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Effect of different chickpea based intercropping systems and organic nutrient modules on weed parameters

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Abstract
The study investigates the effects of chickpea-based intercropping systems and organic nutrient modules on soil physico-chemical properties. Conducted during the rabi season of 2022-23 at the Centre for Organic Agriculture Research and Training, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, the experiment was designed using a strip plot with treatments including sole chickpea and chickpea intercropped with coriander, linseed, and sorghum. Organic nutrient modules applied were organic farming, natural farming, and an integrated approach combining both. The weed density, fresh weight and dry matter production were recorded to be minimum in chickpea + coriander than all other intercropping systems which was on par with sole chickpea during both the seasons. Weed control efficiency was recorded to be highest with the chickpea + coriander intercropping system which was on par with sole chickpea and how ever the weed index was considered to be highest with the sole chickpea which was on par with chickpea + coriander intercropping system. These findings suggest that intercropping with chickpea and using integrated organic management can improve soil quality, promoting sustainable agricultural practices.

Keywords: Chickpea-based intercropping, organic nutrient modules, weed parameters

Introduction

Organic farming is one way to promote self sufficiency and food security. The growth story of organic farming is unfolding with increasing demand not only in India but also globally. In a world battered by the COVID pandemic, the demand for healthy and safe food is already showing an upward trend and hence this is an opportune moment to be captured for a win-win situation for our farmers, consumers and the environment. Organic agriculture is based on four principles relating to Health, Ecology, Fairness and Care (Anonymous, 2005) [1]. These principles were in response to the emerging concerns on diseases caused by indiscriminate use of chemicals in farming, damage to the ecological balance, unequal relationships between the producers and others in use and management of resources, sharing of incomes, damages and loss of living organisms. The principles can be directly converted into aims of organic agriculture, planning to achieve the desired results by effectively addressing the identified problems.

Natural Farming (NF) is considered to be agroecology based diversified farming system, which integrates crops, trees and livestock, allowing functional biodiversity (Rosset and Martinez, 2012) [11] to drastically cut down production costs by replacing the chemical fertilizers and pesticides with home-grown product like Jeevamritham, Beejamritham, Neemastra etc., and adopting intercropping and mulching (Palekar, 2005; 2006; 2006a) [8, 9]. Highlighting the predominance of smallholder farmers (68.5 per cent marginal and 17.7 per cent small farmers) in India, The Economic Survey (2019) emphasised the importance of Zero Budget Natural Farming (ZBNF) as one of the alternative farming practices for improving the farmers income, in the backdrop of declining fertilizer response and farm income. Biological sciences (e.g. microbiology, ecology, soil science) with their increasingly “symbiotic” (Gilbert *et al*. 2012) [3] and "probiotic" (Lorimer, 2017) [6] understandings of soil and plant life are also an inspiration for the ecological renewal of agriculture.

Initially, a Japanese farmer, Masanobu Fukuoka proposed natural farming, which is based on the philosophy of working with natural cycles and processes of the natural world. The movement of promoting ZBNF in India has been championed by Shri Subhash Palekar has resulted into widespread adoption at varying levels in many states, especially, Andhra Pradesh, Karnataka, Maharashtra, Himachal Pradesh). However, in recent times, a section of scientific community and critics vehemently oppose this alternative practices condemning it being not based on scientific evidences, promoting certain beliefs system, particularly indigenous cows, a backward-looking and chauvinistic idiom. After having exhaustive study of the movement, believes that the prevalent ambivalence makes natural farming a valuable case for the political ecology of agriculture. Moreover, most of these studies lack field level or experimental evidences to support their arguments. With this ambiguous context, the present study is an attempt to understand the practices followed by the farmers under natural farming; examine the adoption of practices by the farmers, and to study the implication on costs of crop cultivation, yield and farmers income for major crops in the study area.

Intercropping is an important aspect than sole cropping to growth of more than one crop species or cultivars simultaneously in the same field during a growing season. It is practical application of ecological principles such as diversity, crop interaction and other natural regulation mechanisms. There are very close relationships between yield advantage and nutrient acquisition in intercropping systems. It is an efficient cropping system in terms of resource utilization. It is mainly related to complementary use of environmental resources by the component crops which result in increased and more stable yields. Especially the information on promising intercropping system under delayed monsoon conditions has been lacking which is required for contingency planning. Organic farming and natural farming along with intercropping has potential to increase net returns, reduce the risk of crop failure and reduce environmental impacts. Hence, promising chickpea based intercropping system was tested for their response with coriander, linseed and sorghum to evaluate their yield potentiality and system profitability.

Materials and Methods

A field experiment was conducted during *rabi* season of 2022-2023 and 2023-24 at Centre for Organic Agriculture Research and Training field, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola to study the effect of different organic modules on yield and yield attributes of chickpea based intercropping systems. The soil of the experimental site was medium, black in colour with good drainage. The total rainfall received during the cropping season was 7.0 and 101.6 mm with 2 and 5 rainy days in the year 2022-23 and 2023-24, respectively. The experiment was laid out in Strip plot Design (SrPD) with four cropping systems and three organic integrated nutrient modules and four replications with 2:2 ratio to find out the effect of chickpea based intercropping systems. The crop and variety were JAKI- 9218 (Chickpea), Linseed (NL-260), Coriander (ACR-1) and Sorghum (PKV Kranthi). The main treatments were Chickpea (sole), Chickpea + Coriander (2:2), Chickpea + Linseed (2:2) and Chickpea + Sorghum (2:2), sub plot treatments includes N_1: Organic farming – (Biofertilizers + Vermicompost + Biopesticide, N_2: Natural farming – (Ghanajeevamrith + Bijamrith + Jivamrith + Neemastra) and N_3: Integration of Organic farming and Natural farming - (Biofertiizer + Vermicompost + Jivamrith + Neemastra) replicated thrice. Sowing was done by dibbling on 13th Nov 2022 and 11th November 2023 respectively and grown on broad bed furrow for better aeration and conservation of moisture and easy application of Jivamrut in furrows. The texture of experimental plot soil was clayey. Soil was slightly alkaline in nature. Organic carbon ranged was medium, Soil was low in available nitrogen (193.68 kg ha^{-1}), very low in available phosphorus (14.61 kg ha^{-1}) and high in available potassium (323.99 kg ha^{-1}). A common dose of vermicompost @ 2 t ha^{-1} at basal were applied and Jivamrut @ 500 lit ha^{-1} were applied and biofertilizer seed treatment was given. Data was analyzed by analysis of variance. Crop was raised with recommend package of practices. Observations were recorded on weed flora, weed density, weed drymatter, weed control efficiency and weed index. In case of observation on weeds, normality of distribution was not seen and hence, the values were subjected to square root transformation ($\sqrt{x+1}$) prior to statistical analysis to normalize their distribution.

Results and Discussion

1. Weed Flora in the Experimental Field

The weed flora of the experimental field belongs to nine taxonomic families of which three species were grasses, eleven species were broad leaved weeds and only one species of sedge (Table 1).

Among all the weeds, *Cyperus rotundus* L. and *Parthenium hysterophorus* were dominant. They might have become more persistent due to intensive cropping in the field by eliminating other weed species. Further, there was no lowland rice cultivation for several years continuously in the same field as these weeds do not survive under flooded conditions. Most of the weeds observed in the field experiment.

Table 1: Weed flora of the experimental field

S. No	Botanical Name	Common Name	Family
I	**Grasses**		
1	*Cynodon dactylon*	Bermuda grass	Poaceae
2	*Brachiaria reptans* L.	Running grass	Poaceae
3	*Dactyloctenium aegyptium* (L.)	Crow foot grass	Poaceae
4	*Digitaria sanguinalis* (L.) Scop.	Large crab grass	Poaceae
II	**Sedges**		
1	*Cyperus rotundus* L.	Purple nut sedge	Cyperaceae
III	**Broad leaved weeds**		
1	*Commelina benghalensis* L.	Day flower	Commelinaceae
2	*Cleome viscosa* L.	Spider flower	Capparaceae
3	*Boerhavia diffusa* L.	Spiderling	Nyctaginaceae
4	*Euphorbia hirta* L.	Garden spurge	Euphorbiaceae
5	*Digera arvensis* L.	False Amaranthus	Amaranthaceae
6	*Phyllanthus niruri* L.	Gale of wind	Euphorbiaceae
7	*Celosia argentea* L.	White cock's comb	Amaranthaceae
8	*Physalis minima* L.	Ground cherry	Solanaceae
9	*Amaranthus viridis* L.	Slender amaranthus	Amaranthaceae
10	*Datura stramonium* L.	Jimson weed	Solanaceae
11	*Parthenium hysterophorus*	Congress grass	Asteraceae

2. Weed density (No. m^{-2})

The data pertaining to the species wise (grasses, sedges, BLW's and total) weed density at 20 DAS and at harvest as influenced by various chickpea based cropping systems and different organic nutrient modules were presented in the table 2 and 3.

A. Intercropping system

During both the years of observation and pooled, among various chickpea based cropping systems, the lowest density of grasses, sedges, BLW and total at 20 DAS and at harvest were recorded with chickpea + coriander which was statistically on par with sole chickpea. This was followed by chickpea + linseed. The chickpea which was intercropped with coriander and the sole chickpea showed significantly superior in reducing the total density compared to the other inter-cropping systems, this might be due to the smothering efficiency of the chickpea crop in the initial period.

B. Nutrient management practices

Among the organic nutrient modules, least weed density of grasses sedges, BLW and total was recorded with the integration of both organic and natural farming practices during both the years and respectively which was significantly superior in reducing the weed density over the other nutrient modules.

C. Interaction

The interaction was found to be non-significant.

Table 2: Weed density (No. m^{-2}) at 20 DAS as influenced by different intercropping systems and organic nutrient modules during 2022-23 and 2023-24.

Treatment	Grasses			Sedges			BLW			Total		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
Cropping systems												
C_1: Chickpea (sole)	1.91 (2.78)	1.87 (2.63)	1.89 (2.70)	1.66 (1.88)	1.86 (2.48)	1.77 (2.18)	1.87 (2.67)	2.04 (3.22)	1.96 (2.95)	2.82 (7.32)	3.04 (8.33)	2.95 (7.83)
C_2: Chickpea + coriander (2:2)	1.85 (2.43)	1.77 (2.12)	1.81 (2.27)	1.60 (1.61)	1.78 (2.18)	1.69 (1.90)	1.65 (1.83)	1.96 (2.91)	1.81 (2.37)	2.59 (5.86)	2.85 (7.21)	2.73 (6.54)
C_3: Chickpea + linseed (2:2)	3.06 (8.45)	3.19 (9.19)	3.12 (8.82)	3.30 (10.00)	3.46 (11.04)	3.38 (10.52)	3.17 (9.11)	3.53 (11.64)	3.36 (10.38)	5.32 (27.56)	5.71 (31.86)	5.52 (29.71)
C_4: Chickpea + sorghum (2:2)	4.00 (14.97)	4.15 (16.22)	4.07 (15.60)	4.12 (16.02)	4.38 (18.25)	4.26 (17.13)	4.06 (15.66)	4.22 (16.89)	4.14 (16.28)	6.90 (46.66)	7.23 (51.36)	7.07 (49.01)
S.Em±	0.05	0.07	0.05	0.04	0.14	0.03	0.07	0.07	0.03	0.09	0.07	0.07
C.D. (P=0.05)	0.17	0.21	0.17	0.12	0.24	0.08	0.22	0.21	0.10	0.27	0.21	0.21
Nutrient management practices												
N_1: Organic farming	2.67 (6.92)	2.73 (7.30)	2.70 (7.11)	2.69 (7.25)	2.84 (7.99)	2.77 (7.62)	2.58 (6.95)	2.84 (8.28)	2.72 (7.61)	4.33 (21.12)	4.62 (23.57)	4.48 (22.34)
N_2: Natural farming	2.89 (8.17)	2.90 (8.60)	2.89 (8.38)	2.79 (7.83)	2.98 (9.24)	2.90 (8.53)	3.07 (9.49)	3.19 (10.12)	3.14 (9.81)	4.83 (25.49)	5.06 (27.96)	4.95 (26.72)
N_3: Integration of both	2.55 (6.39)	2.61 (6.72)	2.58 (6.55)	2.54 (7.05)	2.78 (8.23)	2.67 (7.64)	2.42 (5.51)	2.78 (7.59)	2.61 (6.55)	4.07 (18.95)	4.46 (22.54)	4.27 (20.74)
S.Em±	0.06	0.05	0.06	0.04	0.04	0.02	0.04	0.05	0.05	0.11	0.01	0.04
C.D. (P=0.05)	0.22	0.19	0.20	0.13	0.12	0.06	0.14	0.15	0.15	0.39	0.05	0.12
Interaction												
S.Em±	0.02	0.02	0.02	0.03	0.03	0.02	0.03	0.02	0.02	0.03	0.01	0.05
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

* Figures in parenthesis indicate original values and were transformed to ($\sqrt{X+1}$) values

Table 3: Weed density (No. m^{-2}) at harvest as influenced by different intercropping systems and organic nutrient modules during 2022-23 and 2023-24

Treatment	Grasses			Sedges			BLW			Total		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
Cropping systems												
C_1: Chickpea (sole)	9.79 (96.56)	9.90 (98.05)	9.91 (97.31)	5.03 (24.57)	5.00 (24.19)	5.02 (24.38)	9.38 (88.01)	9.49 (90.32)	9.44 (89.17)	14.46 (209.14)	14.57 (212.56)	14.52 (210.85)
C_2: Chickpea + coriander (2:2)	9.46 (88.55)	9.91 (97.23)	9.69 (92.89)	4.96 (23.68)	4.85 (22.59)	4.90 (23.13)	9.04 (81.03)	9.16 (83.19)	9.10 (82.11)	13.92 (193.25)	14.27 (203.01)	14.10 (198.13)
C_3: Chickpea + linseed (2:2)	11.45 (130.66)	11.51 (131.85)	11.48 (131.26)	5.07 (24.76)	5.37 (27.87)	5.22 (26.31)	9.97 (98.78)	9.94 (98.20)	9.95 (98.49)	15.94 (254.20)	16.06 (257.92)	16.00 (256.06)
C_4: Chickpea + sorghum (2:2)	11.68 (136.04)	11.92 (141.75)	11.80 (138.89)	5.48 (29.14)	5.46 (28.82)	5.47 (28.98)	10.49 (109.7)	10.23 (104.1)	10.36 (106.94)	16.57 (274.96)	16.57 (274.67)	16.57 (274.81)
S.Em±	0.11	0.05	0.07	0.03	0.06	0.04	0.13	0.14	0.08	0.20	0.13	0.13
C.D. (P=0.05)	0.36	0.17	0.21	0.09	0.19	0.12	0.42	0.44	0.23	0.64	0.42	0.42
Nutrient management practices												
N_1: Organic farming	10.40 (107.85)	10.64 (112.64)	10.52 (110.25)	5.19 (26.00)	5.14 (25.57)	5.17 (25.79)	9.55 (90.35)	9.49 (89.16)	9.52 (89.75)	14.98 (224.20)	15.09 (227.38)	15.04 (225.75)
N_2: Natural farming	11.26 (128.64)	11.43 (132.04)	11.39 (130.44)	5.40 (28.36)	5.47 (29.04)	5.44 (28.70)	10.57 (111.86)	10.47 (109.74)	10.52 (110.80)	16.35 (269.05)	16.42 (270.81)	16.39 (269.93)
N_3: Integration of both	10.13 (102.17)	10.36 (106.98)	10.25 (104.57)	4.82 (22.24)	4.89 (22.99)	4.85 (22.62)	9.04 (81.00)	9.15 (82.96)	9.10 (81.98)	14.34 (205.41)	14.60 (212.93)	14.47 (209.17)
S.Em±	0.10	0.12	0.05	0.06	0.06	0.06	0.13	0.13	0.12	0.13	0.12	0.13
C.D. (P=0.05)	0.36	0.43	0.15	0.20	0.19	0.19	0.46	0.44	0.36	0.44	0.42	0.39
Interaction												
S.Em±	0.05	0.05	0.05	0.03	0.02	0.02	0.05	0.05	0.05	0.06	0.05	0.05
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

* Figures in parenthesis indicate original values and were transformed to ($\sqrt{X+1}$) values

3. Weed fresh and dry weight (g m^{-2})

The data pertaining to the weed fresh and dry weight at 20 DAS and at harvest as influenced by various chickpea based cropping systems and different organic nutrient modules were presented in the table 4 and 5.

A. Intercropping system

Among various chickpea based cropping systems, the least fresh and dry weight of weeds was recorded with chickpea + coriander at both 20 DAS and at harvest during both the seasons and the pooled data, and this was statistically on par with sole chickpea during both the years. The significant reduction in weed fresh and dry weight might be due to reduced weed density present in sole chickpea and chickpea + coriander. Initial flush of weeds were controlled by the chickpea due to its fast growing habit.

B. Nutrient management practices

Among the organic nutrient modules, least weed fresh and dry weight was recorded with the integration of both organic and natural farming practices during both the years, which was significantly superior over the other nutrient modules. Similar trend was followed in the pooled data.

C. Interaction

The interaction was found to be non-significant.

4. Weed control efficiency (%)

Weed control efficiency recorded at 20 DAS and at harvest as influenced by various chickpea based cropping systems and different organic nutrient modules were presented in the table 5.

A. Intercropping system

Among various chickpea based cropping systems, the highest weed control efficiency was recorded with chickpea + coriander at both 20 DAS and at harvest during 2022-23 (69.61 and 54.86%), 2023-24 (67.09 and 48.45%) and the pooled data (68.35 and 51.66%) respectively, and this was statistically on par with sole chickpea during both the years.

Table 4: Fresh and dry weight of weeds at 20 DAS and at harvest as influenced by different intercropping systems and organic nutrient modules during 2022-23 and 2023-24.

Treatment	Fresh weight						Dry weight					
	20 DAS			At harvest			20 DAS			At harvest		
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
Cropping systems												
C_1: Chickpea (sole)	2.00 (3.02)	2.18 (3.81)	2.10 (3.41)	13.79 (189.08)	14.02 (195.54)	13.90 (192.31)	1.32 (0.75)	1.34 (0.81)	1.33 (0.78)	6.84 (46.08)	7.51 (55.58)	7.19 (50.83)
C_2: Chickpea + coriander (2:2)	1.98 (2.91)	2.11 (3.45)	2.04 (3.18)	13.47 (180.49)	13.84 (190.63)	13.66 (185.56)	1.28 (0.65)	1.33 (0.78)	1.31 (0.72)	6.59 (42.77)	7.39 (53.76)	7.00 (48.26)
C_3: Chickpea + linseed (2:2)	2.09 (3.39)	2.50 (5.25)	2.31 (4.32)	14.74 (216.24)	15.08 (226.66)	14.91 (221.45)	1.50 (1.25)	1.55 (1.11)	1.48 (1.18)	8.10 (65.43)	7.98 (62.74)	8.05 (64.09)
C_4: Chickpea + sorghum (2:2)	2.15 (3.64)	2.53 (5.42)	2.35 (4.53)	14.93 (222.13)	15.36 (235.23)	15.15 (228.68)	1.67 (1.80)	1.69 (1.26)	1.68 (1.53)	8.63 (74.18)	8.98 (80.58)	8.81 (77.38)
S.Em±	0.02	0.03	0.02	0.11	0.06	0.04	0.02	0.01	0.02	0.18	0.10	0.19
C.D. (P=0.05)	0.06	0.09	0.07	0.33	0.19	0.12	0.06	0.03	0.06	0.64	0.30	0.61
Nutrient management practices												
N_1: Organic farming	2.05 (3.23)	2.26 (4.15)	2.16 (3.69)	14.21 (201.15)	14.58 (212.18)	14.40 (206.66)	1.45 (1.14)	1.48 (1.00)	1.43 (1.07)	7.42 (54.28)	7.80 (60.16)	7.61 (57.22)
N_2: Natural farming	2.10 (3.43)	2.50 (5.30)	2.31 (4.36)	14.44 (208.08)	14.85 (220.24)	14.65 (214.16)	1.52 (1.34)	1.56 (1.13)	1.54 (1.23)	8.41 (71.10)	8.68 (75.17)	8.55 (73.14)
N_3: Integration of both	2.01 (3.05)	2.23 (4.00)	2.12 (3.53)	14.05 (196.74)	14.29 (203.63)	14.17 (200.18)	1.36 (0.86)	1.39 (0.85)	1.37 (0.85)	6.79 (45.97)	7.42 (54.16)	7.12 (50.06)
S.Em±	0.01	0.03	0.01	0.04	0.04	0.04	0.02	0.01	0.02	0.08	0.05	0.08
C.D. (P=0.05)	0.03	0.09	0.03	0.12	0.15	0.12	0.05	0.03	0.05	0.24	0.15	0.24
Interaction												
S.Em±	0.01	0.01	0.01	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.05	0.07
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

* Figures in parenthesis indicate original values and were transformed to ($\sqrt{X+1}$) values

B. Nutrient management practices

Among the organic nutrient modules, least weed dry weight was recorded with the integration of both organic and natural farming practices (60.00 and 51.49%) during 2022-23 and (59.96 and 48.07 g m^{-2}) during 2023-24 respectively, which was significantly superior over the other nutrient modules. Similar trend was followed in the pooled data.

C. Interaction

The interaction was found to be non-significant.

5. Weed index (%)

Weed index recorded as influenced by various chickpea based cropping systems and different organic nutrient modules were presented in the table 75.

A. Intercropping system

Among various chickpea based cropping systems, the lowest weed index was recorded with sole chickpea during 2022-23, 2023-24 and pooled data respectively, and this was statistically on par with chickpea + coriander during 2022-23, 2023-24 and pooled data respectively. The significant reduction in weed index might be due to highest equivalent yield in sole chickpea and chickpea + coriander.

B. Nutrient management practices

Among the organic nutrient modules, least weed index was recorded with the integration of both organic and natural farming practices during 2022-23, 2023-24 and pooled data respectively.

C. Interaction

The interaction was found to be non-significant.

Table 5: Weed control efficiency at 20 DAS and at harvest and Weed index as influenced by different intercropping systems and organic nutrient modules during 2022-23 and 2023-24

Treatment	Weed control efficiency (%)						Weed index (%)		
	20 DAS			AT HARVEST					
	2022	2023	Pooled	2022	2023	Pooled	2022	2023	Pooled
Cropping systems									
C_1: Chickpea (sole)	64.96	65.68	65.32	51.37	46.70	49.03	7.94	7.88	7.93
C_2: Chickpea + coriander (2:2)	69.61	67.09	68.35	54.86	48.45	51.66	11.93	11.74	11.86
C_3: Chickpea + linseed (2:2)	42.02	40.11	41.06	30.94	39.84	35.39	40.75	40.69	40.74
C_4: Chickpea + sorghum (2:2)	16.28	21.33	18.80	21.71	22.74	22.23	25.50	30.07	27.76
S.Em±	2.50	2.64	2.78	3.37	2.34	2.96	1.34	1.46	1.37
C.D. (P=0.05)	7.99	8.44	8.89	10.80	7.48	9.47	4.30	4.67	4.39
Nutrient management practices									
N_1: Organic farming	46.86	48.20	47.53	42.72	42.31	42.51	20.34	20.41	20.40
N_2: Natural farming	37.79	37.50	37.65	24.96	27.92	26.44	30.31	30.78	30.56
N_3: Integration of both	60.00	59.96	59.98	51.49	48.07	49.78	13.95	16.59	15.26
S.Em±	2.41	2.35	2.38	2.55	2.08	1.76	1.31	1.20	1.20
C.D. (P=0.05)	8.34	8.12	8.24	8.82	7.21	6.16	4.52	4.16	4.15
Interaction (A*B)									
S.Em±	1.11	1.01	1.05	1.12	0.93	1.06	0.51	0.54	0.52
C.D. (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS

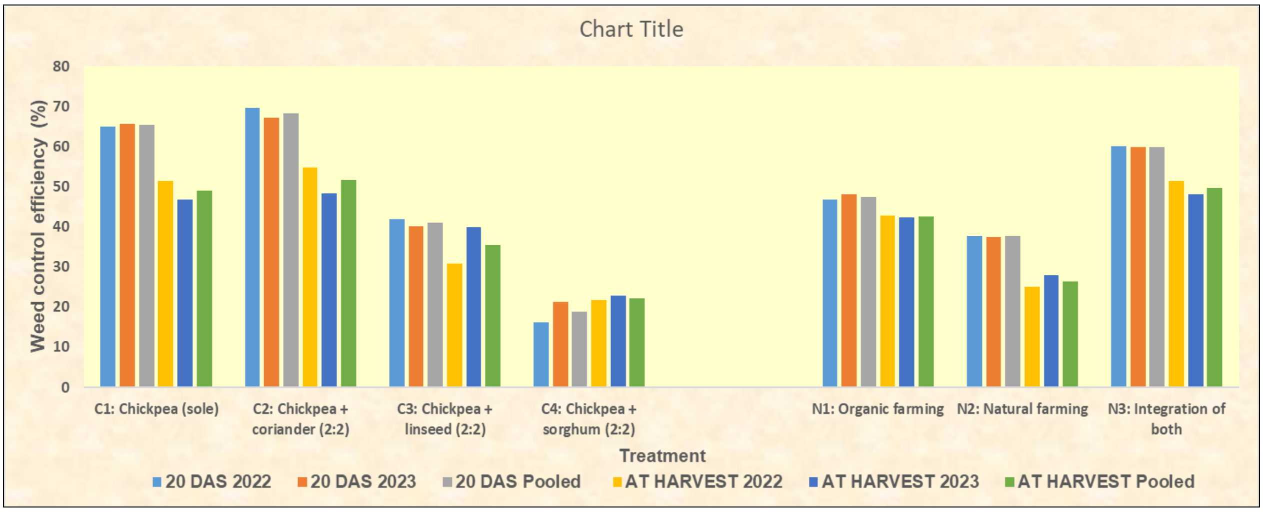

Fig. 10: Weed control efficiency at 20 DAS and at harvest and Weed index as influenced by different intercropping systems and organic nutrient modules during 2022-23 and 2023-24.

Conclusion

From the above study it was clear that chickpea + coriander (2:2) with integration of natural and organic management practices gave the best results among all other treatments and this was at par with chickpea (sole) when applied with integration of both natural and organic farming treatments.

References

1. Anonymous. Directorate of Economics and Statistics, Department of Agriculture Cooperation and Farmers Welfare. Third Advance Estimates of area and production of Seed Spices; c2019-2020.
2. Ganeshamurthy AN, Ali M, Rao S. Role of pulses in sustaining soil health and crop production. Indian J Fertil. 2006;1(12):29-40.
3. Gilbert SF, Sapp J, Tauber SI. A Symbiotic View of Life: We Have Never Been Individuals. Q Rev Biol. 2012;87(4):325-341.
4. Gupta YP. Nutritive value of pulses. In: Oxford & IBH Publishing Company Pvt Ltd, editor. New Delhi, India; c1988. p. 581-601.
5. Li S, Wu F. Diversity and co-occurrence patterns of soil bacterial and fungal communities in seven intercropping systems. Front Microbiol. 2018;9:15-21.
6. Lorimer J. Probiotic Environmentalities: Rewilding with Wolves and Worms. Theory Cult Soc. 2017;34(4):27-48.
7. Mahapatra BS, Singh SP, Rajesh AVK, Vishawakarma C, Bushan A, Kumar RK, *et al*. Performance of lentil, chickpea and wheat under organic mode during initial years of conversion in relation to nutrient management practices. J Ecofriendly Agric. 2006;1(2):105-116.
8. Palekar S. The Philosophy of Spiritual Farming. 2nd ed. Amravati, Maharashtra, India: Zero Budget Natural Farming Research, Development & Extension Movement; c2005.
9. Palekar S. Zero Budget Natural Farming: Five Layers Palekar's Model (Part I). Amravati, Maharashtra, India: Zero Budget Natural Farming Research, Development and Extension Movement; c2006.
10. Poddar R, Kumar S, Kundu R. Production potential and impact on soil health as influenced by chickpea-spices based intercropping system. J Crop Weed. 2017;13(3):189-191.
11. Rosset PM, Martinez-Torres ME. Rural Social Movements and Agroecology: Context, Theory and Process. Ecol Soc. 2012;17(3).
12. Tanwar SPS, Rokadia P, Singh AK. Effect of row ratio and fertility levels on performance of chickpea (*Cicer arietinum*) and linseed (*Linum usitatissimum*) intercropping system under rainfed condition. Indian J Agron. 2011;56(3):87-92.