helps in protecting the trunk from borer and bark eating caterpillar. Narayanasamy (2002) also reported the unusual repelling effect of cow urine in managing fruit borer and leaf beetle. In southern parts products of cow is used to fertilize and manage crops. Rice being one of the most important crop of the world in Sikkim The farmers of the west side applies a technique in which they remove the logged water and reapply fresh irrigation water in pest and disease outburst. Rahman and Karuppaiyan, 2011 described the method stating that its is an indigenous method in which the farmer Alternately dries and wet the rice field for few days is followed by the farmers in particular aligned with case worm and leaf folder in rice.

Concerns and Mitigations

Organic farming can be an alternative of conventional farming but it requires understanding and social acceptance. However, the knock on organic farming has been a boom concerning health and environmental situations its is still a concern well we can say a belief that organic farming gives a very poor yield rate and with that its is almost impossible to feed the world with food at an immense faster rates But all that might not be true, Martini *et al.* in 2004 discussed this issue and compared different organically managed systems that differed from each other only in the number of years since being converted to organic farming (less than 1 year and more than 5 years), they studied the 2-year crop rotation plan of tomato and maize. And observed that there was no significant difference in tomato yields as related to the year of conversion. Huxham *et al.* in 2004 [29] tested and studied the specialised field crop systems and the effects of seven conversion strategies, which was defined by couples of foregoing crops, on winter wheat and on two different kinds of soils. They observed significant yield differences in wheat and found that wheat grown after a Red clover–Ryegrass green manure. These theories clearly explains that due to the conversion and sudden limitation of chemicals there can be loss in yield in the early phases of conversion but after 4-5 years of conversion there will be a constantly rise in the yield and crop production (lotter *et al.*, 2003) [33]. Quick fix mentality for the management of occurrence of pest and diseases could face a huge challenge as organic requires patients and twining the knowledge, combining it with the traditional farming technologies. Soil fertility can be permanently fixed by including animal husbandry in their farming system. In some southern states farmers practising organic farming rely deeply on azola cultivation as they make feeds for their livestock mixed with wheat flour keeping it organic.

Conclusion

Organic agricultural methods are whispered to be more environmentally sound than intensive conventional agriculture. But not much work is being done in the research field to make this organic system a worldwide success Research is necessity of time to determine strategies for controlling the of key factors of pests and diseases occurrence in organic systems, only if organic agriculture is to be expanded to meet increasing consumer demand. Itks which was ones under estimated can be a great help in this field. Organic farming is not only healthy and eco-friendly it is our one of the hopes to conserve the environment via sustainable strategies.

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