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Impact of Treated Watershed on the Socio-Economic Status of Beneficiaries in Wayanad District

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Abstract: ***India is an agrarian economy with a population of over 1.21 billion, three fourths (72 per cent) of this population lives in rural areas and derives its livelihood from agriculture and related activities. Watershed management is a landscape based strategy that aims in bringing overall rural development. In this paper socio-economic status of the beneficiaries of Poothadi and non-beneficiaries of Aavayal watershed area was analyzed based on the primary data collected during the period 2018-19. The beneficiary respondents had higher annual income, family size, land holdings, area under different crops and irrigation when compared to that of non-beneficiaries. Therefore, it can be deduced that the watershed based approach can lead to substantial improvement in rural livelihoods.***

Keywords: RVP (River Valley Project), Sustainable development and Watershed management

I. INTRODUCTION

Water resources management is an essential component of sustainable development in agriculture. Proper watershed management have triple benefits such as it maintains productive capacity in the watershed area, prevents the degrading processes and it is more profitable than rehabilitation of degraded lands. The main objective of a watershed development programme is to increase the economic and social well being of the beneficiaries of the basin in particular and of the whole nation. The watershed based programme had resulted in increased employment generation, crop production, productivity, farm income, groundwater status and overall rural development in the watershed area. Watershed management assumes more importance especially in hilly and undulating areas. Poothadi watershed is located in Wayanad district of Kerala, in Kalpetta and Sulthan Bathery blocks. The watershed includes Poothadi, Kaniyambetta, Meenangadi and Muttil panchayats. Villages under the Pootahdi watershed are Poothadi, Kaniyambetta, Purakkadi, Krishnagiri and Muttil. Poothadi watershed comes under the catchment of the river Chundappuzha, with an undulating topography and comes under high prioritised watershed. Poothadi watershed project (Ka4f Poothadi) was a river valley project (RVP) under RVP Kabani river project. It was a three year project, started in September 2010 and completed in November 2013.

II. MATERIALS AND METHODS

Primary data were obtained from 90 respondents in Wayanad district and they were divided into two categories as beneficiaries and non-beneficiaries. The beneficiaries were selected from the Poothadi watershed which was a treated watershed and non-beneficiaries from Aavayal an untreated watershed in Wayanad district of Kerala. The primary socio-economic characteristics such as age, sex, education, family size, occupation and family income were tabulated and analyzed using percentage analysis. The results of the analysis are presented below.

A. Age

The distribution of respondents on the basis of age was classified into five groups such as less than 40, 40 – 50, 50 – 60, 60 – 70 and above 70 years of age. Table 1 shows the age wise classification of the respondents. The average age of the beneficiaries (54.6 years) was more than that of non-beneficiaries (50.98 years). The average age of the total respondents was 52.79 years. In case of beneficiaries more number of respondents fall under the age group 50 – 60 years (37.78 per cent) followed by 40 - 50(22.22 per cent), 60 -70 (20 per cent), greater than 70 (11.11 per cent) and less than 40 years (8.89 per cent). Among non- beneficiaries more

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number of respondents fall under the age group 40 – 50 years (37.78 per cent) followed by 50 - 60 and 60 – 70 (20 per cent) years age group. In case of the total respondents more number of respondents fall under the age group 40 – 50 years (30 per cent) followed by 50 – 60 (28.89 per cent), 60 – 70 (20 per cent), less than 40 (12.22 per cent) and more than 70 (8.89 per cent) years age group.

Table 1. Distribution of respondents based on age

Particular	<40 Years	40-50 Years	50-60 Years	60-70 Years	>70 Years	Total	Average age (Years)
Beneficiaries	4 (8.89)	10 (22.22)	17 (37.78)	9 (20)	5 (11.11)	45 (100)	54.6
Non-beneficiaries	7 (15.56)	17 (37.78)	9 (20)	9 (20)	3 (6.67)	45 (100)	50.98
Total	11 (12.22)	27 (30)	26 (28.89)	18 (20)	8 (8.89)	90 (100)	52.79

Note: Figures in parentheses indicate per cent to total.

B. Gender

In the study area it was found that more number of respondents were male (80 per cent) and only 20 per cent of the total respondents were female. The distribution of respondents based on gender, presented in table 2, revealed that among the beneficiaries, male respondents were more (66.67 per cent) than that of female respondents (33.33 per cent). Similarly, in case of non-beneficiaries also more number of respondents were male (93.33 per cent) compared to that of females (6.67 per cent).

Table 2. Distribution of respondents based on gender

S. No.	Gender	Beneficiaries	Non-beneficiaries	Overall
1	Male	30 (66.67)	42 (93.33)	72 (80)
2	Female	15 (33.33)	3 (6.67)	18 (20)
3	Total	45 (100)	45 (100)	90 (100)

Note: Figures in parentheses indicate per cent to total.

C. Educational Status

The educational status of the respondents is given in table 3 and it was classified into six classes such as primary, upper primary, high school, higher secondary, graduation and post graduation. It was evident that, more number of respondents had high school education (32.22 per cent), followed by higher secondary (25.56 per cent), graduation (17.78per cent), upper primary (15.56 per cent), post graduation (5.56 per cent) and primary (3.33per cent) level of education. Among the respondents, more number of beneficiaries had higher secondary (35.56 per cent), high school (33.33 per cent) and upper primary (17.78 per cent) level of education. Whereas in the case of non-beneficiaries, more number of respondents had post graduation (8.89 per cent), followed by graduation (24.44 per cent) and primary school (6.67 per cent) level of education.

Table 3.Distribution of respondents based on educational status

S. No.	Educational Status	Beneficiaries	Non-beneficiaries	Overall
1	Primary school	0 (0)	3 (6.67)	3 (3.33)
2	Upper primary	8 (17.78)	6 (13.33)	14 (15.56)
3	High school	15 (33.33)	14 (31.11)	29 (32.22)
4	Higher secondary	16 (35.56)	7 (15.56)	23 (25.56)
5	Graduation	5 (11.11)	11 (24.44)	16 (17.78)
6	Post graduation	1 (2.22)	4 (8.89)	5 (5.56)
7	Total	45 (100)	45 (100)	90 (100)

Note: Figures in parentheses indicate per cent to total.

D. Family Size

The respondents were classified into three groups based on family size, such as small (less than four members), medium (4-6 members) and large (more than 6 members). The average family size of the total respondents was found to be 4.35 and average family size in case of beneficiaries (4.6) was greater than that of non-beneficiaries (4.09). In case of both beneficiaries (57.78 per cent) and non-beneficiaries (55.56 per cent) more than half of the families were medium sized.

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E. Occupational Status

The occupational status of respondents was classified into two categories such as agriculture as the main occupation and as subsidiary occupation. Considering the total number of respondents, about more than half (51.11 per cent) of the respondents had agriculture as the main source of income and remaining respondents (48.88 per cent) considered agriculture as the secondary source of income. Those respondents who had agriculture as subsidiary occupation were government employees, had their own business, pensioned or private employees. More number of non-beneficiaries (55.56 per cent) had agriculture as the main occupation than that of beneficiaries (46.67 per cent).

F. Annual Income

The annual income of the respondents was calculated by aggregating the income from agriculture and also from other sources. The results of the distribution of farmers based on annual income are presented in table 4. The annual income of the farmers has been classified into five categories such as less than ₹ 1 lakh, ₹ 1 to 3 lakhs, ₹ 3 to 5 lakhs, ₹ 5 to 10 lakhs and above ₹ 10 lakhs. Among the total respondents, more number of individuals belonged to ₹ 5 to 10 lakhs (32.22 per cent) income category, followed by ₹ 1 to 3 lakhs (30 per cent) and ₹ 3 to 5 lakhs (23.33 per cent). In the case of the beneficiaries, more number of respondents belongs to the ₹ 1 to 3 lakhs (40 per cent) income category followed by the ₹ 3 to 5 lakhs (20 per cent) and ₹ 5 to 10 lakhs (17.78 per cent). Among the non-beneficiaries greater number of respondents fall in the ₹ 5 to 10 lakhs (46.67 per cent) income category followed by ₹ 3 to 5 lakhs (26.67 per cent) and ₹ 1 to 3 lakhs (20 per cent). The average annual income of the beneficiaries (₹ 5,41,322.22) was more than that of non-beneficiaries (₹ 5,16,111.1) and that of all respondents was ₹ 528716.66.

Table 4. Distribution of respondents based on annual income

S. No.	Particular	Beneficiaries	Non-beneficiaries	Overall
1	Less than ₹ 1 lakh	4 (8.89)	1 (2.22)	5 (5.56)
2	₹ 1 -3 lakh	18 (40)	9 (20)	27 (30)
3	₹ 3-5 lakh	9 (20)	12 (26.67)	21 (23.33)
4	₹ 5-10 lakh	8 (17.78)	21 (46.67)	29 (32.22)
5	More than ₹ 10 lakh	6 (13.33)	2 (4.44)	8 (8.89)
6	Total	45 (100)	45 (100)	90 (100)
7	Average (₹)	541322.22	516111.1	528716.66

Note: Figures in parentheses indicate per cent to total.

G. Experience In Farming

Based on the experience in farming, farmers were classified into four groups such as farmers with farming experience less than 10 years, 10 to 20 years, 20 to 30 years and more than 30 years. Average experience in farming was more for beneficiaries (28.38 years) than that of non-beneficiaries (22.87 years) and average experience in farming in case of all respondents was 25.63 years. Among beneficiaries (48.89 per cent) and non-beneficiaries (33.33 per cent) more percentage of farmers had 20 to 30 years of experience in farming.

H. Land Holdings

In order to understand the land holding pattern of the respondents they were classified into four categories based on the total land holding and they were respondents with less than 3, 3 to 5, 5 to 10 and more than 10 acres of land. Distribution of respondents based on land holdings is depicted in table 5. Among the total respondents more percentage of respondents fall in the category of 3 to 5 acres of land (37.78 per cent) followed by less than 3 (33.33 per cent), 5 to 10 (24.44 per cent) and more than 10 acres (4.44 per cent) respectively. In the case of beneficiaries, more number of respondents had less than 3 acres of land (44.44 per cent) followed by 5 to 10 (24.44 per cent), 3 to 5 (22.22 per cent) and more than 10 acres (8.89 per cent) respectively. Among the non-beneficiaries, more number of the respondent had 3 to 5 acres (53.33 per cent) of land followed by less than 3 (22.22 per cent) and 5 to 10 acres (24.44 per cent) respectively. The average size of land holdings was more in the case of beneficiary farmers (4.38 acres) than that of non-beneficiary farmers (3.89 acres) and the average size of land holdings for the total respondents was 4.14 acres.

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Table 5. Distribution of respondents based on land holdings

S. No.	Particular	Size of land holding (acres)				Total	Average size of land holdings (acres)
		<3	3-5	5-10	>10		
1	Beneficiaries	20 (44.44)	10 (22.22)	11 (24.44)	4 (8.89)	45 (100)	4.38
2	Non-beneficiaries	10 (22.22)	24 (53.33)	11 (24.44)	0 (0)	45 (100)	3.89
3	Total	30 (33.33)	34 (37.78)	22 (24.44)	4 (4.44)	90 (100)	4.14

Note: Figures in parentheses indicate per cent to total.

I. Livestock details

Livestock details were presented in table 6. It reveals that about 40 per cent of the total beneficiaries possessed cattle. Among the beneficiaries and non-beneficiaries, an equal number of respondents had cattle and it was a source of additional income. Cattle were only raised by all the respondents. Average annual income obtained from livestock by the non-beneficiaries (₹ 1,68,156.7) was more than that of beneficiaries (₹ 84,993.33) and average annual income obtained by the total respondents was ₹ 2,53,150.03. Average annual expenditure on livestock production by the non-beneficiaries (₹ 1,10,200) was more than that of beneficiaries was (₹ 41,333.28). Average annual net income obtained by the non-beneficiaries (₹ 57,956.7) from livestock production was more than that obtained by the beneficiaries (₹ 43,661.05). The average number of cattle owned by the non-beneficiaries (3.28) was more compared to that of the beneficiaries (1.24).

Table 6. Livestock details of the respondents

S. No.	Particular	Beneficiaries	Non-beneficiaries	Aggregate
1	Number of farmers owning cattle	18 (50)	18 (50)	36 (100)
2	Average number of cattle	1.24	3.28	2.26
3	Average annual income (₹/year)	84,993.33 (33.57)	1,68,156.7 (66.43)	2,53,150.03 (100)
4	Average annual expenditure (₹/year)	41,333.28 (27.28)	1,10,200 (72.72)	1,51,533.28 (100)
5	Average annual net income (₹/year)	43,661.05 (42.97)	57,956.7 (57.03)	1,01,617.75 (100)

Note: Figures in parentheses indicate per cent to total.

J. Area Under Different Crops

Coffee, pepper, arecanut, banana, tubers (cassava, yam and taro), paddy, ginger and vegetables were the different crops cultivated by the respondents and it is depicted in table 7. In the case of total respondents, the area under coffee (118.1 ha) and pepper (118.3 ha) was almost equal followed by arecanut (92.36 ha), banana (12.21 ha), paddy (12.2 ha), tubers (1.58 ha), ginger (1.04 ha) and vegetables (0.22 ha). Among the beneficiaries, the area under pepper (61.98 ha) was more followed by coffee (61.78 ha), arecanut (45.28 ha), paddy (7.8 ha), banana (6.61 ha), ginger (0.52 ha), tubers (0.4 ha) and vegetables (0.22 ha). In the case of non-beneficiaries, area under coffee was equal to the area under pepper (56.32 ha). It was followed by arecanut (47.08 ha), banana (5.6 ha), paddy (4.4 ha) tubers (1.18 ha) and ginger (0.52 ha). Coffee, pepper and arecanut were the major crops among the beneficiary and non-beneficiary farmers. Pepper-based cropping pattern was prominent among the beneficiaries whereas, among the non-beneficiaries, coffee and pepper-based cropping pattern were familiar.

Table 7. Total area under different crops

S. No.	Crop	Beneficiaries (Ha)	Non-beneficiaries (Ha)	Total (Ha)
1	Coffee	61.78 (33.47)	56.32 (32.85)	118.1 (33.17)
2	Pepper	61.98 (33.58)	56.32 (32.85)	118.3 (33.23)
3	Arecanut	45.28 (24.53)	47.08 (27.46)	92.36 (25.94)
4	Banana	6.61 (3.58)	5.6 (3.27)	12.21 (3.43)
5	Tubers	0.4 (0.22)	1.18 (0.69)	1.58 (0.44)
6	Paddy	7.8 (4.23)	4.4 (2.57)	12.2 (3.43)
7	Ginger	0.52 (0.28)	0.52 (0.30)	1.04 (0.29)
8	Vegetables	0.22 (0.12)	0 (0)	0.22 (0.06)
9	Total	184.59 (100)	171.42 (100)	356.01 (100)

Note: Figures in parentheses indicate per cent to total.

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Thomas *et al*., (2009) revealed that in Elanad watershed of Thrissur district there was no significant difference between the cropping pattern of beneficiary and non-beneficiary farmers. The study also found that NWDPRA project could not create any significant impact on cropping pattern and cropping intensity in the watershed area.

K. Watershed Development Works Implemented In The Beneficiary Farms

Construction of contour graded bunds, staggered trenches and farm ponds, planting of contour vegetative hedges and horticultural development works were the watershed development works implemented by the State department of Soil Survey and Conservation in the beneficiary farms. Contour graded bunds were constructed in all the beneficiary farms. In more than three-fourths of the beneficiary farms farm ponds (77.78 per cent) were constructed followed by staggered trenches (60 per cent). Contour vegetative hedges were planted in more than half (55.56 per cent) of the beneficiary farms, whereas horticultural development works (distribution of planting materials of fruits and trees) took place only in one-fourth (28.89 per cent) of the beneficiary farms.

L. Area Under Irrigation

Among the total respondents, average area under irrigation was more in coffee (2.31 ha) followed by banana (0.44 ha). Average area under irrigation was more in case of beneficiaries (1.06 ha) when compared to that of non-beneficiaries (0.61 ha). In the case of beneficiaries, the average area under irrigation was more in coffee (2.98 ha), followed by pepper (0.88 ha), banana (0.66 ha) and vegetables (0.01 ha).

M. Methods of Irrigation

The area under various methods of irrigation is presented in table 8. Different methods of irrigation practised in the study area were farm pond and well irrigation connected with pump-set and micro-irrigation. The area under rainfed condition was more in case of non-beneficiaries (50 per cent) than that of beneficiaries (21.13 per cent). In case of beneficiary farms, more than half (55.21 per cent) of the area was irrigated by farm ponds followed by wells (23.66 per cent). Whereas among the non-beneficiaries, only one-fourth of the area was irrigated with water from the well (32.5 per cent) followed by farm ponds (16.62 per cent). The total area under irrigation was more in case of beneficiary farms than that of non-beneficiary farms.

Table 8. Area under various methods of irrigation

S. No.	Method of irrigation	Area under irrigation (acres)		
		Beneficiaries	Non-beneficiaries	Total area
1	Rainfed	40.85 (21.13)	87.68 (50)	128.53 (34.86)
2	Well (pump-set)	45.74 (23.66)	56.99 (32.50)	102.73 (27.87)
3	Farm pond (pump-set)	106.73 (55.21)	29.15 (16.62)	135.88 (36.86)
4	Micro irrigation	0 (0)	1.53 (0.87)	1.53 (0.42)
	Total	193.32 (100)	175.35 (100)	368.67 (100)

Note: Figures in parentheses indicate per cent to total.

III. CONCLUSIONS

India is an agrarian economy and more thrust needs to be given for watershed management programmes as a strategy for integrated rural development.

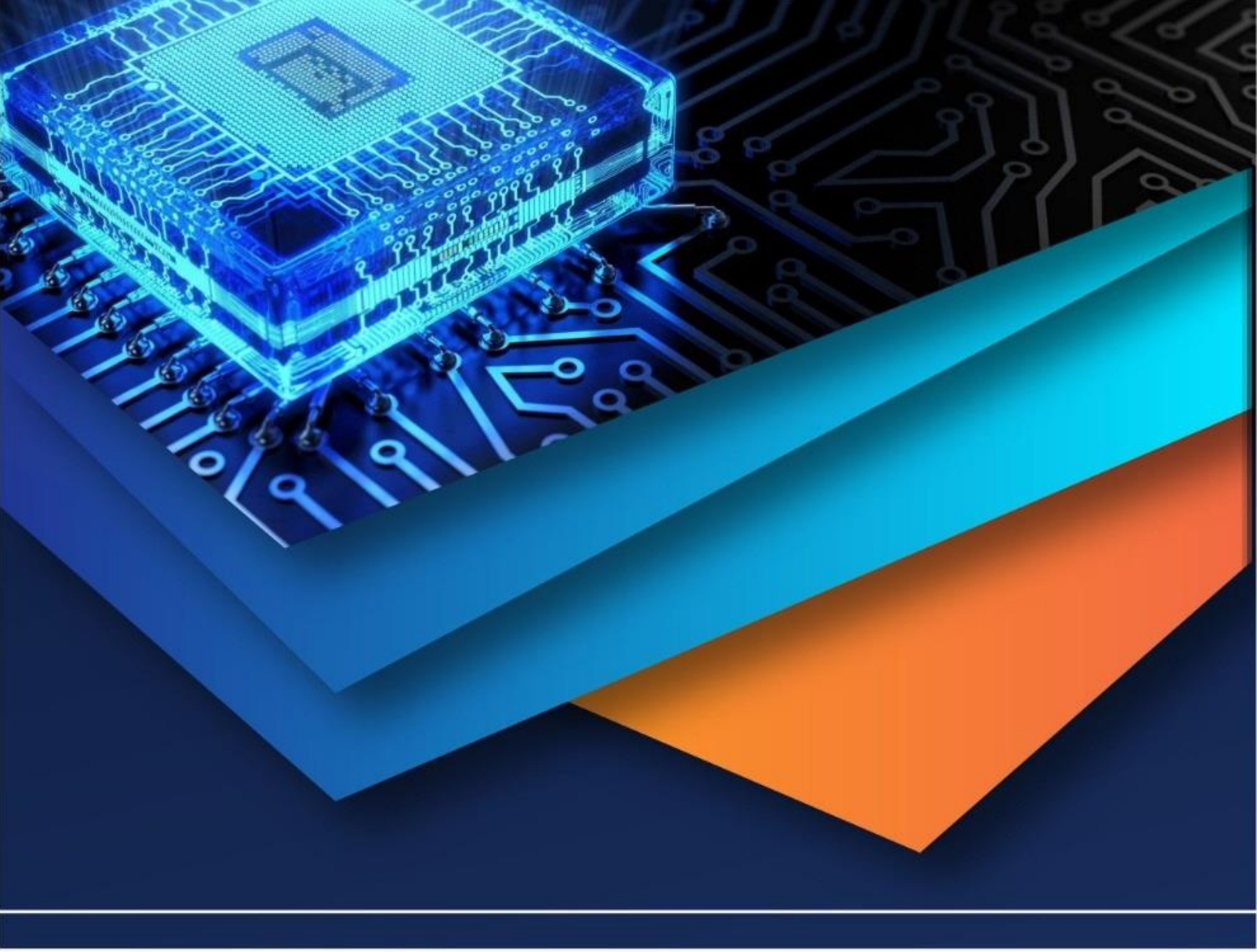
The socio-economic status of the beneficiaries of treated Poothadi watershed and untreated Aavayal watershed in Wayanad district was analyzed based on the primary data collected during the period 2018-19. The beneficiary respondents had higher annual income, family size, land holdings, area under different crops and irrigation, but there was no much difference in cropping pattern, education and occupational status of the beneficiaries and non-beneficiaries. Therefore, it can be concluded that watershed-based approach can lead to overall socio-economic improvement in rural folks. In the watershed area, farm diversification was not addressed well, so strategies to promote integrated farming system and development of agriculture and allied enterprises have to be incorporated in the watershed development programmes.

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