Economic Analysis of Watershed Management and Development in Malwa Region of Madhya Pradesh (India)

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Abstract: The study examines the "Economic Analysis of Watershed Management and Development in Malwa Region of Madhya Pradesh in India". National watershed management approach had a distinct change in the attitude of the farmers, not only in the project area but also outside the watershed. Many farmers had adopted this improved technology. It was expected that with increase in production level the socio-economic condition of the farmers would also improve considerably.

Impact of National Watershed Development Project for Rainfed Areas (NWDPRA) was started in 8th Plan during the year 1994—1995 in Indore district of Madhya Pradesh in India. The specific objectives were to study the cropping pattern, cropping intensity, production, cost and returns and input-output ratio on the farms of different sizes in NWDPRA and non-NWDPRA. A multi-stage random sampling technique was used .A sample of two villages each from NWDPRA and non-NWDPRA areas was selected from Indore block of Indore district. The sample consisting of 40 farmers from each of the categories of NWDPRA and non-NWDPRA in the NWDPRA was selected randomly making a total of 80 farmers. The farmers were grouped under three size-groups, viz., small (less than 2 ha), medium (2 ha—4 ha) and large (4.1 ha and above) farms. The data were collected by survey method during the agricultural year 1999—2000. The watershed management proved to be very effective in the management of renewable natural resources and development of production assets for sustainable agriculture at the local level.

Keywords: cropping intensity ,gross returns , input, net return and input-output ratio

The study showed that the average intensity of cropping came to 239.37 per cent in NWDPRA as compared to 201.41 per cent in non- NWDPRA. The average cropping intensity in NWDPRA was higher by 27.96 per cent than in non-NWDPRA. The average input-output ratio of soybean, maize, wheat and potato were calculated as 1:1.61, 1:1.48, 1:1.67 and 1:1.87, respectively in NWDPRA as compared to 1:1.30, 1:1.24, 1:1.30 and 1:1.67 in non- NWDPRA. The returns on per rupee of investment of these crops were higher in NWDPRA as compared to non-NWDPRA. The average input-output ratio on crop production at cost A_1, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were worked out to 1:2.52, 1:2.39, 1:2.07, 1:2.22, 1:1.94 and 1:1.76, respectively in NWDPRA as compared to 1:2.21, 1:2.08, 1:1.72, 1:1.92, 1:1.60 and 1:1.45 in non- NWDPRA. The returns on per rupee of investment on crop production were higher in NWDPRA as compared to non-NWDPRA. Input-output ratio at their respective levels had given the right indications that the impact of NWDPRA was significantly higher on small, medium and large farms. On an average, total utilization of human labour days in crop production per hectare came to 269.25 days in NWDPRA as compared to 215.03 days in non-NWDPRA.

The National Watershed Development Project for Rainfed Areas (NWDPRA) played a significant role in accelerating agricultural production and affecting a change in cropping pattern in favour of remunerative crops. There had been a positive impact due to adoption of National Watershed Development Project for Rainfed Areas (NWDPRA) in raising the level of income, employment and productivity of various crops in watershed area under small, medium and large farms. NWDPRA would

have been more beneficial when all the development works (engineering structures) of the watershed were completed. Therefore, the NWDPRA approach may be replicated in other dryland areas for the sustained development of agriculture and conserving the precious and source natural resources of the area.

1 Introduction

Balanced ecosystem, consisting of soil, water, plant, man, animal and environment is essential for survival and welfare of mankind. Soil erosion and land degradation have increased, water-table has gone down, forest has been depleted, severity of drought and flood have increased and ecological degradation is greater than few decades ago. The main reason of these degradations/losses is basically increase in demographic pressure on fragile ecosystem, mismanagement and over-exploitation of natural resources and inadequate investment to conserve it. Out of 329 million ha geographical area of the country, 150 million ha are threatened by water and wind erosion, 7 million ha by excessive salts, 6 million ha by waterlogging, 4 million ha by ravines and 3 million ha by shifting cultivation. The per-caput availability of land for providing food, fodder, fuel etc. has declined from 0.90 ha in 1951 to about 0.35 ha in 1991, and it is further expected to decline around 0.13 ha by 2015. It is expected that country needs about 275 million tones food, 1,000 million tones of fodder and 350 million tones fuel to feed 1000 million human and animal population of about 700 million by 2015. It is further expected that non-agriculture needs like shelter, road, industries will require about additional 8 million ha land and it can be met out only by the way of diversion of agricultural land to non-agricultural purposes. The irrigated agriculture has to increase considerably from 20 million ha of 1951 to 113 million ha in 2015 AD to meet the food requirement, and demand of water for irrigation will go down from 90 to 75-80 per cent in coming years. Therefore, man has to find out ways and means to prevent environmental degradation and feed human and animal population. This can be achieved by adopting watershed management approach.

Keeping in view the “Economic Analysis of Watershed Management and Development in Malwa Region of Madhya Pradesh in India”, the present study was conducted with the following objectives:

(1) To study the farm structure, cropping pattern and level of investment on the farms of different sizes in NWDPRA and non- NWDPRA areas.

(2) To work out the cost and returns and input-output ratio on crop enterprises on the farms of different sizes in NWDPRA and non- NWDPRA areas.

2 Farm business analysis

The level of production of different crop enterprises on farms of different sizes determines the efficiency of a farm.

The per hectare values of input, output, net income, family labour income, farm business income and input-output ratio on crop production as a whole on the sample farms on the basis of cost concepts have been worked out in NWDPRA and non-NWDPRA given in table-1.

Table-1, reveals that, on an average, the calculated values of cost A_1, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 came to *Rs*.11,421.63, *Rs*.12,020.38, *Rs*.13,862.95, *Rs*.12,889.39, *Rs*.14,731.96 and *Rs*.16,205.15 per hectare, respectively in NWDPRA as compared to *Rs*.7,811.96, *Rs*.8,279.41, *Rs*.10,077.92, *Rs*.8,973.55, *Rs*.10,776.14 and *Rs*.11,849.91 in non- NWDPRA. The net income over cost A_1, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3, on an average were calculated at *Rs*.17,240.18, *Rs*.16,641.43, *Rs*.14,798.86, *Rs*.15,772.42, *Rs*.13,929.85 and *Rs*.12,456.66 per hectare, respectively in NWDPRA as compared to *Rs*.9,472.35, *Rs*.9,004.90, *Rs*.7,206.39, *Rs*.8,310.76, *Rs*.6,508.17 and *Rs*.5,434.40 in non-NWDPRA. These values were higher in NWDPRA as compared to non-NWDPRA. The average values of output, family labour income and farm business income per hectare were calculated at *Rs*.28,661.81, *Rs*.13,325.65 and *Rs*.13,908.76, respectively in NWDPRA as compared to *Rs*.17,284.31, *Rs*.6,125.95 and *Rs*.6,597.07 in non-NWDPRA. The average output, net income, family labour income and farm business income were higher on all size groups in NWDPRA as compared to non-NWDPRA. It was because of higher use of modern inputs on per hectare basis, higher intensity of cropping and growing of more high yielding crop varieties and cash and oilseed crops in NWDPRA in comparison to non-NWDPRA. The higher returns on NWDPRA were associated with the assistance and

subsidy provided under NWDPRA to the beneficiary farms, which enabled them to incur higher expenditure on inputs ,which in turn results into higher output and return. The inputs use for various crops on NWDPRA was also higher than non-NWDPRA. These factors coupled with higher cropping intensity and better management resulted in higher gross income and net income on NWDPRA. The average input-out put ratio at cost A_1, cost B_1, cost B_2, cost C_1, cost C_2 and cost C_3 were worked out to 1:2.52, 1:2.39, 1:2.07, 1:2.22, 1:1.94 and 1:1.76, respectively in NWDPRA as compared to 1:2.21, 1:2.08, 1:1.72, 1:1.92, 1:1.60 and 1:1.45 in non-NWDPRA. The returns on per rupee of investment of these values were higher in NWDPRA as compared to non-NWDPRA. Input-output ratio at their respective levels had given the right indications that the impact of NWDPRA was significantly higher on small, medium and large farms. The benefits from the NWDPRA were assessed in terms of efficiency, employment and sustainability. It was noted that the NWDPRA were contributing in raising income, generating employment and conserving soil and water resources.

Table 1 Per hectare values of output, input, net income, family labour income, farm business income and input-output ratio in crop production as a whole on the basis of cost concepts on the farms of different sizes in NWDPRA and Non-NWDPRA.

(*Rs*. Per hectare)

Particular	Small		Medium		Large		Average	
	NWDPRA	Non-NWDPRA	NWDPRA	Non-NWDPRA	NWDPRA	Non-NWDPRA	NWDPRA	Non-NWDPRA
Gross returns	28000.86	18363.95	26841.02	17786.64	30144.20	16393.96	28661.81	17284.31
Input over Cost A_1	10030.36	7143.44	10256.59	7655.51	12814.58	8261.45	11421.63	7811.96
Cost B_1	10580.51	7582.67	10872.05	8116.80	13424.83	8747.57	12020.38	8279.41
Cost B_2	12410.51	9362.69	12712.06	9912.41	15274.83	10557.57	13862.95	10077.92
Cost C_1	12035.61	8724.70	11885.86	8896.18	13931.09	9153.48	12889.39	8973.55
Cost C_2	13865.60	10504.70	13725.86	10696.17	15781.09	10963.48	14731.96	10776.14
Cost C_3	15252.16	11555.16	15098.42	11763.13	17359.20	12059.82	16205.15	11849.91
Net Income Over Cost A_1	17970.50	11220.51	16584.43	10131.13	17329.62	8132.51	17240.18	9472.35
Cost B_1	17420.35	10781.28	15968.97	9669.84	16719.37	7646.39	16641.43	9004.90
Cost B_2	25590.35	9001.26	14128.96	7874.23	14869.37	5836.39	14798.86	7206.39
Cost C_1	15965.25	9639.25	14955.16	8890.46	16213.11	7240.48	15772.42	8310.76
Cost C_2	14135.26	7859.25	13115.16	7090.47	14363.11	5430.48	13929.85	6508.17
Cost C_3	12748.7	6808.79	11742.60	6023.51	12785.00	4334.14	12456.66	5434.40
Family labour income	14203.80	7949.88	12756.37	6795.13	13291.25	4740.01	13325.65	6125.95
Farm business income	14746.06	8389.13	13326.51	7256.14	13901.50	5234.31	13908.76	6597.07
Input-output ratio over Cost A_1	1: 2.79	1: 2.57	1: 2.61	1: 2.32	1: 2.35	1: 1.98	1: 2.52	1: 2.21
Cost B_1	1: 2.64	1: 2.42	1: 2.46	1: 2.19	1: 2.24	1: 1.87	1: 2.39	1: 2.08
Cost B_2	1: 2.25	1: 1.96	1: 2.11	1: 1.79	1: 1.97	1: 1.55	1: 2.07	1: 1.72
Cost C_1	1: 2.32	1: 2.10	1: 2.25	1: 1.99	1: 2.16	1: 1.79	1: 2.22	1: 1.92
Cost C_2	1: 2.01	1: 1.74	1: 1.95	1: 1.66	1: 1.91	1: 1.49	1: 1.94	1: 1.60
Cost C_3	1: 1.83	1: 1.58	1: 1.77	1: 1.51	1: 1.73	1: 1.34	1: 1.76	1: 1.45

***** No leased in land involved , hence cost A_1 and cost A_2 are the same.

NWDPRA is the one of the most important strategies to bring socio-economic change in the rained system. In some of the regions, it was silently revolutionised the agriculture and allied sector through various technological interventions, particularly soil and water conservation, and crop diversification. For NWDPRA, location specific technologies are available. There is an overwhelming policy and political support. Only problem is lack of appropriate institutional arrangement. This is a major obstacle in attaining the potential benefits of NWDPRA. Earnest efforts to enthuse stakeholders for their voluntary participation would sustain watershed development and bring prosperity in the rainfed areas.

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