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SOCIO-ECONOMIC STATUS AND CONSTRAINTS FACED BY FARMERS PRACTICING NATURAL FARMING IN HIMACHAL PRADESH INDIA

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ABSTRACT

Natural farming is a farming approach that emphasizes the use of natural inputs, while preserving soil fertility and biodiversity without the use of synthetic chemicals or fertilizers. It is a comprehensive method that aims to emulate the natural ecosystem. To understand the socio-economic characteristics of farmers practicing natural farming, the present study was conducted in district Kangra and Solan of Himachal Pradesh. Two blocks from each district namely Kangra and Indora blocks from district Kangra and Solan and Kandaghat blocks from district Solan were randomly selected and a sample of 120 farmers practicing natural farming was selected for the study. Garret ranking technique was used to analyze the constraints faced by the farmers. The study revealed that 72 per cent of farmers were small farmers and 28 per cent of farmers belonged to large farm category. The average family size comprised of 5 members where the percentage of male was found to be 51 percent. The average number of females per thousands of males was 954. Male literacy rate was higher (96 %) than female literacy rate (93 %). Agriculture was the main occupation of respondents. The average proportion of active workers was worked out to be 69 per cent. Indigenous cows' population was higher than other livestock. About 61 percent of the total land holding was under cultivated area with cropping intensity of 198 per cent. The Garret ranking technique found that the most significant challenge encountered by farmers was labour demanding techniques, followed by an inadequate supply of skilled labour, high wage rates, a lack of market information, and the absence of a specialized market. Promoting natural farming is an important step towards sustainable agriculture and a healthier environment. To encourage natural farming, efforts should be made to create awareness camps for farmers, which include regular handholding, developing a suitable market for produce, financial support, certification etc.

Keywords : Constraints, cropping intensity, literacy, land holdings, socio-economic

Introduction

The agriculture sector continues to be the major source of employment for more than 50 per cent of India's population. However, its share in GDP has declined and this is primarily a consequence of India's progression from an agrarian economy to an industry and service-based economy (Anonymous, 2022). Yet agriculture has been assigned a major role for the

development of Indian economy as it still supports the heavy burden of working population.

India has attained self-sufficiency in food grains production and has emerged as major producer of many agricultural products in the world. This development has been achieved with modern technologies involving extensive use of chemicals in the form of pesticides and fertilizers which has led to many health and environmental issues (Kotschi J.

2015, Supriya *et al.*, 2018 & Sharma *et al.*, 2023). The neo-liberalization of the Indian economy has led to a deep agrarian crisis that is making small scale farming an unviable vocation. Privatized seeds, inputs, and markets are inaccessible and expensive for farmers. Indian farmers increasingly find themselves in a vicious cycle of debt, because of the high production costs, high interest rates for credit, the volatile market prices of crops, the rising costs of fossil fuel-based inputs and private seeds.

Introduction of natural farming is a viable and sustainable option to overcome the ill effects of chemical-based farming. Natural farming concept suggests that all macro and micronutrients required by the crop/plants are present in soil but are in unavailable form. Zero Budget Natural Farming (ZBNF) is one such low-input, climate-resilient type of farming that encourages farmers to use low-cost locally-sourced inputs, eliminating the use of artificial fertilizers and industrial pesticides. Natural farming was first popularized by the Japanese scientist and philosopher, Masanobu Fukuoka and in India, noted agriculturist Subhash Palekar has helped to popularize ZBNF practices across the country (Sharma *et al.*, 2023).

Government of Himachal Pradesh has decided to implement an innovative technique of Subhash Palekar Natural Farming (SPNF) under a new scheme called "Prakritik Kheti Khushhal Kissan Yojna" to reduce cost of cultivation and enhance the farm income for the comprehensive and long-term welfare of the farmers. State has carved out this ambitious plan to cover entire farmers' population of the state under natural farming project to elevate farmers from their current distress and to save consumers from ill effects of chemical-based farming.

Materials and Methods

Analytical framework

To fulfill the specific objectives of the study and based on the nature and extent of availability of data, analytical tools and techniques have been employed for the analysis of the data. Simple tabular analysis was used to examine socioeconomic status, their resource structure, income pattern. Tabular presentation was adopted to compile the general characteristics of the sampled farmers. Simple statistical tools like averages and percentages were used to compare, contrast and interpret the results. The sex ratio, literacy rate, cropping intensity and dependency ratio were calculated using the following formulas:

$$\text{Sex Ratio (females pe 1000 males)} = \frac{\text{No. of Females}}{\text{No. of males}} * 1000$$

$$\text{Literacy rate (\%)} = \frac{\text{Total population of females}}{\text{Total population excluding non - school going below 5 years of age}} * 100$$

$$\text{Cropping Intensity (\%)} = \frac{\text{Total cropped area}}{\text{Net sown area}} * 100$$

$$\text{Dependency ratio w. r. t. total workers} = \frac{\text{No. of dependents in a family}}{\text{Total workers}}$$

Garrett's ranking technique: It was employed to know the constraints faced by the farmers in adopting natural farming. Garrett's formula for converting ranks into per cents is given by;

$$\text{Percent position} = \frac{100 (R_{ij} - 0.5)}{N_i}$$

where,

R_{ij} = Ranking given to the i^{th} attribute by the j^{th} individual

N_j = Number of attributes ranked by the j^{th} individual.

The per cent position of each rank was converted into scores referring to the table given by Garrett and Wood's worth (1969). For each factor the scores of individual respondents were added together and divided by the total number of the respondents for whom scores were added. These mean scores for all the factors were arranged in descending order. Ranks were given and the most important factors were identified.

Results and Discussion

Socio-economic characteristics of sampled households

To have a comprehensive profile of the farm households, a demographic base becomes more relevant. The social characteristics such as family size, age, work force and sex composition of farm households, dependency ratio and literacy affect the economic conditions and in turn affect social conditions. The significance of the social and demographic variables is discussed below. First, the farmers are classified in to two categories (Small and large) on the basis of land holding. Table 1 shows that 71.67 per cent of farmers were small farmers with average land holding of 0.44 ha and 28.33 per cent of farmers belonged to large farm category with the land holding size of 1.84 ha.

Table 1: Distribution of sampled households according to their land holdings

Sr. No.	Category of farmers	No. of farmers	Average size of landholding (ha)
1	Small (<1 ha)	86 (71.67)	0.4442
2	Large (>1ha)	34 (28.33)	1.8459
3	Total	120 (100)	0.8413

Figures in parentheses are percentage to the total.

Size and structure of family

The size and structure of sampled households in the studied area are presented in Table 2. The perusal of table shows that at overall level the average family size was 5 members per household and percentage of

males was 51 per cent and females were 49 per cent. Number of nuclear families was higher (73) than the joint families (47). A positive relationship was found between the farm size and the family in the study area.

Table 2 : Category wise demographic profile of sample households in study area (Number)

Size of the family	Small	Large	Overall
Average size of Family	4.85 (100.00)	5.38 (100.00)	5.00 (100.00)
Average number of Males	2.49 (51.32)	2.74 (50.82)	2.56 (51.18)
Average number of Females	2.36 (48.68)	2.65 (49.18)	2.44 (48.82)
Total Families	86.00 (100.00)	34.00 (100.00)	120.00 (100.00)
Joint families	32.00 (37.21)	15.00 (44.12)	47.00 (39.17)
Nuclear Families	54.00 (62.79)	19.00 (55.88)	73.00 (60.83)

Note: Figures in parentheses are percentages to the total

Age and gender-wise distribution of sampled households

Information related to age-wise distribution of the family members was analyzed and has been presented in Table 3. The maximum number of family members was in the age group of 26-40 for both male as well as

female members. In case of male members this group accounted for 31.92 and 34.47 per cent for female category. The number of females per thousand of males ranged between 949 in case of small farm category to 968 in large farms with an average of 954 at the overall level.

Table 3: Age-wise and gender-wise distribution of sampled households. (Number)

Age interval of males (Years)	Small	Large	Overall
Up to 5	11 (5.14)	3 (3.23)	14 (4.56)
6-15	32 (14.95)	17 (18.28)	49 (15.96)
16-25	30 (14.02)	9 (9.68)	39 (12.70)
26-40	66 (30.84)	32 (34.41)	98 (31.92)
41-60	50 (23.36)	20 (21.51)	70 (22.80)
Above 60	25 (11.68)	12 (12.90)	37 (12.05)
Total male	214 (100)	93 (100)	307 (100)

Age interval of females (Years)			
Up to 5	7	7	14
	(3.45)	(7.78)	(4.78)
6-15	19	11	30
	(9.36)	(12.22)	(10.24)
16-25	28	9	37
	(13.79)	(10.00)	(12.63)
26-40	71	30	101
	(34.98)	(33.33)	(34.47)
41-60	49	22	71
	(24.14)	(24.44)	(24.23)
Above 60	29	11	40
	(14.29)	(12.22)	(13.65)
Total female	203	90	293
	(100)	(100)	(100)
Sex Ratio	949	968	954

Note: Figures in parentheses are percentages to the total

Literacy status

The overall literacy rate varied from 92.56 per cent to 93.14 per cent in small and large farm categories, respectively. Table 4 shows that maximum males (27.04%) had completed their senior secondary level and in case of females 19.45 per cent were educated up to senior secondary level. 4.23 per cent of males and 6.83 percent of females were post graduated.

Farm category wise, overall literacy rate was higher on large farms (93.14%) compared to small farms (92.56%). Male literacy rate was higher (95.56%) as compare to the female literacy rate (89.79%). Similar findings have been shown by Sharma *et al.* (2017) where male literacy rate found higher in rural area as compared to female literacy rate.

Table 4: Education status of family members

(Per cent)

Particulars	Small	Large	Overall
Education status (Male)			
Illiterate	5.14	2.15	4.23
NSG	4.67	4.30	4.56
Up to primary	10.75	10.75	10.75
Middle	10.75	16.13	12.38
Matriculation	23.83	23.66	23.78
10+2 level	27.57	25.81	27.04
Graduation	14.02	10.75	13.03
Post-graduation	3.27	6.45	4.23
	(214)	(93)	(307)
Male Literacy rate (%)	94.61	97.75	95.56
Education status (Female)			
Illiterate	9.36	11.11	9.90
NSG	2.46	4.44	3.07
Up to primary	14.78	16.67	15.36
Middle	17.24	17.78	17.41
Matriculation	14.78	16.67	15.36
10+2 level	18.72	21.11	19.45
Graduation	15.27	6.67	12.63
Post-graduation	7.39	5.56	6.83
	(203)	(90)	(293)
Female Literacy rate (%)	90.40	88.37	89.79
Overall Literacy Rate (%)	92.56	93.14	92.74

Note: Figures in parentheses represent total family members

Occupation and employment pattern of the family members

The occupational pattern of working family members revealed that agriculture was the main occupation in both the farming system. 51.11 per cent of working members was engaged in farming followed

by government service (14.81 %) and dependence on agriculture was higher on small farms (51.37 %) as compared to large farms (50.57 %). In subsidiary occupation, about 25.93 per cent of working members were engaged in agriculture.

Table 5: Occupational and employment pattern of family members (Per cent)

Particulars	Small	Large	Overall
Primary			
Govt. Service	14.75	14.94	14.81
Private Service	14.21	10.34	12.96
Agriculture	51.37	50.57	51.11
Business	8.20	9.20	8.52
Pensioner	11.48	14.94	12.59
	100	100	100
	(183)	(87)	(270)
Subsidiary			
MNREGA/labour	12.57	16.09	13.70
Agriculture	24.59	28.74	25.93
No subsidiary	62.84	55.17	60.37
Total	100	100	100
	(183)	(87)	(270)

Note: Figures in parentheses show the total number of working persons in each category.

Workforce

The proportion of active workers was worked out to be 70.50 per cent in small farmers and 66.67 per cent in large farm categories as shown in Table 6. It was assumed that persons in the age group of 15-60 year are actively engaged in useful economic activities and were termed as working force. The dependents were found 29.50 per cent in case of small farmers and 33.33 per cent in the large farmers. The overall

dependency ratio with respect to total workers was found to be 1:0.44 and among the different categories, it was observed 1:0.42 in small farms and 1:0.50 in large farms. Dependency ratio indicates that on an average one worker has to support less than one member in the family in the sampled area. Dependency ratio estimated with respect to family size was found 1:0.31 on an average.

Table 6 : Farm category wise distribution of workers and dependents of the sampled households

Particulars	Small	Large	Overall
Average no. of workers	3.42	3.59	3.47
	(70.50)	(66.67)	(69.33)
Average no. of dependents (< 14yrs & >65 yrs)	1.43	1.79	1.53
	(29.50)	(33.33)	(30.67)
Average size of family (no.)	4.85	5.38	5.00
	(100.00)	(100.00)	(100.00)
Dependency ratio w.r.t. total workers	0.42	0.50	0.44
Dependency ratio w.r.t. Family size	0.29	0.33	0.31

Note: Figures in parentheses are percentages to the total

Livestock inventory

Table 7 displays the inventory and worth of farm animals in the studied area. Indigenous cows' population was higher than other livestock. The average number of indigenous cow varied from 1.01 to 1.18 in small and large farms. Out of total investment

of animal inventory highest investment (42.35 %) was for indigenous cows followed by buffaloes (23.59 %). Thus it makes the indigenous cow as most popular animal among farmers. At overall level, total investment in livestock was Rs. 59,012, which is higher on large farm (Rs. 62,293) as compared to small farms (Rs. 57,715).

Table 7: Livestock inventory on sample farms

Particulars	Small			Large			Overall		
	No./farm	Value (Rs.)	Value (%)	No./farm	Value (Rs.)	Value (%)	No./farm	Value (Rs.)	Value (%)
Cow (Indigenous)									
In milk	1.01	25628	44.40	1.18	23382	37.54	1.06	24992	42.35
Dry	0.15	1709	2.96	0.21	2118	3.40	0.17	1825	3.09
Cow (Improved)									
In milk	0.41	12128	21.01	0.44	11353	18.23	0.42	11908	20.18
Dry	0.10	1105	1.91	0.18	2735	4.39	0.13	1567	2.65
Buffalo									
In milk	0.22	12209	21.15	0.32	16029	25.73	0.25	13921	23.59
Dry	0.08	1093	1.89	0.12	1471	2.36	0.09	1200	2.03
Young Stock	0.21	1698	2.94	0.18	1235	1.98	0.20	1567	2.65
Bullocks	0.12	610	1.06	0.09	529	0.85	0.11	588	1.00
Goat/Sheep	0.58	1535	2.66	0.62	3441	5.52	0.59	2075	3.52
Total	2.88	57715	100.00	3.32	62293	100.00	3.01	59012	100.00

Land utilization pattern

It was observed from the Table 8 that the on an average, farmers had 0.8413 ha/farm of land. Out of total land holdings, 0.5114 ha/farm was cultivated (60.78%), 0.1108 ha/farm was being utilized for orchards (13.17%) and 0.1453 ha/farm was pasture

land (17.27%). Among different farm size categories, the average land holding of large farmers was higher (1.8459 ha/farm) as compared to small farms (0.4442 ha/farm). However, the proportion of cultivated land was higher on small farms (76.75%) as compared to large farmers (51.06%).

Table 8: Land inventory on sample farms

Particulars	(ha/farm)		
	Small	Large	Overall
Owned land	0.4251	1.8918	0.8407
Leased in land	0.0307	0.0271	0.0297
Leased out land	0.0116	0.0729	0.0290
Total Holding	0.4442	1.8459	0.8413
	(100)	(100)	(100)
Cultivated land	0.3409	0.9426	0.5114
	(76.75)	(51.06)	(60.78)
Orchard land	0.0479	0.2701	0.1108
	(10.77)	(14.63)	(13.17)
Land put to non-agricultural uses	0.0296	0.0486	0.0350
	(6.66)	(2.64)	(4.16)
Current fallow	0.0068	0.1197	0.0388
	(1.54)	(6.49)	(4.61)
Permanent Pastures & Grasslands	0.0190	0.4648	0.1453
	(4.27)	(25.18)	(17.27)
Irrigated	0.3000	0.8353	0.4517
	((87.99))	((88.62))	((88.32))
Un-irrigated	0.0409	0.1073	0.0597
	((12.01))	((11.38))	((11.68))

Note: Figures in parentheses show the percentage to the total land holding.

Note: Figures in double parentheses show the per cent to the cultivated land.

Cropping pattern of the sampled households

Natural farming is a mixed cropping system in which more than two crops are grown simultaneously on the same piece of land including leguminous crops which are planted as an intercrop with the primary crop to ensure that the crops complement each other.

Table 9 shows that the net sown and gross cropped area was 0.5114 and 1.0127 ha, respectively. The major crop combinations adopted by the sampled farmers in *Kharif* season were Cereals-pulses (0.1428 ha) followed by Cereals-vegetable (0.0936 ha), Vegetables (0.0879 ha), Vegetables-pulses (0.0802 ha)

and Cereal-vegetables-pulses (0.0453 ha). In *Rabi* season, highest area was under Cereals-pulses combination (0.1489 ha) followed by Cereals-vegetable (0.1156 ha), Vegetables (0.1036 ha), Cereal-vegetables-pulses (0.0703 ha) and Vegetables-pulses (0.0631 ha). Crop diversification leads to profit maximization by taking use of complementary relationships. Agricultural diversification has been stressed at the national level as a strategy for increasing income and creating employment (Devi and Sharma 2022). The table revealed that overall cropping intensity was 198.02 per cent which indicates that there was efficient utilization of cultivated land.

Table 9: Cropping pattern of the sample households (ha)

Farming System	<i>Kharif</i>			<i>Rabi</i>		
	Small	Large	Overall	Small	Large	Overall
Paddy	0.0489 (12.81)	0.0935 (11.14)	0.0615 (12.03)	-	-	-
Cereals-Pulses	0.0921 (24.13)	0.2712 (32.29)	0.1428 (27.93)	0.1546 (32.37)	0.1344 (23.94)	0.1489 (29.70)
Cereals-Vegetables	0.0594 (15.56)	0.1803 (21.47)	0.0936 (18.31)	0.1118 (23.42)	0.1249 (22.26)	0.1156 (23.05)
Vegetables- Pulses	0.0737 (19.33)	0.0967 (11.51)	0.0802 (15.69)	0.0544 (11.39)	0.0849 (15.13)	0.0631 (12.58)
Cereals-Vegetable-Pulses	0.0252 (6.61)	0.0961 (11.44)	0.0453 (8.86)	0.0607 (12.71)	0.0945 (16.83)	0.0703 (14.02)
Vegetables	0.0822 (21.55)	0.1021 (12.16)	0.0879 (17.18)	0.0960 (20.11)	0.1226 (21.84)	0.1036 (20.66)
Total	0.3815 (100.00)	0.8399 (100.00)	0.5114 (100.00)	0.4776 (100.00)	0.5613 (100.00)	0.5013 (100.00)
Net sown area	0.5114					
Gross cropped area	1.0127					
Cropping intensity (%)	198.03					

Note: Figures in parentheses show the percentage to the total land holding.

Gross household income on sample farms

Income is an important factor in understanding the socio-economic status of a family. Higher income reflects higher status of the family in society. Thus, it is very important to know the contribution of each activity undertaken by family members to the household income. It can be seen from the table that in natural farming total income was Rs. 4,75,651/annum/farm. Maximum contribution in income was from agriculture (40.36 %) followed by

government services (18.53 %). Annual farm income at overall level was Rs. 2.50 lakh and annual non-farm income was Rs. 2.25 lakh. Among non-farm income minimum contribution was from business and share of income from pension was around 11 per cent. Though the share of income was lower than non-farming but it helps to reduce the income inequality among the farmers. A similar study was conducted by Sharma *et al.* 2019 concluded that non-farm income helps the farmers to reduce the income inequality.

Table 10: Source-wise annual household income of the sample farms (per cent)

Particulars	Small	Large	Overall
Farm income	(2,25,933)	(3,11,832)	(2,50,271)
Agriculture+ Horticulture	38.41	44.24	40.36
Livestock	12.77	11.25	12.26
Non-Farm Income			
Govt. service	18.77	18.04	18.53
Private service	12.33	8.20	10.94
Business	7.11	6.03	6.75
Pensioner	10.62	12.25	11.16
	(2,15,581)	(2,50,165)	(2,25,380)
Total	100	100	100
	(4,41,514)	(5,61,996)	(4,75,651)

Note: Figure in parentheses shows the income in Rupees/annum/farm.

Constraints faced by the farmers

To analyze the constraints faced by the farmers in adopting natural farming Garrett's ranking technique was employed and Table 11 depicted various problems faced by the farmers in practicing natural farming on the basis of opinion survey. These problems have been

ranked according to the priority by using Garrett's ranking technique. All the sampled farmers in natural farming system confronted thirteen major problems in the study area during the practice and marketing of natural farming.

Table 11: Problems faced by the farmers in natural farming

Sr. No.	Factors	Garrett mean score	Rank
1	Labour intensive	74.95	I
2	Shortage of skilled labour	71.28	II
3	Higher wages rates	66.45	III
4	Lack of market information	58.96	IV
5	Non availability of specialized market	55.77	V
6	low productivity level of naturally grown crops	52.80	VI
7	Lack of adequate information about SPNF	48.07	VII
8	Unfair price for produce in market	44.38	VIII
9	Non-availability of raw material	41.16	IX
10	Lack of Certification	33.27	X
11	lack of irrigation facility	29.10	XI
12	Consumer unawareness about SPNF produce	23.57	XII
13	Lack of extension facilities	5.27	XIII

The thirteen major constraints were identified and ranks were given by farmers to problem. The major problem faced by the farmers were labour intensive (I) followed by shortage of skilled labour (II), high wage rate (III), lack of market information (IV), non-availability of specialized market (V), low productivity level of naturally grown crops (VI), lack of adequate information about SPNF (VII), unfair price for produce in market (VIII), non-availability of raw material (IX), lack of certification (X), lack of irrigation facility (XI), consumer unawareness about SPNF produce (XII), lack of extension facilities (XIII). Lack of extension

facility was ranked last which means extension officers were putting huge efforts to facilitate the farmers regarding natural farming.

Conclusion and Policy Implications

Socio-economic indicators revealed that majority of the sampled households have nuclear families and maximum number of family members was in the age group of 26-40. The number of females per thousand of males was found 954 at the overall level. The overall literacy rate varied from 92.56 per cent to 93.14 per cent in small and large farm categories

respectively. Maximum of farmers were engaged in farming practices followed by services. Livestock inventory revealed that at least one local cow was being reared by the farmers which is very important factor for practicing natural farming. On an average 69.33 per cent were the workers in family at overall level. The overall dependency ratio w.r.t. total worker was worked out to be 1:0.44. On an average, farmers had 0.8413 ha/farm of land, out of which, 0.5114 ha/farm was cultivated land (60.78%), 0.1108 ha/farm was utilized for orchards (13.17%). The major crop combinations adopted by the sampled farmers in *Kharif* season were Cereals-pulses (0.1428 ha) followed by Cereals-vegetable (0.0936 ha), Vegetables (0.0879 ha), Vegetables-pulses (0.0802 ha) and Cereal-vegetables-pulses (0.0453 ha). In *Rabi* season, highest area was under Cereals-pulses combination (0.1489 ha) followed by Cereals-vegetable (0.1156 ha), Vegetables (0.1036 ha), Cereal-vegetables-pulses (0.0703 ha) and Vegetables-pulses (0.0631 ha). Overall cropping intensity was 198.02 per cent. In the studied area maximum contribution in income was from agriculture (40.36 %) followed by government services (18.53 %). Among different constraints, major constraint faced by the farmers was found that it was a labour-intensive technique followed by shortage of skilled labour, high wage rate, lack of market information, non-availability of specialized market etc. By understanding the socio-economic characteristics of the farmers, suitable policy can be implemented to adopt natural farming. Government should implement more policies like income insurance during the initial year of adoption,

more financial support, improvement in market structure etc.

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