

## **Watershed Management and Its Impact on Economic Development A Geographical Study on Dholpur District**

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### **Abstract**

The goal of the current research, "Impact of Integrated Watershed Development Programme in Rajasthan," was to determine the amount to which the watershed affected farmers' employment, income, and consumption. The district of Dholpur was chosen since it has the most watersheds in the zone. The Dholpur area was specifically chosen for this investigation. It has the most watersheds overall. A total of four watersheds from the Dholpur district were chosen by drawing lots: two watersheds from Gambir and two from Chambal. Farmers who were beneficiaries and those who were not were chosen using a multi-stage random sample method for the current research. A random sample of 40 farmers (beneficiaries) was chosen from the specified watersheds. The integrated watershed improvement project assisted in raising consumption expenditures, which ranged from a minimum of Rs. 2187 for big farmers to a maximum of Rs. 6506 for medium farms annually. The annual additional consumer spending for marginal, small, medium, and big farmer households was, respectively, Rs. 5817, \$4420, \$6506, and 21.87. The study's results demonstrate that the IWDP's influence on consumption patterns and spending was not uniform. Different kinds of recipient households had relative increases in consumer spending at differing rates. The same applied to spending on numerous components, including construction materials, gasoline, food, clothes, and education. For all categories of recipient farmers, there was an absolute and % increase in yearly employment. Marginal farmers had the largest percentage gain in employment (36.25%), followed by small (25.82%), medium (2.69%), and big (2.64%) farms.

**Keywords:** IWDP, Panchayat samities, Employment, Consumption, and Expenditure

### **Introduction**

The main method for transferring rainfed agricultural technology is the watershed technique. Understanding the significance of rainfed/dry land agriculture, soil and water conservation techniques have been acknowledged as key inputs for raising agricultural output in the nation. Programmes for conserving soil and water were started during the first year plans in both the state

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and federal sectors in an effort to stop soil erosion. Unirrigated arable areas with moisture levels between 500 and 1125 mm and above were subjected to the National Watershed Development Project for Rainfed Areas (NWDPA, 1986–1987). It is clear that irrigation has a positive effect on the expansion of rural job opportunities for agricultural labourers and independent family workers. Although irrigation itself requires more agricultural labour, the potential for on-farm employment for other businesses related to irrigation further improves the employment prospects in rural areas. It also necessitates more rural employment since agricultural intensity in irrigated regions tends to increase. A large number of agricultural input and product transactions in irrigated regions creates new job opportunities in rural communities. In places with irrigation, the revenue from animals also gets help. As a result, people adopted modern irrigation technology, which enhanced the usage of better inputs (seed, fertiliser, insecticides, etc.)

### **Methodology**

The Dholpur area was specifically chosen for this investigation. It has the most watersheds overall. A total of four watersheds from the Dholpur district were chosen by drawing lots: two watersheds from Gambir and two from Chambal. For the purpose of the current research, both benefactor and non-benefactor farmers were chosen using a multi-stage random sample method. 40 farmers (beneficiaries) from the identified watersheds were chosen at random. An equal number of non-beneficiaries were also chosen at random from the same or a neighbouring location as the control group of respondents, making a total of 80 respondents in the sample, 40 of whom were beneficiaries and 40 of whom were not.

Additionally, the chosen farmers were divided into four groups: small, medium, big, and marginal farmers. Marginal farmers are those whose land size is less than one hectare. Small, medium, and large farmers are those whose land area is between one and four hectares.

### **Collection of data**

For the years 2013–2014, primary data were gathered from chosen respondents using the personal interview technique. The Directorate of Soil and Water Conservation in Dholpur, Rajasthan, provided secondary data collection.

Costs associated with these activities were used to calculate the income from farming and raising cattle. The overall revenue is calculated by summing the income from crops, animals, and wages earned from working on the farm. The following estimate represents the changes in gross and net returns brought on by the Intergraded Watershed Development Programme:

### **Change in net return**

Net return = Gross return - Total Expenditure

### **Change in employment level**

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Family members' employment was measured in man-days spent on all activities in order to determine changes in employment levels. By comparing the employment levels of beneciar families to those of non-beneciar families throughout the course of the research period, trends in employment generation were examined. The total employment was calculated by aggregating the employment hours for agricultural, animal, and crop operations.

#### **Change in consumption expenditure**

He changes in the consumption by the beneficiaries were assessed by calculating marginal propensity to consume (MPC).

$$MPC = \Delta C / \Delta Y = \text{Changes in consumption} / \text{Changes in income}$$

Where,

MPC = Marginal propensity to consume,

C = Expenditure on consumption items,

Y = Income of the family

#### **Results and Dissuasion**

##### **Changes in income level**

##### **Net returns per hectare for both benevolent and unbenevolent farmers**

Table 1 shows the average yearly gross return produced per hectare, expenses spent, and subsequent net return accruing to non-beneficial and beneficial households from crops. The largest per hectare net return from crops and their byproducts was created by medium farmers (29498), whilst the smallest return was provided by big farmers, or 22967. This was most likely caused by the fact that medium farmers spent the least amount of money (5148) on crop production. For small and medium farms, the per-hectare gross returns earned varied from 28491 to 34646. In the instance of Beneficiary, the greatest per hectare net return from crops and their byproducts was achieved by medium farmers (30518), while the least, or 26052, was achieved by small farmers. This was most likely caused by the fact that on medium farms, the gross return was at its highest (35668), while on small farms, it was at its lowest (31561). The least amount, 5150 dollars per hectare, was spent on crop production by medium farmers, while the most, 6911 dollars, were spent by big farmers.

For small and medium farmers, respectively, the per-hectare net return produced ranged from 26052 to 30518 (Table 1).

Category	Non-beneficiary farmers			Beneficiary farmers		
	Gross return	Expenditure	Net return	Gross return	Expenditure	Net return
1	2	3	4 = (2-3)	5	6	7= (5-6)
1. Marginal farmers	33827	5920	27907	35594	5432	30162
2. Small farmers	28491	5524	22967	31561	5509	26052
3. Medium farmers	34646	5148	29498	35668	5150	30518
4. Large farmers	32570	6600	25970	34791	6911	27880

**Table 1: Annual gross return generated, expenditure incurred and resultant net return accrued to non- Beneficiary and Beneficiary farmers from crops (2021-2022) (Hectare/Annum).**

#### **Change in Beneficiary's net return per hectare**

Table 2 displays the yearly net return of benefactor farmers relative to non-benefactor farmers in terms of he per hectare absolute and percent increase. The study's findings showed that marginal farmers who received IWDP help for crops were able to enhance their yearly net return per hectare by 2255 above and above the 27907 earned by the nonbeneficiary farmers. It was almost 8.08 percent greater than that of farmers who did not get benefits. Small beneficiaries increased their yearly net return per hectare by 3085 over and above the 22967 received by non-beneficiaries. In percentage terms, it was around 13.43% more than that of farmers who did not get benefits.

The yearly net return per hectare for medium-beneficiary farmers increased by 1020 over and above the 29498 obtained by nonbeneficiary farmers. In percentage terms, it was almost 3.45% greater than that of farmers who did not get benefits. The yearly net return per hectare of big farmers who received IWDP support for crops increased by 1910 above and above the 25970 gained by non-beneficiary large farmers. It was almost 7.35 percent greater than that of farmers who did not get benefits. Us, it is clear that all types of beneficiary farmers saw net returns that were higher in absolute terms and in percentage terms than those of non-beneficiaries. Small farmers (3085) saw the largest rise in net return per hectare, followed by marginal farmers (2255), big farmers (1910), and medium farmers (1020).

#### **Changes in consumption level**

The overall amount spent on consumption was divided into six categories: construction, fuel, food, clothes, and education. The influence of IWDP on consumption spending was evaluated by comparing the changes in benefactor families' consumption expenditure to non-benefactor families' over the

research period. The following headings (Table 2) describe the spending patterns and relative changes of benefiting and non-beneficiating households.

Category	Average net return of beneficiary	Average net return of non-beneficiary	Absolute increase in net return of beneficiary over non-beneficiary	Per cent increase in net return
1	2	3	(4 = 2-3)	5
1. Marginal farmers	30162	27907	2255	8.08
2. Small farmers	26052	22967	3085	13.43
3. Medium farmers	30518	29498	1020	3.45
4. Large farmers	27880	25970	1910	7.35

**Table 2: Change in annual net return of Beneficiary farmers over non- Beneficiary farmers from crops on different size group of farms (2021-2022) (Hectare/Annum).**

Consumption spending trends of non-beneficiary households

Table 3 shows the average yearly consumption costs spent by the nonbeneficiary households on several headings. In terms of consumption, it was found that non-beneficial marginal farmers spent 98.20 percent (23517) of their total net return (23948), small farmers spent 98.57 percent (34781) of their total net return (35285), medium farmers spent 88.95 percent (67180) of the total net return (75519), and large farmers spent 74.25 percent (102000) of their total net return (137366). Families with financial need who fall into various groups spend a significant amount of their consumption budget on food items, ranging from roughly 54.00% of big farmers to 76.00% of marginal farmers. As the farm size expanded, the proportion of total net return that was spent on food declined. This was most likely caused by the average family size on marginal and big farms being almost identical, as well as the fact that net returns on various types of farms varied greatly. All the non-beneficiary households under examination gave buildings the least amount of attention out of the six components of consumer spending. For all types of non-beneficiary households, spending on this item only made from 3.49 to 5.55 percent of total consumption expenditures. Different groups of non-beneficiary households spent about the same amount on apparel, or 5.50 percent of all consumption expenditures.

During the research period, schooling expenses varied from as low as 4.50 percent (1060) for marginal farmers to as high as 12.47 percent (8379) for medium farmers. The percentage of total consumption expenditure that was spent on gasoline by various types of non-beneficiary households ranged from 6.48 to 8.82 percent. Thus, it can be deduced that as farm size rose, absolute spending on

all goods increased, but in terms of percentage, it fell in the case of food products, and no discernible trend was detected on other expenditure items on non-beneficial farms (Table 3).

Category	Expenditure on						Total consumption expenditure	Net return accrued	Difference	Consumption expenditure as percentage of net return (%)
	Food	Clothing	Education	Fuel	Buildings	Others				
1	2	3	4	5	6	7	8	9	10	11
Marginal	17850 (75.90)	1365 (5.80)	1060 (4.50)	1525 (6.48)	822 (3.49)	895 (3.80)	23517 (100.00)	23948	431	98.20
Small	25824 (74.24)	1846 (5.30)	1723 (4.95)	2261 (6.50)	1477 (4.24)	1650 (4.74)	34781 (100.00)	35285	504	98.57
Medium	43000 (64.00)	3333 (4.96)	8379 (12.47)	5057 (7.53)	3730 (5.55)	3681 (5.48)	67180 (100.00)	75519	8339	88.95
Large	55000 (53.92)	5000 (4.90)	8000 (5.88)	9000 (8.82)	5000 (4.90)	22000 (21.56)	102000 (100.00)	137366	35366	74.25

\*Figures in parentheses are percentages of total consumption expenditure of the respective category.

**Table 3: Annual consumption expenditure incurred by non- beneficiary families on different items (2021-2022) (Family/Annum).**

#### Pattern of consumption expenditure of beneficiary families

Table 4 displays the average yearly consumer spending of the beneficiary households. The findings indicate that beneficiary marginal farmers consumed the most amount, or 89.55 percent (29334) of the total net return (32756). Small farmers came in second, spending 87.31% (39201) of the total net return (44896) on consumption. Medium and big farmers spent 82.36% and 70.56% of their total net return on consumer goods, respectively. Beneficiary households in all categories spent a significant percentage of their consumption budget on food items, with big farmers accounting for around 54% of this spending and marginal farmers for 74%. Buildings got the least attention from the six categories of consumer spending from all the beneficiary households under examination. Only 4.30 to 4.95 percent of all consumption expenditures for all categories of beneficiary households were spent on this item. On the other hand, different types of benevolent families incurred spending on others, such as travel, entertainment, social customs, etc., ranging from 3.24 percent to 21.24 percent of the overall consumer expenditure. Clothing costs experienced by various groups of benevolent families accounted for around 5% of overall consumption costs. The average amount spent on schooling varied from 5.21% for marginal farmers (1530) to 12.23% for medium farmers (8613). The percentage of total consumption expenditure devoted to gasoline by various groups of benefactor households ranged from 7.17 to 9.13 percent.

#### Changes in consumption

Table 4 shows net additional income accruing to beneciar families, their yearly consumption spending as a percentage increase over non-beneciar households, and their consumption expenditure as a percentage increase. The data clearly shows that IWDP increased the yearly net return of various groups of beneficiary households by amounts ranging from 8808 for marginal farmers to 10286 for big farmers. Families of small and medium farmers that rely on the IWDP for support might enhance

their net return by 9611 and 8808 each year with the help of the IWDP. The annual incremental consumption expenditure was highest for marginal farmers (5817) and lowest for big farmers (2187). Families with small and medium farms spent 4420 and 3242 dollars more on consumption each year, respectively. Table 5 shows that food goods accounted for a significant portion of the increased consumption spending, with marginal farmers accounting for 68.42% of the increase compared to big farmers, who accounted for 50.89%. In terms of both percentage figures, the additional spending on fuel and structures that beneficiary families experienced over non-beneficiary households was second only to the expenditure on food. From 1.42 percent for small farmers to 7.13 percent for big farmers, consumer spending on clothes varied. As it ranged from 5.16 percent for major farmers to 8.82 percent for small farmers, education attracted less attention. In terms of net return and total consumption expenditure, the beneficiaries of the IWDP Programme had a sizable benefit.

According to the general theory of consumption, increasing consumption expenditures were more widely distributed among gasoline, clothes, and education, and less widely distributed among food. When the increase in consumer spending was subtracted from the rise in income, the difference was greatest for big farmer households (8099) and lowest for marginal farmers (2991). The households of marginal farmers had the largest shift in the overall rise in consumer spending above the net return (66.04%), followed by small farmers (45.98%), medium farmers (32.47%), and big farmers (21.26%).

The influence of IWDP on the pattern of consumer spending had not been the same, as may be seen from the discussion above. Different kinds of wealthy households had a relative growth in consumer spending at varied rates. The same applied to spending on a variety of items, including food, clothes, education, fuel, buildings, and others (Tables 4 and 5).

Category	Expenditure on						Total consumption expenditure	Net return accrued	Difference	Consumption expenditure as percentage of net return (%)
	Food	Clothing	Education	Fuel	Buildings	Others				
1	2	3	4	5	6	7	8	9	10	11
Marginal	21830 (74.41)	1655 (5.64)	1530 (5.21)	2105 (7.17)	1263 (4.30)	951 (3.24)	29334 (100.00)	32756	3422	89.55
Small	28915 (73.76)	1909 (4.86)	2113 (5.39)	2826 (7.20)	1765 (4.50)	1673 (4.26)	39201 (100.00)	44896	5695	87.31
Medium	44963 (63.84)	3519 (4.99)	8613 (12.23)	5569 (7.90)	3944 (5.60)	3814 (5.41)	70422 (100.00)	85501	15079	82.36
Large	56113 (53.85)	5156 (4.94)	6113 (5.86)	9513 (9.13)	5159 (4.95)	22133 (21.24)	104187 (100.00)	147652	43465	70.56

\*Figures in parentheses are percentages of total consumption expenditure of the respective category.

**Table 4: Annual consumption expenditure incurred by beneficiary families on different items (2021-2022) (Family/Annum).**

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### Marginal propensity to consume

"Marginal propensity to consume" (MPC) is the proportion of rising consumption to rising income. As a consequence of a certain incremental change in income, MPC assesses the incremental change in consumption. By deducting the net return and consumption of non-beneficiary households from the IWDP beneficiary families, the additional income and consumption were calculated. Table 6 shows that marginal farmers had the highest MPC (0.66) because they spent more money on building renovation, education, and other expenses throughout the research period.

Category	Excess expenditure made by beneficiaries over non-beneficiaries on						Total incremental consumption expenditure	Increase in saving over non-beneficiary	Difference	Percentage increase in consumption expenditure of net return (%)
	Food	Clothing	Education	Fuel	Buildings	Others				
1	2	3	4	5	6	7	8	9	10	11
Marginal	3980 (68.42)	290 (4.98)	470 (8.07)	580 (9.97)	441 (7.58)	56 (0.96)	5817 (100.00)	8808	2991	66.04
Small	3091 (69.93)	63 (1.42)	390 (8.82)	565 (12.78)	288 (6.51)	23 (0.52)	4420 (100.00)	9611	5191	45.98
Medium	1963 (60.54)	186 (5.74)	234 (7.22)	512 (15.79)	214 (6.60)	133 (4.10)	3242 (100.00)	9982	6740	32.47
Large	1113 (50.89)	156 (7.13)	113 (5.16)	513 (23.45)	159 (7.27)	133 (6.08)	2187 (100.00)	10286	8099	21.26

\*Figures in parentheses are percentages of total consumption expenditure of the respective category.

**Table 5: Change in annual consumption expenditure of beneficiary \ families over non-beneficiary \ (2021-2022) (Family/Annum).**

The major farmers' high levels of revenue showed the lowest MPC, at 0.21. It means that since they had previously incurred large expenditures on a variety of consumption expenditure items, the rise in this class' consumption brought on by the significant gain in income was not proportional. The MPC for small and medium farmers, respectively, was 0.45 and 0.32, indicating greater incremental consumption spending compared to the targeted demand for different consumption expenditure items (Table 6).



Category	Total incremental consumption expenditure (Rs.) ( $\Delta C$ )	Total incremental income (Rs.) ( $\Delta Y$ )	MPC = $\Delta C/\Delta Y$
Marginal	5817	8808	0.66
Small	4420	9611	0.45
Medium	3242	9982	0.32
Large	2187	10286	0.21

**Table 6: Marginal propensity to consume (2021-2022).**

### **Employment Level Changes**

His part addresses changes in the beneficiary families' employment levels brought on by the IWDP Programme. Employment was measured in man days spent engaging in all activities to estimate changes in employment levels. By comparing the employment levels of beneficiary families to those of non-beneficiary families during the course of the research period, the influence on employment generation was examined. The findings so collected are reported as follows:

### **Per hectare labour employed on non- beneficiary and beneficiary families**

Table 7 shows the average yearly man days of labour produced by crops per hectare on nonbeneficial farms. For marginal farms, crop employment per hectare was at its highest (145.45-man days), while for big farms, it was at its lowest (68-mm days). Medium farmers produced 121.22-man days of employment per hectare in a given year. A decline in labour employment with an increase in farm size was likely caused by mechanisation, which rose as farm size expanded and reduced the need for human labour to carry out different tasks on the farm.

According to Table 7, marginal farmers produced the most labour per hectare (156.96-man days) whereas big farmers produced the least labour per hectare (69.80-man days), benefiting households. Small and medium farms produced 131.03- and 119.60-man days of employment per hectare throughout the year, respectively (Table 7).

Category	Non-beneficiary families		Beneficiary families	
	Average size of land holding (Ha.)	Average labor employed	Average size of land holding (Ha.)	Average labor employed
Marginal	0.55	145.45	0.69	156.96
Small	1.28	117.96	1.45	131.03

**Table 7: Labor employment generated by crop activities for non- beneficiary and beneficiary families (2021-2022) (Man days/family/ha).**

#### **Changes in employment levels: an overview**

Table 8 shows the number of effective man-days of labour produced by the various types of beneficiary households above non-beneficiary families as a consequence of IWDP support. The study's findings showed that marginal farmers who received IWDP help for crops were able to boost their yearly employment by 29 man days over and beyond the 80 man days worked by the non-beneficiary households. In percentage terms, it was 36.25% greater than the average for families that did not get benefits. Small farmers that received IWDP support for crops may be entitled to add 39 additional man days to their yearly employment over and beyond the 151 man days worked by non-beneficiary families. It was 25.82% greater than that of non-beneficiary households in percentage terms.

Through agricultural activities, medium farmers could be able to enhance their yearly employment by just 08 man days more than the 297 man days worked by non-beneficiary households. The difference between it and non-beneficiary households was 2.69 percent. Similar to small farmers, big farmers only saw a little increase in employment owing to agricultural activity—9 man days, compared to 340 days worked by non-beneficiary households. The difference between it and non-beneficiary households was 2.64 percent.

In summary, it can be said that benefit families, as opposed to non-benefit families, had an absolute and percent rise in yearly employment. The rise in yearly labour employment for medium and large farmers was not significant (Table 8). Marginal farmers saw the largest percentage increase in employment (36.25%), followed by small farmers (25.82%).

Category	Beneficiary farms	Non-beneficiary farms	Absolute change	Per cent change
1	2	3	(4 = 2-3)	5
Marginal	109	80	29	36.25
Small	190	151	39	25.82
Medium	305	297	08	2.69
Large	349	340	09	2.64

**Table 8: Additional employment generated by the crop activities on beneficiary and non-beneficiary farms (2021-2022) (Man days/year/family).**

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