

## Agro-climatic Zone-wise Analysis of Women in Farming in Punjab

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**ABSTRACT** Women play a significant and crucial role in agricultural development and allied fields including in the main crop production, livestock production, horticulture, post harvest activities, agro/social forestry, fisheries, etc. This fact has always been taken for granted and also long ignored. However, lack of data hampers the policy makers in clearly understanding the extent of participation of women in farm operations. Women's perspectives can only be included in designing and implementing macro-economic and social policies if their role is adequately understood. In order to understand the present status of rural women vis-a-vis their agro-climatic zone wise participation in farm activities an attempt was made under the Extension component of All India Coordinated Research Project on Home Science. The study in rural Punjab represented by 2980 households from five agro-climatic zones representing five distinct landholding categories clearly indicate an active participation of women in most of the selected activities. Highest participation in farm activities was found in sub-mountainous undulating zone. Women maximum participation was observed in harvesting and weeding.

### I. INTRODUCTION

Today, women play a vital role in agricultural management and production activities in addition to their responsibilities at the homestead level. She is the backbone of the agricultural workforce. She does the most tedious and back-breaking tasks in agriculture, animal husbandry and homes. Sangwan et al. (1990) stated that all women in India, irrespective of land status of the family provide 14 to 18 hours of productive physical labour in different chores. Their contribution to socio-economic development as producers and worker need to be recognized in the formal and informal sectors (including home based workers) and appropriate policies relating to employment and to her working conditions need to be drawn. Another important source of data is Census of India (2001), according to which there are nearly 12 million cultivators, 107.5 million agricultural labourers and 6 million other farm workers engaged in livestock, forestry and plantations. Of the total agricultural labourers, 38.0 per cent were female and 61.9 percent male workers.

Current database on dual role of women needs to be strengthened to benefit them through relevant policies and knowledge/skill enhancing educational strategies that can enable them to play a visible role and reduce their drudgery. The project entitled 'Data Base on Rural Women' was started under the extension component of All India Coordinator Research Project in Home Science at the national level to understand the

role of rural women in diversified agro-climatic conditions. The nature and extent of women's involvement in agriculture, varies greatly from region to region. But even within a region, their involvement varies widely among different ecological sub-zones. Therefore an attempt was made under the project to generate database and compare the participation of women of different agro-climatic zones in farm operations.

### II. METHODOLOGY

**Locale and Sampling:** The data was generated under the project titled 'Data Base on Rural Women and Indigenous Knowledge' a part of the All India Coordinated Project on Home Science (Extension Component) from the state of Punjab. The state was represented by five agro-climatic zones namely Sub-Mountainous Undulating Zone (Zone I), Undulating Plain Zone (Zone II), Central Plain Zone (Zone III), Western Plain Zone (Zone IV) and Western Zone (Zone V). From each zone minimum of two districts were selected which were further represented by two blocks. From each block two villages were selected for data collection. The data was collected through a personal interview using an interview schedule developed for the purpose of studying eleven farm related operations.

Proportionate random sample of 2980 rural women representing the five distinct landholding categories that were landless: 0 acres, small: 0 to 25 acres, marginal: 2.5 to 5 acres, medium:

5 to 10 acres and large: more than 10 acres was taken for the study. Response was sought from the female head of the selected family for participation patterns that were independent participation, their participation along with male members of the family or participation along with female members.

**Scoring:** To study the participation profile the participation was further classified and scored.

**Statistical Analysis:** The data was analyzed using numbers and percentages. The percentages were worked out from the total sample from each zone and then for each participation pattern using the number of women participating in any given activity.

The mean score was calculated using the following formula:

Score obtained per activity

Mean score = (From the number of participant in that activity)/ No. of participants in that activity (n)

Activity wise mean score = Total participation mean of five zones/ Number of zones (5)

Zone wise mean score = Total participation mean of all activities in each zone/ Number of activities (11)

### III. RESULTS

The data has been presented zone wise and in comparison as follows:

#### Zone Wise Participation Profile

**Sub-mountainous Undulating Zone (Zone I):** Out of the total of 600 of rural women from this zone more than 79.67 percent participated in all the farm operations (Table 1). The highest percentage participation was in harvesting and weeding (94.83 %).

The majority of these women (60.11 % and 50.26 %) were jointly performing these operations with other women and more than 10.0 percent were independently involved, indicating that these operations were mostly performed by womenfolk in this zone. However, even when 85.50 percent of the women were participating in transplanting and irrigation management, the majority out of these were performing these operations with men (77.19 %). More than 80.0 percent reported to be

**Table 1: Participation profile of women in zone 1 (n=600)**

Activities	Participants		Type of participation (% of respondents)		
	No.	%	Joint with men	Joint with women	Independent
Seed selection	478	79.67	40.17	58.58	1.26
Seed treatment	473	78.83	90.06	8.88	1.06
Land preparation	498	83.00	74.70	22.89	2.41
Nursery raising	485	80.83	84.33	14.43	1.24
Sowing	498	83.00	80.32	18.47	1.20
Fertilizer application	480	80.00	90.63	8.54	0.83
Transplanting	513	85.50	77.19	18.52	4.29
Irrigation management	513	85.50	77.19	18.52	4.29
Weeding	569	94.83	37.79	50.26	11.95
Plant protection	478	79.67	76.36	21.97	1.67
Harvesting	569	94.83	24.78	60.11	15.11

participating in nursery raising and fertilizer application followed by 79.67 percent in seed selection and plant protection measures. Das (1993) also reported that majority of women farmers in Syria, Thailand, Trinidad and Nigeria were found to be contributing to the labour force regularly for such activities as transplanting, planting, weeding and harvesting. Land preparation, application of pesticides and irrigation were performed less by women farmers, as identified in all the study countries. However, marketing was carried out by more than 88.0 per cent of the women farmers both in Trinidad and Nigeria, as compared to only about 34 per cent in Thailand and 5.0 per cent in Syria. Moreover, as compared to the other three countries, the majority of the women farmers in Nigeria were involved in processing (91.25%), transportation of crops from field (73.13%), storage of crops for family use (71.25%) and threshing/winnowing (56.25%). Most of the women farmers in all the study areas prepared meals for their families and dealt with house maintenance. More than 60.0 percent of women farmers in Nigeria and Syria collected wood for fuel and water for daily use and took care of their children.

**Undulating Plain Zone (Zone II):** The data in Table 2 reveals a high percentage of female participation in farm operations (84.63 % and more) except in seed treatment where only 54.96 percent of the women participated.

The highest level of participation emerged in weeding and harvesting followed by trans-

**Table 2: Participation profile of women in zone 2 (n=553)**

Activities	Participants		Type of participation (% of respondents)		
	No.	%	Joint with men	Joint with women	Independent
Seed selection	468	84.63	44.66	54.91	0.43
Seed treatment	469	54.96	94.03	5.54	0.43
Land preparation	466	84.42	91.02	8.37	0.43
Nursery raising	467	84.60	93.79	5.78	0.43
Sowing	465	84.24	94.41	5.38	0.22
Fertilizer application	464	84.06	97.41	2.37	0.22
Transplanting	472	85.51	83.26	15.47	1.27
Irrigation management	472	85.51	83.26	15.47	1.27
Weeding	481	87.14	72.14	27.23	0.26
Plant protection	470	85.14	81.70	18.09	0.21
Harvesting	481	87.14	55.30	44.07	0.62

planting and irrigation management revealing that the high participation activities were similar to that of Zone I. However, majority of these women were working with male members. Joint participation with men was highest for fertilizer application sowing and seed treatment meaning that women's role in these activities was limited. The trend was different only in case of seed selection in which 54.91 percent of the women were working jointly with other women. Women with women participation was high even in case of harvesting (44.07 %) and weeding (27.23 %). Independent women participation was negligible in this zone.

**Central Plain Zone (Zone III):** Table 3 reveals the participation of women in farm operations in Central Plain Zone. The women participation was lower than the previous two zones. The role of women in this zone was mostly supervisory in large and medium landholdings. In these also, the participation was mostly with menfolk. Out of the total women participants more than 73.12 percent participated with men in farm operations.

The women with women participation were evident only in case of harvesting (28.06 %) and seed selection (25.22 %). In weeding, 21.43 percent women worked with other women and 5.45 percent worked independently.

**Western Plain Zone (Zone IV):** The data reveals the participation of more than 98.13 percent of the women in farm operations. However, this role was limited because of equally

**Table 3: Participation profile of women in zone 3 (n=599)**

Activities	Participants		Type of participation (% of respondents)		
	No.	%	Joint with men	Joint with women	Independent
Seed selection	452	75.46	74.34	25.22	0.44
Seed treatment	451	75.29	98.67	1.11	0.22
Land preparation	452	75.46	98.67	1.33	0.00
Nursery raising	452	75.46	98.67	1.33	0.00
Sowing	452	75.46	99.12	0.88	0.00
Fertilizer application	452	75.46	99.12	0.66	0.22
Transplanting	453	75.63	97.79	2.21	0.00
Irrigation management	453	75.63	97.79	2.21	0.00
Weeding	532	88.81	73.12	21.43	5.45
Plant protection	451	75.29	95.57	4.21	0.22
Harvesting	531	88.65	66.10	28.06	5.84

high percentage of women jointly working with males. More than 90.0 percent performed seed treatment land preparation, nursery raising fertilizer operation seed selection, plant protection and sowing jointly with menfolk.

Independent participation was negligible although joint participation with women was observed in harvesting and weeding with 23.34 percent and 19.93 percent respectively (Table 4). Women were working with men (95.24 %) in plant protection, nursery sowing and seed treatment .

**Table 4: Participation profile of women in zone 4 (n=598)**

Activities	Participants		Type of participation (% of respondents)		
	No.	%	Joint with men	Joint with women	Independent
Seed selection	588	98.33	95.24	4.59	0.17
Seed treatment	588	98.33	100.00	0.00	0.00
Land preparation	587	98.16	99.66	0.34	0.00
Nursery raising	588	98.33	99.49	0.51	0.00
Sowing	588	98.33	96.77	1.70	1.53
Fertilizer application	588	98.33	99.32	0.17	0.51
Transplanting	588	98.33	88.61	9.35	2.04
Irrigation management	588	98.33	88.61	9.35	2.04
Weeding	592	99.00	77.70	19.93	2.36
Plant protection	588	98.33	99.15	0.17	0.68
Harvesting	591	98.83	71.91	22.34	5.75

**Western Zone (Zone V):** The participation of rural women of Zone V was similar to that

in Zone IV with majority participating in farm operations (more than 89.54%) but with men-folk. More than 92.46 percent women were working with male members in nine operations. It was only harvesting and weeding operations which were performed by 39.31 percent and 20.72 percent of women respectively with other women (Table 5). Independent participation was negligible in all the activities.

**Table 5: Participation profile of women in zone 5 (n=650)**

Activities	Participants		Type of participation (% of respondents)		
	No.	%	Joint with men	Joint with women	Independent
Seed selection	582	89.54	98.63	1.20	0.17
Seed treatment	581	89.38	99.83	0.17	0.00
Land preparation	598	92.00	96.49	3.34	0.17
Nursery raising	597	91.85	96.82	3.02	0.17
Sowing	599	92.15	96.49	3.34	0.17
Fertilizer application	582	89.54	99.48	0.52	0.00
Transplanting	610	93.85	92.46	7.38	0.16
Irrigation management	610	93.85	92.46	7.38	0.16
Weeding	642	98.77	78.35	20.72	0.93
Plant protection	583	89.69	97.77	2.063	0.17
Harvesting	641	98.62	57.25	9.31	3.43

**Zone Wise Comparison:** The data in Table 6 shows the overall comparison of the zones with respect to participation level of women in farm operations. The overall view shows that women were participating in all the farm operations

regardless of agro-climatic zone. As reported by Aggarwal et al. (1998), women were participating in majority of the farm related activities.

The highest mean score of 1.35 for Zone I reveals that women of this zone participated more in farm operations as compared to other zones. This was followed by Zone II with a score of 1.19. The other three zones had nearly similar level of participation.

With regard to zone IV and V, even when the participation of women as shown in Table 4 and Table 5 was more than Zone III, the overall mean score was nearly same. This can be attributed to their high participation but lesser independent or women with women participation.

The activity wise analysis show women playing important role in harvesting, weeding followed by seed selection. The lowest score of 1.03 for seed treatment and fertilizer application is an indicator of low level of women participation in these activities. The harvesting operation ranked first in all the zones except Zone II where seed selection was followed by harvesting.

#### IV. DISCUSSION

**Sub-mountainous Undulating Zone (Zone I):** The highest percentage participation was in harvesting and weeding indicating that these operations were mostly performed by women-folk in this zone either independently or jointly with other women. While joint participation with men in transplanting and irrigation man-

**Table 6: Zone wise comparison between the participation of women in farming activities**

Activities	Zone I		Zone II		Zone III		Zone IV		Zone V		Activity wise mean score
	Mean score	Rank	Mean score	Rank	Mean score	Rank	Mean score	Rank	Mean score	Rank	
Seed selection	1.61	III	1.56	I	1.26	III	1.05	V	1.02	VIII	1.3
Seed treatment	1.11	X	1.06	IX	1.02	V	1.00	X	1.00	XI	1.03
Land preparation	1.28	IV	1.09	VII	1.01	VIII	1.00	X	1.04	V	1.08
Nursery raising	1.17	IX	1.07	VIII	1.01	VIII	1.01	VIII	1.03	VII	1.05
Sowing	1.21	VIII	1.06	IX	1.01	VIII	1.05	V	1.04	V	1.07
Fertilizer application	1.10	XI	1.03	XI	1.01	VIII	1.01	VIII	1.01	X	1.03
Transplanting	1.27	V	1.18	V	1.02	V	1.13	III	1.08	III	1.13
Irrigation mgt.	1.27	V	1.18	V	1.02	V	1.13	III	1.08	III	1.13
Weeding	1.74	II	1.28	III	1.32	II	1.25	II	1.23	II	1.36
Plant protection	1.25	VII	1.19	IV	1.05	IV	1.02	VII	1.02	VIII	1.10
Harvesting	1.90	I	1.45	II	1.40	I	1.34	I	1.46	I	1.51
Zone wise mean score	1.35		1.19		1.10		1.09		1.09		

agement was observed. The women with women participation was observed to high in case of seed selection (58.58 %). Goyal et al. (2003) conducted a study in the Balachaur and Saroya blocks of Nawanshahr districts of sub-mountainous zone of Punjab. They found that farm women were participating in weeding, harvesting with least participation in plant protection measures, raising nursery for seedling and ploughing. With very small landholdings in this area, the major activities of farming which were mostly drudgery laden were performed by women.

Seed treatment and fertilizer application were male centered operations with majority of the women working with male members. This can be attributed to the technical component of these operations which women might not be competent to handle. The high level of women participation in farm operations in Zone I can be attributed to very small landholdings in the foothills which lead to menfolk seeking other employment opportunities outside the villages, leaving women to perform most of the task at the farm level. They return to perform major farm operations at the time of sowing and harvesting.

**Undulating Plain Zone (Zone II):** Independent women participation was negligible in this zone as most of the activities were performed jointly with menfolk. This variation in comparison to Zone I can be due to the reason that menfolk in Zone I were working at much greater distance away from home than the men in this zone, who covered far lesser distance and could even return home in the evening. More so, the zone being more developed than the sub-mountainous zone, families had more income generating avenues than Zone I.

**Central Plain Zone (Zone III):** The women participation was lower than the previous two zones because of the zone being more developed with important towns /cities of the state. High level of farm mechanization, education and additional income from abroad in comparison to other zones effect the participation of the women in farm operations.

**Western Plain Zone (Zone IV):** Independent participation was negligible although joint participation with women was observed. Lower level of participation is observed in all the operations where some kind of knowledge/skill

is required. This can be attributed to low level of technical knowledge/skill among rural women which is required to perform modern day agricultural tasks.

**Western Zone (Zone V):** Independent participation was negligible in all the activities. It was the labor intensive work during harvesting, weeding and transplanting which showed more of participation of women in physically taxing farm operations. With large size of landholdings the farm operations are mechanized. Higher income from large medium and large landholdings leave only the women of the landless and marginal families to work as labourers and perform farm activities. Reddy (2003) also stated that transplanting is a woman's job and is the most labor-intensive operation because saplings are planted in the knee-deep water for the whole day under the scorching sun and pouring rain. Weeding, that is plucking out the weeds is done after transplanting. Generally women and children are employed for this. Harvesting is a major agricultural activity, which is strenuous, where both men and women take part in paddy fields. With the help of sickle they cut the paddy and leave the bundles to dry in the fields.

**Zone Wise Comparison:** Studies on women in agriculture conducted in India and other developing and under developed countries all point to the conclusion that women contribute far more to agricultural production than has generally been acknowledged (Aggarwal 2003). The nature and extent of women's involvement in agriculture, no doubt, varies greatly from region to region. Even within a region, their involvement varies widely among different ecological sub-zones, farming systems, castes, classes and stages in the family cycle. But regardless of these variations, there is hardly any activity in agricultural production, except ploughing in which women are not actively involved. In some of the farm activities like processing and storage, women predominate so strongly that men workers are numerically insignificant (Aggarwal 2003). The present study too points out towards this fact. The overall view shows that women were participating in most of the farm operations regardless of agro-climatic zone.

Women of Zone I participated more as compared to other zones followed by Zone II. The other three zones had nearly similar level of

participation. Zone I being sub-mountainous zone of Punjab state with very small landholdings that too on the foothills of *Shivalik* ranges offered very less opportunities for high farm income. The menfolk work outside the village depending upon their education level or the skills, leaving women to look after the farming operations.

Participation of women in Zone IV and V was more than Zone III but nearly equal mean scores can be attributed to lesser independent or women with women participation. Women contribute significantly in these two zones but the involvement of men in farming leaves lesser scope for women to work independently whereas in Zone III men are also involved in other activities due to higher level of overall development thus enhancing the supervisory role of women. As reported by Reddy (2003), some women work in their own farm due to lack of labourers. This dearth of labourers persists when more labourers migrate to fertile areas for want of better work and pay. Women who supervise the farm activities performed by the labourers generally belong to higher social strata.

## V. CONCLUSION

In overall farm production, women's average contribution is estimated at 55 per cent to 66 per cent of the total labour with percentages, much higher in certain regions (Shiva 1991). Women in Punjab are performing farm operations and as the scenario in the country, their participation also varies across agro-climatic zones. The common aspect that has emerged out of the present study is their participation in drudgery laden farm operations such as harvesting and weeding. Participation level in these activities is more than those which need some technical know-how. The mode of female participation in agricultural production varies with the landowning status of farm households. Their roles range from managers to landless labourers.

## VI. RECOMMENDATIONS

In view of the findings, it becomes imperative to scientifically educate and train women in specialized skill so that they too can improve and sharpen their skills and abilities for performance of tasks which need some technical knowledge and skill

In view of the critical role of women in the agriculture as producers, concentrated efforts need to be made to ensure that benefits of training, extension and various programs reach them in proportion to their participation pattern. Strategies should be designed to enhance the capacity of women and empower them to meet the future participatory needs in farm operations.

Special training programmes for women will enhance their skills and strengthen faith in them for effective and independent performance of farm operations and help them to make a shift from physically enduring operations to specialized tasks.

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