ISSN 0976-7177

जैविक खेती सूचना पत्र

Organic Farming Newsletter

वर्ष 9 अंक 1 मार्च 2013
Vol 9 No. 1 March 2013

संपादकीय कार्यालय Editorial Office
राष्ट्रीय जैविक खेती केन्द्र
National Centre of Organic Farming
हापुड़ रोड, कमला नेहरू नगर, गाजियाबाद–2
Hapur Road, Kamla Nehru Nagar, Ghaziabad-2
☎ 0120-2764212; 2764906; Fax 0120-2764901
Email : nbdc@nic.in; website : http://ncof.dacnet.nic.in

संपादकीय Editorial

प्रिय पाठकों

कृषकों एवं आम जनता में जैविक खेती की बढ़ती ग्राह्यता को देखते हुए अब अलग–अलग फसलों के लिए, विभिन्न पर्यावरणीय क्षेत्रों के अनुसार आर्गेनिक पैकेज आफ प्रैक्टिस का व्यवस्थित दस्तावेजीकरण किया जाना आवश्यक है। प्रगतिशील किसानों द्वारा अपनायी जा रही कृषि तकनीकों को भी प्रोत्साहित करने की आवश्यकता है। ऐसे प्रगतिशील किसानों के अन्वेषकीय प्रयासों से यह स्थापित हो चुका है कि छोटे एवं सीमान्तर कृषकों के लिए जैविक खेती लाभकारी है। देश में स्वास्थ्य के प्रति जागरूक लोगों में भी स्वास्थ्यप्रद व जैविक खाद्यानों के प्रति जागरूकता बढ़ रहीं है। भारत के कुछ अग्रणी राज्यों जैसे मध्य प्रदेश, महाराष्ट्र, उड़ीसा एवं पूर्वोत्तर राज्यों में जैविक खेती का क्षेत्रफल निरंतर बढ़ रहा है। इन राज्यों में बागवानी, कृषि, मसालें एवं कान्डीमेंट्स आदि के जैविक उत्पादन के लिए पर्याप्त संभावनाएं मौजूद हैं जो कि भारत को जैविक क्षेत्र के रूप में स्थापित करने में निश्चित रूप से सहायक है। इस दिशा में विपणन विकास के लिए व्यवस्थित योजना बनाने में विभिन्न क्षेत्रों के समन्वित प्रयास अपेक्षित हैं तथा जैविक उत्पादों की सतत् आपूर्ति भी आवश्यक है। अधिकांश किसानों का मानना है कि उनके उत्पाद प्रमाणीकरण प्रक्रिया खर्चीली होने के कारण प्रमाणीकरण से वंचित रह जाते हैं। लेकिन अब भारत सरकार ने प्रमाणीकरण की वहनीय प्रणाली – भारत की सहभागिता जैविक प्रतिभूति प्रणाली (पीजीएस इंडिया) – शुरू की है जो कि देश में जैविक आन्दोलन को निश्चित रूप से बढ़ायेगा। इस अंक में एक किसान, जो कि राष्ट्रीय जैविक खेती केन्द्र, गाजियाबाद द्वारा संचालित पीजीएस इंडिया प्रमाणीकरण प्रणाली के तहत पंजीकृत है, की जैविक खेती की सफलता की संक्षिप्त कहानी शामिल की गयी है। आशा है यह अन्य किसानों के लिए जैविक खेती करने के लिए प्रेरणाप्रद होगी। प्रकाशन को और अधिक जानकारी युक्त एवं उपयोगी बनाने हेतु आपके लेख, सुझाव तथा विचार आमंत्रित हैं।

Looking to the acceptability of organic farming among the farmers and people, there is an urgent need for systematic documentation of organic package of practices for different crops, suited to different ecological regions. The farming practices of progressive organic farmers also need to be promoted, since their dedicated and innovative efforts to create best relationship between the productivity and sustainability are proving that, organic farming can be the best viable option for small and marginal farmers. The awareness for healthy and organic food among health conscious people is also growing gradually in country. The states like Madhya Pradesh, Maharashtra, Odisha and North Eastern States in India are the leading states where organic area is increasing day by day. These states are having great potential for organic production of horticultural, agricultural, spices and condiments which will definitely help in making India as a organic hub. The consolidated efforts from different sectors are expected for systematic planning for market development. Simultaneously the constant supply of organic products is also required for market. Maximum farmers feel that their products are still beyond the reach of certification, since it's a very costly affair for them. But now Govt. of India has launched an affordable system of certification i.e. Participatory Guarantee System of India, which will definitely strengthen organic movement in country. The current issue presents a brief script of success story of a farmer registered under PGS certification system of India being operated by National Centre of Organic Farming, Ghaziabad. Hope this will inspire farmers willing to farm organically. To make this publication more eventful I invite your participation in the form of article contribution, suggestions and comments.

Dr Krishan Chandra
Editor

Success story

A Tryst with Organic Farming

Shri Shaligram Ganapat Chafale,
Village Rehaki, District Wardha,
Maharashtra

Shri Shaligram Ganapat Chafale, a small farmer from village Rehaki, Selu block in Wardha District of Maharashtra state, is a celebrity among progressive farmers and is enjoying popularity after he successfully converted his entire farm operations to organic. Since last three years he is practicing organic farming on his six acres farm with all possible biodiversity in crops.

The journey started during the year 2007, when former President His Excellency Dr APJ Abdul Kalam convened a meeting of progressive and innovative farmers in Mughal Gardens of Rashtrapati Bhavan in which more than 1500 farmers from all over the country and especially from suicide prone areas were invited. In his address Dr Abdul Kalam emphasized that there is an urgent need to adopt such strategies which makes farming economically viable, as the conventional system has failed to uplift the economic status of small and marginal farmers, but as the successful farming is the key to our future food needs, there is no other alternative, than to economically viable sustainable farming. His Excellency also stressed that, time has come when farmers should explore the possibilities for adopting organic farming practices. Shri Shaligram Chafale, hailing from infamous suicide prone area of Maharashtra also attended that meeting.

In his own word, that was the time he was bearing a huge burden of loan and was facing too much problems in his conventional farming ways, cost of inputs in the form of chemical fertilizers and pesticides was too high and comparatively the yield and net profit was very low. Situation was getting worse with every passing year due to increasing costs and narrowing down of profits. It was getting very difficult for him to balance his house hold and farming expenses. Inspired by Dr Abdul Kalam's vision Shri Chafale decided to start organic farming and give a try to new system. Many progressive organic farmers in the Vidarbha region of Maharashtra encouraged him to convert to organic farming and assured him that it is the best way to ensure profitability and in turn get rid of all types of burdens /loans borrowed for agriculture. Since then, Shri Chafale started planning for organic farming, visited different organic farms and met progressive organic farmers, also learned various plant nutrient management methods, rain water harvesting, water management techniques, cropping patterns, crop rotations and mixed cropping.

Installation of biodiversity was one of the first priorities, which, he implemented through taking large numbers of different crops simultaneously. In the first year he selected crops like chickpea, pigeon pea, soybean, different vegetables, lemon, citrus, sugarcane etc. Diversity among vegetables was maintained by integrating leafy vegetables with brinjal, tomatoes, broccoli, cabbage and capsicum (red, green and yellow). In his 6 acres farm he also developed a fish tank of 58x58 and8mt deep, where he is regularly maintaining 15000 fishes and 12000 prawns and is feeding them organic feed (farm based) daily i.e. small balls of feed prepared from ground nut cake, rice straw, wheat flour and cow dung. Entire farm was fenced with bamboo trees so that green fence is always maintained for bird's shelter. The live fence also acted as good buffer wall. He own 2 cows and 2 bullocks. To fulfill the nutrient requirement of crops he uses on-farm produced vermicompost (50kg/acre) and neem cake 50kg/acre while sowing. For better water use efficiency his entire farm is equipped with sprinkler and drip irrigation

system. For ploughing the soil he uses wooden plough. Keeping in view of the scarcity of labors he takes different crops in separate plots since it is easy to harvest the crops separately. For crops like soybean he adopted the cropping pattern of 9 rows and 2ft space, again 9 rows of soybean and 2 ft space in 2.5 acre plot. For pest management he used 160ml Neem seed kernel extract (NSKE) in 15 lit water /acre as spray. Under organic management Shri Chafle could get a yield of 7-8 quintal of soybean per acre with net sale realization of Rs 60000/- from 2.5 acre. After harvesting soybean crop he took chickpea in the same plot without ploughing with similar nutrient management i.e. 50kg vermin-compost and 50 kg neem cake/acre, similar pest management inputs and could get average yield of 7-8 quintal /acre with net realization of Rs 70000/in total from 2.5 acre. With actual cash cost of cultivation at Rs. 5000/- in each of the two crops, his net profits were around Rs 55000/- from soybean and Rs 65000/- from chickpea.

In adjacent plot of 1.25 acre he took pigeon pea (arhar) crop, with no nutrient management and expenses of Rs 1000/- on labours. The yield of arhar was 7 quintal /1.25 acre area which after value addition he could fetch net realization of Rs 30000. In another plot of 1.25 acre area he took sugarcane crop. Before transplantation of sugarcane seedlings from on farm nursery beds in field, he deep ploughed the soil with wooden plough up to 9 inches .While transplanting the sugarcane seedlings in 5ft x 1.5ft space, he applied a dose of 50kg neem cake/acre and 50kg vermicompost/ acre after one month of transplantation and repeated the same dose for three times during the entire crop period. In 1.25 acre area he could get sugarcane yield of 70 tons and profit of Rs 60000/-.

He has maintained separate plot for vegetables and also sown some marigold and gladiola seeds in between. In case of floriculture he is of the opinion that flowers do not need much nutrient management, it also helps in pest control. He purchased a packet of 1000seeds of marigold for Rs 2500 (Inca series variety) and 1000 gladiola seeds for Rs 1040/-, out of which he could harvest 3.75quintal yield and could fetch a net profit of Rs 10000/- in one season. For growing vegetables as mentioned above he is using same nutrient and pest management practices and he is quite satisfied with its production and marketing, since he is getting good premium price at District market for organic. In lemon and citrus garden which is in growing stage he has sown some marigold seeds and also kept 2no honey bee boxes for honey production. After every 25 days he is harvesting 1.5 kg honey/box and getting good price of Rs 1000/-per kg of organic honey in state level or district level Agri exhibitions. The selling of fresh fish and prawns is done from the farm itself. Yearly he fetches good profit out of this fish and prawns selling. i. e. Rs 140000/ against actual expenses of Rs 40000/-.

Shri Chafale is highly satisfied with his organic production management system, and direct marketing of his produce. During conventional farming days he used to spend significant amount for purchase of fertilizers, pesticides etc but now under organic management his cost on inputs has come down to just 30%. Gradually his farm is becoming visiting and learning centre for the farmers who really want to turn towards organic farming. He is the model registered farmer under one of the Regional Council (NEEM Foundation, Gondakhairi attached with RCOF, Nagpur) appointed under PGS India certification system being operated by National Centre of Organic Farming, Ghaziabad.

While talking about his experience with organic farming he always takes pride in his decision to convert to organic farming and always advise that it is the best and profitable method of farming and farmers must experiment with it. He also suggests that if adequate attention is paid even small and marginal farmers can reap good benefits.

(*Scripted by Dr Sarita M. Mowade based on inputs and details provided by Shri Chafale*)

India Organic News

Govt. promotes organic farming by providing incentives- Demand for organic food items is on the rise during the last few years. Organic products are costlier in the country due to demand by consumers for chemical residue free food grown by nature friendly methods without the use of synthetic inputs. Considering the opportunity, government is promoting production of organic crops, fruits and vegetables through various schemes viz National Horticulture Mission (NHM), Horticulture Mission for North East and Himalayan States (HMNEH), Rashtriya Krishi Vikas Yojana (RKVY), National Project on Management of Soil Health and Fertility (NPMSHF), National Project on Organic Farming (NPOF), Network Project on Organic Farming under Indian Council of Agricultural Research (ICAR) and various other schemes of Agricultural and Processed Food Products Export Development Authority (APEDA). India produced around 3.88 million metric tons of certified organic products which includes all varieties of food products namely basmati rice, pulses, honey, tea, spices, coffee, oil seeds, fruits, processed food, cereals, herbal medicines and their value added products. The production is not limited to the edible sector, but also produces organic cotton fiber, garments, cosmetics, functional food products and body care products. Currently, India ranks 33rd in terms of total land under organic cultivation and 88th position for agriculture land under organic crops to total farming area. The cultivated land under certification is around 4.43 million hectares (2010-11). "There is no provision of Minimum Support Price (MSP) in respect of organic farm produce, however, the government is promoting organic farming by providing incentives to cultivators of organic food products under the NHM at Rs 10,000 per hectare for maximum area of four hectare per beneficiary, for setting up of vermicompost units at 50 percent of cost subject to a maximum of Rs 30,000 per beneficiary and organic farming certification at Rs 5 lakh for group of farmers covering an area of 50 hectare. Assistance for organic food promotion is also available under Rashtriya Krishi Vikas Yojana (RKVY) for projects formulated and approved by the state level sanctioning committee," said Mr Tariq Anwar, Minister of State for Agriculture and Food Processing Industries, Government of India. India exported 86 items in 2010-11 with the total volume of 69,837 metric tons. The export realization was around $157.22 million registering a 33 percent growth over the previous year. Organic products are mainly exported to Europe, USA, Australia, Canada, Japan, Switzerland, South Africa and Middle East. Oil Crops (except Sesame) leads among the products exported (17966 metric tons). (Source- By Narayan Kulkarni, 7 March 2013, Biospectrum, the Business of Bioscience).

India's organic foods market growing at over 20% - The market for organic food in India including exports is currently valued at Rs 1,000 crore. The market for organic food products in India is growing at 20-22% a year, a top official from Yes Bank has said. "The market for organic foods is growing at an compounded annual growth rate (CAGR) of 20-22%," Yes Bank's Country Head, Food and Agribusiness, Girish Aivalli told PTI. With rising spending power of the growing middle class in the country and increased awareness towards chemical free food, organic and natural products sector will grow significantly in the coming years, he added. Yes Bank also released a report 'Indian Organic Foods Market' at a one-day conference, Jaivik India, on proliferation of organic and natural products in the Indian market. The report says that, the global organic food and beverages market is expected to grow from $57.2 billion in 2010 to $104.5 billion by 2015 with a CAGR of 12.8%. Europe contributed to the largest share of the organic foods market in 2010 with revenue of $27.8 billion, the report added. The Asia-Pacific organic food market had total revenue of $3.5 billion in 2010 and had a CAGR of 16.2% between 2006 and

2010, the report indicates. On India, the report says that the market for organic food including exports is currently valued at Rs 1,000 crore. The report added that the country produced around 3.88 million tonne of certified organic products that includes basmati rice, pulses, tea, coffee, spices and oil seeds. Organic foods industry presently is metro-based, with about 95% of the brands existing in top 10 metros like Delhi (NCR), Kolkata, Mumbai, Pune, Chennai, Bengaluru and other tier II cities. According to government data, area under organic farming had risen to 1.08 million hectare. In addition, 3.40 million hectare is wild forest harvest collection area. The states doing well in organic farming are Madhya Pradesh (4.40 lakh hectare), Maharashtra (1.50 lakh hectare) and Orissa (95,000 hectare), the data added. Among crops, cotton is the single largest crop accounting for nearly 40% of total area followed by rice, pulses, oilseeds and spices. India is the largest organic cotton grower in world, and accounts for 50% share of total world organic cotton production, it said. Government is promoting organic farming under National Project on Organic Farming (NPOF), National Horticulture Mission (NHM) and Rashtriya Krishi Vikas Yojana (RKVY). (Source-Friday, March 22, 2013, Business Standard)

Agri Technocrats to Study Potential of Organic Farming In J&K-JAMMU - The Minister for Agriculture Production Ghulam Hassan Mir said that a team of students from the field of agriculture shall be nominated to conduct a study to develop systematic approach and plan for promotion of organic farming among the farmers of the State, after inaugurating 3rd National Summit on Organic Farming aimed at product, certification, value addition and marketing organized by ASSOCHAM India here at K. C. Plaza. State offers immense potential for organic farming in the State and the government will take all out efforts to promote it in a big way. The soil's fertility is decreasing day by day due to use of chemical fertilizers and under such circumstances the farmers have to adopt the organic farming. He said that organic farming was picking up pace in India but the sector has been jostling with lack of awareness, knowledge and confidence about its use and subsequent food products among both farmers and consumers. In the farming system a piece of land is used optimally and to its fullest potential to produce a range of nutritious and healthy food as well as other required commodities in a manner which can healthily feed a small family, and maintain soil health and productivity by agricultural practices based on principles of organic farming**.** The Minister said a large area of cultivated land in the State is already under semi-organic cultivation by default in remote areas in hilly districts of the State due to non-availability of chemical fertilizers. He said that Basmati rice of R. S. Pura, Rajmah of Bhaderwah, potato of Gurez and Machil and red rice (Zug) of Tangdar, Kupwara are major exportable organic products and have the potential of better returns in the national and international markets. The Minister's focus was to explore markets elsewhere in the country and abroad for its saffron, basmati rice and rajmash among various other agricultural produce. The Jammu-Kashmir Government is adopting organic farming in a systematic manner. The farmers of Jammu & Kashmir should tap the opportunity of the growing demand of "Organic Products" in India as well as across the globe. The state of J & K can also take a lead by promoting Organic Farming Practices & becoming the first "Organic State" of India.(Source-Kashmir Observer Friday , March 22, 2013 – IST).

Spatial variability in distribution of organic carbon stocks in the soils of North East India – North Eastern Region (NER) of India has wide variation in physiography and climatic conditions. Because of its strategic settings in the phyto-biomass-rich landscape of the Eastern field-scale, observations are available on soil organic carbon (SOC) content at regional level. Information on status and spatial variability of SOC and its complex interaction with land-use systems is scanty. Therefore, an attempt was made to estimate spatial variability in SOC inventories for surface soils across six states of NER (viz. Assam,

Manipur, Meghalaya, Nagaland, Sikkim and Tripura covering a geographical area of 15.61 m ha) in Geographical Information System (GIS) environment. Results revealed that the soils were very high in SOC content – 98.54% area had >1% and 14.4% area had > 2.5% SOC content. Similarly, 76.5% area had SOC density of 20–40 Mg/ha and 8% area had very high SOC density of 40–60 Mg/ha. A total of 339.8 Tg (1 Tg = 1012 g) SOC stocks was estimated on an area of 10.10 m ha surface soils representing all major land-use systems, with a major share (>50%) coming from forest soils. Complex interaction of geographic location, rainfall, soil texture and land-use practices significantly influenced spatial variation in SOC content, density and stock. The SOC content as percentage of total geographical area was highest in Sikkim followed by Nagaland, Manipur, Meghalaya, Assam and Tripura. (Source- B. U. Choudhury et al, ICAR Research Complex for NEH Region, Umaim 793 103, India 604 CURRENT SCIENCE, VOL. 104, NO. 5, 10 March 2013)

Sustainable Agriculture - Modern Method with Ancient Roots - Agriculture in India is not of recent origin but has a long history dating back to Neolithic age of 7500 – 6500 B.C. It changed the life style of early man from nomadic hunter of wild berries and roots to cultivator of land. Agriculture is benefited from the wisdom and teachings of great saints. The wisdom gained and practices adopted have been passed down through generations. The traditional farmers have developed the nature friendly farming systems and practices such as mixed farming, mixed cropping, crop rotation etc. The great epics of ancient India convey the depth of knowledge possessed by the older generations of the farmers of India. The ecological considerations shown by the traditional farmers in their farming activities are now a day reflected in the resurgence of organic agriculture. (Source-Vijay Gawade and V.V. Kulkarni Consultant, Indian Streams Research Journal Volume 3, Issue. 2, March. 2013)

Life Cycle Assessment for Cultivation of Conventional and Organic Seed Cotton- In this paper, the environmental impact due to cultivation of the conventional and organic seed cotton fibers was determined using life cycle assessment (LCA). Cultivation of conventional seed cotton fibers involves synthetically compounded harmful plant protection chemicals and fertilizers. Whereas, cultivation of organic seed cotton fibers adopts a number of natural pest control practices such as promotion of natural enemies, biological pest control, mass trapping or spraying neem, chilli or garlic for plant protection. Fertilization in organic cotton field involves crop rotation, intercropping with legumes, recycling of crop residues, application of farm yard manure and composites. The LCA results show that cultivation of conventional seed cotton fibers has high environmental impact compared to that of organic seed cotton fibers. The environmental impact is dominated by abiotic depletion, acidification, global warming, human toxicity, freshwater aquatic eco-toxicity, terrestrial eco-toxicity and freshwater sediment eco-toxicity. Further, it is observed that irrigation is the major source that contributes greatly to overall environmental impact in both conventional and organic seed cotton fiber cultivation process (Source-Murugesh Babu. K and Selvadass.M, 2013, International Journal of Research in Environmental Science and Technology Universal Research Publication, February 2013).

Tilling the soil with pesticides- The Ministry of Agriculture had organized a conference on Doubling Food Production during February 1-3, 2013. The “eminent speakers” invited were not the members of International Assessment of Agricultural Science and Technology for Development (IAASTD) or top Indian scientists, rather they were spin masters of biotechnology industry who claimed to have founded the anti-GMO movement and openly promoted it. The old paradigm of food and agriculture is clearly broken. On April 15, 2008, the IAASTD report findings, carried out by 400 scientists over six years, were released. The report had noted that business as usual is no

longer an option. Neither the Green Revolution nor the genetically modified organisms (GMOs) can guarantee food security. We need a new paradigm of working with the laws of nature and ecological sustainability. The fact is that the emerging scientific paradigm of ecological agriculture has shown that we can double food production while protecting the planet, human health and farmers' livelihoods. The old paradigm of agriculture has its roots in war. An industry that had grown by making explosives and chemicals for the war remodeled itself as the agro-chemical industry when these wars ended. Factories that manufactured explosives started making synthetic fertilizers and gradually the use of war chemicals as pesticides and herbicides began. The 1984 Bhopal gas tragedy is a stark reminder that pesticides kill. Pesticides in agriculture continue to kill farmers. One of Navdanya's reports, "Poisons in our Food" released in 2012, shows that a link between epidemics like cancer and the use of pesticides in agriculture exist. A daily "cancer train" leaves Punjab, the land of the Green Revolution in India, with cancer victims. In the last five years, 33,000 people have died of cancer in Punjab.

The chemical push changed the paradigm of agriculture. Instead of working with ecological processes and taking the wellbeing and health of the entire agro-ecosystem with its diverse species into account, agriculture was reduced to an external input system adapted to chemicals. Instead of small farms producing diversity, agriculture became focused on large chemical monoculture farms, producing monocultures for a handful of commodities. Correspondingly, the human diet shifted from 8,500 plant species to about eight globally traded commodities, which were nutritionally empty but loaded with toxics. The scientific paradigm was also transformed. Instead of adopting a holistic approach, agriculture became compartmentalized into fragmented disciplines based on a reductionist and mechanistic paradigm. Just as the gross domestic product fails to measure the real economy, the health of nature and society, similarly the category of "yield" fails to measure real costs and real output of farming systems. On October 25, 2010, the Food and Agriculture Organization of the United Nations released its second report on The State of the World's Plant Genetic Resources for Food and Agriculture. It observed that the so called high-yielding varieties (HYVs) of the Green Revolution should, in fact, be called high response varieties as they are bred for responding to chemicals and are not "high yielding". The narrow measure of "yield" propelled agriculture into deepening monocultures thereby displacing diversity and eroding natural and social capital. According to the FAO report, industrial monoculture agriculture has pushed more than 75 per cent agro-biodiversity to extinction. Seventy-five per cent bees have been killed because of toxic pesticides. Scientist Einstein had once cautioned, "When the last bee disappears, humans will disappear". Seventy-five per cent of the water on the planet is polluted owing to intensive irrigation of chemical-intensive industrial agriculture. The nitrates in water from industrial farms are creating "dead zones" in the oceans. Chemical industrial farming has led to 75 per cent land and soil degradation. Forty per cent of all greenhouse gas emissions, which are responsible for climate change, come from the use of fossil fuels and chemical-intensive industrial globalised system of agriculture. While this ecological destruction of the natural capital is justified in terms of "feeding the people", the problem of hunger has grown. One billion people are permanently hungry. Another two billion suffer from food-related ailments like malnutrition. And this hunger and malnutrition is designed into a food system driven by profits rather than health and sustainability. When the focus is on the production of commodities for trade instead of food for nourishment, it leads to hunger and malnutrition. Only 10 per cent of corn and soya grown is used as food. The rest is used as animal feed and biofuel. Commodities do not feed people, food does. A high cost external input system is artificially kept afloat with $400 billion as subsidies. That is more than a $1 billion a

day. The "cheap" commodities have very high cost financially, ecologically and socially. Industrial, chemical agriculture displaces productive rural families. It is like creating a debt. Debt and mortgages are the main reason for the disappearance of the family farm. In extreme cases, as in the cotton belt of India, debt created by purchase of high cost seed and chemical inputs, has pushed more than 127,000 farmers to suicide in a little over a decade. Getting out of this suicide economy has become crucial for the wellbeing of farmers and all life on earth. A scientifically and ecologically robust paradigm of agriculture is emerging in the form of agro-ecology and organic farming that rejuvenates the natural capital (soil, biodiversity and water) on which sustainable food security depends. Chemical agriculture treats soil as inert and an empty container for chemical fertilizers. The new paradigm recognizes the soil as living where billions of soil organisms create soil fertility. Chemical agriculture destroys biodiversity. Ecological agriculture conserves and rejuvenates biodiversity. Chemical agriculture depletes and pollutes water. Organic farming conserves water by increasing the water-holding capacity of soils through recycling organic matter. Biodiversity and soils rich in organic matter are the best strategy for climate resilience and climate adaptation. While lowering the ecological footprint, organic agriculture increases output when measured through diversity and multifunctional benefits instead of the reductionist category of "yield". Another research by Navdanya released in 2011, "Health per Acre", on biodiverse organic systems has shown that ecological systems produce higher biodiverse outputs and higher incomes for rural families. Our report shows that when measured in terms of nutrition per acre, ecological systems produce more food. We can double food production ecologically. Ecological systems of agriculture are based on care, compassion and cooperation. They enhance ecological resilience, diversity, sustainable livelihoods and health. The new paradigm of agriculture creates living economies and living cultures that increase the well-being of all. (Source- Vandana Shiva, The Asian Age, Friday Mar 22, 2013).

Biodiversity: Importance and Climate Change Impacts - Biodiversity is the variability among living organisms, including genetic and structural difference between individual and within and between individual and within and between species. Biodiversity plays a direct role in climate regulation. Biodiversity conservation will lead to strengthening of ecosystem resilience and will improve the ability of ecosystem to provide important services during increasing climate pressures. This review basically focuses on the importance of biodiversity, the consequences faced by the plants, animals, humans and ecosystem owing to the global warming and climate change and the possible mitigation and adaptation strategies in terms of biodiversity conservation which can protect the planet from the consequences of climate change. (Source- Aparna Rathore and Yogesh T Jasrai, International Journal of Scientific and Research Publications, Volume 3, Issue 3, March 2013)

Soil Carbon Sequestration and Rhizospheric Microbial Population in Apricot Orchards Following Plastic Film Mulching Under Cold Arid Region - The study of agricultural management practices on rhizospheric microbial population and phytomass carbon sequestration in apricot orchard in cold arid region was conducted. Plastic mulching conserved the soil moisture and stabilized rhizospheric temperature of apricot which enhanced the microbial activity in the rhizosphere and plant growth of apricot. Significantly higher soil moisture conservation (19.75%) in July, maximum microbial population of fungi (15.36 cfu/gx10^4 cfu/g soil) and bacteria (11.45 cfu/gx10^6 cfu/g soil) in month of September and enhances in plant growth (17.73 %) at end of season recorded in red plastic mulch with mulch size 1.5 m x1.5 m. Active plant growth phase of apricot plant also influence the microbial activity. (Source-H.V. Singh, Journal of Horticulture, Feb 2013, Vol. 3, No. 8 2013)

Global Organic

Role of organic amendment application on greenhouse gas emission from soil - Globally, substantial quantities of organic amendments (OAs) such as plant residues (3.8×10^9 Mg/yr), biosolids (10×10^7 Mg/yr), and animal manures (7×10^9 Mg/yr) are produced. Recycling of these OAs in agriculture possesses several advantages such as improving plant growth, yield, soil carbon content, and microbial biomass and activity. Nevertheless, OA applications hold some disadvantages such as nutrient eutrophication and greenhouse gas (GHG) emission. Agriculture sector plays a vital role in GHG emission (carbon dioxide— CO_2, methane— CH_4, and nitrous oxide— N_2O). Though CH_4 and N_2O are emitted in less quantity than CO_2, they are 21 and 310 times more powerful in global warming potential, respectively. Although there have been reviews on the role of mineral fertilizer application on GHG emission, there has been no comprehensive review on the effect of OA application on GHG emission in agricultural soils. The review starts with the quantification of various OAs used in agriculture that include manures, biosolids, and crop residues along with their role in improving soil health. Then, it discusses four major OA induced-GHG emission processes (i.e., priming effect, methanogenesis, nitrification, and denitrification) by highlighting the impact of OA application on GHG emission from soil. For example, globally 10×10^7 Mg biosolids are produced annually which can result in the potential emission of 530 Gg of CH_4 and 60 Gg of N_2O. The article then aims to highlight the soil, climatic, and OA factors affecting OA induced-GHG emission and the management practices to mitigate the emission. This review emphasizes the future research needs in relation to nitrogen and carbon dynamics in soil to broaden the use of OAs in agriculture to maintain soil health with minimum impact on GHG emission from agriculture.
(*Source- Thangarajan et al, 2013, Science of The Total Environment*).

Mycorrhizal activity and diversity in a long-term organic Mediterranean agroecosystem - In organic agriculture, soil fertility and productivity rely on biological processes carried out by soil microbes, which represent the key elements of agroecosystem functioning. Arbuscular mycorrhizal fungi (AMF), fundamental microorganisms for soil fertility, plant nutrition and health, may play an important role in organic agriculture by compensating for the reduced use of fertilizers and pesticides. Though, AMF activity and diversity following conversion from conventional to organic farming are poorly investigated. Authors studied AMF abundance, diversity and activity in short- and long-term organically and conventionally managed Mediterranean arable agro-ecosystems. Results show that both AMF population activity, as assessed by the mycorrhizal inoculum potential (MIP) assay, the percentage of colonized root length of the field crop (maize) and glomalin-related soil protein (GRSP) content were higher in organically managed fields and increased with time since transition to organic farming. Authors showed an increase of GRSP content in arable organic systems and a strong correlation with soil MIP values. The analysis of AMF spores showed differences among communities of the three micro-agro-ecosystems in terms of species richness and composition as suggested by a multivariate analysis. Entire data indicate that AMF respond positively to the transition to organic farming by a progressive enhancement of their activity that seems independent from the species richness of the AMF communities. The study contributes to the understanding of the effects of agricultural managements on AMF, which represent a promising tool for the implementation of sustainable agriculture.
(*Source - Stefano Bedini, Luciano Avio, Cristiana Sbrana, January 2013, Biology and Fertility of Soils*).

Selected Soil Enzyme Activities, Soil Microbial Biomass Carbon and Root Yield as Influenced by Organic Production Systems in Sweet Potato - A field experiment was conducted on Typic Rhedustalfs to determine the effects of various organic production systems. Results revealed that the higher soil microbial biomass carbon (SMBC) content was with the application of 100% N through farmyard manure (FYM). The ratio index value (RIV) of biofertilizer along with 50% N through any one of the organic sources were higher than 100% N through green leaf manure (GLM)/vermicompost (VC), integrated use of manure and fertilizer (conventional production system), and control (traditional system of production). Soil enzymes varied with the production systems. The urease, phosphatase, and β-glucosidase activities were more in higher nitrogen (N), phosphorus (P), and organic matter applied treatments, respectively. The SMBC, soil enzymes, and microbial activity were very responsive to organic production systems, but their levels and activities were not reflected in sweet potato root yield.
(*Source - M. Nedunchezhiyan, G. Byju, S. N. Dash & N. Ranasingh, Jan 2013, Soil Science and Plant Analysis*).

Earthworms, spiders and bees as indicators of habitat quality and management in a low-input farming region-A whole farm approach - The benefits of low input farming on biodiversity and ecosystem services are already well-established, however most of these studies focus only on the focal field scales. Efforts aimed to study whether these benefits exist at the whole farm scale, to find the main environmental driving effects on biodiversity at the whole farm scale in farms of different grassland grazing intensity, applying three well-known species diversity indicator groups of different ecological traits. Edaphic (earthworms), epigeic (spiders) and flying (bees) taxa were sampled in each identified habitat type within 18 low-input farms in Central Hungary during 2010. The number of habitat types, the number of grassland plots, the cumulative area of grasslands and habitat type had an effect on the species richness and abundance of spiders, while grassland grazing intensity influenced the species richness of bees. Both bees and spiders were sensitive to vegetation and weather conditions, resulting in more bees on flower-rich farms and those having higher temperature; and more spiders on farms with more heterogeneous vegetation structure and in low-wind areas. Relatively few earthworms were found in the whole study, and their abundance was not influenced by any of the farm composition and management variables. Authors conclude that local field management (grazing intensity of grassland patches) can have a farm scale effect, detectable on species diversity indicators that have high dispersal ability and strong connection to grasslands as important foraging sites (bees). However, other farmland biota (spiders) is also strongly determined by farmland composition and habitat diversity, therefore the maintenance of a mosaic within-farm habitat structure is strongly recommended. The application of earthworms as farmland composition or management indicators is strongly restricted because of their special needs of soil conditions.
(*Source - Anikó Kovács-Hostyánszki[a],, March 2013 Ecological Indicators*).

Effect of hand-hoe based conservation agriculture on soil fertility and maize yield in selected smallholder areas in Zimbabwe - Conservation agriculture (CA) based on hand-hoe prepared planting basins is being widely promoted in southern Africa, targeting resource-constrained farmers with limited access to draft power. This study was conducted across 15 districts covering four agro-ecological zones in Zimbabwe where paired CA and conventional animal drawn tillage (CADT) plots had been established on 450 farms as part of CA promotion. The aim of the study was to assess the effect of CA on soil pH, organic C, total P and maize (*Zea mays* L.) grain yield compared with CADT, and also to evaluate the yield benefits of mulching and crop rotation in CA with or without mineral fertilizer use. It was hypothesized that CA improved the pH, organic C, total P of the soils (Arenosols)

and grain yield compared with CADT and that mulching and crop rotation in CA increased maize grain yield. A total of 1014 soil samples (0–0.2 m depth) were taken at the end of the 2009-10 cropping season and analyzed for pH, organic C and total P. Grain yield was determined in 2009-10 and 2010-11 from 0.01 ha net plots. There was no significant difference in average soil pH, total P and organic C between CA and CADT plots and therefore the hypothesis that CA improves these soil properties was rejected. Average concentration for organic C for both CA and CADT plots was less than 10 g kg^{-1}, a minimum threshold for well managed soils. When combined with mineral fertilizer: mulching, crop rotation, and mulching + crop rotation in CA increased maize grain yield by 20–33%, 7–9% and 58–69%, respectively. With no mineral fertilizer application, mulching, crop rotation, and mulching + crop rotation depressed maize grain yield by 48%, 28% and 36%, respectively. Therefore the hypothesis that mulching and crop rotation increase maize grain yield was accepted when mineral fertilizer was added and rejected when the fertilizer was not added. It was concluded that the yield benefits of CA can only be realized when mineral fertilizer is also applied. All the three CA principles in combination with mineral fertilizer results in highest yield benefits compared with one or two principles as currently done by most smallholder farmers in Zimbabwe. Access to mineral fertilizer is an important factor in the targeting of CA promotion in smallholder areas of Zimbabwe and similar socio-ecological zones in sub-Saharan Africa. (*Source-Justice Nyamangara, Soil and Tillage Research Volume126, January 2013, Pages 19–25*).

Recovery of organic fertility in degraded soil through fertilization and crop rotation-Maintenance and enhancement of the quality of degraded soil are, in essence, dependent upon the improvement of physical, chemical and biological properties of the soil. Improvement in microbial parameters of the degraded soil was studied in the present experiment through the effect of fertilizer sources and levels and cropping patterns in a factorial design in northern Pakistan. The experiment was designed in RCB with split plot arrangements. Cropping patterns i.e. maize–wheat–maize (C1), maize–lentil–maize (C2) and maize–wheat + lentil intercrop-maize (C3) were kept in main plots while fertilizer treatments; the control (T1), 50% NP (T2), 100% NPK or the recommended dose (T3) and 20 t ha^{-1} farmyard manure integrated with 50% mineral N and 100% P and K (T4) were tested in sub-plots during the study. Maximum and significant improvement in microbial parameters was recorded in T4 with 44, 24, 27 and 24.6% increase in total nitrogen (total N), mineralizable nitrogen (MN), microbial biomass nitrogen (MBN), and microbial biomass carbon (MBC) after a 10 day incubation period over the T3, respectively, in the surface soil and 10%, 21%, 24% and 24.2% increase in the corresponding microbial parameters in the sub soil. The cropping patterns having cereal–legume rotation also improved organic soil fertility by 25%, 11.4%, 13% and 44% increase in total N, MN, MBN and MBC after a 10 day incubation period over the cereal-cereal rotation, respectively, in surface and 4%, 11%, 10% and 31% increase in the corresponding microbial parameters in the sub surface soil. The conclusion was that degraded alfisols require 50% N from the organic sources out of its total N requirements along with the inclusion of legumes in the traditional cereal–cereal crop rotation for the recovery of its microbial parameters.
(*Source-Wiqar Ahmad[a], Farmanullah[b], online 26 February 2013Journal of the Saudi Society of Agricultural Sciences*).

Increase in soil nutrients in intensively managed cash-crop agricultural ecosystems in the Guanting Reservoir catchment, Beijing, China- Since the late 1970s, transitions in socioeconomic status and new governmental policies have led to drastic changes in agricultural land use types and farm management practices across rural China, such as an increase in the area of land cultivated for cash–crops (e.g. vegetables and orchards) and intensive fertilization and irrigation of this land. How

this more intensive management and land use for the more profitable cash crops affects soil nutrients is of great concern for carbon, soil and water quality management. In this paper, we attempted to assess the influence of cash crop ecosystems on soil nutrients in the catchment upstream of the Guanting Reservoir, in the Beijing municipality, North China plain. Soil nutrients in cash crop (orchard and vegetable) ecosystems with between 8 and 20 years of intensive management history were compared with traditional agro-ecosystem management patterns (corn and soybean). Results showed that soil organic carbon (SOC) had improved, and total nitrogen (N), and available phosphorus (P) concentrations had marginally increased under intensive management practices in the vegetable and orchard ecosystems in the last 25 years. The increases in SOC and total P densities at the 100 cm soil depth in orchard, vegetable and irrigated corn systems were greater than those in the rain fed corn and soybean systems. Soil available P and electrical conductivity (EC) were highest in the vegetable lands. However, no significant changes were found between the soil physical properties (i.e. bulk density, clay content and water stable aggregate content) of the traditional and cash-cropping systems. Multi regression analysis showed that manure and mineral fertilizer contributed significantly to the increase in soil nutrients. Intensively managed orchards are a better option for improving soil quality and SOC sequestration. However, the risks of nonpoint source pollution from, and soil salinization in, the land used for vegetable cultivation should be considered in the future.

(*Source-Liding Chen[b,] Xinyu Zhang[a,,,] , February 2013, Geoderma, Volumes 193–194, Pages 102–108*).

Previous Crops and Organic fertilisers in Lettuce: Effects on Yields and Soil Properties - The use of organic amendments in agriculture could sustain crop production and preserve the agroecosystem, due to their importance in the conservation of organic matter in soil. The objective of this research was to evaluate the effects of differing organic fertilizers and of previous crops on lettuce growth, nutritional status and yields. The effects on soil characteristics were further investigated. The research was carried out during two years (2006 and 2007) at Metaponto (MT) in Southern Italy, on lettuce crops cultivated after eggplant and melon to avoid their continuous cropping. The effects of application of a mineral fertilizer (MF), and of three treatments in organic fertilizers (commercial stable manure - OM; anaerobic digestate based on wine distillery wastewater - AD; composted municipal solid organic wastes coming from the separate collection - MSW) were studied. Head average weight, leaf area index, nitrate content and SPAD readings during the cropping cycles did not show significant differences among fertilizer treatments. On the contrary, marketable yield and head average weight at the harvest presented significantly different among the three organic fertilizers. The average marketable yield and head average weight of organic fertilizers experimental (AD and MSW treatments) decreased of 16 and 17%, respectively, compared to OM treatment. The previous melon crop influenced positively all analyzed parameters of the lettuce compared with previous eggplant crop. The previous melon crop reached the highest marketable yield with an increase of 59% compared with previous eggplant crop. Compared to the mineral fertilizer, organic ones significantly increased the extracted fraction of soil organic carbon (6.9, 10.7 and 14.9% for OM, AD and MSW, respectively), without significant changes for the humic and fulvic content.

(*Source - Rita Leogrande[a], Ornella Lopedota[a], Angelo Fiore[a],Carolina Vitti, online: 30 Jan 2013, Journal of Plant Nutrition*).

Impacts of land use on soil microbial biomass and soil organic status in Western Cameroon - Living organisms and their enzymes are responsible of most of the soil biotic interactions in agro-ecosystems. This study was to evaluate the impact of

land use (cropping systems and farming practices) on the physical, chemical and biological properties of soil in Western Cameroon. The soil samples (0-20 cm) in four different land use systems (extensive, intermediate, intensive and an undisturbed natural habitat)were taken. Also measured soil health indicators in each land use type. It was observed that the total organic carbon (C_{org}) and P availability was significantly higher in agro-ecosystems as compared to undisturbed natural habitat. Similar trends were recorded for pH, electrical conductivity, and glucosidase, dehydrogenases and acid phosphatase activities. A significant variation in microbial biomass C (C_{mic}: 312.0 to 544.5 mg kg^{-1} dry soil) and microbial biomass N (N_{mic}: 5.40 to 25.31 mg kg^{-1} dry soil) with land use intensity was also recorded. The C_{mic}/C_{org} ratios of soils were two-fold lower in agricultural lands with vegetables than the undisturbed control plot indicating a decrease in soil microorganisms. Regression analysis revealed a negative correlation ($r = - 0.806$, $P < 0.01$) between soil clay content and microbial biomass C, and a high C_{org}/N ratio suggesting a heterogeneous distribution of the population of microorganisms between soils and the immobilization of P, respectively. These results suggested that the selected soil health indicators were sensitive to farming practices and cropping systems.
(*Source*- Fotio Daniel, Simon Serge, Ondo Jean Aubin, *Vol 3, No 1 (2013) Journal of Biology, Agriculture and Healthcare*).

Soil microbial biomass and bacterial and fungal community structures responses to long-term fertilization in paddy soils- Long-term fertilization can influence soil biological properties and relevant soil ecological processes with implications for sustainable agriculture. This study determined the effects of long-term (>25 years) no fertilizer (CK), chemical fertilizers (NPK) and NPK combined with rice straw residues (NPKS) on soil bacterial and fungal community structures and corresponding changes in soil quality. Soil samples were collected from a long-term field site in Wangcheng County established in 1981 in subtropical China between mid summer and early autumn of 2009. Terminal restriction fragment length polymorphism (T-RFLP) and the real-time quantitative polymerase chain reaction (real-time qPCR) of bacterial and fungal community and microbial biomass (MB-C, -N and -P) were analyzed.Redundancy analysis of the T-RFLP data indicated that fertilization management modified and selected microbial populations. Of the measured soil physiochemical properties, soil organic carbon was the most dominant factors influencing bacterial and fungal communities. The bacterial and fungal diversity and abundance all showed increasing trends over time (>25 years) coupling with the increasing in SOC, total N, available N, total P, and Olsen P in the fertilized soils. Compared to chemical fertilizer, NPKS resulted in the greater richness and biodiversity of the total microbial community, soil organic C, total N, MB-C, -N and -P. The high biodiversity of microbial populations in NPKS was a clear indication of good soil quality, and also indicated higher substrate use efficiency and better soil nutrient supplementation. Otherwise, unfertilized treatment may have a soil P limitation as indicated by the high soil microbial biomass N: P ratio. Our results suggest that NPKS could be recommended as a method of increasing the sustainability of paddy soil ecosystems.
(*Source - Hongzhao Yuan, Tida Ge, Ping Zhou, February 2013, Journal of Soils and Sediments*).

Medium-term impact of tillage and residue management on soil aggregate stability, soil carbon and crop productivity- Conservation agriculture is widely promoted for soil conservation and crop productivity increase, although rigorous empirical evidence from sub-Saharan Africa is still limited. This study aimed to quantify the medium-term impact of tillage (conventional and reduced) and crop residue management (retention and removal) on soil and crop performance in a maize–soybean rotation. A replicated field trial was started in sub-humid Western Kenya in 2003, and measurements were taken from 2005 to

2008. Conventional tillage negatively affected soil aggregate stability when compared to reduced tillage, as indicated by lower mean weight diameter values upon wet sieving at 0–15 cm ($P_T < 0.001$). This suggests increased susceptibility to slaking and soil erosion. Tillage and residue management alone did not affect soil C contents after 11 cropping seasons, but when residue was incorporated by tillage, soil C was higher at 15–30 cm ($P_{T*R} = 0.037$). Lack of treatment effects on the C content of different aggregate fractions indicated that reduced tillage and/or residue retention did not increase physical C protection. The weak residue effect on aggregate stability and soil C may be attributed to insufficient residue retention. Soybean grain yields tended to be suppressed under reduced tillage without residue retention, especially in wet seasons ($P_{T*R} = 0.070$). Consequently, future research should establish, for different climatic zones and soil types, the critical minimum residue retention levels for soil conservation and crop productivity.
(*Source-B.K. Paul, Agriculture, Ecosystems & Environment, Volume 164, 1 January 2013, Pages 14–22*).

Effects of crop rotation, crop type and tillage on soil organic carbon in a semiarid climate - There is uncertainty about how crop rotation and tillage affect soil organic C (SOC) on the Canadian prairies. We compared SOC amount and change (▲SOC) for one continuous crop and four 3-yr fallow-containing crop rotations under no-tillage (NT), and two fallow-containing crop rotations under minimum-tillage (MT), from 1995 to 2005 in semiarid southwestern Saskatchewan. After 11 yr, SOC (0- to 15-cm depth) was 0.2 Mg C ha^{-1} higher under continuous crop compared with fallow-containing systems. There were no significant differences in SOC and ▲SOC among fallow-containing rotations or between MT and NT. Total C inputs were weakly (R^2=0.18) but significantly (P<0.05) correlated to ▲SOC, which changed by ±0.33 Mg C ha^{-1} for each Mg ha^{-1} C input above or below 2.4 Mg C ha^{-1} yr^{-1}. Carbon inputs were typically less than this amount and SOC generally decreased over the experiment. Simulations of SOC with the Century model were consistent with our observations regarding ▲SOC per unit of C input. There was slight loss of SOC for the above-average precipitation regime during the study. Simulations also supported our finding that SOC differences between crop mix and tillage systems may require several decades to become distinguishable in this semiarid climate with small and variable C inputs.
(*Source- B. M. Shrestha,[1] B. G. McConkey, Canadian Journal of Soil Science, 2013, 93(1): 137-146, 10.4141/cjss2012-078*).

Long-term effective microorganisms application promote growth and increase yields and nutrition of wheat in China-An eleven years long-term field experiment for soil fertility and crop yield improvement had been conducted at China Agricultural University's Qu-Zhou experiment station since 1993. The field experiment included three treatments: effective microorganisms (EM) compost treatment; traditional compost treatment; and unfertilized control. The results revealed that long-term application of EM compost gave the highest values for the measured parameters and the lowest values in the control plot. The application of EM in combination with compost significantly increased wheat straw biomass, grain yields, straw and grain nutrition compared with traditional compost and control treatment. Wheat straw biomass, grain yields, straw and grain nutrition were significantly higher in compost soils than in untreated soil. This study indicated that application of EM significantly increased the efficiency of organic nutrient sources.
(*Source-Cheng Hu[a], Yingchun Qi[b,], European Journal of Agronomy Volume 46, April 2013, Pages 63–67*).

Conversion of traditional biomass into modern bioenergy systems : A review in context to improve the energy situation in Nepal - Nepal is an energy starving country where approximately 87% of the total energy share is met through traditional biomass resource especially by fuelwood. However, use of traditional biomass fuel is

confronted with series of issues and challenges such as low efficiency, labor intensive, degradation of environment and emission of health hazardous gases. In an effort to improve the energy situation as well as to improve the indoor environment, Nepal's government has initiated the adoption and implementation of efficient biomass technologies in Nepal. Improved health and sanitation, reduced fuelwood consumption, improved social and physical facilities, and reduced drudgery for women are some of the major benefits of efficient biomass technologies to the rural households. Use of biogas reduces the fuelwood consumption by 2 tons/yr and workload by 1100 h/yr. Similarly, use of improved cooking stove can increases the efficiency up to 15–20% and reduces greenhouse gases of 1.09 tCO_2eq/yr as compared to the traditional cooking stove. Despite continuous effort from government and foreign donors, the task of rapid dissemination of the efficient biomass technologies to more remote and isolated rural communities is still challenging in Nepal. Therefore, more systematic and comprehensive study supported by research and development is required to extend these technologies in more remote and poor communities of Nepal, especially in mountainous areas.

(*Source* **-** *Anup Gurung, Sang Eun Oh,Renewable Energy, Volume 50, February 2013, Pages 206–213*).

Effects of Farmyard Manure and Inorganic Fertilizer Application on Soil Physico-Chemical Properties and Nutrient Balance in Rain-Fed Lowland Rice Ecosystem- A field experiment was conducted to assess the effects of combined application of farm yard manure (FYM) and inorganic NP fertilizers on soil physico-chemical properties and nutrient balance in a rain-fed lowland rice production system in Fogera plain, northwestern Ethiopia. The study was carried out during the main cropping seasons of 2010 and 2011. Twenty-seven treatments comprising a factorial combination of three rates of FYM (0, 7.5, and 15 $t{\cdot}ha^{-1}$), three rates of nitrogen (0, 60, 120 $kg{\cdot}N{\cdot}ha^{-1}$) and three rates of phosphorus (0, 50 and 100 $kg{\cdot}P_2O_5{\cdot}ha^{-1}$) were tested. The experiments were laid out as a randomized complete block design with three replications. Bulk density, organic matter content, and available water holding capacity, total N, and available P of the soil were measured just after harvesting the rice crop. Results showed that application of 15 $t{\cdot}FYM{\cdot}ha^{-1}$ significantly increased soil organic matter and available water holding capacity but decreased the soil bulk density, creating a good soil condition for enhanced growth of the rice crop. Application of 15 $tFYM{\cdot}ha^{-1}$ increased the level of soil total nitrogen from 0.203% to 0.349%. Combined application of 15 $t{\cdot}ha^{-1}{\cdot}FYM$ and 100 $kg{\cdot}P_2O_5{\cdot}ha^{-1}$ increased the available phosphorous from 11.9 ppm to 38.1 ppm. Positive balances of soil N and P resulted from combined application of FYM and inorganic N and P sources. Application of $15{\cdot}t\ ha^{-1}{\cdot}FYM$ and 120 $kg{\cdot}N{\cdot}ha^{-1}$resulted in 214.8 $kg{\cdot}ha^{-1}{\cdot}N$ positive balance while application of 15 $t{\cdot}ha^{-1}{\cdot}FYM$ and 100 $kg{\cdot}P_2O_5{\cdot}ha^{-1}$ resulted in a positive balance of 69.3 $kg{\cdot}P_2O_5{\cdot}ha^{-1}$ available P. From the results of this experiment, it could be concluded that combined application of FYM and inorganic N and P fertilizers improved the chemical and physical properties, which may lead to enhanced and sustainable production of rice in the study area.

(*Source - Tilahun Tadesse, Nigussie Dechassa, American Journal of Plant Sciences, Vol. 4 No. 2, 2013, pp. 309-316. doi: 10.4236/ajps.2013.42041*)

How Important is the Quality of Organic Amendments in Relation to Mineral N Availability in Soils?- Wastes generated from municipal and agricultural activities have the tremendous potential for application in agriculture as a source of nutrients and as amendments to improve soil organic matter (SOM). A decline in SOM can represent a serious threat to soil fertility and quality. Nitrogen (N) mineralization from organic amendments is important for understanding the N dynamics in terrestrial ecosystems. In this review, quality of the amendments such as C/N ratio, N content, and biochemical compositions, etc. are discussed. Since, C/N ratio cannot explain

all differences in N mineralization; emphasis has been laid on characterizing different compounds in organic amendments that govern the mineralization process. The importance of simulation models has also been described in modeling N mineralization from some complex materials like compost, animal manures and farmyard manures. These complex simulation models once modified according to the quality of the organic amendments can simulate N mineralization and thus, they can be used for simulating N dynamics in terrestrial eco-systems.
(*Source - M. Mohanty, Nishant K. Sinha, Agricultural Research February 2013*).

Food security, climate change, and sustainable land management : A review - Agriculture production in developing countries must be increased to meet food demand for a growing population. Earlier literature suggests that sustainable land management could increase food production without degrading soil and water resources. Improved agronomic practices include organic fertilization, minimum soil disturbance, and incorporation of residues, terraces, water harvesting and conservation, and agroforestry. These practices can also deliver co-benefits in the form of reduced greenhouse gas emissions and enhanced carbon storage in soils and biomass. Here, we review 160 studies reporting original field data on the yield effects of sustainable land management practices sequestering soil carbon. The major points are: (1) sustainable land management generally leads to increased yields, although the magnitude and variability of results varies by specific practice and agro-climatic conditions. For instance, yield effects are in some cases negative for improved fallows, terraces, minimum tillage, and live fences. Whereas, positive yield effects are observed consistently for cover crops, organic fertilizer, mulching, and water harvesting. Yields are also generally higher in areas of low and variable rainfall. (2) Isolating the yield effects of individual practices is complicated by the adoption of combinations or "packages" of sustainable land management options. (3) Sustainable land management generally increases soil carbon sequestration. Agroforestry increases aboveground C sequestration and organic fertilization reduces CO_2 emissions. (4) Rainfall distribution is a key determinant of the mitigation effects of adopting specific sustainable land management practices. Mitigation effects of adopting sustainable land management are higher in higher rainfall areas, with the exception of water management.
(*Source-Giacomo Branca, Leslie Lipper, Agronomy for Sustainable Development February 2013*).

Chicken Farming in Grassland Increases Environmental Sustainability and Economic Efficiency - Grassland degradation caused by overgrazing poses a threat to both animal husbandry and environmental sustainability in most semi-arid areas especially north China. Although the Chinese Government has made huge efforts to restore degraded grasslands, a considerable attempt has unfortunately failed due to an inadequate consideration of economic benefits to local communities. Chicken farming is an innovative alternative strategy for increasing environmental sustainability and economic income, rather than a challenge to the traditional nomadic pastoral system. Our approach might be technically applicable to other large degraded grasslands of the world, especially in China. A controlled field experiment was conducted to test our hypothesis that utilizing natural grasslands as both habitat and feed resources for chickens and replacing the traditional husbandry system with chicken farming would increase environmental sustainability and raise income. Aboveground plant biomass elevated from 25 g m^{-2} for grazing sheep to 84 g m^{-2} for chicken farming. In contrast to the fenced (unstocked) grassland, chicken farming did not significantly decrease aboveground plant biomass, but did increase the root biomass by 60% ($p<0.01$). Compared with traditional sheep grazing, chicken farming significantly improved soil surface water content (0–10 cm), from 5% to 15%. Chicken farming did not affect the soil bulk density, while the traditional sheep

grazing increased the soil bulk density in the 0–10 cm soil layer by 35% of the control ($p<0.05$). Most importantly, the economic income of local herdsmen has been raised about six times compared with the traditional practice of raising sheep. Ecologically, such an innovative solution allowed large degraded grasslands to naturally regenerate. Grasslands also provided a high quality organic poultry product which could be marketed in big cities.
(*Source - Meizhen Liu mail, Bingxue Wang,Plos 1, Research artice*).

Biogas in organic agriculture—effects on productivity, energy self-sufficiency and greenhouse gas emissions-Anaerobic digestion of manure and crops provides the possibility of a combined production of renewable energy and organic fertilizer on organic farms and has been suggested as an option to improve sustainability of organic agriculture. In the present study, the consequences of implementation of anaerobic digestion and biogas production were analyzed on a 1000 ha model farm with combined dairy and cash crop production, representing organic agriculture in Denmark. The effects on crop rotation, nitrogen flows and losses, yield, energy balance and greenhouse gas (GHG) emissions were evaluated for four scenarios of biogas production on the farm. Animal manure was digested for biogas production in all scenarios and was supplemented with: (1) 100 ha grass–clover for biogas, (2) 100 ha maize for biogas, (3) 200 ha grass–clover for biogas and reduced number of livestock, and (4) 200 ha grass–clover for biogas, reduced number of livestock and import of biomass from cuttings made in ungrazed meadows. These four scenarios were compared with the current situation in organic agriculture in Denmark and to a situation where slurry from conventional agriculture is no longer imported. Implementation of anaerobic digestion changed the nitrogen flows on the farm by increasing the slurry nitrogen plant availability and introducing new nitrogen sources from legume-based energy crops or meadows. The amount of nitrogen available for application as fertilizer on the farm increased when grass–clover was used for biogas production, but decreased when maize was used. Since part of the area was used for biogas production, the total output of foodstuffs from the farm was decreased. Effects on GHG emissions and net energy production were assessed by use of the whole-farm model FarmGHG. A positive farm energy balance was obtained for all biogas scenarios, showing that biomass production for biogas on 10% of the farm area results in an energy surplus, provided that the heat from the electricity production is utilized. The energy surplus implies a displacement of fossil fuels and thereby reduced CO_2 emission from the farm. Emissions of N_2O were not affected substantially by biogas production. Total emissions of methane (CH_4) were slightly decreased due to a 17–48% decrease in emissions from the manure store. Net GHG emission was reduced by 35–85% compared with the current situation in organic agriculture. It was concluded that production of biogas on organic farms holds the possibility for the farms to achieve a positive energy balance, provide self-sufficiency with organic fertilizer nitrogen, and reduce GHG emissions.
(*Source-Siri Pugesgaard[a], [c], Jørgen E. Olesen[a], Uffe Jørgensen[a] and Tommy Dalgaard[a], Department of Agroecology, Aarhus University, Blichers Allé 20, DK-8830 Tjele, Denmark, Renewable Agriculture and Food Systems, 2013*).

The Impact of Organic Farming on Quality of Tomatoes Is Associated to Increased Oxidative Stress during Fruit Development- This study was conducted with the objective of testing the hypothesis that tomato fruits from organic farming accumulate more nutritional compounds, such as phenolics and vitamin C as a consequence of the stressing conditions associated with farming system. Growth was reduced in fruits from organic farming while titratable acidity, the soluble solids content and the concentrations in vitamin C were respectively +29%, +57% and +55% higher at the stage of commercial maturity. At that time, the total phenolic content was +139% higher than in the fruits from conventional

farming which seems consistent with the more than two times higher activity of phenylalanine ammonia lyase (PAL) we observed throughout fruit development in fruits from organic farming. Cell membrane lipid peroxidation (LPO) degree was 60% higher in organic tomatoes. SOD activity was also dramatically higher in the fruits from organic farming. Taken together, our observations suggest that tomato fruits from organic farming experienced stressing conditions that resulted in oxidative stress and the accumulation of higher concentrations of soluble solids as sugars and other compounds contributing to fruit nutritional quality such as vitamin C and phenolic compounds.
(*Source - Aurelice B. Oliveira,Enéas Gomes-Filho, Claudia A. Marco, Laurent Urban, February 20, 2013, PLOS ONE 8(2): e56354.doi:10.1371/journal.pone. 0056354*).

Cropping system effects on sorghum grain yield, soil organic carbon, and global warming potential in central and south Texas- There is an increased demand on agricultural systems in the United States and the world to provide food, fiber, and feedstock for the emerging bioenergy industry. The agricultural intensification that this requires could have positive and negative feedbacks in productivity and the environment. In this paper we used the simulation model EPIC to evaluate the impact of alternative tillage and management systems on grain sorghum (*Sorghum bicolor* L. Moench) production in central and south Texas and to provide long-term insights into the sustainability of the proposed systems as avenues to increase agricultural output. Three tillage systems were tested: conventional (CT), reduced (RT), and no-tillage (NT). These tillage systems were tested on irrigated and rainfed conditions, and in soils with varying levels of structural erosion control practices (no practice, contour tillage, and contours + terraces). Grain yield differed only slightly across the three tillage systems with an average grain yield of 5.7 Mg ha^{-1}. Over the course of 100-year simulations, NT and RT systems had higher soil organic carbon (SOC) storage (100 and 91 Mg ha^{-1}, respectively) than CT (85 Mg ha^{-1}), with most of the difference originating in the first 25 years of the simulations. As a result, NT and RT systems showed lower net global warming potentials (GWPs) (0.20 and 0.50 Mg C ha^{-1} $year^{-1}$) than CT (0.60 Mg C ha^{-1} $year^{-1}$). Irrigated systems had 26% higher grain yields than rainfed systems; yet the high energy needed to pump irrigation water (0.10 Mg C ha^{-1} $year^{-1}$) resulted in a higher net GWP for irrigated systems (0.50 vs. 0.40 Mg C ha^{-1} $year^{-1}$). Contours and contours + terraces had minimal impact on grain yields, SOC storage and GWP. No-till was the single technology with the largest positive impact on GWP and preservation or enhancement of SOC. Overall, the impact of individual tillage cropping systems on GWP seems to be decoupled from the productivity of a given location as determined by weather or soil type. When expressed per unit of output, high yield locations have a much lower GWP than low yield locations and would be therefore prime targets for production intensification.
(Source - Manyowa N. Meki,[a] Agricultural Systems, Volume 117, May 2013, Pages 19–29).

National and International Events

ISOFAR /MOAN Symposium on Crop Protection Management in Mediterranean Organic Agriculture organized jointly by: International Society of Organic Agricultural Research (ISOFAR) Mediterranean Organic Agriculture Network (MOAN) and Technical Center of Organic Agriculture (CTAB) during May 14 - 16, 2013 at Sousse (Tunisia) - Organic Agriculture has experienced a rapid expansion in recent years, with continued growth globally and in the Mediterranean region, where it offers sustainable development opportunities and initiatives. Organic Farming aims for an efficient crop protection as a key indicator of sustainability which depends on the optimal integration and adaptation of the various system components. Pests, diseases and weeds may become serious threats by causing great damages to the crops if appropriate control measures are not taken. The crop protection management is a critical issue in Organic Farming and is considered as one of the most challenging tasks that organic farmers are facing. Given the specific conditions of arid and semi-arid regions and the production of more than one crop per year, the management of pest control in Mediterranean countries has to meet the specific conditions of the crops and improve crop protection over a longer period of time compared with conventional systems. The main objective of this symposium is to offer a great opportunity for all interested participants to share information and experiences about crop protection and in Organic Agriculture under Mediterranean conditions. The organizers welcome papers to both preventive and curative measures, including physical control, biological control, and the use of botanical and of authorized products. The main symposium topics are Plant protection strategies for main pests, diseases and weeds, biological control, plant extracts, resistant and tolerant varieties. The symposium language is English. For further details please contact - Prof. Dr. Mohamed Ben Khedher,Technical Center of Organic Agriculture (CTAB) P.O.Box 54, Chatt Meriem 4042, Sousse, Tunisia.Tel: ++ 216 73 327 279; Fax: 00 216 73 327 277 E-mail: benkheder.Mohamed@iresa.agrinet.tn

International Conference on Organic Agriculture Sciences (ICOAS) - The 4th Scientific Conference on Organic Agriculture in Central and Eastern Europe will be held during 9-13th October 2013 in Hungary. Previously held in the Czech Republic, ICOAS provides an opportunity for researchers, non-governmental organizations, practitioners and policy makers around the globe to meet and discuss current results of organic agriculture sciences. From 2013 ICOAS will be a bi-annual event organized every second year in a different Central and Eastern European country with a special emphasis on selected topics of organic agriculture research for each conference. The theme for ICOAS 2013 is "Targeting Global Sustainability – Food Security, Biodiversity and Climate Change". ICOAS 2013 is hosted by the Hungarian Research Institute of Organic Agriculture (ÖMKi), partner institute of FiBL Switzerland**.** Registration for the conference will open in March 2013**.** Proceedings of previous conferences are available for download on Organic Eprints: http://orgprints.org/20541/, http://orgprints.org/20537/, http://orgprints.org/20485/

Launch of Technology Innovation Platform of IFOAM Attracts Global Interest at BioFach Science Day - The BioFach Science Day held on February 15th, 2013, in Nuremberg, Germany saw the successful launch of the Technology Innovation Platform of IFOAM (TIPI). An initiative welcomed by the entire organic sector. It already counts over 35 research institutes as its members and aims to encourage more global research projects on the impact Organic Agriculture can have on issues such as food security, ecosystem degradation as well as social and economic discrimination of farmers. TIPI will foster international cooperation; engage all who

benefit from advances in knowledge; facilitate information exchange; and assist practitioners to disseminate, apply and implement innovations and scientific knowledge consistent with the principles of Organic Agriculture.

IFOAM Organic Leadership Course, Europe 2013 - First residential session of IFOAM organic leadership course is going to happen during: 14-21st July 2013 in Dornach, Switzerland By enrolling yourself, or by sending one or more of employees/associates to participate, participants will gain and enhance their skills in: Organic Agriculture production principles; Standards, certification and value chain development; Advocacy strategy and practice; Research and support systems; Management and leadership; Communication. For more information on participation or sponsorship, Interested people can contact at: **e-mail:** academy@ifoam.org or visit website at: www.ifoam.org/academy.

15 days training program for Natueco Science Organic Farming - Learn sustainable soil making without any market input. You can increase your output from the very first crop irrespective of the quality of your soil. Each day will be equally divided into practical and theory. Soil management, root and canopy management, pruning, water management, treatment of sick plants and importance of biodiversity will be covered. Guidance will be given to plan your own farm. Each course is limited to 15 participants. Advance booking with payments. Fee for this training course is Rs.5000/- which includes basic accommodation, 100% vegan meals, which will be as far as possible organic. Participants will be expected to join in the farm work as a part of the training. No smoking, alcohol, drugs or consumption of animal products are permitted on the campus. People who are interested in learning more may stay after their 15 day program and work on the farm. Their food and stay will be covered and honorarium may also be paid if needed according to their skills. All participants are welcome to come back to the farm and share their experiences as well as see the progress and seasonal changes. For registration contact Dipak Suchde or 09329570960, Malpani Trust - SHARAN , at Bajwada, Post Nemawar, Ta. Khategaon, Dist Dewas 455339, MP.

Second International Conference on Organic Food Quality and Health Research in Warsaw, Poland - Second International Conference on Organic Food Quality and Health Research is going to happen during 05.06.2013 to 07.06.2013 in Warsaw, Poland Food Quality and Health Association (FQH, The Netherlands), Warsaw University of Life Sciences (Poland) and ISOFAR (The International Society of Organic Agriculture Research) kindly invite researchers, representatives of national and international agencies, control bodies and industries to take part in this conference in Warsaw. The Conference will focus on the sustainable systems of agriculture and their impact on food quality and human health There will be key note speeches as well as parallel working sessions and poster presentation on the following topics:

- The future of sustainable agriculture
- Quality of food from organic and related systems
- New methods for food quality determination
- Systemic view on food and health

The conference will be organized in the Sofitel Hotel, Krolewska 11 (Pilsudski square), Warsaw, Poland.The Hotel is located in the downtown of Warsaw near to the Old Town. The Hotel is located 10 minutes by walk from the Metro Station Swietokrzyska. Special rates will be offered for accommodation in the Sofitel Hotel. For specific questions please contact to e-mail at info(at)fqh2013.org, Dr. Johannes Kahl, conference chair (on behalf of conference organizers).

Books Reviews

ORGANIC FOOD MARKETING IN URBAN CENTRES OF INDIA, By Nina Osswald & Manoj Kumar Menon Published by International Competence Centre for Organic Agriculture (ICCOA) ISBN: 978-81-925226-2-3, 147 pages - Organic food is poised to take deeper root in urban India. While during the 1990s and early 2000s, the bulk of certified organic produce was exported, the domestic market for organic food has since started to develop dynamically. The media and some analysts even speak of an organic boom. A great diversity of organic initiatives exists in the country, ranging from long-standing farmer-centric initiatives to more recent domestic organic brands. Supply chain models and retail formats are equally diverse and include small organic stores, supermarkets, community-supported agriculture, restaurants and e-commerce. *Organic Food Marketing in Urban Centres of India* presents a classification framework for the wide range of organic food distribution model as well as figures on the number of stores and sales volumes of each of these distribution models, per city. Many of the estimates of the overall domestic market size that are published in the media and in market surveys lack a robust data basis and are therefore often imprecise or outdated. The data that Osswald and Menon present can provide a more robust basis for such market size estimates. In light of the large proportion of non-certified organic producers operating in the domestic market, the authors also bring clarity into the question as to which stakeholders should be counted as organic in such market size estimates. With more and more shops opening, organic food products have become more readily available in urban centres of India over the past few years, and domestic sales are growing steadily. Nevertheless, due to a number of obstacles, large segments of the population do not have access to organic food yet. The major challenges that stakeholders in the domestic market face include lack of a wide product range and consistent product availability, especially for fresh produce; quality control and difficulties in working with scattered producers; lack of institutional support and market linkages for small and marginal producers; supply chain constraints such as inadequate transport infrastructure, storage and cooling facilities; lack of awareness of organic food among consumers; and meeting consumer needs. Case studies from different cities and contexts are used throughout this book to illustrate these points. Examples of successful organic marketing initiatives already exist across the country, and they need to be shared more widely among the various stakeholders. This information will allow stakeholders – especially those on the grassroots level – to benefit from the increasing demand for organic food in urban markets and to develop their own marketing initiatives in a sustainable manner. *Organic Food Marketing in Urban Centres of India* presents wide-ranging insights into the current state and future prospects of organic food markets in urban India. Focusing principally on Mumbai, Bangalore and Hyderabad, the authors:

- Document emerging strategies, lessons learned and robust, field-tested models in organic food retailing
- Examine best-practice examples and conditions for successful and holistic market development
- Suggest sustainable, long-term models of growth for organic producers
- Identify challenges and obstacles to growth in organic supply chains
- Present a set of case studies covering a wide variety of models and market niches
- Place special focus on small and marginal farmers and on local, de-centralized supply chains

This book is a valuable resource for organic manufacturers, retailers, policy makers and researchers. It is also of great practical use to the average urban citizen interested in consuming sustainably. For researchers, the

comprehensive bibliography of academic publications and other texts on the Indian domestic market for organic food contained in the book is of great value. The research for *Organic Food Marketing in Urban Centres of India* was undertaken during 2011 and 2012 as a collaborative effort between the International Competence Centre for Organic Agriculture (ICCOA) in Bangalore and the Humboldt University Berlin, Germany, as part of the project "Hyderabad as a Megacity of Tomorrow: Climate and Energy in a Complex Transition towards Sustainable Hyderabad – Mitigation and Adaptation Strategies by Changing Institutions, Governance Structures, Lifestyles and Consumption Patterns", or Sustainable Hyderabad Project.

Small Organic Retail is Beautiful, by Ananthasayanan et al 2013 - This small booklet, presenting a few successful and inspiring cases of direct marketing by farmers, retail marketing for organic produce and an emerging Community Supported Agriculture model, is meant to showcase the possibilities that exist with such enterprises. The possibilities are related to both production-end issues as well as consumption-end. The objective however is to ensure that agri-producers have a better deal when they negotiate with markets and that consumers have access to safe, diverse and nutritious food, in addition to making informed choices regarding their buying behaviour (choices that determine sustainability and safety around food consumption). The idea for this booklet emerged from inspiring case studies presented in a workshop called "Markets That Empower Farmers & Consumers" organized in Bhubaneswar by Xavier Institute of Management- Bhubaneswar and ASHA (Alliance for Sustainable & Holistic Agriculture) This booklet is also to present possibilities with alternative perspectives of markets. Mainstream markets function with certain core beliefs – that scale matters; that measuring the success of an enterprise is by looking at profits earned; that competition is necessary and good, that bottom line is all that matters - to name a few. They also claim that the 'customer is the king'. That price determination is done by demand and supply forces. However, here are examples of how this paradigm has been turned on its head. While some might write these off as isolated experiments and experiences and therefore not scaleable, we believe that a multitude of such small scale initiatives is indeed possible, to improve the livelihoods situation of many farmers even as they provide healthy food to 'empowered' consumers.

Sustainable Soil Management by Deirdre Rooney, March 22, 2013 Published: by Apple Academic Press - 246 Pages- Changing land-use practices and the role of soil biological diversity has been a major focus of soil science research over the past couple of decades—a trend that is likely to continue. The information presented in this book points to a holistic approach to soil management. The first part looks at the land use effects on soil carbon storage, and considers a range of factors including carbon sequestration in soils. The second part of the book presents research investigating the interactions between soil properties, plant species, and the soil biota.

Cropping Systems for Sustainable Farming by B. L. Jana, Pointer, 2013, xvi, 308 p, tables, figs, colour plates, ISBN : 9788171327058, $90.00 - Cropping Systems for Sustainable Farming has prompted and attempted to analyse specific points and marked the situations of cropping patterns and systems with diversification of crops all the year-round grown in a definite rotation or sequence with their nutrient management species and varieties production technologies with an approach for physical resources in cropping and farming systems, dry land agriculture, biodiversified agro-ecological systems, changing cropping systems and their sequences, preserving biodiversity for bio-wealth and ecosystems, global warming, impact of pollution on vegetation soil erosion control measures, crop contingency planning, agricultural and horticultural vision farm research for meeting the challenges, economy-based on agriculture, recommendation of cropping practices in India, socio-economic analysis of SAT agriculture, saline farming in the Sundarbans, organic enrichers in management of soil salinity rainforests by

the sea etc. This book presents upto-date research, field studies of the agricultural scientists and activities of the agricultural extensionists with farmers participation to work together to design an appropriate farming methodologies enhancing sustainable production and productivity, profitability for the developing countries like ours. All these modern information and need based technologies for a site specific area will help to reduce malnutrition and hunger in the rural India. Farming system is the best safety net against hunger and keeping the production cost under control without sacrificing crop yield for survival going green all around.

NATIONAL CENTRE OF ORGANIC FARMING

19, Hapur Road, Near CBI Academy, Ghaziabad-201002 (UP)
e-mail: nbdc@nic.in, Tel. 0120-2764212 Fax 0120-2764901

APPLICATIONS ARE INVITED FOR
"CERTIFICATE COURSE ON ORGANIC FARMING"

F.No.6-9/2004-NCOF/Vol.3

To create first generation organic agriculture extension workers and field worker, to develop rural trainers on organic management practices with special focus on cropping system management, nutrient management and plant protection etc., applications from eligible and interested candidates are invited for 30 days duration residential **Certificate Course on Organic Farming** to be organize by this centre at Ghaziabad. It is proposed to organize such three programmes with 30 participants in each course. Details are as below:-

1. Course I : from 25.07.2013 to 23.08.2013
2. Course II : from 02.09.2013 to 01.10.2013
3. Course III : from 30.12.2013 to 29.01.2014

Eligibility of Participation: The course will be open for rural youth having Degree/Diploma in Agriculture. SAUs/Educational Institutes can also sponsor their undergraduate students for such course.

How to Apply: Duly typed application can be submitted on A-4 size paper **clearly indicating choice of duration of course** to the Director, National Centre of Organic Farming, 19, Hapur Road, Near CBI Academy, Ghaziabad-201002 (UP) along with detailed Bio-Data and a passport size photograph (dully attested by gazetted officer) pasted on the Bio-Data, supported by attested photocopies of Educational Qualifications (Degree / Diploma in Agriculture) **10 clear days before the commencement of the course**. The applications can either be submitted directly or through the institutions where the applicant is presently pursuing his studies, **however, a signed, scanned copy of the application must be sent to email id nbdc@nic.in with subject line "Application for Certificate Course"**. During the stay of participant at NCOF, Ghaziabad, lodging and boarding charges shall be borne by this centre, however, NO TA/DA shall be paid for attending this course. Selection of participant will be on first come first serve basis and it will be the sole discretion of Director, NCOF to change / postpone or cancel any of the course, circumstances, if so warrants.

(DIRECTOR)