

Effect of organic, inorganic and integrated production systems on crop productivity and soil fertility under north Gujarat condition.

ABSTRACT

A field experiment was conducted during 2015-16 to 2021-22 at Centre for Research on IFS, S.D.A.U., Sardarkrushinagar to study the effect of organic, inorganic and integrated production systems on crop productivity and soil fertility with different crop sequences under north Gujarat condition. Total six treatments viz; T₁:100 % organic (50% N through FYM + 25% N through vermicompost + 25% N through castor cake), T₂: 75 % organic + Innovative organic practices (Panchgavya and Jivamrut spray @ 2 %), and from 2020-21 onward IOP was application of Beejamrit + Ghanjeevamrit @ 250 kg/ha + Jeevamrit @ 500 lit/ha/irrigation twice in a month), T₃:100 % inorganic package, T₄: State recommendations (10 t FYM once in a year + RDF), T₅: 50 % organic package + 50 % inorganic package, T₆: 75 % organic package + 25 % inorganic package with three cropping sequences viz;CS₁: Groundnut - wheat - green gram, CS₂:Green gram - coriander - vegetable cowpea, CS₃:Green gram - fennel - fennel continue were executed in strip plot design. crop sequence C₁(Groundnut- wheat-greengram) recorded significantly highest groundnut equivalent yield (4886 kg/ha) with application of RDF + 10 t/ha FYM once in year (T₄), while crop sequence C₃(Greengram- fennel- continue) registered significantly lower GEY(1364 kg/ha) under T₂(75 % organic+ innovative organic practices(application of Beejamrit + Ghanjeevamrit @250 kg/ha + Jivamrut @500 lit/ha/ irrigation twice in month). The crop sequence C₁ registered significantly highest system gross profit of 2,90,945₹ /ha under T₁ (100 % organic sources), while all the crop sequences registered at par system gross profit with application of 75 % organic+ innovative organic practices (application of Bijmrit + Ghanjivamrut @250 kg/ha + Jivmrit @500 lit/ha/ irrigation twice in month, T₂) and 50% organic package + 50 % inorganic package(T₅). The percent increase in average of three cropping sequences was about 39.1 % in soil organic carbon, 4.1 % in soil available nitrogen, 1.6 % in available phosphorus, 7.2 % in available soil potash, 26.1% in Fe, 22% in Mn, 15.1% in Zn and 64.7% in Cu, while 9.9 % increase in soil water holding capacity and 2.1 % decrease in bulk density, highest microbial counts (bacteria, Actinomycetes and Fungi) under 100 % organic treatment(T₁) over treatment of State recommendations + 10 FYM/ha once in a year(T₄).

Key words: , Bjamrut, Crop sequence, Ghanjvamrut, Jivamrut, microbial counts.

Introduction

Organic agriculture is a production system, which avoids or largely excludes the use of synthetic compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent possible, organic farming system relies on crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects, weeds and other pests.

Growing of high yielding varieties with indiscriminate use of fertilizers, poor water management practices and inefficient plant-protection measures in modern chemical intensive agriculture has resulted into

Comment [IJPSS1]: While it is clear in presenting the research objectives and main results, improvements to the sentence structure and definition of abbreviations could improve clarity. In addition, it is advisable to provide more detailed explanations of some results to strengthen the impression and facilitate the reader's understanding.

Comment [IJPSS2]: Revise keywords to reflect the main issues raised in the research.

Comment [IJPSS3]:

The introduction provides a thorough overview of organic farming and how it compares to intensive chemical farming. The use of references to previous studies provides a good scientific basis. However, further explanation of why organic farming is considered a more sustainable solution could enrich the argument. In addition, detailing the specific challenges or problems facing agriculture in a particular region, such as North Gujarat, can provide further context and relevance to the research being conducted. It is also important to clarify the objectives of the research and the urgent need to understand the impact of specific production systems on productivity and soil fertility in specific environmental conditions.

degradation of lands owing to low crop yields with poor quality of produce (Pradhan and Mondal, 1997). Conversion of modern chemically intensive agriculture to a more sustainable form of agriculture like organic farming appears to be an option for maintaining the desirable agricultural production in future (Modgalet al., 1995). Generally, it is common thinking that yields of several crops reduced during the initial years under organic farming, but high market value of organically grown produces may be able to compensate the losses in yields (Mahapatra et al., 2006). Food crops grown using organic inputs having less or no chemicals are being preferred over conventionally produced food by the end users. Food materials produced organically has got its place in food market in developed and developing countries (Urkurkar et al. 2010). Crop based nutrient requirement studies are also going on. But so far no work has been carried out on Integrated Nutrient Management (INM) for crops and cropping systems to address various issues on soil, water and air pollution. Saving of chemicals, improvement in soil health and quality, is also an alarming need of this region as well as nationwide. This, calls for an urgent need to study the performance of predominant cropping systems with various nutrient management options in order to increase the profitability and productivity of crops and cropping systems as well as to enhance farm input use efficiency. Keeping this in view a research problem on “study of effect of organic, inorganic and integrated production systems on crop productivity and soil fertility under North Gujarat condition” has been planned to conduct the experiment at Centre for Research on IFS, SDAU, Sardarkrushinagar.

Materials and methods

A field experiment was conducted during 2015-16 to 2021-22 at Centre for Research on IFS, S.D.A.U., Sardarkrushinagar to study the effect of organic, inorganic and integrated production systems on crop productivity and soil fertility with different crop sequences under north Gujarat condition. The soil was very low in organic carbon and available nitrogen (141 kg ha^{-1}) and medium in available P (13.47 kg ha^{-1}) and available K (180 kg ha^{-1}). Total six treatments viz; T₁: 100 % organic (50% N through FYM + 25% N through vermicompost + 25% N through castor cake), T₂: 75 % organic + Innovative organic practices (Panchgavya and Jivamrut spray @ 2 %), and from 2020-21 onward IOP was application of Beejamrit + Ghanjeevamrit @ 250 kg/ha + Jeevamrit @ 500 lit/ha/irrigation twice in a month), T₃: 100 % inorganic package, T₄: State recommendations (10 t FYM once in a year + RDF), T₅: 50 % organic package + 50 % inorganic package, T₆: 75 % organic package + 25 % inorganic package with three cropping sequences viz; CS₁: Groundnut - wheat - green gram, CS₂: Green gram - coriander - vegetable cowpea, CS₃: Green gram - fennel - fennel continue were executed in strip plot design. The soil was very low in organic carbon and available nitrogen (141 kg ha^{-1}) and medium in available P (13.47 kg ha^{-1}) and available K (180 kg ha^{-1}). The all crops were fertilized as per treatments details and sown as per recommended spacing for each crops by using recommended varieties and seed rate. The castor cake was applied 10 days before sowing of crops.

Results and discussion

Groundnut equivalent yield (kg/ha):

Data presented in table 1 showed that crop sequence C₁ (Groundnut- wheat-green gram) recorded significantly highest groundnut equivalent yield (4886 kg/ha) with application of RDF + 10 t/ha FYM once in year (T₄), while crop sequence C₃ (Green gram- fennel- continue) registered significantly lower GEY (1364 kg/ha) under T₂ (75 % organic + innovative organic practices (application of Beejamrit + Ghanjeevamrit @ 250 kg/ha + Jivamrut @ 500 lit/ha/ irrigation

Comment [IJSS4]: The Materials and Methods section provides a clear overview of the research design and experimental procedures. The descriptions of soil conditions, treatments, inter-group variation, and fertiliser and planting methods are well presented. However, the addition of some details related to plant variety selection and plant density could have enriched this information. In addition, a further explanation of the use of castor cake and the rationale behind its use 10 days before planting would enhance the reader's understanding.

Comment [IJSS5]: The discussion provides an in-depth analysis of the research results, including their impact on crop productivity, system profitability, and soil properties. The emphasis on the effect of organic fertiliser on crop yield and soil quality provides valuable insights. However, additional recommendations for practical applications in the field would have improved the comprehensiveness of the discussion.

twice in month). Data revealed that year has significant effect on crop sequences and treatment. The significantly highest GEY (5011 kg/ha) has been recorded under C₁ during first year (after conversion period) of experiment. Crop sequences expressed its significantly lower response over years. In case of treatments, T₄ registered significantly higher GEY (4225 kg/ha) during second, which was at par with first year also (4103 kg/ha). The interaction among treatments and crop sequences over years had fails to exert its significant effect on ground nut equivalent yield, but crop sequences C₁ recorded numerically higher GEY with application RDF + 10 t/ha FYM once in year during all the years after conversion period with all different nutrient management. Nitrogen application through organic manures significantly augmented the onion equivalent yield. This is due to greater availability of nutrients in soil, improved soil physical condition and higher total uptake of nutrients because of better root penetration leading to better absorption of nutrients and moisture (Meena *et al.* 2010).

System gross profit (₹/ha)

Data presented in table 2 revealed that crop sequence C₁ registered significantly highest system gross profit of 2,90,945₹/ha under T₁ (100 % organic sources), while all the crop sequences registered at par system gross profit with application of 75 % organic+ innovative organic practices (application of Bijmrit + Ghanjivamrut @250 kg/ha + Jivmrit @500 lit/ha/ irrigation twice in month, T₂) and 50% organic package + 50 % inorganic package(T₅). The lowest system gross profit was recorded under crop sequence C₃ with T₃ treatment. The crop sequences interaction with years was found significant. The significantly highest system gross profit was recorded in C₁ (2,75,729₹/ha) during all the years after conversion period. The treatment interaction also was found significant. Application of 100 % organic sources (T₁) registered significantly highest system gross profit of 2,29,029₹/ha over rest of treatments during all four years. The treatment T₃(1,91,036 ₹/ha and T₅(2,01,168 ₹/ha) was at par in case of system gross profit during 2018-19. The interaction among treatments and crop sequences over years had fails to exert its significant effect on system gross profit, but crop sequences C₁ recorded numerically higher system gross profit/ha with application of 100 % organic source during all the years after conversion period with all different nutrient management.

System net profit (₹/ha):

Data presented in table 3 indicated that significantly highest net profit was recorded under T₁ with C₁ crop sequence (153222 ₹/ha), while the system net profit of C₁ cropping sequence was at par under treatment T₄(144185). The lowest system net profit was recorded under crop sequence C₃ with T₃ treatment(33023). The crop sequences interaction with years was found significant. The significantly highest system net profit was recorded in C₁ (124979 ₹/ha) in mean of all four years after conversion period. The treatment and years interaction was found non significant. Application of 100 % organic sources (T₁) registered numerically highest system net profit of 144165₹/ha over rest of treatments. The interaction among treatments and crop sequences over years had fails to exert its significant effect on system net profit, but crop sequences C₁ recorded numerically higher system net profit/ha with application of 100 % organic source during all the years after conversion period with all different nutrient management.

Effect of cropping system and different nutrient management on soil properties:

The cropping sequences and the nutrient management treatments showed significant influence on soil properties. Soil quality indices for the various cropping sequences and various nutrient management treatments were computed using key indicators viz., pH, EC, OC,

micronutrients, Water holding capacity and bulk density. The detail introspection of the soil residual status after completion of seven years sequence presented in table 4 clearly revealed that, there was improvement in major and minor soil available nutrients (N, P, K, Fe, Mn, Zn and Cu) and physical properties of soil (soil water holding capacity and bulk density of soil at the end of seventh years cycle over its initial value of 2014-15 due to different nutrient management and three cropping sequences. The percent increase in average of three cropping sequences was about 39.1 % in soil organic carbon, 4.1 % in soil available nitrogen, 1.6 % in available phosphorus, 7.2 % in available soil potash, 26.1% in Fe, 22% in Mn, 15.1% in Zn and 64.7% in Cu, while 9.9 % increase in soil water holding capacity and 2.1 % decrease in bulk density under 100 % organic treatment(T₁) over treatment of State recommendations + 10 FYM/ha once in a year(T₄). Application of organic manure along with significantly improved the physical properties of soil. Maximum decrease in bulk density an increase in porosity were recorded with application of organic manure over the initial value due to addition of large amount of bulky organic manure in the field. These results are in close conformity with the findings of Pradhan and Mondal (1997) and Varalakshmi *et al.*, (2005). Continuous application of organic manures in sufficient quantities to improve the soil organic carbon in soil thereby sustaining the soil health have been reported by Tiwari *et al.* (2002).

Microbial population:

Data presented in table 5 indicated that highest numbers of bacteria, Actinomycetes and Fungi were found under 100 % organic sources and also in integrated nutrient management in all three crop sequences, while the lowest bacteria, actinomycetes and fungi were found under 100 % inorganic in all three crop sequences. Similar improvement in microbial properties of soil with organic nutrition has been reported by Dubey and Agrawal (1999) and Saini *et al.*, (2005). Shanmei *et al.* (2002) also reported favourable effect of organic manures on soil biological properties.

Conclusion

This study clearly established the influence of cropping sequences and nutrient management treatments on productivity, profitability, soil quality indices and microbial counts. In view of the results obtained from the present investigation, it is concluded that farmers growing crops under organic farming are recommended to adopt groundnut - wheat- greengram crop sequence with recommended dose of nitrogen to each crop in the ratio of 50:25:25 through FYM:vermicompost:castor cake, *viz* for groundnut 1250 FYM kg/ha based on 0.5% N, 210 kg/ha vermicompost based on 1.5% N and 80 kg/ha castor cake, for wheat 12000 FYM kg/ha, 2000 kg/ha vermicompost and 770 kg/ha castor cake and for greengram 2000 FYM kg/ha, 335 kg/ha vermicompost and 130 kg/ha castor cake (based on 0.5%, 1.5% and 3.9% nitrogen content in respective organic source) for obtaining higher system equivalent yield and net return. It also improves soil health.

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Comment [IJSS6]: These conclusions clearly state the effect of crop sequence and nutrient management treatments on productivity, profitability, soil quality indices and microbial counts. Specific recommendations for farmers growing crops using organic farming methods provide practical guidance. However, including thoughts on constraints or challenges farmers may face in implementing these recommendations could enrich the conclusions.

Comment [IJSS7]: Add more recent references

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Table1: Effect of different treatments and cropping sequences on groundnut equivalent yield in pooled (2018-19 to 2021-22)

Crop sequences x Treatments								
Treatments x Crop sequence	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	Mean	
C ₁	4214	3650	4230	4886	4585	3629	4199	
C ₂	3485	2934	3348	4117	3735	2947	3427	
C ₃	1606	1364	1485	1882	1780	1463	1597	
Mean	3105	2649	3021	3628	3366	2680		
S.Em.±							66.66	
CD at 5%							186	
CV%							9.03	
Year x Crop sequences								
Crop sequences/ Year	C ₁	C ₂	C ₃	Mean				
Y ₁	5011	3456	2485	3651				
Y ₂	4807	3829	1500	3370				
Y ₃	3365	3256	1185	2602				
Y ₄	3615	3169	1217	2668				
Mean	4199	3427	1597					
S.Em.±	54.43							
CD at 5%	152							
CV%	9.20							
Year x Treatments								
Year/Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	Mean	
Y ₁	3590	3242	3745	4103	3944	3280	3651	
Y ₂	3381	2805	3214	4225	3811	2835	3370	
Y ₃	2682	2256	2546	3043	2819	2267	2602	
Y ₄	2754	2295	2579	3142	2892	2338	2667	

Mean	3105	2649	3021	3628	3366	2680						
S.Em.±	76.97											
CD at 5%	215											
CV%	9.03											
Year x Crop sequence x Treatments												
Year/ Crop sequences/ Treatments	2018-19			2019-20			2020-21			2021-22		
	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃
T ₁	4978	3358	2434	4793	3849	1501	3408	3377	1260	3677	3356	1229
T ₂	4471	3074	2181	4083	3130	1202	2906	2852	1009	3142	2680	1065
T ₃	5175	3507	2552	4757	3482	1404	3340	3219	1080	3648	3184	906
T ₄	5544	3986	2781	5888	4903	1884	3943	3769	1416	4169	3809	1449
T ₅	5388	3764	2679	5394	4379	1659	3669	3468	1321	3888	3329	1461
T ₆	4507	3048	2286	3924	3231	1349	2923	2851	1026	3164	2658	1193
S.Em.±	133.32											
CD at 5%	NS											
CV%	8.38											

Table 2: Effect of different treatments and cropping sequences on gross profit in pooled (2018-19 to 2021-22)

Crop sequences x Treatments								
Treatments/ Crop sequence	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	Mean	
C ₁	290945	251669	233877	274064	255895	197928	250736	
C ₂	222339	187191	170778	209993	190522	150301	188721	
C ₃	102448	87028	75771	96014	90791	74644	87782	
Mean	205244	175296	160142	193357	179069	140157		
S.Em.±							3766	
CD at 5%							10501	
CV%							9.03	
Year x Crop sequences								
Crop sequences/ Year	C ₁	C ₂	C ₃					Mean
Y ₁	275729	190011	136618					200786
Y ₂	264141	210192	82257					185530
Y ₃	185083	179367	65295					169601
Y ₄	198909	174514	66960					146794
Mean	230958	188521	87782					
S.Em.±							3075	
CD at 5%							8574	
CV%							9.13	
Year x Treatments								
Year/Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	Mean	
Y ₁	229029	206852	191036	209312	201168	167318	200785	
Y ₂	215701	178950	163983	215538	194406	144601	185530	
Y ₃	200548	168947	153982	188303	173165	132659	161601	
Y ₄	175698	146435	131567	160275	147537	119251	146794	

Mean	205244	175246	160142	193357	179069	140957						
S.Em.±	4348											
CD at 5%	12125											
CV%	9.03											
Year x Crop sequence x Treatments												
Year/Crop sequences/ Treatments	2018-19			2019-20			2020-21			2021-22		
	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃
T ₁	317567	214261	155259	305803	245568	95734	305803	215439	80403	234609	214090	78396
T ₂	285260	196136	139161	260489	199712	76648	260489	181973	64380	200438	170945	67923
T ₃	263998	178907	130203	242708	177618	71623	242708	164184	55055	186095	162403	46202
T ₄	282790	203317	141830	300415	250106	96092	300415	192257	72237	212635	194294	73897
T ₅	274846	191999	136660	275216	223372	84632	275216	176909	67370	198305	169806	74501
T ₆	229915	155445	116595	200212	164774	68816	200212	145441	52326	161371	135544	60839
S.Em.±	7531											
CD at 5%	NS											
CV%	8.86											

Table 3: Effect of different treatments and cropping sequences on net profit inpoled (2018-19 to 2021-22)

Crop sequences x Treatments								
Treatments/ Crop sequence	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	Mean	
C ₁	153222	122067	122549	144185	129365	78487	124979	
C ₂	138268	106051	92965	122182	109580	67794	106140	
C ₃	43269	33221	33023	46600	39827	19573	35918	
Mean	111587	87113	82846	104322	92924	55285		
S.Em.±							3746	
CD at 5%							10446	
CV%							17.74	
Year x Crop sequences								
Crop sequences/ Year	C ₁	C ₂	C ₃				Mean	
Y ₁	173257	107630	84754				121880	
Y ₂	96515	127811	30394				84907	
Y ₃	82612	96986	13431				64343	
Y ₄	147533	92133	15096				84921	
Mean	124979	106140	35919					
S.Em.±							3058	
CD at 5%							8529	
CV%							17.54	
Year x Treatments								
Year/Treatments	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	Mean	
Y ₁	144165	126839	120842	129675	123640	86122	121880	
Y ₂	105042	76599	71346	109057	94143	53253	84907	
Y ₃	86216	63893	59670	75575	66282	34422	64343	
Y ₄	110923	81121	79525	102982	87630	47342	84921	

Mean	111587	87113	82846	104322	92124	55285						
S.Em.±	4325											
CD at 5%	NS											
CV%	16.68											
Year x Crop sequence x Treatments												
Year/Crop sequences/ Treatments	2018-19			2019-20			2020-21			2021-22		
	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃	C ₁	C ₂	C ₃
T ₁	206226	130190	96080	161497	117075	36555	131368	106054	21225	183533	130019	19218
T ₂	180166	114995	85355	118572	88384	22841	100832	80275	10574	139444	89804	14116
T ₃	173977	101094	87455	99805	85358	28875	86372	80331	12307	150531	84591	3454
T ₄	181103	115505	92416	162294	118198	46678	104445	99458	22823	177981	106482	24483
T ₅	174165	111058	85697	142430	106332	33669	95967	86474	16406	150488	88864	23538
T ₆	123904	72939	61524	82267	63746	13746	62934	43078	-2746	83222	53038	5768
S.Em.±	7492											
CD at 5%	NS											
CV%	17.54											

Table 4: Effect of cropping sequences and different nutrient management treatments on soil properties after completion of crop Sequence 2021-22 (Summer 2022)

Crop sequences	Soil parameters		SOC (%)	N (kg/ha)	P (kg/ha)	K (kg/ha)	pH	EC (dSm-1)	Fe (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	Cu (mg/kg)	MWHC (%)	BD (gm/cc)
	Treatments													
CS ₁ (G.nut-wheat-g.gram)	Organic	100% Organic	0.40	163	18.48	187	7.95	0.203	5.90	12.06	0.62	0.76	32.9	1.440
		75% organic+ IP	0.37	160	17.64	178	8.03	0.185	6.88	12.36	0.54	0.84	31.8	1.437
	Inorganic	100% inorganic	0.26	151	17.08	164	7.95	0.178	4.76	9.90	0.70	0.58	30.0	1.481
		State reco.	0.28	154	16.80	181	7.93	0.178	4.28	10.36	0.54	0.50	29.7	1.471
	INM	50% organic+50% inorganic	0.32	160	19.32	184	7.96	0.199	4.76	10.90	0.42	0.80	31.6	1.443
		75% organic+25% inorganic	0.34	163	20.44	182	8.01	0.190	5.74	10.56	0.48	0.84	31.7	1.442
	Initial status		0.21	141	13.47	180	7.22	0.150	3.50	5.26	0.30	0.42	29.5	1.540
	% increase/decrease of T1 over T4		40.9	6.1	10.0	3.5	0.3	14.1	37.9	16.4	14.8	52.0	10.7	-2.1
CS ₂ (G.gram-coriander-veg. cowpea)	Organic	100% Organic	0.37	151	16.52	184	8.03	0.204	5.42	12.32	0.52	1.04	31.6	1.441
		75% organic+ IP	0.35	169	16.24	179	7.98	0.186	3.62	9.82	0.30	0.80	31.0	1.445
	Inorganic	100% inorganic	0.25	154	15.96	172	8.04	0.184	3.96	9.38	0.52	0.58	29.6	1.477
		State reco.	0.27	151	17.64	163	8.02	0.175	3.96	8.64	0.38	0.54	29.2	1.476
	INM	50% organic+50% inorganic	0.32	154	19.60	187	7.89	0.184	5.26	10.00	0.16	0.88	32.0	1.434
		75% organic+25% inorganic	0.34	154	17.64	170	7.88	0.204	4.60	10.16	0.22	0.66	32.1	1.455
	Initial status		0.21	141	13.47	180	7.22	0.150	3.50	5.26	0.30	0.42	29.5	1.540
	% increase/decrease of T1 over T4		40.6	0.0	-6.3	12.7	0.1	16.4	36.9	42.6	36.8	92.6	8.2	-2.4
CS ₃ (G.gram-funnel-fellow)	Organic	100% Organic	0.36	163	19.60	182	8.01	0.180	3.62	9.04	0.70	0.72	33.1	1.445
		75% organic+ IP	0.35	144	19.32	185	7.96	0.208	5.08	9.86	0.76	0.66	31.7	1.447
	Inorganic	100% inorganic	0.25	151	17.92	163	8.07	0.184	2.82	8.02	0.50	0.50	29.8	1.468
		State reco.	0.27	154	19.32	172	7.93	0.211	3.62	8.40	0.66	0.50	29.9	1.471
	INM	50% organic+50% inorganic	0.3	154	20.44	181	7.97	0.239	4.12	8.70	0.56	0.58	31.2	1.474
		75% organic+25% inorganic	0.33	157	19.60	173	7.78	0.199	6.56	10.20	0.70	0.62	31.6	1.463
	Initial status		0.21	141	13.47	180	7.22	0.150	3.50	5.26	0.30	0.42	29.5	1.540
	% increase/decrease of T1 over T4		35.3	6.1	1.4	5.8	1.0	-14.5	0.0	7.6	6.1	44.0	10.7	-1.8

Table 5: Effect of nutrient management and crop sequences on microbial counts at end of the cropping sequence(2018-19 to 2021-22)

Crop Seq.	Microbial count (per gram of soil)	Organic management		Inorganic management	Inorganic management	Towards organic management	
		100 % organic	75 % organic + 25 % IOP	100 % inorganic package	State recommendation	50 % organic package + 50 % inorganic package	75 % organic package + 25 % inorganic package
		T ₁	T ₂	T ₃	T ₄	T ₅	T ₆
CS ₁	Bacteria($\times 10^6$)	146.7	66.78	15.0	48.48	35.5	56.80
	Actinomycete($\times 10^5$)	184.7	142.2	27.6	46.47	95.2	65.30
	Fungi($\times 10^4$)	117.8	132.5	50.1	83.63	46.8	99.88
CS ₂	Bacteria($\times 10^6$)	51.38	44.53	4.81	13.87	25.8	22.10
	Actinomycetes $\times 10^5$)	167.6	137.0	17.4	40.51	81.8	64.66
	Fungi($\times 10^4$)	60.72	48.48	11.39	12.76	35.5	32.14
CS ₃	Bacteria($\times 10^6$)	75.63	116.1	10.8	198.7	53.0	215.70
	Actinomycete ($\times 10^5$)	190.8	190.1	27.4	43.06	119.4	94.63
	Fungi ($\times 10^4$)	114.0	96.25	25.00	17.45	39.23	33.30

Table 6 : Details of inputs used, purchase price and sale price

A	25% premium price		Normal price		
1.	Selling price of groundnut pod	₹ 63.8/kg	1.	Selling price of groundnut pod	₹ 51.01/kg
2.	Selling price of wheat	₹ 27.6/ kg	2.	Selling price of wheat	₹ 22.10/ kg
3.	Selling price of kharif green gram	₹ 45.1/kg	3.	Selling price of kharif green gram	₹ 36.05/kg
4	Selling price of coriander	₹ 105.10/kg	4.	Selling price of coriander	₹ 84.05/kg
5	Selling price of cowpea(veg)	₹ 18.80/kg		Selling price of cowpea(veg)	₹ 15.00/kg
6	Selling price of fennel	₹ 68.80/kg	6	Selling price of fennel	₹ 55.0/kg
7	Selling price of summer green gram	₹ 52.50/kg	7	Selling price of summer green gram	₹ 42.0/kg
a	FYM	₹ 0.6/kg	c	Labour charge	₹ 340/day
b	Vermi compost	₹ 6/kg	d	Castor cake	₹ 7.8/kg

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