

Review Article

# Impact of Agricultural Diversification on the Pattern of Human Labour Utilization Among the Households – A Case Study of Mid Hill Zone of Himachal Pradesh

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**Abstract** - This study has been conducted among the different households in the Mid Hill Zone of Himachal Pradesh to study the pattern of human labour utilization before and after agricultural diversification. The impact of agricultural diversification on labour utilization has also been worked out among households. This study reveals that there is a change in the utilization of labour man-days after agricultural diversification. Before diversification, households were utilizing more labour mandyas in the production of traditional crops, i.e. food-grain crops, but after diversification, more labour man-days have been utilized in the production of high income yielding cash crops, i.e. vegetables, horticultural and floricultural crops. On the other hand, households are also getting more employment in the production of these cash crops.

**Keywords** - Agricultural Diversification, Human labour, Household, Pattern, Utilization.

## I. INTRODUCTION

The present study is conducted to work out the pattern and impact of agricultural diversification on human labour utilization in the Mid Hill Zone of Himachal Pradesh. This study reveals the utilization of human labour in food-grain crops, vegetables, livestock, horticultural and floricultural crops before agricultural diversification and the impact on human labour utilization after diversification. This is explained with the help of primary data collected and presented in the tables.

## II. OBJECTIVES OF THE PRESENT STUDY

The specific objectives of the present study are: -

1. To study the pattern of human labour utilization before agricultural diversification in the study area.

2. To study the pattern of human labour utilization after agricultural diversification in the study area.
3. To study the impact of agricultural diversification on human labour utilization in the study area.

## III. STATISTICAL TOOLS OF ANALYSIS

After arranging the data in homogeneous categories and by working out the averages and percentages, the following statistical tools have been used:

### A. Standard Man days

Due to differences in the work efficiency of male, female, children, and old persons, the family human labour days have been converted into Standard Man Days by allotting the proper co-efficient of efficiency, i.e. one Woman Day (WD) will be treated equally to 0.75 Man Days (MD). One Child Day (CD) has been treated equally to one Old Person Day (OD), and both have been treated equally to 0.50 MD.

Thus:  $1\text{ CD} = 1\text{ OD} = 0.50\text{ MD}$

$1\text{ WD} = 0.75\text{ MD}$

### B. Herfindahl Index

The Herfindahl Index has been used to study the extent of agricultural diversification in the present study. The specification of this method is as under:-

$$H = \sum_{i=1}^n P_i^2$$

Where H = Herfindahl index

P<sub>i</sub> = Proportion of area under i<sup>th</sup> crop.



$$P_i = \frac{A_i}{\sum_{i=1}^n A_i}$$

In which  $A_i$  = Area under  $i$ th crop (hectare),

$\sum_{i=1}^n A_i$  = Total cropped area (hectare)

$i = 1, 2, 3, \dots, n$  (Number of crops)

$N$  = Total number of crops

The value of the Herfindahl index (H) varies from zero to one; with the increase in diversification, the Herfindahl index would decrease. This index takes a value one when there is no diversification and when there is a complete specialization, it approaches zero as  $N$  get large, i.e. if diversification is 'perfect'. It has an inverse relationship with diversification.

**IV. PATTERN OF HUMAN LABOUR UTILIZATION BEFORE AGRICULTURAL DIVERSIFICATION**

The pattern of human labour employment in food-grain crops, vegetables, horticulture, floriculture and livestock activities before agricultural diversification have been

presented in Table 1 for all sizes of holdings per year. The labour utilized for food-grain crops has been calculated 130.65, 215.02, 289.49 and 372.02 standard man-days on the marginal, small, semi- medium, and medium size of holdings, respectively, whereas for all sizes of holdings together, these standard man-days has been worked out 222.11. In terms of percentage, 38.88, 42.56, 45.35, and 46.59 per cent of the total man-days have been allocated for food grain crops on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all sizes of holdings together has been worked out 43.26 per cent. The per year per household standard man-days allocated for non-food grain crops has been worked out 25.78, 49.76, 80.94 and 147.32 on the marginal, small, semi-medium and medium size of holdings respectively, whereas, for all sizes of holdings together, 62.53 standard man-days have been allocated. In terms of percentage, 7.67, 9.85, 12.68, and 18.45 per cent of the total standard mandays have been allocated on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage has been worked out 12.18 per cent on all size of holdings together.

**Table 1. Per Year Household Standard Mandays Utilized Before Agricultural Diversification By the Sample Households (Standard Man- Days)**

Particulars	Marginal Holdings	Small Holdings	Semi- Medium Holdings	Medium Holdings	All Holdings
Food Grain Crops	130.65 (38.88)	215.02 (42.56)	289.49 (45.35)	372.02 (46.59)	222.11 (43.26)
Non- Food Grain Crops (Vegetables)	25.78 (7.67)	49.76 (9.85)	80.94 (12.68)	147.32 (18.45)	62.53 (12.18)
Livestock	179.56 (53.44)	240.45 (47.59)	267.97 (41.97)	279.15 (34.96)	228.78 (44.56)
Horticulture	_____	_____	_____	_____	_____
Floriculture	_____	_____	_____	_____	_____
Total Mandays	335.99 (100)	505.23 (100)	638.34 (100)	798.49 (100)	513.42 (100)

**Note:** Figures in parentheses indicate percentages to the column total.  
 - Indicates Nil Human Labour Utilization.

The livestock activities have been another important activity before agricultural diversification, for which the standard mandays allocated has been worked out 179.56, 240.45, 267.97 and 279.15 on the marginal, small, semi-medium and medium size of holdings respectively, whereas this number has been worked out 228.78 among the all size of holdings together. In terms of percentage, 53.44, 47.59, 41.97 and 34.96 per cent standard mandays has been utilized on the marginal, small, semi- medium, and medium size of holdings, respectively, whereas for all sizes of holdings together, this percentage has been worked out 44.56 per cent.

This table further shows an increasing tendency with an increase in the size of holdings in the utilization of mandays for food-grain crops and vegetables due to the reason that all the holdings groups have been more dependent on these crops before agricultural diversification whereas contrary to it in case of livestock activities although in terms of absolute numbers of mandays show an increasing tendency, the percentage of mandays utilized shows a decreasing tendency with an increase in the size of holdings mainly due to the reason that the small farmers due to their uneconomic size of holding devote more time for livestock activities.

**V. PATTERN OF HUMAN LABOUR UTILIZATION AFTER AGRICULTURAL DIVERSIFICATION**

The pattern of human labour employment in food-grain crops, vegetables, horticulture, floriculture and livestock activities after agricultural diversification has been presented in Table 2 for all sizes of holdings. The labour mandays utilized for food grain crops have been calculated 63.06, 110.46, 150.65 and 197.79 standard mandays on the marginal, small, semi- medium and medium size of holdings, respectively, whereas, for all sizes of holdings together, this number has been worked out 115.42. In terms of percentage, 13.56, 14.91, 15.19 and 15.21 per cent of the total mandays has been allocated for food grain crops on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all sizes of holdings together, has been worked out 14.77 per cent. The per year per household standard mandays allocated for non-food grain

crops has been worked out 178.68, 303.02, 436.68 and 608.03 on the marginal, small, semi- medium and medium size of holdings respectively, whereas, for all sizes of holdings together, this number came out 325.29 standard mandays. In terms of percentage, 38.42, 40.90, 44.03 and 45.44 per cent of the total standard mandays has been allocated on the marginal, small, semi- medium, and medium size of holdings, respectively, whereas this percentage has been worked out 41.64 per cent for all size of holdings together. The livestock activities have been another important activity after agricultural diversification; for this, the standard mandays allocated has been worked out 180.14, 250.69, 283.10 and 299.19 on the marginal, small, semi- medium and medium size of holdings, respectively, whereas 238.97 standard mandays have been utilized by all size of holdings together.

**Table 2. Per Year Household Standard Mandays Utilized After Agricultural Diversification By the Sample Households (Standard Man- Days)**

Particulars	Marginal Holdings	Small Holdings	Semi-Medium Holdings	Medium Holdings	All Holdings
Food Grain Crops	63.06 (13.56)	110.46 (14.91)	150.66 (15.19)	197.79 (15.21)	115.42 (14.77)
Non- Food Grain Crops (Vegetables)	178.68 (38.42)	303.02 (40.90)	436.68 (44.03)	608.03 (45.44)	325.29 (41.64)
Livestock	180.14 (38.73)	250.69 (33.83)	283.10 (28.55)	299.19 (22.36)	238.97 (30.59)
Horticulture	26.74 (5.75)	45.34 (6.12)	67.92 (6.85)	141.57 (10.58)	62.15 (7.95)
Floriculture	16.46 (3.54)	31.41 (4.24)	53.36 (5.38)	91.53 (6.84)	39.38 (5.04)
Total Standard Mandays	465.08 (100)	740.92 (100)	991.72 (100)	1338.11 (100)	781.21 (100)

**Note:** Figures in parentheses indicate percentages to the column total.

The percentage of mandays utilized in livestock activities after agricultural diversification has been worked out 38.73, 33.83, 28.55 and 22.36 per cent on the marginal, small, semi- medium, and medium size of holdings respectively, whereas on all sizes of holdings together, this percentage came out 30.59 per cent. Horticulture and floriculture have now become significant sources of income after agricultural diversification among the sample households. The standard mandays utilized in the horticultural crops has been worked out 26.74, 45.34, 67.92 and 141.57 on the marginal, small, semi- medium and medium size of holdings, respectively, whereas on all size of holdings together, these mandays has been worked out 62.15. In terms of percentage, the standard mandays allocated for horticulture has been worked out 5.75, 6.12, 6.85 and 10.58 on the marginal, small, semi- medium and medium size of holdings respectively, whereas, for all sizes of holdings together, this percentage came out 7.95 per cent. Taking

floricultural crops, another important source of income after agricultural diversification, the number of mandays allotted came out 16.46, 31.41, 53.36 and 91.53 standard mandays on the marginal, small, semi-, medium and medium size of holdings respectively, whereas, for all sizes of holdings together, this number came out 39.38 standard mandays. In terms of percentage, 3.54, 4.24, 5.38, and 6.84 per cent of the total standard mandays have been allocated on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all sizes of holdings together has been worked out 5.04 per cent.

This table shows that there has been an increasing tendency in the percentage of mandays utilization with an increase in the size of holdings in case of food grain crops, vegetables, horticulture and floriculture due to the reason that all these holdings consider these crops more remunerative after agricultural diversification while in case of livestock activities, the percentage of mandays utilized shows

decreasing tendency with an increase in the size of holdings due to the reason that the smaller holdings are still more dependent on livestock activities for supplementing their household income. It has also been observed that after agricultural diversification, more household labour has been utilized due to the reason that all the sample households have now got enough work in their own agricultural, horticultural, floricultural and livestock activities.

### VI. IMPACT OF AGRICULTURAL DIVERSIFICATION ON THE PATTERN OF HUMAN LABOUR UTILIZATION

The pre and post-agricultural diversification situation has been presented in Table 3, which clearly reveals that due to the shift from the food grain crops to vegetables, horticultural and floricultural crops, the percentage of mandays utilized in food grain crops has been decreased by 20.12, 20.69, 21.75 and 21.82 per cent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this decrease came out 20.78 per cent on all holdings together.

**Table 3. Change in Household Annual Standard Mandays After Agricultural Diversification Among the Sample Households (Standard Mandays)**

Particulars	Marginal Holdings	Small Holdings	Semi-Medium Holdings	Medium Holdings	All Holdings
Food Grain Crops	-67.59 (-20.12)	-104.56 (-20.69)	-135.83 (-21.75)	-174.23 (-21.82)	-106.69 (-20.78)
Non- Food Grain Crops (Vegetables)	+ 152.90 (+45.51)	+253.26 (+50.13)	+355.74 (+55.73)	+460.71 (+57.70)	+262.76 (+51.18)
Livestock	+0.58 (+0.17)	+10.24 (+2.03)	+15.19 (+2.38)	+20.04 (+2.51)	+10.19 (+1.98)
Horticulture	+26.74 (+7.96)	+45.34 (+8.97)	+67.92 (+10.64)	+141.57 (+17.73)	+62.15 (+12.10)
Floriculture	+16.46 (+4.90)	+31.41 (+6.22)	+53.36 (+8.36)	+91.53 (+11.46)	+39.38 (+7.67)
Total Change	+129.09 (+38.42)	+235.69 (+46.65)	+353.38 (+55.36)	+539.62 (+67.58)	+267.79 (+52.16)

**Note:** Figures in parentheses indicate a percentage increase or decrease in column total.  
 + Indicates increase.  
 - Indicates decrease.

Table 3 clearly shows that after agricultural diversification, there has been a decreasing tendency in the household labour days utilization for food-grain crops with an increase in the size of holdings because of the fact that large size of holdings had been utilizing more household labour now for the production of cash crops such as vegetables, horticultural and floricultural crops. The percentage increase in the labour days utilized in the production of vegetables has been worked out the highest as compared to other crops among all the size of holdings. The percentage increase in labour utilization for the production of vegetables has been worked out 45.51, 50.13, 55.73 and 57.70 per cent on the marginal, small, semi- medium, and medium size of holdings, respectively, whereas this percentage increase for all sizes of holdings together, has been worked out 51.18 per cent. In the case of livestock activities, the percentage of mandays utilized shows an increasing tendency with an increase in the size of holdings. The percentage increase in the mandays utilized for livestock activities has been worked out 0.17, 2.03, 2.38 and 2.51 per cent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage increase for

all sizes of holdings together, has been worked out 1.98 per cent.

This table further shows that after agricultural diversification, horticultural and floricultural crops are emerging as more significant sources of increased income of the sample households. The percentage increase in the mandays utilized for the production of horticultural crops has been calculated 7.96, 8.97, 10.64 and 17.73 per cent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage increase for all sizes of holdings together, has been worked out 12.10 per cent. In the case of floricultural crops, the percentage increase in the mandays utilized has been worked out 4.90, 6.22, 8.36 and 11.46 per cent among the marginal, small, semi- medium and medium size of holdings respectively, whereas for all holdings together, this percentage increase in mandays has been worked out 7.67 per cent. This table clearly reveals that there has been an increase in the overall mandays utilized due to the fact that there has been a significant increase in the income of all the holdings after agricultural diversification. The percentage increase in the overall mandays utilized has been worked out 38.42, 46.65, 55.36 and 67.58 per cent on the marginal, small, semi- medium and medium size of

holdings respectively, whereas this percentage increase for all size of holdings together, has been worked 52.16 per cent. This table clearly shows that there has been a significant change in employment after agricultural diversification, i.e. now all the sample households have got enough employment on their own holdings in agricultural, horticultural, floricultural and livestock activities.

## VII. CONCLUSION

This study reveals that agricultural diversification has brought a huge change in human labour utilization in the study area. Before agricultural diversification, more labour mandays have been used in the production of traditional crops, i.e. food-grain crops and livestock activities. After agricultural diversification, now more labour mandays are being used for the production of high income yielding cash crops, i.e. vegetables, horticultural and floricultural crops. This study reveals that there is a 20.78 per cent annual decrease in the utilization of human mandays for traditional crops, i.e. food-grain crops, due to agricultural diversification. On the other hand, now more labour mandays have been utilized for the production of cash crops such as vegetables, floricultural and horticultural crops. This annual increase of labour mandays has been worked out 51.18 per cent for vegetables, 12.15 per cent for horticultural and 7.67 per cent for floricultural crops respectively.

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