जैविक खेती सूचना पत्र

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जैविक खेती सूचना पत्र, राष्ट्रीय जैविक खेती परियोजना के अन्तर्गत जारी एक बहुभाषीय तिमाही प्रकाशन है। जैविक खेती के उत्थान, प्रचार प्रसार व इसके नियामक तंत्र से जुड़े लेख, नयी सूचनाएं, नये उत्पाद, विषेषज्ञों के विचार, सफल प्रयास, नयी विकसित प्रक्रियाऐ, सेमिनार–कान्फ्रेन्स इत्यादि की सूचना तथा राष्ट्रीय व अर्न्तराष्ट्रीय समाचार विशेष रूप से आमंत्रित हैं। सूचना पत्र में प्रकाशित विचार व अनुभव लेखकों के अपने हैं जिसके लिए प्रकाशक उत्तरदायी नहीं है।

Organic Farming Newsletter (OFNL) is a multilingual quarterly publication under National Project of Organic Farming. Articles having direct relevance to organic farming technology and its regulatory mechanism, development of package of practices, success stories, news related to conferences, seminars etc, and national and international events are especially welcome. Opinions expressed in articles published in OFNL are those of the author(s) and should not be attributed to the publisher.

प्रिय पाठको

आर्थिक तंगी के माहौल में भी सभी अनुमानों को नकारते हुए जैविक खेती का विकास लगातार नये आयाम छू रहा है। बायोफैक २०१० में प्रतिभागियों की संख्या तथा विश्व में जैविक खेती के नये आंकड़े इस बात के सबूत हैं। भारत में भी जैविक खेती वर्ष दर वर्ष मजबूत होती जा रही है तथा प्रमाणीकृत जैविक क्षेत्र का विस्तार १० लाख है. से अधिक हो गया है।

प्रमाणीकृत जैविक खेती के साथ-साथ टिकाऊ व कम लागत की जैविक खेती का भी विस्तार हो रहा है। इस अंक में जैविक खेती तथा खाद्यान्न सुरक्षा का एक प्रारूप प्रस्तुत किया जा रहा है। पौध संरक्षण उपायों की अपनी महत्ता है इस विषय पर भी एक लेख अन्य सभी स्थायी स्तंभों जैसे राष्ट्रीय व अंतर्राष्ट्रीय समाचार, अनुसंधान जानकारी तथा अद्यतन घटनाओं के साथ प्रस्तुत है। आशा है पाठक इस अंक को बहुउपयोगी पायेंगे।

ए.के. यादव
संपादक

Dear Readers

Against all expectations and projections of downturn due to economic recession, organic farming has grown again in double digit. Turnout of participants at BioFach 2010 and recent global statistics released at BioFach are clear cut indications. India has also recorded robust growth during 2009 and has crossed the one million ha mark.

Besides premium segment trade and certified organic farming, the sustainable and low-cost organic farming model is also getting increasingly popular in India. A model for development of such inclusive system of organic farming and food security is being presented in this issue. Plant protection being an important issue is also being discussed, along with other standard co
lumns on International and National news, research findings and recent developments. I hope the readers will find this issue useful and informative.

A.K. Yadav
Editor

Organic Farming and Food Security: A Model for India

C.P.S. Yadav
Chief Advisor Society For Organic Agriculture Movement (SOAM)
(Former Vice Chancellor , R.A.U. Bikaner and Director
General U.P. Council of Agriculture Research, Lucknow)

Harimohan Gupta
Secretary Society for Organic Agriculture Movement (SOAM)
(Former Joint Director Agriculture, Govt. of Rajasthan)

Agriculture is life and blood of our country's economy. It was highly gratifying that India achieved self-reliance in food production in the shortest span of time in the world, but despite everything, our traditional agro system suffered a great setback, especially owing to the indiscriminate use of fertilizers, insecticides, fungicides and herbicides. This has also created the problem of decline in the soil fertility, pollution of water resources, and chemical contamination of food grain. There is an urgent need to take a holistic view of this problem to curb its negative impact. Organic Agriculture is a major pillar for sustainable Agriculture and an answer to our problem of environment degradation, unsafe food, polluted water, degraded land and wide range of illness due to unsustainable Agriculture practiced in the recent past.

The organic agriculture is not only the need of the hour but also a timely answer to the problems of environment-degradation, unsafe food, polluted water, degraded land and a plethora of agro-maladies emanating from unsustainable agro-system. It hardly needs reiteration that organic agriculture can ensure maintenance of soil health, protection of the environment and sustaining of crop productivity. Furthermore, organic agriculture in keeping with the traditional Indian agro-system not only maintains ecological balance but also ensures sustainability in terms of food production and safeguarding the human health.

From the very beginning, the agriculture in India was based on natural farming, meaning thereby that whatever nutrients were drawn from the soil in the form of agricultural produce were returned to the soil in some form or other, as a result all nutrients required for production of crops were always available in the soil in plenty. Thus, the productivity of the soil was maintained and there was no need to add any inorganic nutrient into the soil from out side.

There may be people who feel that by switching over to organic farming the production will decrease. Yes, this may happen in the initial 3-5 years. The reason for this is that during past 50 years, we have drawn out most of the nutrients from the soil by practicing intensive agriculture. Today when we shift to organic farming, it will not be possible to maintain the nutritional balance in the very first year but in subsequent year, the soil fertility status will improve and by 5 years the production will reach to pre-organic level and may increase above it in the years to come. Once this situation is reached, it will remain sustainable year after year. The pest and disease problems will also be minimized, the number of irrigation

will also come down and most of the living forms like earthworms will return to the soil to add to the fertility and to improve its health. This way, the organic farming will cut down the cost on fertilizers, micronutrients, pesticides and irrigation. As a result the overall cost of production will be reduced and farmer will get more economic return with less investment. Besides this, the organic products do not cause any harm to human health and the health of domesticated animals like cattle, goat and sheep. If health improves the expenditure on medicine will be reduced.

Analyzing the economic aspects of organic agriculture, it can be mentioned that marketing of healthy produce from agriculture will earn additional revenue to the farmer and will cut down the cost of inputs needed for such production. Further, there will be gradual improvement in the fertility status of the soil, which will yield more produce per unit area. In sum total, there will be considerable economic benefit on long-term basis and farmer will get rid of maladies associated with the market purchased inputs.

On the cost of soil health if we continue to practice intensive agriculture without making proper nutritional management through organic process the soil will soon become infertile and dead. The produce from chemical treated soil and crop will adversely affect the human health and diseases of different types will appear. In support of this let us take the example of Punjab state. In this state plenty of water is available for irrigation. In greed for taking more yield and benefit, the farmers have made excessive use of chemical fertilizers. There is no doubt it increased the production of wheat and paddy but now 25 per cent of Punjab population is suffering from diabetes. The probe into such happening indicated considerable zinc deficiency in the diet of Punjab people which may have been one of the factors responsible for this. The zinc deficiency is mainly attributed to continuous drain of zinc from soil following excessive use of fertilizers. Likewise, excessive use of pesticides has been responsible for diseases like cancer. Forty year ago in the state only few shops of chemist were there. Today in every village there is one or more shop. It is a testimony of the fact that because of excessive use of chemicals in agriculture, the food, water, soil and air have been polluted to the extent that it has adversely affected the human health in spite of the fact that food availability per capita has increased as compared to past 40 years.

In brief it can be concluded that if one shifts from chemical agriculture to organic agriculture, in the first year there may be 30-40 per cent loss in production which will come down to 15-20 per cent in the second year and 5-10 per cent in the third year. This loss will be compensated by additional income the farmer will get by marketing good quality organic produce. In subsequent years the production will reach the pre-organic level and may increase further over the years. Some loss will also be compensated by lower cost of input in organic agriculture.

It first happened in Brazil. And even the internationally acclaimed agricultural scientist, Novel Laureate Dr. Norman Borlaug, could not first believe it. To grow a bumper crop of soybean and that too without chemical fertilizers, it was beyond the imagination of Dr Borlaug. Prof. Johanna Dobereiner of the Third World Academy of Sciences persuaded Dr. Borlaug to visit Brazil and see the miracle in crop cultivation without nitrogen fertilizer. Almost the entire soybean crop in Brazil today is grown without the application of nitrogen fertilizers. And unlike the soybean growing tracts of India, which suffer from excessive usage of fertilizers, the entire soybean growing belt in Brazil is healthy,

shows no sign of degradation and fatigue. In other words, absence of nitrogen fertilizers has encouraged sustainable cultivation of soybean.

Necessity, is the mother of invention. With nitrogen fertilizers not subsidized in Brazil, and obviously priced beyond the reach of farmers, soybean growers were left with no choice but to depend upon organic sources. Agriculture scientists too were forced to undertake research on increasing the efficiency of organic manures. As result of not applying synthetic nitrogen, Brazil is incurring an annual saving of US $3.2 billion.

Soybean is not the only crop that grows without any application of artificial nitrogen. Sugarcane too has emerged as a key to high energy balance with the elimination of nitrogen fertilizers for the production of bio-energy. Brazil has transformed its rural economy by producing ethanol from sugarcane as an alternate fuel for motor vehicles. The vehicles running on alcohol are far less damaging to the environment, emitting 57 per cent less carbon monoxide, 64 per cent less hydrocarbons and 13 per cent reduced nitrogen peroxide than cars running on gasoline. The ethanol fuel now runs four million cars, saving equivalent of 2,60,000 liters of petrol per day.

Scientists meanwhile succeeded in isolating a soil bacterium that helped in the increased uptake of plant nutrients from organic manure. With the result that sugarcane varieties under cultivation are receiving the highest bacterial nitrogen fixation, directly from the atmosphere, among all non-legume crops. When grown with ample doses of phosphorus fertilizer and with foliar application of molybdenum, the crop takes about 150 kg. of nitrogen directly from the atmosphere. Selecting the favourable genotypes resulted in some of the best sugarcane varieties that can produce enough without the intake of nitrogen fertilizers. And still, the crop yields in semi-organically farmed sugarcane in Brazil are much higher than that of the chemically fertilized crop in India. From 4.2 million hectare, Brazil harvests on an average 64 tones of sugarcane per hectare.

Between 1971 and 1981, the initial years of the Green Revolution, excessive intake of chemical fertilizers had led to an increase in the nitrate content of ground water by two and a half times. The seriousness of the problem lies in the fact that once nitrates get into aquifer, it will be decades before the nitrate level in the water falls bellow the acceptable limit for drinking. High levels of nitrates in drinking water are not only unsafe and cause birth defects but may also lead to nervous breakdown and cancer. Contamination of soils by heavy metals like cadmium through phosphatic fertilizers is yet another hidden threat. And more recently, fertilizers have been found to be playing a significant role in extending the Ozone Hole.

Let us now examine the emerging barriers to crop sustainability. Punjab has often been hailed as the country's granary. The land which once produced a rich golden harvest is now beginning to collapse under its own artificial burden of intensive cultivation. The warning bells have been sounding for quite some time and have gone unheeded – intensive cultivation of wheat and rice has already exhausted the nutrient reservoir of the soil. The indiscriminate marketing of chemical fertilizers, without the accompanying doses of organic manures, has drastically reduced the soil fertility. With the organic content of soil hovering around a pathetically low of >0.2 per cent, Punjab soils are getting increasingly dependent on chemical fertilizers.

A Government task force in 1979, comprising scientist and economists, concluded that "some farmers actually

experienced no reduction at all when they gave up the use of chemicals. And those who did, lose some production still made more money because they didn't have to pay for expensive chemicals." In another study conducted by the Centre for the Study of Biological Systems, University of Washington at St. Louis, two groups of farms with similar soil and environmental conditions, with one using chemical and the other without it, were evaluated for five years. The study concluded: "A five year average shows that the organic farms yielded, in dollars per acre, exactly the same returns. In terms of yield, the organic farms although yielded 10 per cent less but gave similar profits due to savings on cost of chemical inputs". Now, before any opinion is made, don't forget that the comparison was between a no chemical farm and an energy efficient farm the likes of which do not exist in India. In Indian context, such study would have been clearly in favour of an organic farm. In any case, it is better to harvest 10 per cent less from a farm than be faced with a near collapse of the farming system.

The answer, therefore, lies in following a non-chemical integrated plant nutrient management system which reinforces the role of organic matter in soil. Since much of the damage to the soil structure and fertility, and the contamination of ground water, is the result of excessive fertilizer usage, the industry need to be made responsible for the damages and also accountable for any further destruction of the soil system.

Model of food security for India

Govt. of India is making all efforts to ensure food security to its people. In doing so it has provided sizeable state support for keeping fertilizers affordable to farmers. Quantum of fertilizer subsidy during last few years is given in Table 1. The pattern of Government support on every 50 kg fertilizer bag is given in Table 2 (as mentioned by the then Minister of Fertilizers and Chemicals during 2008-09).

Table-1. Quantum of fertilizer subsidy during last 10 years

Year	Amount Rs. (in crores)
2000-2001	13,800
2001-2002	14,170
2002-2003	14,858
2003-2004	15,252
2004-2005	15,779
2005-2006	18,299
2006-2007	25,952
2007-2008	40,338
2008-2009	98,450
2009-2010 (estimated)	52,000
Total :-	**3,08,898**

Table- 2. Pattern of Govt. support provided for each bag of fertilizer

Fertilizer	Govt. support (per mt in Rs.)	Govt. support on every 50 kg bag in Rs.
DAP	49234.00	2462.00 (domestic and imported both)
UREA	28336.00	1417.00(imported urea)
MOP	31108.00	1555.00(not produced)
NPK	36722.00	1836.00(domestic)
SSP	8134.00	407.00(domestic)

If this support is reduced, the cost of food commodities will go up. On this ground the state support is being justified and continued and on this logic no one would like to speak against it as this is likely to put the food security in danger.

This has also been made amply clear by the scientists not only in India but world over that excessive and continued use of fertilizers may make soil unproductive and barren if corrective measures are not taken in time. Under such scenario and no alternative solution in sight, the food security may again be threatened in coming 40 to 50 years. By this time where from the food grain will be obtained to feed the 1.50 billion people of the country.

The Govt. of India's stand to keep the state support going on the fertilizer is justified on the ground that the entire 14 crore ha cultivable land can not be brought under organic farming over night and organic matter in the form of dung urine and crop residues etc. can not be generated to meet the need of entire cultivable land. Also there is possibility of 30-40 % reduction in yield in the 1st year of shifting to organic farming.

As per Govt. of India estimates of Rs. 2 lakh per ha conversion cost to organic farming, if we convert India's 1% cultivable land (1% of 14 crore ha) ie 14 lakh ha. crop area, then Rs 28000 crore additional state support will be needed. If 50% of this state support i.e. Rs. 14000 crores is spent on live stock development and Rs. 25000 per milch animals is provided to individual farmer then 14 lakh small and marginal farmers will get 56 lakh milch animals @ of 4 animal per ha. In other words milk, dung and urine of four animal per ha will become available continuously. These farmers on being converted to organic even if face 30-40% reduction in grain yield will get the following additional produce to compensate the loss.

a) Milk at the rate of 7.5 liter per day/ animal, will yield 30 liter milk per day for 8 months. Annually 7200 liter milk @ Rs.20 will give an additional income of Rs.144000 per year.
b) On the other hand expenditure on feed, fodder and labour per day/ animal will be (Rs.80 per animal per day, for 4 animals Rs. 320 per day, 9600 per month) Rs. 115200 per year. The income from milk per year (Rs 1,44,000) minus the expenditure of Rs.115200 per year will give a net profit of Rs. 28800 with milk alone.
c) *Gobar* per animal per day will be 10 kg. From four animals it will be 40 kg per day and 14400 kg/ year. With this *gobar, desi khad* worth Rs.15000 can be produced without any extra cost. From above *khad* following nutrients will become available to the farmer for use in his farm (Table 3).

Table-3. Nutrient availability from desi khad made from the dung of 4 animals

Nutrients	Percentage	Total nutrients
Nitrogen	1.5%	216 kg.
Phosphorus	1%	144kg.
Potash	1%	144kg.
Total		504 kg. + micronutrients

Summary:

1.Value of milk	Rs 144000
2.Value of gobar khad	Rs 15000
Less expenditure on cattle feed	Rs 115200
Net Profit	Rs 43800 per year

At the present rate of recommendations per ha/year in Rabi, (Wheat) and Kharif (Paddy) the state support on fertilizer is worth Rs. 20000 per year. In lieu of this the farmer gets 80 quintal (wheat+paddy), the market value of this produce is Rs. 57,600/- (@ Rs.1200/Qtls approx). If Govt. stops this support of Rs. 20000 on fertilizers to farmers then on the basis of 40% yield reduction under organic farming, the farmer will get only Rs. 76000 per year. This reduction in income due to yield loss will be compensated by additional income the farmer will get from milk and cow dung etc. which will amount to Rs. 43800 (28800 from milk and 15000 from cow dung etc.), therefore farmer will earn additional net income of Rs. 5400 over wheat and paddy if he would have adopted organic in the first year. Five years fertilizer subsidy @ 20,000 per year equals Rs. 1 lac. If Govt assistance is provided to the farmer to purchase 4 milch animals in the very first year then the related impact will be as shown in Table-4.

As is proposed in the Table 4, if the total subsidy to be provided on chemical fertilizer over a period of five years is provided to all the farmer for purchase of good Indian breeds of cows @ of Rs.25000 per milch animal amounting to Rs. 1.00 lakh then by 5th year by making use of the gober (dropping) of these milk animal, he will prepare compost, Nadep compost, vermicompost and other bio inputs and the production per ha will level up in 5 years and in 6th years there will be additional income of Rs. 48,600/- from milk and dung where as by providing a subsidy of Rs. 20,000/- on fertilizers no additional profit will accrue, instead the amount of subsidy on fertilizer will increase over time with concomitant adverse impacts.

In the proposed model the food security is built in because the milk and gobar obtained from the milch animals will compensate for the yield losses or it may even be more than that. Milk in itself is a complete food and gobar and urine are very useful sustainable bio inputs for crops. This model can be considered as 100% sustainable agriculture model. It has no risk involved for food security. Simultaneously it is eco-friendly as well as health friendly. The specialty of this model will be that Govt. of India will get a permanent relief from fertilizer subsidy over a period of time. Also the farmer adopting this model will earn additional income of Rs 67,800/year/ha in 10th year and the fertility of the field will increase thereby the yield will increase by 25% hence food security will increase and by 10th years the number of animal will increase to reach a number of 13 animals. The increase in animal population has been indicated in table No. 5

Table-4. Yeild reduction and return in organic farming over 10 years period)

Year of organic	Yield (%)	Value of reduction/increase in yield (in Rs.)	Additional income from milk and cow dung (in Rs.)	Gain (in Rs.)
1	- 40	-38400.00	43800.00	5400.00
2	-30	-28800.00	43800.00	15000.00
3	-20	-19200.00	43800.00	24600.00
4	-10	-9600.00	43800.00	34200.00
5	Nil	-	43800.00	43800.00
6	+5	+4800.00	43800.00	48600.00
7	+10	+9600.00	43800.00	53400.00
8	+15	+14400.00	43800.00	58200.00
9	+25	+24000.00	43800.00	67800.00
10	+25	+24000.00	43800.00	67800.00

Table 5. Increase in number of animals from 5 to 10 years

Year	No. Milk animal	Milk animal raised	Additional income in Rs.	Area brought under organic farming in ha.
1st year	4	-	-	1.00
2nd year	4	-	-	1.00
3rd year	4	-	-	1.00
4th year	6	2	50000	1.50
5th year	6	-	-	1.50
6th year	6	-	-	1.50
7th year	9	3	75000	2.00
8th year	9	-	-	2.00
9th year	9	-	-	2.00
10th year	13	4	100000	3.00
Total :-	13	9	225000	3.00

Table 6. Interest free loan for purchase of milk animal are provided,then)
(Yeild reduction and return in organic farming over 10 years period)

Year of organic	Yield (%)	Value of reduced yield (in Rs.)	Additional income from milk and cow dung (in Rs.)	Gain (in Rs.)	Repayment Of interest free loan (In Rs.)
1	- 40	-38400.00	43800.00	5400.00	Nil
2	-30	-28800.00	43800.00	15000.00	Nil
3	-20	-19200.00	43800.00	24600.00	Nil
4	-10	-9600.00	43800.00	34200.00	Nil
5	Nil	-	43800.00	43800.00	25000.00
6	+5	+4800.00	43800.00	48600.00	25000.00
7	+10	+9600.00	43800.00	53400.00	25000.00
8	+15	+14400.00	43800.00	58200.00	25000.00
9	+25	+24000.00	43800.00	67800.00	Nil
10	+25	+24000.00	43800.00	67800.00	Nil
Total					100000.00

As is evident from Table 5 a farmer who receives a subsidy of Rs. 1.00 lakh in the 1st year will be owner of 13 milch animals by the 10th year. With these additional 9 milch animals 2 ha additional land will be brought under organic farming from non organic chemical intensive farming. If this continues then in coming 40-50 years the entire country can be brought under organic farming with residue free food, healthy soil and clean environment.

In an alternative model (Table 6) it is proposed that if a farmer is provided interest free loan of Rs. 1.00 lakh for purchase of 4 milch animals then as per proposed model from 5th year to 8th year at a rate of Rs. 25,000/- year he will repay the entire loan amount to the Bank. After that he will continue to get additional income.

Now the question will arise that, for 1% cropped area (14th lakh ha) out of 14 crore cropped area of the country, if four milch animals/ha are to be provided then from where such a large number of animals i.e. 56 lakh will be managed to implement the proposed model. Not only this, many other question will be raised such as, whether the Govt. of India will be able to earmark a budget of Rs. 14000 crores or farmers will accept the model or what will be the scenario if milk

supply is increased. Here for this sustainable agriculture model, we only would like to mention that during past 10 years Govt. of India had spent Rs. 3,08,898 crore on fertilizer subsidy (Table 1) and additional 70,000 crores on waving of the loan amount taken by the farmers but in spite of all this, there has been an increase of only 311 kg/ha in food grain yield over this period. If the calculation of this increase in yield is worked out further then it will come to barely 31 kg per ha/year which itself rings the danger bell for food security.

As per proposed model of sustainable agriculture for 14 lakh ha land support of Rs. 14,000 crores for 56 lakh improved breed of milch cattle to the farmers can eliminate the need for fertilizer subsidy forever for that land and can ensure food security and environmental safely.

If the Govt decides to test the validity of this sustainable model, then such models can be run in each state in a cluster of 100 ha for 5 years (the mark of yield to level-up). After this for implementation of this sustainable model subsidy provision as indicated in the model be made. This model can also be tested over a small unit of 100 ha in an area where farmers are using 1ton of chemical fertilizer per ha per year and claim subsidy of more then Rs. 50,000 on fertilizer. Large numbers of civil society organizations including our institution "SOAM (Society of Organic Agriculture Movement)" can offer its services

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Table 7. Status of cereal production in some countries
Area(A) -1000 ha Production (P) -1000 MT Yield (Y)-Kg/hac.

Countries	Population (x100000)	YEAR 1994-96			YEAR 2006			Yield increased/ decreased Kg/ha	Availability/ capita/day (In gm)
		A	P	Y	A	P	Y		
Bangladesh	1622.20	10770	27883	2588	11799	44790	3796	(+)1208	756
Brazil	1924.02	19099	46818	2451	18424	59159	3210	(+)753	1027
China	13355.3	90106	422930	4693	83725	444055	5303	(+)610	890
India	11763.6	99978	213568	2136	99006	242887	2453	(+)311	564
Japan	1275.30	2340	14526	6208	2006	11742	5853	(-)345	252
Pakistan	1685.94	12269	24256	1977	12897	32864	2548	(+)571	534
Russia	1419.27	51065	69380	1359	40574	76866	1894	(+)535	1482
South Africa	4932.05	5652	12388	2191	3011	9454	3140	(+)943	5626
America	3085.74	62862	323073	5440	52875	338513	6402	(+)962	2989

Source: 1, Statistics Division FAO 2009 (Area harvested, production and yield), 2. List of countries by population-Wikipedia-The Free Encyclopedia)

ORGANIC CROP PROTECTION KNOWLEDGE AND ADOPTION IN INDIA: CURRENT STATUS AND SCOPE FOR FUTURE

S. Sithanantham
Sun Agro Biosystem, Porur, Chennai-600116.
(Email:sithananantham@yahoo.com)

Introduction

In the context of renewed interest and current thrust globally for promoting organic farming principles, it is important to assess the status of crop protection technologies as a critical component of the overall scenario. It was indeed relevant till nearly a half century ago, when farming in most of the tropical world, including the Indian sub-continent, was largely organic, based on adopting home-grown traditional practices and utilizing locally available natural resources/products in crop pest management. The introduction of extensive monocropping and intensive use of external and synthetic agro-inputs in the last century has led to significant agro-ecological imbalances in the soil-crop-pest-natural enemy continuum. The eco-system disasters caused by excessive and irrational use of external inputs like synthetic pesticides, as experienced initially in the western hemisphere and later in many parts of India in the later half century led to the search for eco-safe alternatives as the concept of Integrated Pest Management (IPM). The IPM approach is now being further refined in our country, to be maximally eco-friendly and largely organic, so as to cater to export oriented and organic focus farming. This will help to safeguard the vast unexplored agro-biodiversity in this region's fragile agro-systems as well as to promote growing of fully organic crops, not by default, but by active local natural resource conservation and utilization programs, which would also raise the incomes and quality of life of the local people engaged in rural and peri-urban farming, with focus on catering town needs and for augmenting the farm incomes in India.

Overall scenario of organic crop protection technologies

Towards step-wise progress in promoting organic crop protection methods, we should take into account the various crop pest/diseases of local importance and select the appropriate eco-friendly products/practices that could be tested on them. Further, the refinement of the dose rates/regimes for the more promising bio-inputs should be followed by steps to take each of them systematically to reach the final stage of wide-scale awareness, besides catering to their local availability and adoption at farm level. Unlike organic crop management inputs which are few-like organic manures and

biofertilizers- and can be applied commonly to many/most crops, organic pest control (crop protection) methods are often crop-pest/disease specific and the inputs to be availed for use often tend to be many and varied.

In addition, the stage of readiness of the different organic crop protection products/techniques for local access and adoption also differs among the target sub-groups of pests/diseases of horticultural crops of importance in each region. For instance, for some pests/diseases, we are yet to identify suitable organic control methods/products, while for some others we may have known the applicable options but need to refine/fine tune them for local agro-climatic adaptation, while for yet others, we may not have arrived at the optimum dose rates and regimes of application of the bioproducts, especially among the promising botanical and microbial products. The use of lures and traps for managing/monitoring some of the mobile insect groups also remains to be further studied/demonstrated for maximizing their pest control impact, especially against fruit flies and major caterpillar pests.

Bio-agents for organic crop disease control

In promoting organic suppression products/practices for different crop diseases, it is gratifying to note that with the current knowledge on beneficial microbes, it possible to satisfactorily control almost all the foliar diseases by deploying *Pseudomonas fluorescens* and *Bacillus subtilis,* while root/soil diseases could be targeted by *Trichoderma harzianum* and *Pseudomonas fluorescens.* For promoting organic control of the soil nematode problems, we could focus on *Paecilomyces lilacinus* and *Pseudomonas fluorescens* besides cultural practices like companion/sequential cropping of nematode suppressing crops like marigold, sun hemp etc.

Microbial agents for organic insect pest control

Towards promoting the use of microbial biopesticides for insect pest control, the major targets for insect specific viruses (NPV-*Helicoverpa, Spodoptera*) and bacterial entomopathogens (like *Btk*) would be caterpillar pests (borers, defoliators). Among fungal entomopathogens, while *Metarhizium* anisopliae could be dyed to target hoppers, thrips and termites, Verticillium *lecanii* could be used on scales and mealy bugs, while *Beauveria bassiana* can be used for root grubs and some foliar pests. *Paecilomyces fumosoroseus* could be targeting pests like Diamond Back Moth (DBM) and aphids.

Botanical biopesticides for organic insect pest control

Several botanically derived pest control products are presently available as ready to use products .Among them, neem and karanj-based formulations appear more promising. In addition to formulated products, it is also possible to empower farmers with preparing fresh extracts from neem seed kernel (NSKE),which could be tested as a local alternative for both curative control and for period of preventive protection against a wide range of target pests of importance in India.

Indigenous pest control technology knowledge (ITK)

It is equally valuable to recognize that there is a treasure house of local knowledge on locally available

plants/practices, which are traditionally used for pest control. These could be validated for their relative extent of efficacy and eco-safety, while the more promising among them could be promoted further for use in organic crop protection. Very often research–extension officials face the dilemma in accepting (simply based on claims without data/proof) or rejecting (since the mode of action on the target pest/disease is not explainable). We should fill in this knowledge gap, so to help assemble the relevant information to strengthen the case of the different indigenous and eco-friendly practices/products.

In cow-based farming systems, the use of cow-derived products like cow urine, panchagavya, besides biodynamic agriculture practices could well be also validated for their beneficial impact and be integrated in organic crop protection regimes, wherever appropriate. Beneficial cultural practices like inter-cropping and crop rotation which can also help minimize the pest/disease build up could be suitably fine –tuned for adoption at farm level.

Traps and lures for Insect pest control

Insect trap systems can also be more effectively utilized for both monitoring and mass trapping of the adult stages of several important pests. The start made recently with use of fruit fly lures for tree fruit crops like oranges (using methyl eugenol as attractant) could be further extended for cucurbit crop fruit flies (with cue lure). Further, the use of lures and traps for capturing the adult stages of several important caterpillar pests (*Helicoverpa, Spodoptera, Leucinodes, Plutella, Earias)* could be promoted as means of integrating with deployment of locally mass-producible biological control agents like *Trichogramma*.

Conclusion

In operationalizing the programme for promoting organic crop protection, as part of overall organic farming, it is important to link both with Indigenous Technology Knowledge (ITK) and modern scientific knowledge on promising bio-inputs like botanicals and microbials. Further there is scope to combine capacity building training of IPM scientists, besides involving them in time-bound R&D programs on four major themes-disease suppressing biocontrol agents, microbial biopesticides for insect pests, botanical products in pest control, besides use of trap systems for insect pest monitoring and mass trapping. In addition, there is need to establish pilot mass production units at state /region/district levels for microbial biopesticides to control major pests and diseases. Concurrent and wide-scale awareness building of the scope of promising organic crop protection products/ practices through systematic training programs among farmers and local extension/advisory personnel should also receive due attention.

India Organic News

Impact of Organic Farming on Yield and Quality of BASMATI Rice and Soil Properties - The management of soil organic matter is critical to maintain a productive organic farming system. No one source of nutrient usually suffices to maintain productivity and quality control in organic system. In addition, the inputs to supplement nutrient availability are often not uniform presenting additional challenges in meeting the nutrient requirement of crops in organic systems. With this concept, a field experiment was conducted at the research farm of Indian Agricultural Research Institute, New Delhi, India during 2003-06 in rice-wheat-green gram cropping system. In this experiment, different treatments comprising organic amendments such as Blue Green Algae (BGA) 15kg/ha, Azolla 1.0 tonne/ha, Vermicompost and Farm Yard Manure (FYM) 5.0 tonne/ha each applied alone or in combination were tested in organic crop production. These treatments were compared with absolute control ($N_0P_0K_0$) and recommended dose of chemical fertilizer ($N_{80}P_{40}K_{40}$). In wheat crop Azotobacter replaced Azolla, but other treatments remained same. For rice, a scented variety 'Pusa Basmati 1' and for wheat and green gram HYVs were taken. Biomass of green gram was incorporated in soil after picking of pods and wheat was sown using zero tillage practice. The observations on grain yield, contents of Fe, Zn, Mn and Cu in rice grains, insect pest incidence, soil nutrients and microbial activity were taken. Results revealed a significant enhancement in grain yield of rice over absolute control due to the application of different organic amendments applied alone or in combinations. Rice grain yield increased by 114 to 116.8% over absolute control when all the 4 organic amendments were applied altogether. The rice grain yield (4.0 t ha-1) obtained under combined application of four organic amendments was at par with the yield recorded under recommended dose of chemical fertilizer application. An interesting observation recorded was that there was no serious attack of any insect pest or disease in organically grown crop. Soil microbial population (Actinomycetes, Bacteria, Fungi and BGA) enhanced due to the application of organic amendments in comparison to absolute control as well as recommended fertilizer application that in turn resulted in a notable enhancement in soil dehydrogenase and phosphatase enzyme activity. Soil organic carbon and available phosphorus contents were also found to be significantly increased due to organic farming practice over control as well as chemical fertilizer application. Rice grain analysis for nutrients viz. Fe, Zn, Mn and Cu showed a significant increase in Fe and Mn content in the treatments having 2 or more organic amendments over control. Zn and Cu content also increased but the increment was significant with combined application of 3 or 4 organic amendments. The study revealed that addition of four organic amendments viz. BGA, Azolla, FYM and Vermicompost could give the optimum yield (4.05 t/ha) of organic Basmati rice and improve grain and soil quality. (Source Singh et al 2008 http://orgprints.org/view/projects/wissenschaftstagung).

Impact of Organic Farming on Economics of Sugarcane Cultivation in Maharashtra - Organic farming is a system of farm management to create an eco-system which can achieve sustainable productivity without the use of artificial external inputs such as chemo-synthetic fertilizers and pesticides. The potential of organic farming in generating socially and environmentally beneficial effects are impressive. However, it is essential to assess its performance in terms of its economics which ultimately influences the adoption. Therefore, the primary goal of this paper was to examine the impact of organic farming on economics of

sugarcane cultivation in Maharashtra. The study was based on primary data collected from two districts covering 142 farmers, 72 growing Organic Sugarcane (OS) and 70 growing Inorganic Sugarcane (IS) in Maharashtra. The study finds that OS cultivation enhances human labour employment by 16.90 per cent and its cost of cultivation is lower by 14.24 per cent than IS farming. Although the yield from OS is 6.79 per cent lower than the conventional crop, it is more than compensated by the price premium received and yield stability observed on OS farms. The OS farming gives 15.63 per cent higher profits and profits are also more stable on OS farms than the IS farms. The paper concludes by suggesting some key policy measures for rapid advancement of OS farming in selected regions of the state (Source Kshirsagar, 2007, Gokhale Institute of Politics and Economics, Pune 411 004, Maharashtra, India).

Eco-friendly technologies for rice cultivation - A sound package of eco-friendly technologies to grow rice is being successfully adopted by a few progressive farmers in Puliangudi village in Tirunelveli district of Tamil Nadu. "The technologies work well with indigenous rice varieties such as Kitchili Samba. The cost of cultivation is substantially reduced and the organic rice fetches a premium price in the market," says Mr. P. Gomathinayagam, a pioneer in organic farming in Puliangudi. "I grew a medium-duration (140 days) Kitchili Samba rice in about 1.6 hectares. The seeds were treated with *Panchakavya,* and the nursery was treated with plenty of tank silt and a host of organic amendments. Liberal quantities of tank silt were applied and green leaf manure was incorporated a few days ahead of the final ploughing. Biogas slurry was applied through irrigation when the seedlings were just establishing in the main field," he explained. One round of spray with 3 per cent solution of Panchakavya was given 20 days after transplanting. On the 30th day, a combination of coconut milk and butter milk, mixed in equal volume, in ten times their volume of water was sprayed on the crop to promote active plant growth and tillering. On the 40th day, another round of spray with *Panchakavya* (3 per cent solution in high volume spray) was given. A bio-insect repellent was sprayed on the 45th day of transplantation. The crop was regularly irrigated, and a grain yield of about 6 tonnes was obtained from the 1.6 hectare plot. He also was assured of high quality straw for his cattle. The cost of cultivation worked out to Rs. 14,000 for 1.6 hectares. "I sell the output as organic rice at a rate of Rs. 30 per kg, and it makes organic rice cultivation more rewarding economically as well environmentally," pointed out Mr. Gomathinayagam. He is championing the cause of organic farming in the southern districts of Tamil Nadu. Several farmers are following his advice. "I adopted the organic rice farming technologies and harvested about 9.25 tonnes of paddy a hectare from the bold grained Trichi-1 variety. I dumped liberal quantities of daincha in the field and allowed it to decompose well in the field ahead of planting. There was no need for any plant protection also. The cost of cultivation worked out to Rs. 12,500 per hectare. I also harvested plenty of healthy straw for our animals," said Mr. V. Antonysamy, a progressive farmer of Puliangudi village (Source – TNAU Agritech Portal, http://agritech.tnau.ac.in/org_farm/orgfarm_success%20stories.html).

Low cost botanical pesticides for organic cultivation - Organic practices avoid investment on costly chemicals and instead meet the requirement from on-farm resources. On economic front also, the cost for using chemical pesticides and fertilizers for growing a crop in a hectare works out to about Rs.6,000-7,000 while the cost of growing the same crop using organic inputs may come to only about Rs.500 - Rs. 1,000, according to Ms. Rajareega of Raasi organic farms at Muthupatti village in Sivaganga district, Tamil Nadu. She has been using only organic manures and bio-repellents made from locally available resources. For example she

uses 5 different leaf extracts (*eindhu ilai karaisal* in Tamil) derived from *Calotropis* (called *y erukku* in Tamil), *Jatropha curcas* (*kattu amanaku* in Tamil), Neem (*vembu* in Tamil), Guduchhi/Amruth (*seenthil kodi* in Tamil), Chaste tree (*nochi* in Tamil), Malabar nut (*adathoda* in Tamil), Kalmegh (*siriyanangai* in Tamil), Clerodendron (*peenarisanghu* in Tamil) and Usil (*arappu* in Tamil). These plants are commonly found in all villages. About 1 kg of leaves from each plant is taken and powdered and then ground into a paste. It is then mixed with 5 litres of cow's urine. The concoction is then diluted in 5 litres of water and left undisturbed for 5 days. When required for using, about 500 ml of this concoction is diluted in 10 litres of water and sprayed over the plants, she explains. Another tried and proven mixture she uses is ginger garlic extract (called *inji poondu karaisal* in Tamil). About 1 gm of ginger and garlic each, 2gm of green chilli and 5 litres of cow's urine and water are taken. The garlic, ginger and green chilli are ground into a paste and mixed with cow's urine and water. After 10 days the mixture is filtered and used. The prescribed quantity is about 500 ml of this solution diluted in 10 litres of water which can be sprayed over the plants. The ideal time for spraying these karasals (extracts) is during 6 am to 8.30 am and between 4 pm and 6.30 pm, depending upon the soil, crop and other climatic factors the concentration can be raised or lowered. Both the above karaisals have been found effective in controlling leaf roller, thrips, mealy bugs, fruit, stem and bark borer, hairy caterpillar and aphids. Even if a farmer is not convinced about the benefits of organic inputs he can continue to grow his crops using chemicals, but at the same time he can set aside a small portion in his field to grow the same crop using organic inputs. By doing so he can find out for himself the cost benefit ratio. That itself can convince him of its efficacy. Readers can contact Ms. Rajareega, Raasi organic farms, Muthupatti, via Kallal, A. Siruvayal (post), Sivaganga district, Tamil Nadu, email: rajareega@rediffmail.com, mobile: 9865-582142 and phone: 04565-284937. (Source - TNAU Agritech Portal, http://agritech.tnau.ac.in/org_farm/orgfarm_success%20stories .html).

Panchakavya - Panchagavya, an organic product has the potential to play the role of promoting growth and providing immunity in plant system. Panchagavya consists of nine products viz. cow dung, cow urine, milk, curd, jaggery, ghee, banana, Tender coconut and water. When suitably mixed and used, these have miraculous effects. Mix 7 kg cow dung and 1 kg cow ghee thoroughly both in morning and evening hours and keep it for 3 days. After 3 days mix 10 lit cow urine and 10 lit water and keep it for 15 days with regular mixing both in morning and evening hours. After 15 days mix Cow milk - 3 liters, Cow curd - 2 liters, Tender coconut water - 3 liters, Jaggery - 3 kg and well ripened poovan banana – 12 nos and panchagavya will be ready after 30 days. All the above items can be added to a wide mouthed mud pot, concrete tank or plastic can as per the above order. The container should be kept open under shade. The content is to be stirred twice a day both in morning and evening. The Panchagavya stock solution will be ready after 30 days. (Care should be taken not to mix buffalo products. The products of local breeds of cow is said to have potency than exotic breeds). It should be kept in the shade and covered with a wire mesh or plastic mosquito net to prevent houseflies from laying eggs and the formation of maggots in the solution. If sugarcane juice is not available add 500 g of jaggery dissolved in 3 liter of water.

Physico-chemical properties of Panchagavya revealed that they possess almost all the major nutrients, micro nutrients and growth harmones (IAA & GA) required for crop growth. Predominance of fermentative microorganisms like yeast and lactobacillus might be due to the combined effect of low pH, milk products and addition of jaggery/ sugarcane juice as substrate for their growth. The low pH

of the medium was due to the production of organic acids by the fermentative microbes as evidenced by the population dynamics and organic detection in GC analysis.

Table 1. Physico chemical and biological properties of Panchagavya

Chemical composition	
pH	5.45
EC dSm2	10.22
Total N (ppm)	229
Total P (ppm)	209
Total K (ppm)	232
Sodium	90
Calcium	25
IAA (ppm)	8.5
GA (ppm)	3.5
Microbial Load	
Fungi	38800/ml
Bacteria	1880000/ml
Lactobacillus	2260000/ml
Total anaerobes	10000/ml
Acid formers	360/ml
Methanogen	250/ml

Lactobacillus produces various beneficial metabolites such as organic acids, hydrogen peroxide and antibiotics, which are effective against other pathogenic microorganisms besides its growth. GC-MS analysis resulted in various compounds of fatty acids, alkanes, alconol and alcohol group (Table 2).

Recommended dosage

Spray system - 3% solution was found to be most effective compared to the higher and lower concentrations investigated. Three litres of Panchagavya to every 100 litres of water is ideal for all crops. The power sprayers of 10 litres capacity may need 300 ml/tank. When sprayed with power sprayer, sediments are to be filtered and when sprayed with hand operated sprayers, the nozzle with higher pore size has to be used.

Flow system - The solution of Panchagavya can be mixed with irrigation water at 50 litres per hectare either through drip irrigation or flow irrigation

Seed/seedling treatment - 3% solution of Panchagavya can be used to soak the seeds or dip the seedlings before planting. Soaking for 20 minutes is sufficient. Rhizomes of Turmeric, Ginger and sets of Sugarcane can be soaked for 30 minutes before planting.

Seed storage - 3% of Panchagavya solution can be used to dip the seeds before drying and storing them.

Table 2. Organic composition of panchakavya

Sl.No.	**Fatty acids**	**Alkanes**	**Alconol and Alcohols**
1.	Oleic acids	Decane	Heptanol
2.	Palmitic acid	Octane	Tetracosanol
3.	Myristic	Heptane	Hexadecanol
4.	Deconore	Hexadecane	Octadeconol
5.	Deconomic	Oridecane	Methanol, Propanol, Butanol and Ethanol
6.	Octanoic		
7.	Hexanoic		
8.	Octadeconoic		
9.	Tetradeconoic		

Periodicity of use

1.	Pre flowering phase	:	Once in 15 days, two sprays depending upon duration of crops
2.	Flowering and pod setting stage	:	Once in 10 days, two sprays
3.	Fruit/Pod maturation stage	:	Once during pod maturation

Time of application of Panchakavya for different crops

Crops	Time schedule
Rice	10,15,30 and 50th days after transpalnting
Sunflower	30,45 and 60 days after sowing
Black gram	Rainfed: 1st flowering and 15 deays after flowering Irrigated: 15, 25 and 40 days after sowing
Green gram	15, 25, 30, 40 and 50 days after sowing
Castor	30 and 45 days after sowing
Groundnut	25 and 30th days after sowing
Bhendi	30, 45, 60 and 75 days after sowing
Moringa	Before flowering and during pod formation
Tomato	Nursery and 40 days after transplanting: seed treatment with 1 % for 12 hrs
Onion	0, 45 and 60 days after transplanting
Rose	At the time of pruning and budding
Jasmine	Bud initiation and setting
Vanilla	Dipping setts before planting

Effect of Panchakavya

Leaf - Plants sprayed with Panchagavya invariably produce bigger leaves and develop denser canopy. The photosynthetic system is activated for enhanced biological efficiency, enabling synthesis of maximum metabolites and photosynthates.

Stem - The trunk produces side shoots, which are sturdy and capable of carrying maximum fruits to maturity. Branching is comparatively high.

Roots - The rooting is profuse and dense. Further they remain fresh for a long time. The roots spread and grow into deeper layers were also observed. All such roots help maximum intake of nutrients and water.

Yield - There will be yield depression under normal circumstances, when the land is converted to organic farming from inorganic systems of culture. The key feature of Panchagavya is its efficacy to restore the yield level of all crops when the land is converted from inorganic cultural system to organic culture from the very first year. The harvest is advanced by 15 days in all the crops.It not only enhances the shelf life of vegetables, fruits and grains, but also improves the taste. By reducing or replacing costly chemical inputs, Panchagavya ensures higher profit and liberates the organic farmers from loan.

Drought Hardiness - A thin oily film is formed on the leaves and stems, thus reducing the evaporation of water. The deep and extensive roots developed by the plants allow to withstand long dry periods. Both the above factors contribute to reduce the irrigation water requirement by 30% and to ensure drought hardiness.
(Abstracted from TNAU Agritech Portal, http://agritech.tnau.ac.in/org_farm/orgfarm_success%20stories .html).

Global Organic News

The World of Organic Agriculture - 2010

As per the details released at BioFach 2010 at Nuremberg, the organic agriculture is developing rapidly, and statistical information is now available from 154 countries of the world. Its share of agricultural land and farms continues to grow in many countries. The main results of the latest global survey on certified organic farming are summarized below:

Growing area under certified organic agriculture

- 35 million hectares of agricultural land are managed organically by almost 1.4 million producers.
- The regions with the largest areas of organically managed agricultural land are Oceania (12.1 million hectares), Europe (8.2 million hectares) and Latin America (8.1 million hectares). The countries with the most organic agricultural land are Australia, Argentina and China.
- The highest shares of organically managed agricultural land are in the Falkland Islands (36.9 percent), Liechtenstein (29.8 percent) and Austria (15.9 percent).
- The countries with the highest numbers of producers are India (340'000 producers), Uganda (180'000) and Mexico (130'000). More than one third of organic producers are in Africa.
- On a global level, the organic agricultural land area increased in all regions, in total by almost three million hectares, or nine percent, compared to the data from 2007.
- Twenty-six percent (or 1.65 million hectares) more land under organic management was reported for Latin America, mainly due to strong growth in Argentina. In Europe the organic land increased by more than half a million hectares, in Asia by 0.4 million.
- About one-third of the world's organically managed agricultural land – 12 million hectares is located in developing countries. Most of this land is in Latin America, with Asia and Africa in second and third place. The countries with the largest area under organic management are Argentina, China and Brazil.
- 31 million hectares are organic wild collection areas and land for bee keeping. The majority of this land is in developing countries – in stark contrast to agricultural land, of which two-thirds is in developed countries. Further organic areas include aquaculture areas (0.43 million hectares), forest (0.01 million hectares) and grazed non-agricultural land (0.32 million hectares).

Almost two-thirds of the agricultural land under organic management is grassland (22 million hectares). The cropped area (arable land and permanent crops) constitutes 8.2 million hectares, (up 10.4 percent from 2007), which represents a quarter of the organic agricultural land.

Continent wise growth –

- **Africa** - In Africa, there is more than 900'000 hectares of certified organic agricultural land. This constitutes about 2.5 percent of the world's organic agricultural land. 470'000 producers were reported. The countries with the most organic land are Uganda (212'304 hectares), Tunisia (174'725 hectares), and Ethiopia (99'944 hectares).

- **Asia** - The total organic agricultural area in Asia is nearly 3.3 million hectares. This constitutes nine percent of the world's organic agricultural land. 400'000 producers were reported. The leading countries by area are China (1.9 million hectares) and India (1 million

hectares). Timor Leste has the most organic agricultural area as a proportion of total agricultural land (seven percent). Organic wild collection areas play a major role in India and China, while Aquaculture is important in China, Bangladesh and Thailand.

- **Europe -** As of the end of 2008, 8.2 million hectares in Europe were managed organically by more than 220'000 farms. In the European Union, 7.5 million hectares were under organic management, with almost 200'000 organic farms. 1.7 percent of the European agricultural area and 4.3 percent of the agricultural area in the European Union is organic. Twenty-three percent of the world's organic land is in Europe.

- **Latin America -** In Latin America, 260'000 producers managed 8.1 million hectares of agricultural land organically in 2008. This constitutes 23 percent of the world's organic land. The leading countries are Argentina (4 million hectares), Brazil (1.8 million hectares), and Uruguay (930'965 hectares).

- **North America -** In North America, almost 2.5 million hectares are managed organically, representing approximately 0.6 percent of the total agricultural area. Currently the number of farms is 14'062. The major part of the organic land is in the U.S. (1.8 million hectares in 2008). Seven percent of the world's organic agricultural land is in North America. Despite tough economic times, U.S. sales of organic products, both food and non-food, reached 24.6 billion US dollars by the end of 2008, growing an impressive 17.1 percent over 2007 sales, according to the Organic Trade Association's 2009 Organic Industry Survey.

- **Oceania -** This region includes Australia, New Zealand, and island states like Fiji, Papua New Guinea, Tonga and Vanuatu. Altogether, there are 7'749 producers, managing more than 12.1 million hectares. This constitutes 2.8 percent of the agricultural land in the area and 35 percent of the world's organic land. Ninety-nine percent of the organically managed land in the region is in Australia (12 million hectares, 97 percent of which is extensive grazing land), followed by New Zealand (100'000 hectares), and Vanuatu (8'996 hectares).

Global market - According to Organic Monitor estimates, global sales reached 50.9 billion US dollars in 2008, doubling in value from 25 billion US dollars in 2003. Consumer demand for organic products is concentrated in North America and Europe; these two regions comprise 97 percent of global revenues. Asia, Latin America and Australasia are important producers and exporters of organic foods. The financial crisis has had a negative impact on the global market for organic products; however, preliminary research finds that growth continued in 2009 in spite of the poor economic climate.

Standards and regulations - 2009 witnessed several major developments in the field of standards and regulations. The new EU regulation on organic production came into force as well as the Canadian organic standard. Furthermore, the Australian domestic organic standard was implemented. Canada and the U.S. concluded the world's first fully reciprocal agreement between regulated organic systems, and the EU introduced procedures for approving certification bodies from outside the EU. It is expected that these developments will ease trade in organic products and foster the future growth of the sector. The number of countries with organic standards has increased to 73, and there are 16 countries that are in the process of drafting legislation. In 2009, FAO, IFOAM and UNCTAD started the Global Organic Market Access (GOMA) project. The aim of GOMA is to facilitate

equivalence, harmonization and other types of cooperation in order to simplify the process for trade flow of products among the various organic guarantee systems. There has been modest growth in the number of certification bodies. The total is 488, up from 481 in 2008. Most certification bodies are in the European Union, the United States, Japan, South Korea, China, Canada, and Brazil. A growing number of organic producers are certified through Participatory Guarantee Systems (PGS) across the world. PGS are locally focused quality assurance systems. It is estimated that around 10'000 small operators are involved in PGS world-wide. The leading countries with regards to PGS are located in the global South. Several organic standard setters have also developed draft standards for climate "add-ons" for organic certification, and it is expected that the use of carbon labeling by retailers will grow considerably in the future.

Organic farming and development support - Both private and public development initiatives have contributed considerably in the last 25 years to the growth of the organic sector in many countries of the world. Activities have related to, for instance, building up the capacities of different stakeholder groups in the organic sector, developing domestic and international markets, and developing local standards and legislations. One of the new initiative is the proposed Organic Research Centres Alliance (ORCA), hosted by FAO, which intends to internationally network and strengthen existing institutions with scientific credentials and empower them to become centers of excellence in transdisciplinary organic agriculture research. International trade, an engine for growth can substantially contribute to poverty reduction in developing countries. The Trade, Climate Change and Environment Programme of the International Trade Centre (ITC) supports the organic sector through the provision of market information, training in standards compliance, and trade promotion; by supporting policies favorable to organic agriculture and trade; and by facilitating business contacts.
(Source – Helga Willar, The World of Organic Agriculture- Statistics & Emerging Trends 2010, Publication FiBl and IFOAM)

Organic cotton weathers crisis with 20% growth - Organic cotton weathered the financial crisis remarkably and posted impressive 20 percent growth in 2008-09 farming season over the 2007-08. Output rose to 175,113 metric tonnes (802,599 bales) grown on 625,000 acres of land (253,000 hectares). Organic cotton now represents 0.76 percent of global cotton production, according to a new report by Organic Exchange. According to the fourth annual Organic Exchange Farm and Fiber Report 2009, organic cotton was grown in 22 countries worldwide with the Top Ten producer countries being led by India, and including (in order of rank) Turkey, Syria, Tanzania, China, United States, Uganda, Peru, Egypt and Burkina Faso. Approximately 220,000 farmers grew the fiber. Not all is rosy, however. Despite major market players sticking to their commitments to use organic cotton in their apparel and home textile products, there simply wasn't the market for products (organic or conventional) in general, given the global economic downturn. In addition, a number of farmers had planted vast acreage of organic cotton on speculation and in response to what had appeared to be a healthy, burgeoning marketplace. As a result, unsold stocks which represent between 17 and 22 percent of production (some 30,000 to 35,000 tons (137,789 to 160,754 bales) of organic cotton has yet to find buyers. 2008-09 was a year of challenges for the organic cotton sector, but also one that highlights the need to improve recordkeeping, forecasting, pricing, and communication systems and gain more firm commitments and contracts," noted Simon Ferrigno, OE Organic Exchange Farm Development Team manager and lead author of the report. According to the Organic Exchange Organic Cotton Market Report

2009, global retail sales of organic cotton and home textile products topped 3.2 billion U.S. dollars in 2008. (Source – Commodity Online Feb 2010)

Contamination of GM cotton in organic cotton a growing concern - Leading European retailers and brands have unknowingly been selling certified organic cotton clothing contaminated with GM cotton from India, Ecotextile News reports. The scale of the alleged fraud uncovered by the German edition of the Financial Times seems to be immense. A director of the independent testing laboratory Impetus in Bremerhaven, who examined the cotton fabrics, claimed that around 30% of the tested samples contained GM cotton. The GM cotton found in the collections has been traced back to India which supplies nearly half of the global supply of organic cotton. Many brands involved in the trade, have been criticised for not adequately monitoring their supply chains. Monika Buening of the Federal Consumer Affairs Agency said that trade agencies needed to take immediate action to limit the damage. A spokeswoman for the Swedish clothing chain H&M stated that the company became aware of the incident last year and admitted that GM cotton could have made it into its organic range. C&A are said to be undertaking a thorough investigation (Source - Ecotextile News Organic-Market Info, March 2010)

A Comparison of the Effects of Three GM Corn Varieties on Mammalian Health – In this study authors present for the first time a comparative analysis of blood and organ system data from trials with rats fed three main commercialized genetically modified (GM) maize (NK 603, MON 810, MON 863), which are present in food and feed in the world. NK 603 has been modified to be tolerant to the broad spectrum herbicide Roundup and thus contains residues of this formulation. MON 810 and MON 863 are engineered to synthesize two different Bt toxins used as insecticides. Approximately 60 different biochemical parameters were classified per organ and measured in serum and urine after 5 and 14 weeks of feeding. GM maize-fed rats were compared first to their respective isogenic or parental non-GM equivalent control groups. This was followed by comparison to six reference groups, which had consumed various other non-GM maize varieties. Authors applied nonparametric methods, including multiple pairwise comparisons with a False Discovery Rate approach. Principal Component Analysis allowed the investigation of scattering of different factors (sex, weeks of feeding, diet, dose and group). The analysis clearly reveals for the 3 GMOs new side effects linked with GM maize consumption, which were sex- and often dose-dependent. Effects were mostly associated with the kidney and liver, the dietary detoxifying organs, although different between the 3 GMOs. Other effects were also noticed in the heart, adrenal glands, spleen and haematopoietic system. Authors conclude that these data highlight signs of hepatorenal toxicity, possibly due to the new pesticides specific to each GM corn. In addition, unintended direct or indirect metabolic consequences of the genetic modification cannot be excluded (Source Vandolois et al 2009 *Int J Biol Sci* 2009; 5:706-726)

GM Crops Increase Herbicide Use in the United States - The rapid rise in herbicide tolerant (HT) crops is increasing the application of toxic herbicides to alarming levels in the US, according to a comprehensive report by the Organic Food Center, USA. Research based on statistics from the US Department of Agriculture (USDA) revealed that from 1996 to 2008 pesticide use increased by 318 million pounds; a decrease of 64 million pounds in insecticide use was overwhelmed by an increase of 383 million pounds in herbicide use. Especially worrying is that most of this increase (46 percent) took place between 2007 and 2008. This has led to major environmental concerns regarding the safety of HT crops as they continue to dominate the corn, soybean and cotton markets in the US. Ecological risks, such as herbicide resistant super

weeds, and economic impacts on farmers, were especially highlighted in the report released jointly with the Union of Concerned Scientists and the Center for Food Safety, in the US (Source - **http://www.i-sis.org.uk/GMcropsIncreasedHerbicide.php**)

Influence of the Input System (Conventional versus Organic Farming) on Metabolite Profiles of Maize (*Zea mays*) Kernels - Maize (*Zea mays*) kernels grown conventionally and organically, respectively, were investigated using a gas chromatography/ mass spectrometry (GC/MS)-based metabolite profiling methodology. By analysis of three cultivars grown at two locations with different input systems and at a third location where both organic and conventional farming were applied, the impact of the growing regime on the metabolite spectrum should be put into the context of natural variability. The applied analytical approach involved consecutive extraction of freeze-dried maize flour and subsequent subfractionation. Approximately 300 compounds from a broad spectrum of chemical classes were detected, of which 167 were identified. The metabolite profiling data were statistically assessed via principal component analysis (PCA) and analysis of variance (ANOVA). The PCA demonstrated that the observed separations were mainly due to genetic differences (cultivars) and environmental influences. The different input systems (conventional/organic) only led to minor differentiations. ANOVA and quantification of selected constituents confirmed these observations. Only three metabolites (malic acid, *myo*-inositol, and phosphate) were consistently different because of the employed input system if samples from all field trials were considered. (Source - Richard et al *J. Agric. Food Chem.*, February 12, 2010)

Nutritional quality and safety of organic food - A review - Food security, nutritional quality and safety vary widely around the world. Reaching these three goals is one of the major challenges for the near future. Up to now, industrialized production methods have clearly shown severe limitations such as a worldwide contamination of the food chain and water by persistent pesticide residues, and reduced nutrient and flavor contents through low-cost intensive food production and/or processing. In line with several published literature reviews, the French Agency for Food Safety (AFSSA) performed under an up-to-date exhaustive and critical evaluation of the nutritional and sanitary quality of organic food. This review is based on the AFSSA report issued and recently published studies. The major points are: 1/ organic plant products contain more dry matter and minerals (Fe, Mg); and contain more anti-oxidant micronutrients such as phenols and salicylic acid, 2/ organic animal products contain more polyunsaturated fatty acids, 3/ data on carbohydrate, protein and vitamin levels are insufficiently documented, 4/ 94–100% of organic food does not contain any pesticide residues, 5/ organic vegetables contain far less nitrates, about 50% less; and 6/ organic cereals contain overall similar levels of mycotoxins as conventional ones. Thus, organic agricultural systems have proved that, it is able to produce food with high quality standards (Source - Denis Lairon 2010 Agron. Sustain. Dev. 30 : 33 – 41)

Organic Farming Improves Soil Health, Delivers Nutrient-Rich Foods - Based on a growing body of research, a panel of scientists has offered several positive conclusions regarding the impacts of organic farming on soil quality and the nutritional content of food. The panel presented its findings at the annual meeting of the American Association for the Advancement of Science (AAAS). Over the last decade abundant research has compared the impacts of organic and conventional farming systems on soil and food quality. Based on this body of research, some of it carried out in field experiments and laboratories, the panel offered six conclusions:

1. Studies of apple production demonstrate that organically farmed soils display improved soil health as measured by increased biological diversity, greater soil organic matter, and improved chemical and physical properties. Enhancement of soil quality in organic apple production systems can lead to measurable improvements in fruit nutritional quality, taste, and storability.

2. Organically farmed tomatoes have significantly higher levels of soluble solids and natural plant molecules called secondary plant metabolites, including flavonoids, lycopene, and vitamin C.

3. Organic farming can, under some circumstances, delay the onset of the "dilution effect." In hundreds of studies, scientists have shown that incrementally higher levels of fertilizer negatively impact the density of certain nutrients in harvested foodstuffs, hence the name, the "dilution [of nutrients] effect." Specifically, tomatoes grown with organic fertilizers maintain constant concentrations of beneficial phenolic secondary plant metabolites and antioxidants, even as fruit grow larger, whereas concentrations of these same beneficial compounds decline with increasing fruit size when the same tomato cultivar is grown using conventional methods and fertilizer.

4. Studies of 27 cultivars of organically grown spinach demonstrate significantly higher levels of flavonoids and vitamin C, and lower levels of nitrates. Nitrates in food are considered detrimental to human health as they can form carcinogenic compounds (nitrosamines) in the GI tract and can convert hemoglobin to a form that can no longer carry oxygen in the blood.

5. The levels of secondary plant metabolites in food appear to be driven by the forms of nitrogen added to a farming system, as well as the ways in which the biological communities of organisms in the soil process nitrogen. Compared to typical conventional farms, the nitrogen cycle on organic farms is rooted in substantially more complex biological processes and soil-plant interactions, and for this reason, organic farming offers great promise in consistently producing nutrient-enriched foods.

6. Organic soil fertility methods, which use less readily available forms of nutrients, especially nitrogen, improve plant gene expression patterns in ways that lead to more efficient assimilation of nitrogen and carbon in tomatoes. This improvement in the efficiency of nutrient uptake leaves plants with more energy to produce beneficial plant secondary metabolites, compounds that promote plant health as well as human health

"The work reviewed over the last decade points directly to two major scientific challenges". "First, we need to understand more how soil biological communities' process nutrients and communicate to plant roots in order to promote improved quality in organically grown crops. And second, we need better tools to help organic farmers fine-tune their production systems in order to maximize the soil and nutritional quality benefits of organic farming."(Source Sean Moloughney 2009, Neutraceutical World).

National and International Events

North India Organic Farming Conference & JAIVIK HAAT, 7-9 February 2010 - Sponsored by Organic Farming Association of India (OFAI) and supported by Madhya Pradesh Council of Science & Technology, Bhopal, National Centre of Organic Farming, Ghaziabad, Department of Agriculture and Cooperation, GOI & State Mandi Board of Madhya Pradesh a three day North India Organic Farming Conference was organized at the Agriculture College Campus, Indore from 7th February to 9th February 2010. The conference was locally hosted by OFAI-North India Secretariat, Banda (UP), M.P. Organic Farming Association and K.J. Education Society, Bhopal.

Chief guest of the conference, Dr.Ram Krishna Kusmaria Hon'ble Minister of Agriculture, Govt of MP inaugurated the twin event in the presence of Dr. A.K.Yadav, Director, NCOF, Prof. P.K.Verma , the Director General of MPCOST , Padm-Shri T.G.K. Menon, Dr. Claude Alvares , Director OFAI, Dr. Bharatendu Prakash , Director, OFAI-North, and over 650 OFAI-members, organic farmers, M.P. Agriculture Department officials, scientists and promoters of organic farming from 16 states of India and a participant from Canada.

The conference was opened by Dr. Bharatendu Prakash with introductory note and welcome address by Dr. Claude Alvares. Indore's contribution to world wide organic farming promoted by Sir Albert Howard on the basis of traditional Indian farming practices was recalled at this historical gathering. Chief guest Dr. Kusmaria expressed concern over the quality of food which is available for people these days destroying their valuable health. He questioned the proposal for introduction of Bt-seeds etc to our agriculture from backdoor and declared M.P. to be free from genetically modified seeds. He informed that State Organic Farming Policy is being finalized and is likely to be announced soon. Dr. Kaushal, former Director of Agriculture, MP welcomed revival of organic farming in Madhya Pradesh and elaborately discussed about the myths against organic farming. He emphatically told that low productivity or threat to food security because of adoption of organic farming is far from truth.

The second day was devoted to experience sharing of organic farmers from all over India and the scientific experiments carried out within institutions and in farmers' fields. The experiences of Subhash Sharma (Yavatmal, Maharashtra), K.K.Bhartiya and Vishnu Pratap Singh (Uttar Pradesh), R.S.Dube (Katni), Vijai Jardhari (Uttarakhand), Anand Thakur, Shyamsunder Chandak, Smt. Radha Dube, Ravindra Thakur, Rajendra Rathod, B.L. Daima, Bakhtawar Togdi, Abhai Kher and Sanjai Singha etc. of M.P., Shashikant and Ramashankar Rai of Bihar, Manvir Singh (Haryana) and Shankar Bisi (Orissa) were shared with the august geathering.

In a scientific session chaired by Prof. O.P. Shivastava, ex-Dean of I.A.S. (BHU), number of speakers presented their findings and views. Important speakers in this session were : Dr. V.N. Shroff (Indore), Prof. U.P.Singh (Varanasi), Dr. Tarak Kate (Wardha) , Jayant Barve (Sangli) , Dr. MS Acharya (Udaipur), Dr. Ashok Krishna (Indore), Dr. Rajesh Saxena (Bhopal), Dr. Rajindar Chowdhari (Rohtak), Dr. G.S. Murthy of Delhi and Prof. O.P.Shrivastava.

Next session was on popularization of organic farming and the certification process. Shri Joy Daniel, Shri Miguel Braganza and Dr. Bharatendu Prakash gave a detailed account of PGS- certification process being popularized by OFAI under PGS Organic India Council as a part of international efforts of spreading organic farming amongst small farmers. Several PGS - farmers from Aurangabad (Maharashtra) gave their first hand experience of working through PGS.

Further during discussion on economics of organic farming, Sh. Birendra Kr. Jain of Damoh presented his chart comparing the economics of farmers' adopting organic

farming and chemical and machine based modern farming. He emphasized that five basic factors health, economy, self-reliance, environment and religious sentiments should be the guide for any development process we adopt. Professor Rajindar Chowdhari of Rohtak insisted on proper documentation of organic process of farming to be helpful to farmers. Sh. Rajendra Rathod presented his school curriculum to be introduced at primary-secondary education level.

A very important event during this conference was release of Hindi translation of Sir Albert Howard's legendary book "An Agriculture Testament" translated by Shri Prabhakar Pandit and published by Shri Arun Dike of Indore.

The valedictory session in the afternoon of 9th February 2010 was chaired by Dr. GS Kaushal. Shri K.P.Aharwal, the Joint Director of Agriculture, Indore thanked all the guests, the participants and the volunteers who made this conference a great success. Shri Aharwal, a crusader of organic farming gave a befitting slogan also :
Sachcha Kisan-Achchha Kisan –Jaivik Kisan Sachchi Kheti- Achchhi Kheti –Jaivik Kheti "
(Report by Smt. Shobhana, OFAI, North)

Everything Organic and Natural Exhibition, 26 – 28 November 2010 at Chennai Trade Centre, Chennai, India - The organic and natural products industry is fast expanding in India, which is one of the richest and diversified countries as far as organic and natural products are concerned. Organic products are now marketed in major supermarkets across the country, and the industry is enjoying double digit annual growth. In response to growing concern about natural products, health and environment issues, an International exhibition entitled "Everything Organic and Natural Exhibition" is proposed during 26-28 November 2010 at Chennai, along with two other events namely: Asian Herbal Show and Wellness Asia. Main industry focus of these triple events are fine organic foods, agricultural products, processed foods, baby foods, cosmetics, dairy products, dental products, naturopathic, Unani, Siddha medicines, Botanical extracts, cosmetics, hygiene products and vegan products. For further details readers may contact M/S Service International, 91-11-45055500, 45055566, Email econ@servintonline.com, Website – www.servintonline.com.

National Promotion of Sustainable livelihoods for Small and Marginal Farmers through Organic Farming 4th March 2010 at Tirupati – Institute for Integrated Rural development (IIRD), Aurangabad in collaboration with NGOs WORD, Janodaya, DPC and SEVA organized a one day national seminar on Promotion of Sustainable livelihoods for Small and Marginal Farmers through Organic Farming to promote organic farming among farmers. It was also aimed at promoting the concept of "Organic Bazar" and cooperative business model for the economic welfare of small and marginal farmers. Shri Shankarrao of Sri Venkateshwara Agricultural College, Shri Mallesam of KVIC, Joy Daniel of IIRD and Chandan Mukherjee of SEVA were among the prominent speakers. WORD founder Shri Gangadhar underlined the need for promoting organic farming to reduce cultivation costs and increase the agricultural yields. (Source – The New Indian Express, March 5, 2010, Hyderabad)

Workshop on Organic farming "Vision for Holistic and Sustainable Organic Farming in Sikkim – The Future Thrusts" – To define the state policy on organic farming and to chalk out the road map for converting Sikkim 100% organic by 2015, a two days workshop was organized by the department of Food Security and Agriculture Development and Horticulture and Cash Crop Development Department, Govt of Sikkim during 17-18 March 2010, at Saramsa Gardens, Ranipool, Sikkim. The workshop was inaugurated by the Hon'ble Chief Minister of Sikkim Shri Pawan Chamling. The workshop was participated by large numbers of organic agricultural experts from throughout the country. The workshop was divided into 4 technical sessions. Themes of different technical sessions with prominent speakers were:

a. Status, scope and strategies in Organic farming, Dr. A.K. Yadav, Director NCOF and, Addl Director, FSAD, Sikkim and Ms Swarna of ICCOA.

b. Potential, Constraints and Challenges in Organic Farming, Dr Tej Pratap, VC, CSKHP Krishi Vishvavidyalaya, Dr R.A. Ram, CISH, Lucknow.
c. Organic Agriculture – Crop Protection technologies, Dr. V.M. Pawar, Former VC, Dr. Sithanantham, Director Entomology, Chennai and Dr S. Balaji of IPL
d. Organic Policy, Scope and Strategies, certification, Shri Mukesh Gupta, ICCOA, R. Gakhar of AFC and Sandip Bahrgav, CEO of One cert Asia International.

During the two days sessions efforts were made to chalk out a road map to convert at least 50,000 ha (50% of Sikkim's total cultivable area) into organic by design. Hon'ble Minister of Agriculture and Horticulture, Govt of Sikkim and Secretary of Agriculture and Horticulture, Govt of Sikkim conducted the proceedings of the workshop. The workshop concluded with the pledge to achieve the status of organic Sikkim by 2015 as per the vision of the Hon'ble Chief Minister of Sikkim.

Organic Farmers Meet at MPKV Rahuri dated 11th March 2010 – A one day organic farmers meet was organized by the MP Krishi Vidyapeeth, Rahuri, Dsitt Ahmednagar, Maharashtra at NCOF sponsored Model Organic Farm at Rahuri. The meet was participated by more than 350 organic farmers of the Western Maharashtra. While inaugurating the meet Dr. Rajaram Deshmukh, Vice Chancellor of MPKVV stressed the need for promotion of organic farming and organic farming technologies. He also stressed the need for stepping up the investments in research for organic agriculture. Chief Guest Dr. A.K. Yadav, Director, NCOF elaborated the overall scenario of organic farming in the country with specific role of organic farmers of Maharashtra in the organic farming movement in the country. Various mechanical and power driven tools developed by the Vidyapeeth and by the innovative farmers and entrepreneurs were also demonstrated as important mechanical aids under organic management. Many practicing organic farmers shared their experiences on various organic management technologies.

BioFach and Vivaness 2010 – Biofach world organic trade fair is the biggest meeting place and platform for the organic sector and its stakeholders, especially buyers and sellers of organic products. It is held annually in the month of Feb in the city of Nurnberg, South of Germany. Biofach 2010 celebrated its 21th Birthday and was opened on 17.02.10 The inauguration ceremony was attended by dignitaries Dr. Ulrich Maly, Lord Mayor of Nuremberg, Katherine DiMatteo, President IFOAM and also Mariann Fischer Boel, EU Commissioner for Agriculture and Rural Development, Professor Carbonaro, Ministers and official representatives of Governments from around the world. They emphasized on not just the sustainability of organic sector, but that organic agriculture really delivers critical solutions to urgent global problems by increasing the sustainability of our social, environmental and financial resources. Organic sector is rooted in values such as authenticity, transparency, innovation, self-determination, and ethical agriculture, It is from these powerful values, that the organic sector must collaborate to grow, prosper and expand, thus delivering these essential solutions

This year the fair brought together 2,557 exhibitors and around 43,500 visitors. India's participation in Biofach is growing in size in the recent years. Initially Indian exporters of organic products used to take individual spaces/stalls at the fair but since last three years APEDA is coordinating India Pavilion at Biofach. With an increasing demand for organic products especially in EU, US and Japan many countries world over are making an onset in the development of organic products. India, bring an agricultural nation and backed by a legacy of organic farming has a potential to make a mark in the international market. However this large framework has brought forth the need for certification and maintaining strict quality standards in organic products. Keeping in view of the growing India Organic sector, ICCOA a Bangalore based organic sector NGO, also sponsored a Indian delegation comprised of various State Government officers and other stakeholders to BioFach and Institute of Organic Agriculture (FiBL), Switzerland to understand the international

trends and requirements in organic production, trade and quality management.

According to a survey carried out by an independent organization, 85% of BioFach exhibitors and as many as 97% of Vivaness exhibitors were anticipating a boost to their business in the wake of the fair. This is an increase of 12% and 16% respectively compared with last year, which is clear evidence of optimism going forward. Vivaness is the international platform for natural cosmetics and wellness, and this year 183 manufacturers from 21 countries presented their products. After Germany with 88 manufacturers, came France with 29, followed by Italy (16), Great Britain (12) and Austria (8). The international organic industry will next meet from Wednesday 16 February to Saturday 19 February 2011 at the Trade Fair Centre in Nuremberg.
(A report by Manoj Menon, Ececutive Director, ICCOA, Bangalore)

Guelph Organic Conference in Canada - The 29th Guelph Organic Conference was organized in Guelph, Ontario, Canada, from January 28 to 31, 2010. The 4 day event included international speakers, seminars and introductory workshops on key topics including GE foods, organic production and certification, changing climates, eco-villages, earth buildings, and farmland protection and food security. From producer to consumer, the workshops offered something for everyone. There was also an organic expo and tasting fair with more than 160 exhibitors including 35 food samplers on Saturday and Sunday, with free access for the public, offered an opportunity to sample and purchases a wealth of organic, fair trade products. Makers and movers met and the organizers invited to discover how to make many positive changes. A special open meeting was held on Saturday, January 24, hosted by the Toronto Farmers' Market Network to build links between growers and consumers (Source – Organic Market Info, March 2010)

Soil Association: Annual conference 2010 - The Soil Association Conference "The Future of Food" took place in the Custard Factory, Birmingham, from February 3 to 4, 2010. It addressed the triple challenges of climate change, resource depletion and food security and the need to develop new models for food and farming systems for the 21st century. Despite the urgency of the need for radical overhaul of the current food and farming systems, many key players in the agricultural industry believe that the solution will be based on existing production systems with high inputs, GM and global trade. The conference debated whether a modified "business as usual" strategy will suffice or whether preparing for the future will require the most far reaching changes to our food systems for more than half a century. The conference was opened on February 3 by Patrick Holden, Director of the Soil Association. The opening was followed by two panels – the politicians and the farmers - and by two workshops. On February 4, panel three and four dealt with civil society and the public.

Cosmos standard - Cosmetic Organic Standard

The European cosmetics standards working group is in the process of establishing a not-for-profit **Cosmos-standard international association**. The association will undertake to achieve its goal through collective ownership of the Cosmos-standard and implementation of a high quality and harmonised certification / inspection service by the Cosmos-standard members. Certification / inspection to Cosmos-standard will be offered by the Cosmos-standard members as soon as the international association has obtained legal status. This will be received on pronouncement of the Belgian Royal Decree which is expected to be in April 2010. In the meantime, the founders of Cosmos-standard are harmonising the certification documents and control procedures. The final version of Cosmos-standard is available at http://www.cosmos-standard.org/

Book Reviews

Organic Farming and Vermiculture, by Gaurav Singh, 2009, Publisher ALP Books, New Delhi, ISBN; 978-93-80184-07-04, Price Rs. 320/- - Organic farming is one of the several approaches, found to meet the objectives of sustainable agriculture. Many techniques used in organic farming like intercropping, mulching and integration of crops and live stocks are not align to various agricultural systems including the traditional agriculture practiced in old countries like India. However organic farming is based on various laws and certification programmes. Which prohibit the use of almost all synthetic inputs and health of the soil is recognized as the central theme of the method. The present book discusses various aspects of organic farming and vermiculture technology in 18 chapters, starting from relevance of organic farming to problems and constraints, National programmes, Indian and Global perspectives, critical assessment of the prevailing system, agro-ecosystems, land use change, soil and water resource condition, to biodiversity and carbon service. In brief the author has tried to evaluate and discuss the organic farming in today's context with its potential in present and future. (AKY)

Vermicomposting and Vermiwash by L.L. Somani, Publisher Agrotech Publishing Academy, Udaipur, ISBN: 81-8321-088-0 Price Rs. 1200.00 US$ 120 – Intensive agriculture with the use of chemical fertilizers in large amount has no doubt, resulted in many fold increase in the productivity of farm commodities but the adverse effect of these chemicals are clearly visible on soil physical properties, micro-flora, quality of water, food and fodder. This led to the development of organic farming/ Integrated Plant Nutrient Systems (IPNS). Among various components of these alternative systems, vermicomposting is key component. Any organic waste can be converted into nutrient rich compost with the activity of microorganisms and earth worms. Earthworms and microorganisms are important biological organisms helping nature to maintain nutrient flow from one system to another and minimize environmental degradation. Vermicomposting is the best method of composting for any kind of organic matter, which could provide a win-win situation to tackle the problem of safe disposal of waste. The book include all about earthworm, vermicomposting and vermiwash technology. The book will be useful to the students, teachers, scientists and researchers from the different branches of agriculture. (Jacket)

Biodiversity Conservation and Sustainable Development by Rajib Lochan Panigrahi and Lingaraj Patro, Publisher Discovery Publishing House Pvt Ltd, New Delhi, ISBN:978-81-8356-333-8, Price Rs. 625.00 – Conservation and sustainable use of biodiversity is fundamental to ecologically sustainable development. Biodiversity is part of our daily lives and livelihood, and constitute resources upon which families, communities, nations and future generations depend. Biological diversity is fundamental to the fulfillment of human needs. An environment rich in biological diversity offers the broadest array of options for sustainable economic activity, for sustaining human welfare and for adopting to change. This book contains 10 articles on biodiversity, its conservation, prospects, need of education and technological

conservation, community participation, hazards of chemicals and industrial substances to habitats, air, water etc. The contributors are eminent academicians, researchers and administrators of several institutions of repute in different states of India. (AKY)

Vermicomosting for Sustainable Agriculture by R.K. Pawar, Publisher Oxford Book Company, Jaipur, ISBN: 978-81-89473-62-4 – As the importance of sustainable agriculture, which looks into the current agricultural output using eco-friendly methods without compromising future, continues to grow, vermicomposting presents an effective technique of enhancing the sustainability of agriculture. The book has been written as a manual which looks into the process of vermicomposting as a viable option to promote sustainable agriculture. There is a global need, which is increasingly making its presence felt, for agriculture to incorporate renewable resources and cause minimum pollution and maintain the optimum yield levels. The book guides readers on the cultivation of earthworms, vermicompost pits and the use of earthworm excreta. Analyzing current trends and techniques too, the text is an up-to-date manual on the relevance of vermicomposting for sustainable agriculture and is expected to be highly useful for readers. (AKY)

The World of Pests and Parasites, Edited by B.N. Pandey, S.P. Trivedi, Kamal Jaiswal and Neelima Gupta, Publisher Sarup Book Publishers Pvt Ltd., New Delhi, ISBN: 978-81-7625-916-3, Price Rs. 660.00 – Large numbers of pests and parasites are known to cause appreciable loss to crops, animals and fishes, poultry, grains, fruits, vegetables and human health. For devising appropriate and nature friendly control measures it is essential to know their life cycle and adaptations etc. The present book "World of Pests and Parasites" has been painted on a large canvas with broad strokes comprising 19 chapters by experts and researchers in the field. The compilation is basically a part of the proceedings of the National Seminar on "Current issues on Applied Zoology and Environmental Sciences with Special Reference to Eco-restoration and management of Bioresources". The editors hope the book will be of immense use for the students, teachers and researchers of this field as standard reference book. (AKY)

Biofertilizers for sustainable Agriculture by B.K. Jain, Publisher Oxford Book Company, Jaipur, ISBN: 978-81-89473-77-8 – We live in an age where in a growing need has been felt to grow food in sufficient amount to feed the growing world population, without compromising on either nutritional quality or ecological balance. In such a scenario, sustainable agriculture, albeit fraught with various hurdles and challenges, presents a highly viable option. This book has been designed as an introductory manual which seeks to acquaint readers with the essentials of biofertilizer use in sustainable agriculture practice. The aim is to unravel what entails biofertilizer, their types, nutritional qualities, their use and the methodology of producing them. In addition the book takes care to incorporate critical perspectives which look into biofertilizer use as per its advantages, the challenges surrounding its use and the future offered by it. (Jacket)

Handbook of Biofertilizers and Microbial Pesticides by M.S. Vora, H.N. Shelat and R.V. Vyas, 2008, Publisher Satish Serial Publishing House, Delhi, ISBN: 81-89304-41-), Price Rs. 1395.00 – Through this book authors have attempted to provide knowledge of biofertilizers and microbial

pesticides with microbiological techniques required for their maintenance and use. Chemical fertilizers and pesticides have provided foot for first green revolution which is now gradually switching to use of biofertilizers and microbial pesticides in current era of organic farming and eco-friendly management practices. The book is edited by related renowned scientists having wide field experiences with an exhaustive compilation. Book consists 24 chapters covering information on various beneficial microorganisms commonly used in agriculture, covering all aspects like isolation, identification, characterization, mass multiplication and formulation; quality testing, financial aspects and future prospects with basic information on various techniques. (Jacket)

Biofertilizer Technology, 2008, by Tanuja Singh and S.S. Purohit, Publisher, Agrobios (India), ISBN 978-81-7754-382-7, Price Rs. 990.00 – Biofertilizers have earned a respectable place in nutrient management of practically all the crops. The journey started with Rhizobium has now diversified to galaxy of different biofertilizers. With the growing importance of organic farming the importance of biofertilizers have further strengthened. Keeping in view of the recent developments in the field of their use, product formulation, production technology and quality control this book has been written with clear analysis of ground realities and future needs. Authors hope the book will be useful for all the stakeholders associated with integrated nutrient management and organic farming systems. (AKY).

Bio Pest Management (Entomopathogenic Nematodes, Microbes and Bioagents), By H.C.L. Gupta, A.U. Siddiqui and Aruna Parihar, Publisher Agrotech Publishing Academy, ISBN: 978-81-8321-168-0, Price Rs. 1980.00, US$ 150 - Insects, Pathogens, nematodes and plants have co-existed for nearly 400 million years. Since then these pests have been causing losses to the plants amounted to about 20-30% of their yield potential. The use of chemical pesticides was although found to be effective in initial years but has proved a stumbling block to sustainable development. Keeping in view of the adverse impacts of such chemicals on environment, plants and animal and human health, efforts are being made to develop alternative environment friendly management practices. Biological control of pests using entomopathopgenic nematodes is gaining popularity in the recent times. This book is an excellent compilation of articles contributed by eminent scientists of the country in the field. The importance of entomopathogenic nematodes as a key component along with other bioagents such as parasitoids, predators, pathogens and also with some chemicals are discussed for developing appropriate management strategy for control of agricultural pests. Strategies have also been discussed on commercialization prospects of such formulations. The editors hope that the topics discussed in the book would be useful not only to the students, but the information given could be utilized to develop management strategies for the effective pest control under different cropping systems and management approaches. (AKY)

राष्ट्रीय जैविक खेती परियोजना के अंतर्गत राष्ट्रीय एवं क्षेत्रीय जैविक खेती केन्द्रों के पते और उनके कार्यक्षेत्र राज्य

List and Address of National and Regional Organic Farming Centres with states of their jurisdiction under National Project on Organic Farming

निदेषक राष्ट्रीय जैविक खेती केन्द्र 204 बी खण्ड, सी.जी.ओ. परिसर–2, कमला नेहरू नगर, गाजियाबाद–201 002 (उ.प्र.) 0120-2721896, 2721905, 2753844 वेबसाइट : : www.dacnet.nic.in/ncof ईमेल : nbdc@nic.in उत्तर प्रदेष, उत्तराखंड एवं दिल्ली	Director National Centre of Organic Farming, 204-B Wing, CGO Complex-II, Kamla Nehru Nagar, GHAZIABAD - 201 002 (UP). 0120-2721896, 2721905, 2753844 Web: www.dacnet.nic.in/ncof, Email: nbdc@nic.in UTTAR PRADESH, UTTARAKHAND AND DELHI
क्षेत्रीय निदेषक क्षेत्रीय जैविक खेती केन्द्र 34, दूसरा मेन रोड, हेब्ब्ल, बापटिस्ट अस्पताल के पास बंगलूरू–560 024 (कर्नाटक) 080-23330616 ईमेल : biofkk06@nic.in कर्नाटक, केरल, तमिलनाडु, पांडिचेरी तथा लक्षद्वीप	Regional Director Regional Centre of Organic Farming, 34-II, Main Road, Hebbal,Near Baptist Hospital, BANGALORE-560024 (Karnataka). 080-23330616, Email: biofkk06@nic.in Karnataka, Kerala, Tamilnadu, Pondicherry and Lakshdweep
क्षेत्रीय निदेषक क्षेत्रीय जैविक खेती केन्द्र ए 153, षहीद नगर, भुवनेष्वर–751 007 (उड़ीसा) 0674-2544381 ईमेल : biofor04@nic.in बिहार, उड़ीसा, झारखंड, पंष्चिम बंगाल एवं अंडमान निकोबार	Regional Director Regional Centre of Organic Farming, A-153, Sahidnagar, BHUBANESHWAR-751007 (Orissa). 0674-2544381, Email: biofor04@nic.in Bihar, Orissa, Jharkhand, West Bengal and Andman & Nicobar
सहायक निदेषक क्षेत्रीय जैविक खेती केन्द्र 798 पटेल नगर, सीआइडी कालोनी के सामने, हिसार–125 001 (हरियाणा) 01662-242709 ईमेल : biofhr05@nic.in हरियाणा, हिमाचल प्रदेष, पंजाव, जम्मू एण्ड कष्मीर	Assistant Director Regional Centre of Organic Farming, 798 Patel Nagar, Opposite CID Colony, HISSAR-125001 (Haryana). 01662-242709, Email: biofhr05@nic.in Haryana, Himachal Pradesh, Punjab, Jammu & Kashmir
क्षेत्रीय निदेषक क्षेत्रीय जैविक खेती केन्द्र राज्य कृषि फार्म, मंत्रीपुखरी, इंफाल–795 002 (मनिपुर) 0385-2422217 ईमेल : biofmm01@nic.in आसाम, अरुणाचल प्रदेष, मेघालय, मिजोरम, मणिपुर, नागालैंड, त्रिपुरा तथा सिक्किम	Regional Director Regional Centre of Organic Farming, State Agricultural Farm, Mantripukhari, IMPHAL-795 002 (Manipur). 0385-2422217, Email: biofmm01@nic.in Assam, Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Nagaland, Tripura and Sikkim
क्षेत्रीय निदेषक क्षेत्रीय जैविक खेती केन्द्र हीरा भवन, मकान संख्या 21, न्यू चुंगी नाका, आधारतल, जबलपुर–482 004 (मध्य प्रदेष) 0761-2460972 ईमेल : biofmp06@nic.in मध्य प्रदेष, गुजरात, राजस्थान, छत्तीसगढ़, दमन और दीव	Regional Director Regional Centre of Organic Farming, Hira Bhawan, House No.21, New Chungi Naka, Adhartal, JABALPUR-482 004. 0761-2460972, Email: biofmp06@nic.in Madhya Pradesh, Gujrat, Rajasthan, Chhattisgarh, Daman & Diu
क्षेत्रीय निदेषक क्षेत्रीय जैविक खेती केन्द्र नया सचिवालय भवन, पूर्वी खण्ड, सिविल लाइन्स नागपुर–440 001 (महाराष्ट्र) 0712-2561459 ईमेल : biofmh10@nic.in महाराष्ट्र, आन्ध्र प्रदेष, दादर और नगर हवेली	Regional Director Regional Centre of Organic Farming, New Secretariate Building, East Wing, Civil Lines, NAGPUR-440 001. 0712-2561459, Email: biofmh10@nic.in Maharashtra, Andhra Pradesh, Dadra and Nagar Haveli

प्रकाशन व मुद्रण – निदेशक, राष्ट्रीय जैविक खेती केन्द्र, 204 बी खण्ड, सीजीओ परिसर–2, कमला नेहरू नगर, गाजियाबाद–201 002

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Editor : Dr A.K. Yadav