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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, विशेषज्ञों 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.

संपादकीय

प्रिय पाठको
जैविक किसान आदि काल से ही स्थानीय आदानो का प्रयोग कर सफलता पूर्वक जैविक खेती कर रहे हैं। ऐसे अनेक आदान किसानों के बीच काफी प्रचलित हैं। यद्यपि इन आदानों की कोई वैज्ञानिक वैधता नही है परंतु किसानों के बीच उनकी बढती लोकप्रियता उनकी उपादेयता की द्योतक है। अभी हाल ही में कुछ वैज्ञानिको ने ऐसे स्थानीय आदानों की जॉच की। इस अंक में ऐसी ही एक तरल खाद की जॉच पर एक लेख प्रस्तुत है। जैविक पौध संरक्षण में जैव कीटनाशियों का विशिष्ट स्थान है ऐसे जैव कीटनाशियों पर भी इस अंक में एक लेख प्रस्तुत है।

पिछले कई वर्षों से राष्ट्रीय जैवकि खेती केन्द्र जैविक खेती क्षेत्र, जैविक फसल उत्पादन इत्यादि पर आंकडे एकत्रित कर रहा है। इस अंक में वर्ष २००९-१० के ऑकडे दिये जा रहे हैं। अन्य स्थायी स्तंभ जैसे राष्ट्रीय व अंर्तराष्ट्रीय सूचनायें अन्य जानकारी तथा पुस्तक समीक्षायें इत्यादि अपने पूर्ववत स्वरुप में हैं। आशा है जानकारी सभी के लिये उपयोगी होगी।

ए.के. यादव
संपादक

Dear Readers
Since ages, practicing organic farmers have developed their own ways and inputs which are being used by most of the organic farmers. Although, scientific validation of such indigenous formulations is not there but their adoption by large number of farmers is indicative of their usefulness. Recently scientists at various institutes have taken up the challenge and tried to establish the utility and efficacy of such inputs. Abstract results of one such study on on-farm liquid manures is being presented here. To look after the plant protection needs under organic management, bio-pesticides play an important role. An article on such useful technologies is also being presented here for the benefit of readers.

As an annual exercise of NCOF the annual statistics on area under organic management, crops being taken and total productivity of different crops in different states under organic management is also being presented along with the standard columns of National and international news, research developments, activities in states and book reviews. I hope the information provided here will not only be useful for practitioners, but also to teachers, planners and students.

A.K. Yadav
Editor

Status of Organic Agriculture in India

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After years of spectacular growth the area under organic agriculture has seen slightly negative growth during the year 2009-10. Compared to total registered area of 12.07 lakh ha in the previous year, the year 2009-10 registered total area under certification process at 10.8 lakh ha. Negative growth was mainly because of withdrawal of some big projects. But interestingly the growth in terms of number of projects, number of processors and total number of grower groups has continued to grow. As on March 2010 India has brought more than 4.48 million ha area under organic certification process. Out of this cultivated area accounts for 1.08 million ha while remaining 3.39 million ha is wild forest harvest collection area. Overall scenario of organic sector during 2009-10 in terms of total operators, processors, grower groups and exporters is given in Table 1. Year wise growth of cultivated area under organic management is shown in Table 2. State wise details of total area and number of farmers under full organic, in-conversion and total under organic management process (2009-10) are given in Table 3. Details of wild harvest collection area in different states are given in Table 4. Details in respect of important commodities produced during 2009-10 (state-wise) are given in Table 5.

Keeping in view of the continued efforts of NCOF to create comprehensive data base, the year 2009-10 statistics comes with state-wise and commodity-wise area under different crops and total production of different commodities under in-conversion and organic status.

Table 1. Detail of Number of Operators, Processors, Growers Group and Exporters certification agency-wise for the year 2009-10

Sr. No.	Name of Agency	Number of Operators	Number of Processors	Number of Grower Group	Number of Exporters
1	Aditi	9	4	4	1
2	AOCA	200	4	167	0
3	BVQI	11	4	7	3
4	CG Cert	8	2	1	0
5	CUC	200	130	86	76
6	Ecocert	170	113	77	59
7	Foodcert	1	0	0	0
8	IMO	194	20	42	35
9	Indocert	173	12	50	8
10	LACON	86	25	37	33
11	NOCA	220	28	104	7
12	One Cert	454	50	118	16
13	ROCA	40	0	27	0
14	SGS	172	8	93	8
15	USOCA	123	26	81	7
16	VOCA	38	1	25	0
	Total	**2099**	**427**	**919**	**253**

Table 2 State - wise and Year-wise Total Area under Organic Certification Process (2005-06 to 2009-10)

Sl. No.	State	Year				
		2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**
1	Andhra Pradesh	1661.42	10487.07	21472.98	32450.524	30967.23
2	Arunachal Pradesh	557.76	830.24	1038.8	311.06	1897.5
3	Assam	1817.504	4032.94	4747.32	4629.37	5108.92
4	Bihar	0	0.00	125	0	1096.3
5	Chhattisgarh	293.16	347.88	177.98	503.84	444.301
6	Delhi	1658.71	5965.28	0	33289.11	267.7
7	Goa	5555.07	6950.30	14612.96	10979.78	7390.77
8	Gujarat	1627.06	7760.82	165885.49	50927.5448	70538.86
9	Haryana	3437.52	3571.92	2090.95	12220.30	8972.75
10	Himachal Pradesh	3647.41	9576.73	10605.92	15435.57	576.1
11	J & K	22315.92	32541.79	33047.1	419.47	613.07
12	Jharkhand	5.00	2263.85	0	0	0
13	Karnataka	4117.17	11711.84	65207.65	22230.142	51468.458
14	Kerala	15474.47	14744.66	11934.71	10507.797	14869.34
15	Manipur	347.65	6019.55	10869.592	10818.07	3171.31
16	Maharashtra	18786.69	114612.36	125095.85	277780.61	150467.74
17	Madhya Pradesh	16581.37	163230.90	214087.96	463553.02	440525
18	Mizoram	300.40	333.40	16121.69	34906.13	27859.82
19	Meghalaya	378.89	0.00	273.4	1813.38	3043.11
20	Nagaland	718.76	7208.89	14490.4	24042.65	9645.69
21	Orissa	26387.86	74585.11	75678.5	81560.31	95740.91
22	Punjab	3779.31	1600.42	3320.2	4192.52	5263.61
23	Rajasthan	22104.91	24868.23	23780.59	29267.57	41127.92
24	Sikkim	177.64	1806.73	172.08	1476.61	7394.22
25	Tripura	20.87	0.00	0	0	281.06
26	Tamil Nadu	5423.63	5066.48	7667.254	8431.10	6742.88
27	Uttar Pradesh	3033.976	7301.47	20444.78	22246.16	53545.23
28	Uttaranchal	5915.85	8676.74	12493.85	30501.59	31065.61
29	West Bengal	6732.43	10534.11	9880.08	13737.06	15563.05
30	Others	824.13	1540.84	0	8823.84	0
	Total	**173682.54**	**538170.55**	**865323.086**	**1207055.128**	**1085648.459**

Table 3. Area Under Organic Certification process and Number of farmers registered (2009-10)

S. No.	States	Total Area in ha			Total No. of farmers		
		Organic	In-Conversion	Total	Organic	In Conversion	Total
1	Andhra Pradesh	10129.11	20838.12	30967.23	9046	22458	31504
2	Arunachal Pradesh	523.17	1374.33	1897.5	116	590	706
3	Assam	1598.18	3510.74	5108.92	479	2768	3247
4	Bihar	0	1096.3	1096.3	0	2111	2111
5	Chhattisgarh	332.06	112.241	444.301	3	116	119
6	Delhi	77.3	190.4	267.7	4	66	70
7	Goa	5947.1	1443.67	7390.77	620	203	823
8	Gujarat	53596.95	16941.91	70538.86	19353	10213	29566
9	Haryana	3585.16	5387.59	8972.75	1794	3473	5267
10	Himachal Pradesh	437.09	139.01	576.1	346	833	1179
11	J & K	430.63	182.44	613.07	132	68	200
12	Jharkhand	0	0	0	0	0	0
13	Karnataka	16099.06	35369.39	51468.45	6061	26163	32224
14	Kerala	7352.67	7516.67	14869.34	6215	8857	15072
15	Manipur	1247.16	1924.15	3171.31	2066	2901	4967
16	Maharashtra	105172.62	45295.12	150467.74	44551	21098	65649
17	Madhya Pradesh	378572.26	61952.74	440525.0	151953	25072	177025
18	Mizoram	18002.27	9857.55	27859.82	14177	13878	28055
19	Meghalaya	1366.01	1677.1	3043.11	823	2685	3508
20	Nagaland	3091.3	6554.39	9645.69	3459	15639	19098
21	Orissa	79086.99	16653.92	95740.91	49523	12605	62128
22	Punjab	379.84	4883.77	5263.61	85	2992	3077
23	Rajasthan	29969.93	11157.99	41127.92	10204	7603	17807
24	Sikkim	2872.73	4521.49	7394.22	3130	4697	7827
25	Tripura	203.56	77.5	281.06	1	295	296
26	Tamil Nadu	3199.44	3543.44	6742.88	206	3465	3671
27	Uttar Pradesh	8665.35	44879.88	53545.23	5518	26458	31976
28	Uttarakhand	16158.86	14906.75	31065.61	20695	26484	47179
29	West Bengal	9881.91	5681.14	15563.05	737	2785	3522
30	Other	0	0	0	0	0	0
	Total	**757978.71**	**327669.74**	**1085648.45**	**351297**	**246576**	**597873**

Table 4. **State-wise Wild Harvest Collection area under organic certification process (2009-10)**

S.No	State	Area in Ha	No. of Farmers	Certification agency
1	Gujarat	20	25	Aditi
2	Himachal Pradesh	70	40	Aditi
3	Karnataka	18	20	Aditi
4	Chattisgarh	13251	2197	CG Cert
5	Uttar Pradesh	2432500	1	SGS
6	Andhra Pradesh	1000	31	IMO
7	Maharashtra	631.99	1	CUC
8	Rajasthan	147419.88	1	CUC
9	Tamilnadu	404.69	1	CUC
10	Karnataka	70212.46	4	CUC
11	Orissa	80.94	1	CUC
12	Chattisgarh	3000	1	CUC
13	Maharashtra	40	6	NOCA
14	Himachal Pradesh	5200	12	NOCA
15	Tamilnadu	345	30	Ecocert
16	Uttar Pradesh	450	28	Ecocert
17	J & K	32165.1	119	Ecocert
18	Tamilnadu	137.45	8	Indocert
19	Himachal Pradesh	627790.12	53	Indocert
20	Tamilnadu	44000	1	LACON
21	Uttar Pradesh	17861	120	LACON
	Total	**3396597.63**	**2700**	

Cotton continues to be the largest single crop covering almost 45% of total area under organic management followed by oil seeds, fruits and vegetables, other cereals and millets and rice. In terms of total production, with 8.37 lakh tonnes of (seed cotton), cotton continues to be on top followed by fruits and vegetables, herbal and medicinal plants, oil seeds, other cereals and millets, rice and wheat. Among states Madhya Pradesh with only one crop under organic management (cotton) continues to be on top followed by Maharashtra, Orissa, Rajasthan, Gujarat and Karnataka. In wild harvest collection area Uttar Pradesh occupies first place followed by Himachal Pradesh and Rajasthan.

Table 5. State-wise and Commodities area and production of different crops during the year 2009-10

State	Cotton	Rice	Wheat	Other Cereals	Pulses	Oil Seeds	Tea/Coffee	Spices	Fruil/ Vegetables	Herbal/ Medicinal	Others
Arunchal Pradesh											
Quantity	0	0	0	808.3	1.2	165.3	2560	6283.71	21.90	4399.4	0
Area (ha)	0	0	0	326.8	2	146.2	498.97	1249.22	4.98	60.5	0
Andhra Pradesh											
Quantity	20971.31	0	0	6418.85	1981.52	4817.94	651.66	771.04	43132.10	9545.23	0
Area (ha)	8845.48	0	0	2668.68	2560.22	2438.01	3224.43	220.19	7617.25	1761.14	261.43
Assam											
Quantity	0	0	0	1904.11	2	291.24	2493.41	8880.85	7938.78	7758.99	0
Area (ha)	0	0	0	429.78	0.5	187.09	2493.24	567.39	840.51	732.80	0
Bihar											
Quantity	0	0	0	0	0	0	0	0	28777.8	0	0
Area (ha)	0	0	0	0	0	0	0	0	1096.3	0	0
Chattisgarh											
Quantity	0	24.59	26.2	120.38	0	210.05	0	79.04	535.51	1657.78	0
Area (ha)	0	0	8.091	59.81	0	0	0	0	76.87	31.54	0
Delhi											
Quantity	0.15	0	187.5	194.21	102.43	44.45	0	3.32	2128.05	19.82	8.01
Area (ha)	0.1	0	73.28	129.32	95.5	40.95	0	1.3	71.19	5.8	0.75
Goa											
Quantity	0	0	0	0	0	5.01	0.01	0.193	2676.87	0.17	0
Area (ha)	0	0	0	0	0	0	0	0	9874.75	0	0
Gujarat											
Quantity	47978.71	16.37	24.29	7140.96	1318.79	11721.17	0	1062.2	19226.38	4436.39	3.6
Area (ha)	30906.62	2.18	10.15	5773.872	1183.109	9267.731	0	659.284	4673.93	3234.28	10434.77

States and Parameter	Cotton	Rice	Wheat	Other Cereals	Pulses	Oil Seeds	Tea/Coffee	Spices	Fruil/ Vegetables	Herbal/ Medicinal	Others
Haryana											
Quantity	3.4	6046.62	4249.115	17830.989	293.285	51.045	0	286.51	14398.653	2738.77	1.99
Area (ha)	3.23	1793.55	1605.153	5080.237	146.34	25.821	0	33.942	3661.489	72.34	54.16
Himachal Pradesh											
Quantity	0	0	58.443	189.39	67.507	61.17	176	36.262	4464.054	72.16	289.49
Area (ha)	0	0	12.833	45.409	8.557	1.168	44	3.653	458.655	1.24	31.63
Jammu and Kashmir											
Quantity	0	0	0	0	0	0	0	0.664	4769.3	0	0
Area (ha)	0	0	0	0	0	0	0	105.22	499.85	8	0
Jharkhand											
Quantity	0	0	0	0	0	0	0	0	0	0	18479
Area (ha)	0	0	0	0	0	0	0	0	0	0	0
Karnataka											
Quantity	767.60	0	3487.6	23866.49	1969.444	27198.647	2781.681	17809.42	94312.523	7605.41	143.019
Area (ha)	1390.07	0	282.315	11855.561	889.427	7718.638	22773.867	10333.54	54229.886	13898.03	1361.23
Kerala											
Quantity	0	1.8	0	225.6	11.709	11076.681	6406.343	3784.293	10552.947	2356.73	1238.36
Area (ha)	0	0	0	40.282	0.24	1705.114	4015.209	2288.898	5937.023	667.85	190.83
Manipur											
Quantity	0	0	0	0	0	339.96	0	34376.18	16934.106	12714.52	0
Area (ha)	0	0	0	0	0	163.96	0	1826.498	987.795	677.86	66.372
Maharashtra											
Quantity	155766.69	171.67	2794.9	15344.51	13755.98	55606.961	565.4	8515.81	143092.36	6212.40	1205.4
Area (ha)	81359.12	35.17	1294.32	5860.369	9202.4	35057.758	1.41	1897.00	10560.682	1021.66	6275.17
Madhya Pradesh											
Quantity	513830.18	0.74	26294.99	33306.425	15838.55	168008.08	0	11785.92	71324.665	23047.03	52
Area (ha)	259509.25	0.6	6397.449	17142.794	15709.35	102967.08	0	6780.877	1903.145	6409.05	3490.44

States and Parameter	Cotton	Rice	Wheat	Other Cereals	Pulses	Oil Seeds	Tea/Coffee	Spices	Fruil/ Vegetables	Herbal/ Medicinal	Others
Mizoram											
Quantity	0	510.02	0	2707.783	256.4	962.953	727.215	46122.55	52959.249	39866.74	512.506
Area (ha)	0	506.5	0	902.12	128.5	91.07	981	7816.69	6925.1	5066.7	310.09
Meghalaya											
Quantity	0	0	0	0	0	0	86.35	5526.905	842.223	10625.95	0
Area (ha)	0	0	0	0	0	0	110	559.043	1287.16	1048.75	35.67
Nagaland											
Quantity	0	4.42	0	6034.969	0.53	246.437	108.74	4553.043	29503.543	1524.1	1.95
Area (ha)	0	11	0	2941.63	0	215.25	101.87	1364.9	3847.96	167.7	0.15
Orissa											
Quantity	79306.80	34	9.2	9249.095	2720.806	3358.732	1.8	1111.304	3291.04	4347.55	0
Area (ha)	56349.55	30.07	95.54	6030.358	1271.352	1696.777	0	489.084	555.395	940.43	9761.096
Punjab											
Quantity	0	56.6	6145.493	10882.3	10.75	457.05	0	43.2	17649.85	76.3	33.67
Area (ha)	0	18.99	2155.729	2289.656	9.894	215.901	0	15.405	5667.988	9.911	45.868
Rajasthan											
Quantity	18658.68	4.5	5723.704	7614.45	2324.543	19065.805	0	4944.961	9290.251	12707.58	109.2
Area (ha)	9151.21	1.518	1861.75	4005.978	2010.885	11723.008	0	3302.076	2316.395	4318.04	2852.987
Sikkim											
Quantity	0	0	30.65	1293.443	5	6.906	87.5	1282.326	946.462	313.649	701.18
Area (ha)	0	0	38.94	1751.448	10.08	9.4052	177.64	778.009	376.835	145.052	2162.496
Tripura											
Quantity	0	0	0	0	0	0	400	0	0	15100	0
Area (ha)	0	0	0	0	0	0	203.56	0	0	77.5	0
Tamil Nadu											
Quantity	9.67	12.77	0	1743.85	22.314	1573.803	2504.733	571.159	11173.263	4593.002	51
Area (ha)	6.21	4.8	0	912.361	1.152	1343.34	1618.805	100.223	1680.833	1320.064	107.72

States and Parameter	Cotton	Rice	Wheat	Other Cereals	Pulses	Oil Seeds	Tea/Coffee	Spices	Fruil/ Vegetables	Herbal/ Medicinal	Others
Uttar Pradesh											
Quantity	0.2	5303.147	62896.81	89466.942	10981.74	6301.48	0	5747.919	280364.15	12622.037	344.572
Area (ha)	0.405	6624.2	15943.44	21208.576	2187.997	2545.773	0	683.2	16964.342	2198.061	737.33
Uttarakhand											
Quantity	0	5575.2	1641.72	34545.44	1561.88	3496.33	115.92	3853.244	18454.227	4262.222	1484.98
Area (ha)	0	2263.694	1665.268	16948.542	1639.2	2342.25	730.362	3101.32	1083.272	2428.677	2056.319
West Bengal											
Quantity	0	0	0	154.255	0.71	0.52	20947.842	1075.846	1084.021	589.264	1.443
Area (ha)	0	0	0	224.31	1.96	1.8	11866.87	593.23	39.645	157.036	1618.659
All India Grand Total											
Quantity	837293.435	17762.45	113570.6	271042.755	53227.09	315067.73	40614.611	168507.9	889844.33	189193.24	24661.38
Area (ha)	447521.278	11292.27	31444.25	106627.90	37058.66	179904.10	48841.23	44770.21	143239.24	46460.041	41855.18

Organic Liquid Manures: Source for Beneficial Microorganisms and Plant Nutrients

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Traditional agricultural practices based on natural and organic methods of farming offer several effective, feasible and cost effective solutions to most of the basic problems being faced in conventional farming systems. Various organic liquid manures like panchagavya, beejamrutha, jeevamrutha and biodigester are being used by many progressive farmers in organic agriculture practices. Organic liquid manures play a key role in promoting growth and providing immunity to plant system. The spray of Panchagavya on chillies produces dark green coloured leaves within 10 days and its role as plant growth promoter has already been reported by Subhashini *et al* (2001) and Sreenivasa *et al* (2009). The seed dipping in beejamrutha is known to protect the crop from harmful soil-borne and seed-borne pathogens in addition to improvement in seed germination (Sreenivasa *et al* 2010). The bio-digester liquid can be used both as botanical pesticide and liquid manure. It can be regularly added to the soil along with water at the rate 200 liter per hectare.

A survey conducted by the scientists of Institute of Organic Farming, University of Agricultural Sciences, Dharwad in 13 districts of North Karnataka has revealed that quite a good number of farmers (several hundreds) are using organic liquid manures in the organic crop production. Though many farmers are getting better yield by using organic liquid manures, scientific validation has not been carried out so far. Hence an attempt has been made to analyze these organic liquid manures at the Institute of Organic Farming, University of Agricultural Sciences, Dharwad to ascertain the nutrient status and microbial load.

Panchagavya was prepared using the ingredients viz cow dung (5kg), cow urine (3L), cow milk (2L), curd made from cow milk (2L), ghee made from cow milk (1L), sugarcane juice (3L), tender coconut water (3L) and ripened banana (12 Nos). All these ingredients were added to a wide mouthed mud pot and kept open under shade. The contents were stirred twice a day for about 20 minutes both in the morning and evening to facilitate aerobic microbial activity. After fifteen days of incubation, the fermented product “Panchagavya” was used for further studies.

Beejamrutha was prepared using the ingredients cow dung, cow urine, water and lime. Cow dung (5kg) tied in a cloth was dipped in a bucket containing 50 liters of water overnight. Next day morning, the tied dung was squeezed and extract was collected in water. Five litres of cow urine, a handful of soil and 50g of lime was added to this extract.

Jeevamrutha was prepared by mixing 10 kg cow dung, 10L cow urine, 2 kg jaggary, 2 kg pulse flour with 200 L water and kept for one week for incubation.

Biodigester was prepared by crushing green leaves of neem, calotropis, vitex, lantana, adothoda, ipomea, custard apple and agave (5 kg each) in the bio-digester tank containing urine (10 litres), dung (10 kg), little quantity of soil and 200 litres of water. The digested liquid manure was ready in 3 weeks

The serial dilution and standard plate count method was used for isolation of total bacteria, fungi, actinomycetes and other

beneficial groups viz free living N_2 fixers and P-solubilizers using nutrient agar, Martin's rose bengal agar, Kuster's agar, Norris N free media and Pikovskaya's media respectively. The plates were incubated at 28 ± 2^0C for one week and the colony counts were recorded.

The major nutrients such as nitrogen, phosphorus and potassium present in panchagavya were estimated by following microkjeldhal method, vanadomolybdate method and flame photometry respectively. The micronutrients present in panchagavya were estimated using Atomic Absorption Spectrophotometer (AAS).

The microbial load and nutrient status present in panchagavya, beejamrutha, jeevamrutha and biodigester are given in Table Nos. 1 & 2 respectively. The data indicates the presence of microflora especially nitrogen fixers and P-solubilizers (Table 1.) in all the organic liquid manures in addition to both major and micro nutrients (Table 2). Presence of naturally occurring beneficial microorganisms predominantly bacteria, yeast, actinomycetes, photosynthetic bacteria and certain fungi were detected in organic liquid manures (Swaminathan, 2005). Papen *et. al.*(2002) reported that panchagavya contains *Azotobacter*, *Azospirillum* and phosphobacteria.

The results of the present study revealed the nutrient status and microbial load present in the organic liquid manures which may differ with the type and quantity of material used, period of fermentation, environmental conditions etc. However the nutrients and microflora present in organic liquid manures support the improvement in soil fertility and in turn results in better yield when they are used in field.

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Table 1 : Microbial load in different organic liquid manures

Organisms	Colony count (cfu/ml)			
	panchagavya	**beejamrutha**	**jeevamrutha**	**biodigester**
Bacteria	26.1×10^5	15.4×10^5	20.4×10^5	12.9×10^5
Fungi	18.0×10^3	10.5×10^3	13.8×10^3	9.2×10^3
Actinomycetes	4.20×10^3	6.8×10^3	3.6×10^3	3.0×10^3
Phosphate solubising organisms	5.70×10^2	2.7×10^2	4.5×10^2	1.0×10^2
Free living N_2-fixers	2.70×10^2	3.1×10^2	5.0×10^2	2.1×10^2

Table 2: Nutrient status of different organic liquid manures

Parameter	panchagavya	beejamrutha	jeevamrutha	biodigester
pH	6.82	8.2	7.07	7.29
Soluble salt (EC)	1.88 dsm^{-1}	5.5 dSm^{-1}	3.40 dSm^{-1}	1.09 dSm^{-1}
Total Nitrogen	0.10 percent	40 ppm	770 ppm	255 ppm
Total Phosphorus	175.4 ppm	155.3 ppm	166 ppm	79 ppm
Total Potassium	194.1 ppm	252.0 ppm	126 ppm	42 ppm
Total Zinc	1.27 ppm	2.96 ppm	4.29 ppm	0.52 ppm
Total Copper	0.38 ppm	0.52 ppm	1.58 ppm	1.24 ppm
Total Iron	29.71 ppm	15.35 ppm	282 ppm	9.60 ppm
Total Manganese	1.84 ppm	3.32 ppm	10.7 ppm	8.30 ppm

Organic Agriculture and Climate Change

In a recent review on organic agriculture and climate change it has been emphasized that the mitigation and adaptation potential of organic agricultural systems revolves along three main features: farming system design, cropland management and grassland and livestock management. An important potential contribution of organically managed systems to climate change mitigation is identified in the careful management of nutrients and, hence, the reduction of N_2O emissions from soils. Another high mitigation potential of organic agriculture lies in carbon sequestration in soils. In a first estimate, the emission reduction potential by abstention from mineral fertilizers is calculated to be about 20% and the compensation potential by carbon sequestration to be about 40–72% of the world's current annual agricultural greenhouse gas (GHG) emissions, but further research is needed to consolidate these numbers. On the adaptation side, organic agriculture systems have a strong potential for building resilient food systems in the face of uncertainties, through farm diversification and building soil fertility with organic matter. Additionally, organic agriculture offers alternatives to energy-intensive production inputs such as synthetic fertilizers which are likely to be further limited for poor rural populations by rising energy prices. In developing countries, organic agricultural systems achieve equal or even higher yields, as compared to the current conventional practices, which translate into a potentially important option for food security and sustainable livelihoods for the rural poor in times of climate change. Certified organic products cater for higher income options for farmers and, therefore, can serve as promoters for climate-friendly farming practices worldwide.
(Source – Nadia et al 2010, Renewable Agriculture and Food Systems: 25(2); 158–169)

Microbial Pesticides – An Alternative Tool to Combat Insect Pests in Organic Farming

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India loses about 30% of its crops due to pests and diseases each year. The damage by pests and diseases is estimated to be about Rs.60,000 crores annually. To contain the losses chemical pesticides were introduced but the intensive and indiscriminate use of these chemicals over the years has further complicated the scenario with emerging problems of resistance to insecticides, resurgence of other minor pests, increasing toxic residue in / on the crop plants and agro-ecosystem pollution. Excessive use of pesticides has also adversely affected the non target organisms such as pollinators, parasitoids, predators and wild animals. To overcome these problems, biological control (***Jivasya Jiv Bhojanam***) is one of the safe approaches for pest management. Insect pathogens are being effectively utilized for pest control in different crops, since the Second World War.

In nature every ecosystem exists in a balance. Growth and multiplication of each organism depends on the environment suitability, food chain, its predators and parasites, etc. Insect pest predators and pathogens are important bio-control agents and selectively target their specified host without affecting the other organisms and plants and perish once their feed (i.e. the pest) is exhausted. Use of such bio-control agents is not only safe and economical but also they do not leave any residue. Bio pesticides are living organisms, which interfere with the life cycle of insect pests in such a way that the crop damage is minimized. The agents employed as microbial pesticides includes disease-causing fungi, bacteria and viruses, further, they complement and supplement other methods of pest control. They are capable of bringing down the targeted pest population below economic threshold level (ETL). However, the crux lies in their mass production and application at the appropriate time. Last decade has witnessed a tremendous break through on this aspect, especially on standardization of production techniques storage, transport and application of *Trichoderma, Gliocladium, Paecilomyces, Pseudomonas, NPV and Bacillus* spp.

1. Bacterial pathogens

Over 90 species of naturally occurring, insect-specific (entomopathogenic) bacteria have been isolated from insects, plants, and the soil, but only a few have been studied intensively. Among widely used bacterial biopesticides while *Bacillus thuringensis* is an endotoxin producer, *Bacillus popilliae* and *Bacillus lentimorbus* are obligate pathogens and *Serretia marscences, Bacillus subtilis* and *Pseudomonas* are opportunistic pathogen and antagonistic

a. *Bacillus thuringiensis* - a key biopesticide

Amongst all insect pathogenic microbes, *B. thuringiensis* (*Bt*) has received prime attention and the products based on this bacterium are being widely used as biological insecticides. *Bt* is a gram positive, aerobic, sporulating bacterium that synthesizes crystalline protein [delta (δ) endotoxin] during later stage of growth as secondary metabolites which is highly toxic to agriculturally important pests especially caterpillars belonging to lepidopteron group at very low concentration. The delta endotoxin protein crystal accounts for up to 30% of total protein content of the bacterium. The crystal contains insecticidal proteins

that may vary in type, quantity as well as toxicity against different groups of insects depending on the bacterial strain and place of isolation. Bt δ endotoxin (cry proteins) has acquired acceptability as eco-friendly biopesticides because of its specificity towards insects having alkaline gut. The formulations have been found to be by and large safer to higher animals. *Bt* is being extensively used for control of insects in agriculture, horticulture, forestry and also for mosquito control over past three decades.

b. Bacillus popilliae and B. lentimorbus

Among the naturally occurring bacteria that have been mass-produced for the control of Japanese beetle larvae in turf since the 1940s are *Bacillus popilliae* and *B. lentimorbus*. The bacterial preparation, usually applied to the soil infects the beetle larvae and cause "milky disease". Milky disease spores may reproduce within the beetle larvae and establish a resident population capable of causing mortality over several seasons if the soil is sufficiently warm and moist through the summer months. It may take several seasons for the disease to control the pest, and it is preferable to treat a broad area to reduce the impact of immigrating healthy beetles.

2. Fungal Pathogens (Mycopesticides)

More then 500 fungi are reported world over belonging to various classes such as Ascomycota, Basidiomycota and Deuteromycota and known to parasitize 200 insect pests belonging to orthoptera, hemiptera, lepidoptera, diptera and coleoptera. Among them the entomopathogenic muscardine fungi - *Beauveria bassiana* and *Metarrhizium anisopliae* are being widely used world over. Among disease antagonists *Trichoderma* spp. and *Paecilomyces* are most important with wide acceptance. Some fungi, such as *Entomophthora* and related species, are fairly specific with regard to the groups of insects.

a. White muscardine fungus (*Beauveria bassiana*)

The white muscardine fungus, *Beauveria bassiana* has a worldwide distribution and has a wider host range infecting insects from most of the insect orders. Fungus is effective in controlling both caterpillars and sucking pests. It has provided effective control of major insect pests of fibre, cereals, vegetables and ornamental crops.

b. Green muscardine fungus: (*Metarhizium anisopliae*)

Metarhizium anisopliae fungi causes disease by adhesion & formation of germ tube, produces toxins & enzymes. The *Metarhizium anisopliae* is an effective pathogen of several pests like borers, loopers, semiloopers and some sucking pests.

Mode of action (Mycosis) - The infection propagule in muscardine fungi are the conidiophore, which primarily invades in insect through the host cuticle, body wall, spiracles or through mouthparts. The penetration is both mechanical and enzymatic through the action of protinase, lipase and chitinase on the body wall. Growth of the fungus in the haemocoel is by budding, which produces hyphal bodies. These are transported throughout the haemocoel and give rise to localized concentration of mycelia followed by host death, due to depletion of nutrients and impact of fungal toxins. A heavy growth of inter-winding mycelia develops in the body cavity after 1-2 days of infection and dead insect becomes completely mummified in few days time. Finally hyphae emerges from the dead cadaver and sporulate on the host surface which gives white (mycelia growth) or green coloration (spores) with cushiony growth all over dead insect.

C. *Trichoderma* - a fungal bioagent to fight soil borne plant diseases

Losses due to plant diseases are 10-20% of the total world food production every year, resulting in economic losses amounting to billions of dollars. Chemical control is often non-specific in its effects,

killing beneficial organisms and it may have undesirable health and environmental pollution risks. Biological control of pathogens using genus *Trichoderma* is very promising method against soil-born plant parasitic fungi. *Trichoderma* spp. found to be present in substantial numbers in nearly all agricultural soils and other natural habitats consisting of organic matter. Mode of action involves their tropical growth toward hyphae of target host, coil about them in a lectin-mediated reaction, and degrade cell walls of the target fungi. This process (mycoparasitism) limits growth and activity of plant pathogenic fungi. In addition to, or sometimes in conjunction with mycoparasitism, individual strains may produce antibiotics. The antifungal abilities of these beneficial microbes are known since few decades and have been found to be effective antagonists against wide range of plant pathogenic fungi including *Pythium* spp., *Rhizoctonia solani*, *Fusarium* spp., *Botrytis cinerea, Sclerotium rolfsii,* and *Sclerotinia homoeocarpa.* Moreover, Besides antagonism *Trichoderma* is also known to produce IAA and secrete wide range of organic acids which promotes growth and help in solubilization of fixed phosphorous in soil, thus ensuring phyto-tonic effect in dual role.

d. *Paecilomyces lilacinus* - a bioagent of root-knot nematodes & promote plant growth

Phyto-nematodes belonging to genus *Meloidogyne* causing root-knot disease on the roots of wide varieties of agricultural crops are widely distributed global pests, causing discernible yield losses both quantitatively as well as qualitatively in tobacco (51%), banana, (15%), wheat (13%), groundnut (36%), green gram (12%), cowpea (12%), pigeonpea (13%), okra (55%), chickpea (39%) and bottle gourd (76%). Biological control of root-knot nematodes includes use of bacterial, fungal and other parasites and predators for their effective and economic suppression. Biological control of root-knot disease (*Meloidogyne* spp.) by *Paecilomyces lilacinus* in groundnut (peanut) and cotton has been successfully achieved. Nematode egg parasitized by biocontrol fungus, *P. lilacinus* has provided fairly effective check of root-knot disease under field conditions. Three years pooled results indicated reduction of root-knot disease by 34.7% in groundnut and 28.7% in cotton enhancing 19.1% and 10.7% crop yield, respectively over control when fungus was applied @ 25 kg/ha (spore dust/granules having 10^9 conidia/g based on rice grain substrate carrier). On application with soil organic amendments, fungus gave better control of root-knot disease in cotton, chickpea, banana and tomato nursery over the last 8 years. Besides bio-control activity, the fungus is also known to solubilize fixed phosphorous in soil and ensures phyto-tonic effect in dual role.

3. Entomopathogenic nematodes - A novel tool for management of insects, phyto-nematodes and diseases of agricultural crops.

Entomopathogenic nematodes (EPNs) especially the members of genus *Steinernema* (27 species) and *Heterorhabditis* (8 valid species) are innovative bioagents for plant protection scientists in India. These EPNs have Symbiotic association with bacteria (belonging to genus *Steinernema–Xenorhabdus* and Genus *Heterorhabditis–Photorhabdus)*. The nematode and associated bacteria cause mortality of host insect within 24-48 hours of nematode entry in to the host. The nematode-bacteria combine have wide host range throughout the class Insecta. They have been found to be safe to non-target organisms and compatible with pesticides. Symbiont also produces antifungal and antibacterial metabolites like Xenorhabdin, Xenocoumacins, Xenoxodes, Nematophines (3‘ indole ethyl 3’ methyl -2’ Oxo) and soluble proteinaceous compounds Which make EPN a broad spectrum bioagent for integrated pest and disease management. Management of insects through EPNs during last two decades has increased to a surprising level in developed countries and now EPN based several biopesticides are widely marketed in Europe and America and

are considered as second most adopted biopesticide after *Bacillus thuringiensis*. An effort on use of EPN in India was started since late 60's but till date it is under extensive research phase.

4. Insect viruses

Insect-specific viruses can be highly effective natural controls of several caterpillar pests. Different strains of naturally occurring nuclear polyhedrosis virus (NPV) and granulosis virus are present at low levels in many insect populations. Epizootics can occasionally devastate populations of some pests, especially when insect numbers are high. Insect viruses need to be eaten by an insect to cause infection but may also spread from insect to insect during mating or egg laying. In some cases, for example while searching for suitable hosts for egg laying, beneficial insects such as parasitoids may also physically spread a virus through the pest population. No threat to humans or wildlife is posed by insect viruses. Virus diseases of caterpillar pests may cause indirect mortality of some beneficial larval parasitoids if the host insects die before the parasitoids have completed development. Predators and adult parasitoids are not directly affected. Viruses can over winter in the environment or in over wintering insects to re-establish infection in subsequent seasons.

Nucler Polehedrosis Virus (NPV)

In the late 1960's the nuclear polyhedrosis virus (NPV) was studied through series of tests in India and thorough out the world as new biopesticide belonging to insect pathogenic baculoviruses. The registered pioneer viral insecticide was containing the NPV produced for lepidopteran caterpillars. The NPVs proved harmless to non-insect invertebrate cell lines vertebrate cell lines, vertebrates, plants and non-arthropod invertebrates. In the field, baculoviruses can persist in the soil for at least 3 years. Birds are major pathway by which baculoviruses are spread; 40% of individuals and 9 bird species found to excrete active virus on feeding with infected insects. Between 1 and 10% of baculoviruses remained on plants and the soil contained the remaining 90 to 99%. No baculoviruses were found in percolation water. Air flow, rain splash, parasites and aphids all dispersed viruses. Despite baculoviruses having many alternative lepidopteran hosts, field infections were not found in alternative hosts, suggesting no risk of environment pollution and other hazards.

Commercial Production of Microbial pesticides:

The process of growing microorganisms such as bacteria, fungus, and yeast constitute biotechnological fermentation process similar to production of alcohol, antibiotics, biochemical, biofertilizers and protein products. Though there are about 140 biopesticide production units in the country, but they are able to meet the demand of only less than 1% of cropped area. Majority of the microbial pesticide formulations are based on solid or liquid substrate based multiplication process following static or shake flask techniques. Very few units use fermentor based production system. There exists a wide gap between potential, demand and supply, which can only be bridged by setting up of more and more units for production. In commercial terms among mycopesticides, *Trichoderma viride* is the most popular one followed by *Metarhyzium*, *Bauveria* and *Verticillium.*

Epilogue

Due to growing chemical pesticide residue and environmental problems, there is an urgent need to promote environmental friendly bio- pesticides in the country, but for their effective promotion following issues need redressal.

- Industrial fermentation technique for bioagents needs to be improved and refined to launch effective microbial pesticides in the market.
- Large-scale field demonstrations at farmer's fields are required to increase awareness and adoption in pest management strategy.
- Use of effective microbial pesticides should be accelerated in integrated management and economics needs to be worked out to promote them in organic farming.
- Interest to be focused on developing new methods of biocontrol.

India Organic News

Analysis of knowledge level of organic farming practices of pigeon pea growers – University of Agricultural Sciences, Dharwad, Karnataka conducted a study to analyze the organic cultivation practices in pigeonpea with the specific objectives, to analyse the knowledge on organic practices by farmers in organic pigeonpea cultivation, and to analyse the forward linkage activities followed by organic pigeonpea growers of Gulbarga district consisting of ten Ttalukas. The study revealed that 63.33 per cent of the respondents had medium knowledge on organic farming practices. The reason might be that, the practices which are simple were generally known and regularly being practiced in the area, are known to most of the farmers. Further analysis indicates that majority of respondents had knowledge about the practices like, recommended varieties (Maruti, 93.33%, BSMR 82.50%, Asha 56.67% and BRG 46.67%), recommended seed rate (81.66%), recommended sowing time i.e. within 15th July (98.33%), recommended spacing (71.67%) and seed treatment with rhizobium (90.83%), Trichoderma (78.33%) and PSB (77.50%). Since these practices are important aspects of cultivation of any crop. It is necessary for farmers to know about these basic practices perfectly which might have motivated the farmers to have better knowledge. In regard to pest management practices, in cultural practices majority of the respondents 100, 96.67, 95.63 and 57.50 per cent, had knowledge about summer ploughing, sowing with in 15th July, crop rotation and mixed cropping, respectively. About mechanical practices majority of farmers had knowledge about pheromone traps (98.83%) and bird perches (81.67%), while only 26.67 per cent of farmers had knowledge about light traps. In concern to biological practices, majority of respondents had knowledge about panchagavya (90.83%), biodigester (80.83%) and Trichoderma (68.33%), while cent per cent of respondents had knowledge about NPV and NSKE. The possible reason for the respondents to be better aware about nutrient and pest management practices are due to the fact that pigeonpea crop suffers from many pests and diseases. So control of these pests and diseases becomes important for successive cultivation and as it is organic farming no chemical fertilizer is applied, nutrient requirement of crop is full filled with organic materials. So, these things might have motivated the farmers to know more about pest and nutrient management practices. (Source Sidram et al 2009, Karnataka J. Agric. Sci., 22 (5): 1145-1146)

Organic cotton farmers facing crisis - Karnataka may soon fall off the organic cotton map owing to shortage of non-Bt cotton seeds and contamination of traditional seeds. As a result, a major organic cotton belt such as H.D. Kote in Mysore district may very well be transformed into a Bt cotton area much to the chagrin of organic farmers, who are peeved over the non-availability of non-Bt seeds. The other places in the State where cultivation of organic cotton was taking root was Raichur, Nanjangud, Haveri and Hubli. However, now farmers may be forced to shift to Bt cotton. Vivek Cariappa, member of the State High Power Committee on Organic Farming, informed that 51 per cent of the world's organic cotton is produced in India and Karnataka was in the forefront of promoting organic cotton which fetched a higher profit. “Organic cotton fetched a higher premium than Bt cotton in the market and farmers earned Rs. 900 more per quintal. The non-availability of conventional seeds is also due to the contamination of the parent line with the genetically modified variety because of cross-pollination, which is difficult to check or monitor. The H.D. Kote-based Savayava Krishikara Sangha sent cotton seeds available in the market for testing and the results confirmed that the seeds were contaminated. Officials in the Department of Agriculture confirmed the near absence of the traditional variety of cotton seeds in the market. They said that they had discussed the issue with National Seeds Corporation Ltd., which can grow the traditional variety of cotton seeds if the farmers gave the indent,

but the process would take at least two years. (Source: The Hindu.com)

Status of organic farming in India - A survey was made on certified organic farms in the country to ascertain the real benefits and feasibility of organic farming in terms of the production potential, economics and soil health in comparison to the conventional farms. The study revealed that organic farming, in spite of the reduction in crop productivity by 9.2%, provided higher net profit to farmers by 22.0% compared to conventional farming. This was mainly due to the availability of premium price (20–40%) for the certified organic produce and reduction in the cost of cultivation by 11.7%. In cases, where such premium prices were not available and the cost of cultivation was higher primarily due to purchased off-farm inputs, organic farming was not found economically feasible. However, there was an overall improvement in soil quality in terms of various parameters, viz. physical, chemical, biological properties, availability of macro- and micronutrients, indicating an enhanced soil health and sustainability of crop production in organic farming systems. (Source – Ramesh et al, Current Science,Vol. 98(9) 10 May 2010)

Production and post harvest management practices followed in organic vegetable cultivation - The research study was conducted in Belgaum district of Karnataka state during 2007-08, with the sample size of 140 respondents. The ex-post-facto research design was used for the study. The findings revealed that all the respondents adopted transplanting method in chilli and tomato crops, FYM application, deep summer ploughing, crop rotation, collection and destruction of affected plants and shoots and marketed through commission agents. Majority of the respondents were found to practice timely weeding (98.57%), raising of seedlings (96.43%), planting recommended aged seedlings (90.00%), use of vermicompost (83.57%) and cleaning of fruits (84.29%). Whereas comparatively less per cent of respondents were found to practice use of Biopesticides (19.29%), mulching (15.00%), incorporation of crop residues (14.29%),composting (7.86%) and value addition (2.86%). (Source- Mallikarjun et al *2010 Karnataka J. Agric. Sci.,23 (2) : (269-273))*

Converting to Organic - Cautiously, but convincingly, farmers of Katewadi in Baramati district have embraced organic farming. The transition began around 2004 when Katewadi's 848 farmers, who grow sugarcane, grapes, pomegranate, wheat and banana, were made aware of the economic and health benefits of putting away the toxic spray. "When farmers who adopted organic farming methodology started getting better yield, many others like me also gave a shot to organic manures, which, besides increasing the yield, also improved the health of the soil," said Shithal Kumar Kate, a farmer who grows table variety and wine variety of grapes on his 12 acres of land. Kate himself prepares the manure he uses in his farm with cow dung, cow urine, jaggery, flour and water, and calls it Jeevamrutha. "We did not make the switch (to organic farming) in a day. The farmers here slowly cut down on the use of chemical fertilisers. If the ratio of chemical and organic was 80 : 20seven years ago, it is vice-versa now. My aim is to reach 100 per cent within two years," said Kate. Now in Katewadi, no one burns farm waste - a practice prevalent till five years ago. "We don't burn the farm waste, as it can be used in the fields as compost. Our family was into sugarcane farming but we shifted to banana three years ago. We use vermicompost, Jeevamrutha and also animal waste in our fields. The yield is good and the soil condition has improved tremendously," said Vijay Dutta who owns three acres of farmland. Big farmers, like Eknath Maruthi Rao Kate, who own 30 acres of land, have erected vermicompost sheds on their premises. He uses the vermicompost in his fields and also supplies it to small farmers in the region. "I get 12 tonne vermicompost every three months and use it in my farms. I grow sugarcane in 20 acres, grapes on five acres, banana on three acres and pomegranate on two acres," said Eknath, adding that there has been a gradual rise in his produce. "Earlier, the sugarcane yield was 60 tonnes per acre. It saw a rise every year and in the last season it touched 85 tonnes per acre," said Eknath.

Global Organic

Asian Churches promote organic farming - A representative body of Asian churches is seeking to highlight the importance of organic agriculture. A consultation on Life-giving agriculture (LGA), organized by the Christian Conference of Asia (CCA) in the Sri Lankan cities of Kandy and Colombo, has urged Churches to build awareness about organic and sustainable farming among people irrespective of their religion and beliefs. “This movement questions the role of the mainstream agricultural establishment in promoting practices that challenge economic, ecological and social sustainability,” the consultation said in a statement, acknowledging the growing LGA movement in Asia. 35 pastors, farmers, rural activists, youth and church leaders from across Asia attended the consultation which highlighted LGA’s principle of “utilizing nature’s benefits to the maximum and recovering nature’s regenerative ability.” The consultation featured exposure trips to LGA and organic farming-practicing farms, country reports sharing, group discussions and informal sharing. It also recommended recycling organic matter and to maximize and enhance microbial activity by avoiding the use of chemical inputs such as chemical fertilizer, pesticides and weedicides. “Ecological initiatives such as household production of biofertilizers and community level production of biopesticides can build community strengths on the foundation of people’s existing capacity,” it added. The consultation, held in Sri Lanka on Nov. 22-27, was a follow-up to the first CCA-organized consultation held in Korea in 2006. (Source: ucanews.com)

The Great Debate: Organic or Not?-The word "organic" has completely exploded in the past 10 years. While the concept has always been around, it's recently made headlines in our ever-growing health-conscious world. Parents want to feed their children an all-organic diet; nature-lovers want our farmers to grow their food in harmony with our earth; doctors emphasize health benefits from organic pesticides. But is organic really all it's cracked up to be? Are the benefits of organically grown food significant? Let's break down organic to find out if it really is healthful or just another buzzword. The Coronado farmers market is a certified market, meaning everyone grows what they sell, but it's not an organic-certified market. "We have around five or six farmers here that are certified organic," said market manager Mary Hillebrecht. Other farmers are pesticide-free, but don't confuse that with organic. Pesticide-free doesn't always mean that there is no usage of chemicals. "The use of chemical fertilizer is still considered pesticide-free," Hillebrecht said. Before you go spitting out that tomato you thought was chemical-free, take into consideration what chemical fertilizers are. Farmers use fertilizer to help feed the plant and restore nutrients that are removed in the farming process. "We like to replace what we take out," Hillebrecht said. The use of a chemical or organic fertilizer does not change the taste of the crop, but there is a difference in what each does to the soil.

Organic Foods: Alternative Pest Control: Bats - Organic food is certainly susceptible to pests as much as "conventional" food; the main difference is that certified organic food cannot use pesticides without possibility of their certification being stripped and not reinstated for up to three years. Instead, many organic farmers depend on permaculture techniques or organic pest control: beneficial insects, small birds and companion planting are some methods employed in organic farming. The USDA has an entire series of videos on YouTube which give information on environment, sustainable farming, organic farming, the importance of local food (economically and healthfully) and other subjects within the realm of the USDA. Merlin Tuttle, Bat Conservation International, says that "There is a Mexican free-tailed bat which is capable of catching up to 40 or more corn earworm or armyworm moths over surrounding croplands. Each one of those moths could be carrying as much as a thousand eggs. Many organic farmers are

now relying heavily on bats in integrated pest management. They build houses for up to 2000 bats at a time in their orchards and several have actually ceased using pesticides as a result of having successfully attracted bats." Bats also act in the same manner as other small birds, butterflies and bees in aiding pollination, small rodent population control and fertilization with their rich guano. Some farmers build bat-boxes to encourage bats on their farms or otherwise encourage bat-friendly habitats which include clean water runoff from the farms themselves. Treating the farm, homestead or urban garden in a manner that co-exists with the natural world truly is in the line of permculture in which organic food is best grown. Employing bats to encourage safe pest control while depositing fresh fertilizer could be the answer to replace even certain types of machinery along with the pesticides. Along with bees and butterflies, bats can help boost an otherwise lacking landscape into one that produces enough natural, healthy food to feed an entire community as well as preserve natural resources with clean watersheds and healthy soil. (Source: justmeans.com)

Syria invests in organic farming - The Syrian Government is about to start the second step of the investment programme launched in 2006 to develop organic farming in the country, through farmers' education and infrastructures. Syria is ready to launch the second step of the national project for the promotion of organic and quality farming. The Syrian Government aims to spread awareness among producers about the great value of organic crops. The first part of the program started in 2006 with 20 training workshops throughout the country aimed at informing farmers about organic farming methods and interesting perspectives on the market for organic products. The second step of the project involves the creation of infrastructures to support the launch of new productions. This stage should be completed in 2012. Syrian experts have decided to focus on traditional crops such as pistachios, olives, tomatoes and cotton. But in addition to the typical products of the country, new crops scarcely consumed in Damascus will be tested, such as cherries, citrus fruits and several vegetables. (Source: greenmed.eu)

Study Shows Organic Dairy Advantages - Grass-based organic dairy farming promotes cow health, enhances milk quality, and lightens the environmental footprint of dairy farming. Reproductive health problems on high-production, grain-based dairies lead to fewer and longer lactations, increasing costs and cutting lifelong production and revenue. Organic systems promote cow health and longevity by placing less stress on cows and feeding them healthier forage-based diets, while also improving the nutritional quality of milk, according to a new report released by The Organic Center, Bolder, Colo. "A Dairy Farm's Footprint: Evaluating the Impacts of Conventional and Organic Farming Systems" compares milk and meat production and revenue earned, feed intakes, the land and agricultural chemicals needed to produce feed, and the volume of wastes generated by representative, well-managed conventional dairy farms and also representative, well-managed organic farms. Key findings include: (1) the average cow on organic dairy farms provides milk through twice as many, markedly shorter lactations and lives 1.5 to 2 years longer than cows on high-production conventional dairies, (2) Because cows live and produce milk longer on organic farms, milking cow replacement rates are 30% to 46% lower, reducing the feed required and wastes generated by heifers raised as replacement animals, (3) Cows on organic farms require 1.8 to 2.3 breeding attempts per calf carried to term, compared to 3.5 attempts on conventional farms, (4) The enhanced nutritional quality of milk from cows on forage based diets, and in particular Jersey cows, significantly reduces the volume of wastes generated on organic dairy farms, (5) The manure management systems common on most organic farms reduce manure methane emissions by 60% to 80%, and manure plus enteric methane emissions by 25% to 45%. Reducing methane emissions is a critical goal for all dairy farmers because this greenhouse gas is 25-times more potent than CO_2 in global warming potential. The report also notes that gross milk and meat sales revenues are about 50% higher per year of a cow's life on organic dairy farms, largely because of significantly greater milk revenue. Over the last five years, organic dairy farmers have received, on average, a premium of $10.98

per hundredweight of milk (average of $26.82 per hundredweight of organic milk compared to conventional average price of $15.93). (Source: californiafarmer.com)

Organic Agriculture law to hasten low carbon development path - The Organic Agriculture Act of 2010 will hasten the country's shift to a low carbon development path. This was the bold statement issued by Go Organic! Philippines, a network of natural farming advocates, during the opening of the 7th National Organic Agriculture Conference at Lucena City. The conference was organized by the Department of Agriculture (DA.) Go Organic! Philippines said the release of the implementing rules and regulations (IRR) of Republic Act 10068, as the law is otherwise known, will usher in a shift from chemical intensive to ecologically-sound food production practices. The La Liga Policy Institute (La Liga), a development policy research and advocacy non-government organization (NGO), which acts as the secretariat of the Go Organic! Philippines, is supporting the initiative to promote organic farming in the country. Currently, La Liga and Go Organic! Philippines are pushing for Congress to adopt the proposed IRR for RA 10068. The final draft was signed by Agriculture Secretary and was submitted last week to the agriculture committees of the Senate headed by Senator Francis Pangilinan and the House of Representatives under Batangas 4th District Rep. Mark Llandro Mendoza. Roland Cabigas, managing director of La Liga and a convenor of Go Organic! Philippines said under Rule 2.2 of the IRR states that: "Organic agricultural systems, in its goal to reduce environmental pollution and ecosystem destruction and, prevent the depletion of natural resources, shall endeavor to promote the low carbon development path and its strategies." Meanwhile, Rule 5.1 states that the National Organic Agriculture Board (NOAB), through the Bureau of Agriculture and Fisheries Product Standards (BAFPS), shall call upon all Government agencies and instrumentalities, including the LGUs, academe, NGOs, Small Farmers Organizations (OSFO), Organic Farmers Organizations (OFOs), and RDE institutions, to submit their respective annual and long term Organic Agriculture plans taking into consideration climate change impact and mitigation, with emphasis on adaptation such as low carbon development path, disaster risk reduction and management, gender sensitive development, site specific ecosystem-based for consolidation and integration into a comprehensive National Organic Agriculture Program (NOAP). The NOAP formulated by said agencies shall observe the principle of bottom-up, multi-disciplinary and multi-sectoral participatory planning, monitoring and evaluation system. On the other hand, Rule 13.2 states: "The adoption of organic agriculture through the implementation of NOAP projects and activities shall consider strategies to promote the low carbon development path." Low carbon development path is defined by the IRR as "growth that integrates positive impact on environment, minimizes if not eliminates green house gas emissions, taking into account long term sustainability." As part of its budget advocacy, La Liga is pushing for the country's low carbon development through financing of specific climate change mitigation and adaptation measure.

Organic Farming delivers healthier, richer soil and nutritionally enhanced food - Six encouraging conclusions on the impacts of organic farming on soil quality and the nutritional content of food were reached by a panel of scientists participating in a symposium at the annual meeting of the American Association for the Advancement of Science. A growing body of sophisticated research over the last decade has compared the impacts of organic and conventional farming systems on soil and food quality: 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. Organically farmed tomatoes have significantly higher levels of soluble solids and natural plant molecules called secondary plant metabolites, including

flavonoids, lycopene, and Vitamin C. Most secondary plant metabolites are antioxidants, a class of plant compounds that have been linked to improved human health in populations that consume relatively high levels of fruit and vegetables. 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.

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.

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. 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.
(Source – www.organic-market.Info)

Positive effects of organic farming on below-ground mutualists: large-scale comparison of mycorrhizal fungal communities in agricultural soils - Agricultural practices have significant impact on soil biodiversity. Whether organic farming enhances AMF diversity and whether AMF communities from organically managed fields are more similar to those of species-rich grasslands or conventionally managed fields, an attempts was made to study the AMF community composition in 26 arable fields (13 pairs of organically and conventionally managed fields) and five semi-natural grasslands, all on sandy soil. Terminal restriction fragment length polymorphism community fingerprinting was used to characterize AMF community composition.

The average number of AMF taxa was highest in grasslands (8.8), intermediate in organically managed fields (6.4) and significantly lower in conventionally managed fields (3.9). Moreover, AMF richness increased significantly with the time since conversion to organic agriculture. AMF communities of organically managed fields were also more similar to those of natural grasslands when compared with those under conventional management, and were less uniform than their conventional counterparts, as expressed by higher β-diversity (between-site diversity). Authors suggest that organic management in agro-ecosystems contributes to the restoration and maintenance of these important below-ground mutualists. (Source - Erik Verbruggen et al 2010, New Phytologist, 186 : 968-979)

Seminar, Conferences, National and International Events

BioFach India together with India Organic, 7th to 9th December 2010, Bombay Exhibition Ground, Mumbai - With the objectives of developing markets for Organic products from India and Asia, and to bring all stakeholders together, ICCOA started to organize India Organic Trade Fairs since 2005. In 2009 Nurnberg Messe and ICCOA came together to launch a joint fair called "BioFach India together with India Organic". The event was inaugurated on 7th Dec. 2010 and the Dignitaries who graced the occasion includes; Mr. Mukesh Gupta, President ICCOA; Dr. Marco Hartmann, German Technical Cooperation; Mr. Frank Venjakob, Project Director, Nurnberg Global Fairs; and Mr. Manoj Kumar Menon, Executive Director, ICCOA. The Fair provides a platform for the Organic Stakeholders to showcase the advancement of organic agriculture, newer technologies, products, processes and its derivatives. It invites participation from the world of organic agriculture with a broad spectrum of stake holding groups. It Includes producers of organic food, wholesalers/distributors, trade promotion organizations, Federal/State Pavilions, Organic farmers groups, NGOs, Organic Input manufacturers, Organic Textile producers, International producers/distributors, etc. The entire space was divided in to two sections: (1) BioFach India Section where only certified organic /approved organizations/ companies/certification agencies, were present and (2) India Organic Section comprising of Organic stakeholders, organizations, farmer groups, State Pavilions without certified organic status. Besides National Centre of Organic Farming pavilion there were six state pavilions (Haryana, Himachal Pradesh, Kerala, Karnataka, Nagaland and Chhattisgarh) and one foreign country pavilion of Saudi Arabia.

Concurrent to the fair a two day seminar program was also organized by ICCOA in association with Nuernberg Messe and IGCC from 8th to 9th Dec. The seminar was Co-sponsored by Ministry of Food Processing Industries (MoFPI), Govt. of India; APEDA and NABARD. The delegate registration was from almost all the sectors and states including a good number of foreign delegates. Seminar program was inaugurated by Ms. Agatha Sangma, Honorable Minister of State for Rural Development, Govt. of India. The Seminar was addressed by 16 experts on various topics. Among resource persons 7 speakers were from India and 8 were International speakers. They represented a broad range of institutions in public as well as from private sector and brought to the Seminar a valuable mix of experiences and perspectives. Important topics covered during the seminar were: (1) Strategies and technologies for improving organic production, (2) International Requirements for Organic Certification Bodies**,** (3) Harmonization of organic standards**,** (4) Permitted Agents & Inputs in Organic Agriculture, (5) Processing with care – Post-harvest handling, processing and (6) Market Access Issues- The World Markets for Organic Products. To ensure the availability of organic delicacies a Organic Food Court was also arranged by Morarka Organic Foods Private Limited from Rajasthan.

Asian Herbal Show / **Everything Organic & Natural** / **Wellness Asia 2010** - For the first time the country, witnessed triple event together showcasing products related to the Herbal, Organic & Wellness Industry under one roof at the Chennai Trade Centre during 26-28th November 2010. The event was organized by Services International & Society for Conservation of Resource Development & Medicinal Plants. The event was held alongside an International Conference. The theme of the International Conference was: Challenging & Emerging Dimensions in Medicinal / Herbal Plants & their products: A global perspective. The Conference was attended by 438 eminent Scientists, Professors, Researchers and

other Industry Specialists including delegates from UAE, Egypt, Nigeria & Uzbekistan

The International Exhibition had 35 Exhibitors from the Herbal, Organic & Wellness Industry. The Countries participated in the exhibition were India, Singapore, Japan, Malaysia & USA, Everything Organic & Natural showcased Products like Spices, Organic Tea, Fine Organic Foods, Cereals and Pulses, Food Ingredients, Preserves and Honey, Organic Certifying Agency, Organic Palm Products & Ecoware, Agricultural Products, Natural Products, Vegan Products & Industry Publications. Asian Herbal Show had Manufacturers/ Exporters of Herbal & Ayurveda Products, Ayurveda – Sidha & Unani Drugs, Herbal Extracts, Ingredients, Herbal Food & Dietary Supplements, Herbal Health Products, Herbal Drinks, Herbal Tea, Ayurvedic Medicines for lifestyle diseases, Personal Care products like Hair Care, Hand & Nail, Eye Care, Dental Care, Skin & Body Care, Herbal Cosmetics, Forest Products like leaves, gums & Seeds, Moringa oil, tea & food products, Natural Products, Industry Publications & Online Promotional Media. The National Institute of Siddha an autonomous organisation under Department of AYUSH, Minsitry of Health & Family Welfare, Government of India, offered education courses in Siddha, Treatment services, Research activities to develop Siddha as evidence based medicine and engaged in promoting and propagation of siddha medicine. Wellness Asia showcased beauty, fitness and wellbeing through fitness equipments, massage chairs, nail art both manual and machine, nail art spa, beauty supplies, Personal Care products like Hand & Nail, Skin & Body Care, Industry Publications etc. The above Fair had 3743 Visitors from countries across globe like India Indonesia, Malaysia, Netherlands, Nepal, UAE, Germany, Egypt, Srilanka, USA, Bangladesh, New Zealand, Lebanon and Singapore.

Conclave on Organic Products : The Way Ahead, Certification, Marketing, Export ..– The Associated Chambers of Commerce and Industry of India (ASSOCHAM) organized a one day conclave on organic products-The way ahead. The event was inaugurated by Shri Subodh Kant Sahai, Hon'ble Union Minister for Food Processing Industry, Govt of India. The conclave was supported by Ministry of Food Processing Industries, Ministry of Agriculture and APEDA, Ministry of Commerce. The conclave was specifically focused on the growth of organic products domestically as well as internationally. The important speakers, which elaborated the organic agriculture growth story in different sectors include: Dr C.D. Mayee, Chairman, ASRB, ICAR, Shri Asit Tripathy, Chairman, APEDA, Prof K.M. Salooja, Director IGNOU, Mr Sandeep Bhargava CEO OneCert (Asia) Certification Agency, Dr. A.K. Yadav, Director, NCOF and Dr D. Kumar, Dy Commissioner (INM), DAC.

IFOAM Summit, Nuremberg, Germany 15th of February in Nuremberg, Germany - In preparation for the IFOAM General Assembly (GA) to be held from October 3rd to October 5th, 2011 in Namyangju City, Gyeonggi Province, Republic of Korea, IFOAM will host an IFOAM Member meeting the day before the opening of BioFach 2011, February 15th, 2011, from 14:00 to 18:00. Members will have an opportunity to exchange information and prepare their input to the GA and Members who will not be able to travel to Korea for the GA will be able to interact with other IFOAM Members and participate in the organization's decision-making through the presentation of motions. The 17th Organic World Congress will be held in Namyangju City, Gyeonggi Province, South Korea from September 28th to October 1st, 2011. The IFOAM General Assembly (GA) convenes once every three years and takes place in conjunction with the IFOAM Organic World Congress (OWC). It is the democratic decision-making forum of the international organic movement. The venue of the GA will be the Namyangju film studios, located in a beautiful green area in Namyangju City. (www.ifoam.org)

The United Nations Climate Change Conference, 29 November to 10 December 2010 at Cancun, Mexico - The United Nations Climate Change Conference in Cancún, Mexico, kicked off with calls for commitment and compromise. In his

opening speech, Mexican President Felipe Calderón cited last year's hurricane in Mexico, this year's floods in Pakistan and fires in Russia as examples of increasing incidences of natural disasters brought about by climate change and already affecting the poorest and most vulnerable. Calling on negotiators in Cancún to make progress in the interest of their children and grandchildren, he said that the "eyes of the world" were focused on the meeting. "Climate change is an issue that affects life on a planetary scale," he said. "What this means is that you will not be here alone negotiating in Cancún. By your side, there will be billions of human beings, expecting you to work for all of humanity," he said. The two-week meeting is the sixteenth Conference of the 194 Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and the sixth meeting of the 192 Parties to the Kyoto Protocol. Mexican Foreign Minister and newly elected President of the Conference, Patricia Espinosa said: "It is time to make a concerted effort before it is too late. We can only achieve the results if we commit to making progress." According to COP President Espinosa, Governments meeting in Mexico can reach a deal to launch action on adaptation, technology transfer and forests; along with creating a new fund for long-term climate finance. UNFCCC Executive Secretary Christiana Figueres said in her opening address that Governments had revealed a growing convergence that a balanced set of decisions under both the Convention and the Kyoto Protocol could be an achievable outcome in Cancún. At the same time, a number of politically charged issues need to be resolved in order to reach such an outcome. Chief among these is how to take mitigation actions forward. In the course of 2010, all 37 industrialised nations and 42 developing countries, including the largest emerging economies, submitted targets and voluntary actions to reduce or limit greenhouse gas emissions. These mitigation promises need to be formalised as a matter of urgency.

Middle East Natural & Organic Products Expo 2010 - The Middle East Natural & Organic Product Expo is a "never to be missed" expo in the region as it attracts high quality trade buyers from all over the world especially from GCC, Middle East and African countries. The overwhelming response from the trade community in the region is a clear example that there is a high demand for organic products in the Middle East market. Significantly, the show is held in Dubai, the cosmopolitan city-state of the UAE. Dubai offers a vantage point to companies for regional penetration with the city being the trading and export hub for the whole of Middle East and Africa. For further details contact Joby Mathew MurickenHead - ExhibitionsGlobal Links Dubai L.L.CEmail: info@naturalproductme.com Web: www.naturalproductme.com

First International Conference on Organic Food Quality and Health Research - is scheduled for 18 – 20 May 2011 at Diplomat Hotel Conference Centre, Prague, Czhech Republic. The conference will focus on the state of art in research on organic food quality and health focusing specially on areas such as: (a) quality and safety of organic plant and animal products, (b) impact of processing on organic quality and safety, (c) standardization n of novel methods, (d) organic food authenticity, (e) impact of organic food on animals and (f) organic related health concepts. For further details log on to www.fqh2011.org.

BioFach Nuremberg 2011 - BioFach, the World's Biggest Organic Trade Fair scheduled for 16th - 19th February 2011 at Exhibition Centre Nuremberg, Germany promises to brings together about 2500 exhibitors - two thirds from abroad - and approximately 46000 trade visitors from around 120 countries of the world to Nuremberg every year in February. BioFach, applies strict admission criteria to guarantee the constantly high quality of the products are on display. (www.biofach.com)

BioFach China 2011 - Organized by the China Green Food Development Center and NürnbergMesse, BioFach China is scheduled for 26-28 May 2011 at Shanghai, China.

Book Reviews

Handbook of Organic Farming 2010 By P.D. Gera, Abhishek Publications, 328 p, ISBN : 81-8247-308-9, Price Rs. 995.00 - The organic farming is a tested heritage with us. It not only improves our land/soil and increases production, but saves the eco-system from the chemical pollution, as it does away with the use of hazardous, expensive chemical fertilizer, pesticides and herbicides. The book is particularly designed to know that what is organic farming how it is good and how we save our mother earth from hazardous chemical and take care of our health also as now a days what so ever we eat, it may be fruits, vegetables etc are either produced by chemicals or chemical is sprayed on it. In this handy book the author has explained the basics of organic farming like. Methods of Organic Farming and Climate change, Organic Fertilizer, Organic Gardening and Farming Techniques etc."

Agricultural Organic Waste : Basic Concepts, Potentials and Characteristics 2006 By B.N. Swami, D.C. Joshi and S.R. Choudhary, Himanshu Pub, , x, 246 p, tables, figs, ISBN : 81-7906-126-4, Price Rs. 895.00 - This compendium presents basic concepts about the characteristics and composition of organic waste and its potentials for crop production. The chemistry and biochemistry of organic waste, its decomposition and mineralization and manifestations on soil physical, chemical and microbial make up are highly specialized fields of study. Specialists in each of these topics have been invited to contribute and thus a comprehensive account on the biochemistry of organic residues, as source of plant nutrients, humification process and influence on soil fauna has been thoroughly dealt with. The compendium will be very useful for those involved in maintaining soil health, natural resource conservation and organic farming movement. The book will also be equally beneficial for teachers and students of agricultural and environment sciences." (jacket)

Natural, Organic, Biological, Ecological and Biodynamic Farming 2010 Edited by V.N. Tiwari, D.K. Gupta, S.R. Maloo and L.L. Somani, Agrotech Pub, , 420 p, ISBN : 81-8321-156-7, Rs. 1,980.00 – Oeganic farming is getting widely accepted with the time world over and is being perceived as future sustainable form of agriculture which relies mainly on conservation and optimum utilization of resources, crop rotations and environment friendly inputs. The present book will be helpful for understanding characteristics of biofertilizers, Vermiculture and biocontrol agents, their production techniques and applications and thus, solve the above problems. Organic farming is thus considered as a movement directed towards the philosophy of "Back to Nature". It aims at low input farming thus reducing dependence on inorganic fertilizers, plant protection chemical and weedicides. The book contains 30 chapters each contributed by authorities in their field of specialization highlighting their vast experience relevant to natural, organic, biological, ecological, and bydynamic aspects of no-chemical farming. Considering the vast scope and huge export potential of organic foods from India, such types of information on status, strategy and scope in the form of a book was a long felt need. Since, this is the beginning of popularizing such technologies, the outcome of this book will serve the purpose of the target audience. This book should be of interest and use to students, teachers, researchers of agricultural colleges and universities, administrators and extension officers, consultants, rural development and training centres and other agencies who are involved in production and promotion of organic food. The book will serve as a good reference book on Organic Food Production." (jacket)

Organic Farming : Principles, Prospects and Problems 2010 Edited by Suresh N. Deshmukh, Agrobios, , xvi, 360 p, tables, figs, ISBN : 81-7754-363-6, Rs. 795.00 The Green Revolution based on High Yielding Varieties which require heavy doses of chemical inputs and irrigation, helped our

country to tide away the serious gap between the demand and supply of food grains. No doubt it was a great success story but that success has taken a heavy toll of ecosystem. Non-judicious use of chemical inputs for boosting crop production has unleashed havoc and is posing danger to whole ecosystem. It has not only polluted soil and water to the point of health hazards but affecting the quality of food products. Organic farming is seen as a solution to this problem, but it is still not fully understood by the farmers and their mentors. This book aims at clarifying different aspects of organic farming. There are 20 chapters in this book, the first being essentially introductory in nature. Success of organic farming depends upon the replenishment of social fertility. The common notion that nutrients are given to the plant crop has to be changed. The fact is nutrients are to be given to the soil and that too in a balanced way -- needs to be emphasized. Taking this into consideration a chapter on soil world has been included. The success of commercial organic farming depends upon a certification from recognized certified agency and hence a chapter on soil world has been included. For the benefits of organic farmers chapters on 'Present Indian Scenario' and 'International Scenario' have been included. Post harvest technology is the most neglected activity in India and hence has been covered in details. Economics of organic farming, frequently asked questions by farmers, do's and don'ts etc. have also been discussed."

Plant Protection Practices in Organic Farming 2010, Edited by Ajay Sharma and Rajeshwar S. Chandel, International Book Distributors, 566 p, ISBN : 81-7089-365-8, Rs. 2,500.00 - The key to successful organic food production lies in protection of crops from various biotic enemies. In the book entitled "Plant Protection Practices in Organic Farming" a sincere effort have been made to provide the society all the practices which can be used in reducing the pest populations. In addition there are some chapters which do not directly address the issues pertaining to the plant protection but are of immense importance for the management of a healthy crop so as to get better returns. In the first chapter the authors have mentioned the importance of the organic farming and why it is so much needed in the present day scenario. This chapter also covers the information on the various guidelines set for the practicing organic farming. In the second chapter the pesticide residues pertaining in different crops are highlighted. Third and fourth chapters contain exhaustive information on the biocontrol agents of various insect pests and the biopesticides available in the market to manage these pests respectively. In the fifth chapter the concept of nutrient management for the plants has been discussed. Sixth chapter is based on the information pertaining to the protected cultivation and the different structures used in this type of cultivation. Seventh and eighth chapters deal with the insect pests and diseases encountered in the poly houses respectively and their management with out the use of chemical pesticides. The insect pests and disease of vegetables, temperate fruits, subtropical fruits and potatoes are covered in the separate chapters. Insect pests management of spices and cereal crops are covered in chapters sixteen and seventeen. The eighteenth chapter is on cultivation and utilization of medicinal plants. It covers the aspect of medicinal; plants use as biopesticides against various insects. In the nineteenth chapter the wild fruits are discussed as they can be an important source in increasing the biodiversity in an area. After growing a good crop it is important to get good returns, and for that the yield is to be taken to a good market. The time between the harvest and the use of yield is very important as an appreciable portion is lost in this transit. The next chapter deals with how to minimize the post harvest losses in different corps. In the modern world biotechnology is playing an important role in the human life. The plant science is also not devoid of this important science. The transgenic plants and GMO's are important in the plant science. In the last chapter, role of biotechnology has been discussed in reference to the plant protection and its role in producing a crop organically. All these chapters are of immense importance to the farmers, Orchadists and plant scientists and can act as a valuable knowledge source for managing organic systems (jacket).