

# Impact of Water Concept on Agriculture in Jhalawar District, Rajasthan

Dr. P. Sudha Rani, Nalla Naresh

**Abstract** :The present case study was carried on water concept implemented at Jhalawar District, Rajasthan. The main objective of the study was to access the impact of the MJSA project on rain fed agriculture. Detailed study of water harvesting structures constructed in the area and survey conducted on farmers revealed that , Ground water level has been improved in the village, besides that, total Irrigated area has been increased from 198.88 hectares to 323.99 hectares. Irrigation has also been increased indirectly under Irrigation facility through Dug wells. Total number of Tube wells irrigated area has been increased and a shift from low productivity to high productivity was observed . The MJSA project also helped to increase the overall percentage of crop productivity in farmers of all categories.

**Key words** : Income, ground water level , crop productivity, MJSW

**INTRODUCTION:** Rain fed areas account for 60% of net sown area land and support 40% of India's population. A large portion of productivity depends on rain and the irrigation provides additional employment for rural population. Recently our natural resources are in a state of degradation due to poor watershed management practices in the rain fed areas. Therefore, to improve Ground water level, and increase agricultural productivity, watershed management is very much necessary. Watershed management planning is a process that results in a blueprint of how to best protect and improve the water quality and other natural resources in a watershed. Very often, watershed boundaries extend over political boundaries into adjacent municipalities and/or states. That is why a comprehensive planning process that involves all affected municipalities located in the watershed is essential to successful watershed .Watershed transcends communities, households and even villages, so that successful and sustainable development is critically linked with both inter household and inter village co-operation.

The Four Waters Concept, enunciated by Hanumantha Rao consists of utilisation of four water resources - rain water, surface water, soil moisture and ground water. His concept was successfully implemented in China. In India , the state government setup a separate department on watershed and soil conservation in January 1991. The national watershed development programme (NWDPA) was taken up in 10 districts since 1991-92. The scheme has extended to cover all blocks .Further, Mukhyamantri Jal Swawalamban yojana was started in January, 2016 with a view to make every village self-reliant in water and increase productivity of land.

5 results will be achieved if implemented successfully. a) Main stream will flow with base flows (spring flows), which is similar to dense forest. b) Run-off water coming out will be less turbid . c) Dug-wells in upland areas should have water during summer. d) 30% of rain-fed areas should have irrigation.(8% at present ). e) Ensure water resources even during drought period. ( perennial crops). Research studies undertaken in the 1990s

and early 2000s to examine the socio-economic impacts of the watershed technology have endorsed the program in terms of costs and benefits (Deshpande and Reddy 1990, Singh et al.1993, Ninan and Lakshmikantamma 1994 Singh et al. 1995, Nalatawadmath et al. 1997, Reddy 2000, Fan, S. and P. Hazell (2000), Kolavalli and Kerr, 2002. These studies not only vindicated the economic viability of WSD but also underlined that it is among the most important options to the development of rain fed agriculture in India.

Studies carried out by P.Sudharani and Naresh.Nalla in the year 2015, on the implementation of this technique in Adilabad district and the work done by Bhanwar Lal in the year 2001 on the impact of watershed project on rain fed agriculture in Alwar district, has pointed out that this concept helped farmer to improve their crop production. The earlier work done by Sriram vidire towards watersheds of Rajasthan tells that Four water concept has benefited the farmers thrice and ground water level has been improved by 7 inches.

### **OBJECTIVE:**

The present study has three objectives : To assess the impact of national watershed development projects on a) on the levels of productivity of farmers b) income and employment.

### **Study area :**

Rajasthan has 10% of total population, 5% of land area, the state has only 1% of water. A 2012 study reveals that, it has the highest probability of drought in India. The main objective of Rajasthan was to conserve and harvest rain water and make villages self-reliant even during drought periods. Therefore, "Mukhyamantri Jal Swavlamban Abhiyan was organized to conserve water. The programme has been designed in such a way that everything from planning to execution shall be followed in a participatory approach down to the village community level. The scheme was created with the idea of natural resource management with hydrological unit as a base to develop water, forest and land. The purpose of this Mission on Water Conservation is to make villages self-sufficient in water use and thus provide a permanent solution to the demand of drinking water besides ensuring storage and conservation of water for making it available for irrigation. In first year around 3000 villages on the basis of priority were identified. Some of the key objectives of the programme are: To create a water sustainable Rajasthan, to increase the irrigated area, ensure effective water conservation through convergence of resources of different departments, to create awareness about community participation in water management, to prepare a village action plan through water budgeting via community participation .To make the village a self sufficient unit in drinking water through sustainable measures Four Waters Concept Four waters concept, which has been successful in countering drought and averting migration of labour in China, is quite relevant to the drought-prone Rajasthan. The Four Waters concept revolves around the harvesting of available runoff (rain water, ground water, under-ground water & in situ soil moisture) in rural areas by treatment of catchment, proper utilization of available

water harvesting structures, renovation of the non-functional water harvesting structures & creation of new water harvesting structures. It also includes development of forest, land, water & fauna keeping watershed/cluster/index as a unit for natural resource management.

Jhalawar district in Rajasthan is located between 23° 45' 20" and 24° 52' 17" North latitude and 75° 27' 35" and 76° 56' 48" East longitude covering an area of 6928 sq.km. The district is part of Kota Division and is divided into five sub-divisions namely Aklera, Kanpur, Jhalawar, Pirawa, and Bhawanimandi. Administratively the district is divided into 7 tehsils and 6 development blocks (Fig. 1). There are 1618 revenue villages and 8 urban towns in the district. Urban and rural population of the district is 2.29 and 11.82 lakhs respectively.



### Main Development Problems or Issues

Jhalawar is industrially a backward district of the state. Even though the district occupies prime position in production of soybean, orange and coriander, agro-processing industry in the district has failed to pick up. The district lacks basic facilities for the development of industries. This includes inadequacy of railway infrastructure, cold storage facilities and a district dairy cooperative. Most of the water in this highest rainfall district flows out of the district in the absence of water shed development and also leads to soil erosion. Development of watershed, farm bunds and small/medium irrigation plans were needed to use this water for the district. This is all the more important as five out of six administrative blocks of the district have been declared critical with the state of groundwater development varying between 94 and 110. (Jhalawar, district human development report,2009.). Getting water for

sheep, goat etc in the grazing lands were difficult and generally heavy precipitation criss cross the hillocks within no time and would runoff in to the rivulets.

### METHODOLOGY:

**Activities:** The activities planned under MJSA programs were construction of structures like : Mini percolation tanks , Ploughing across the slops , Field boundary trenches, continuous contour trenches and percolation ponds and vegetative structures.( Fig.I to Fig.V)

construction of Structures: The following structures were constructed all over the district to tap the rain water.

Fig.I Percolation ponds



Fig.II & Fig.III Contour trenches.



Fig.IV & Fig.V Vegetative structures



**RESULTS:**

The results are presented in a tabular form (Fig 1 to 6. ). The results given in table -I shows that total Irrigated area has been increased from 198.88 hectares to 323.99 hectares. Irrigation has also been increased indirectly under Irrigation facility through Dug wells. Total number of Tube wells irrigated area has been increased from 142.31 to 241.75 hectares, and likewise, un irrigated area has been decreased.

**Table-1 : Impact of Water concept on land use pattern.**

Land use	Before (Hectares)	After(Hectares) after Ist year of implementation
Forest land	355.0	355.0
Well Irrigated	51.32	87.24
Tube wells irrigated	142.31	241.75
Total Irrigated area	193.88	323.99
Un irrigated area	840.57	511.58
others	0.35	-
Cultivable waste area	530.25	530.25
Area unavailable for cultivation	304.52	304.52

A questionnaire survey was conducted with a group of farmers from four different places in Jhalawar district.(Table-II). The list of farmers holding small lands, and large size lands were interviewed and subjected to analysis and results are presented in a tabular form to access the impact of MJSA project on their socio-economic condition.

Outcomes of the above construction works :

**Table - II : Change in annual net income of formers belonging in to all categories.**

**Beneficiary farmers:**

Category	Net Income per Annam		Additional Income	% Increase of Income
	Before of MJSA	After of MJSA		
<b>1.Marginal Farmers.</b>				

Agriculture	21,215/-	23,270/-	2,055/-	8.83%
Dairy	8,585/-	10,085/-	1,500/-	14.87%
Grazing of Animals	Grazing at far off distance.	Grazing at in nearby areas on fresh grass.		
<b>2.Farmer Holding Small Lands.</b>				
Agriculture	38,695/-	46,145/-	7,450/-	16.14%
Dairy	5,500/-	6,500/-	1,000	15.38%
Grazing of Animals	Nil	Grazing done in nearby ground		
<b>3.Farmer Holding Medium Lands.</b>				
Agriculture	77,811/-	82,231	4,420/-	5.3%
Dairy	6,590	7,340		
<b>4.Farmer Holding Large Lands</b>				
Agriculture	1,31,700/-	1,40,360/-	8,660/-	6%
Dairy	6,550/-	7,120/-	570.00/-	8%

The above analysis shows that MJSA project for Watershed development impacted on all types of farmers to a large extent, in terms of Ground water recharge, earnings and increase in percentage annual income. The increase in net annual income for agriculture among marginal farmers was 8.83%, as compared to 16.14% for small farmers, 5.3% for medium farmers and 6% for large farmers. The increase in income for dairy activities were found to be 14.87% in marginal farmers, 15.38% in small farmers, 4% in medium farmers and 8% in large farmers. Grazing of their livestock for all the farmers was easy task when compared previously, as they had to go long distances for grazing of their live stock before the implementation of the project.

Marginal farmers were able to earn additional income per annum by Rs.2,055/- on agricultural activities. The findings are also in agreement with the earlier work done by Jain et.al., in the year 2010 while working on beneficiary and non-beneficiary farmers. His findings shows an improvement by 14.8% per annum.

Medium farmers who gained assistance under MJSA programme were able to increase income in Agricultural activities by 5.3% and dairy activities by 4%. The increase was less when compared to marginal farmers and small farmers. This may be due to many factors.

Small farmers who utilized the project were able to increase their income by Rs.7,450/ annually. Increase in dairy activities contributed to 15.38%.The increase was significant as compared to medium farmers

Large farmers who benefited under MJSA project were able to increase their income on agriculture by 8 % annually and 6% on dairy activities.

## DISCUSSION:

Rajasthan has 10% of total population, 5% of land area, the state has only 1% of water. A 2012 study reveals that, it has the highest probability of drought in India. The main objective of Rajasthan was to conserve and harvest rain water and make villages self-reliant even during drought periods. Therefore, "Mukhyamantri Jal Swavlamban Abhiyan" was organized to conserve water. The programme has been designed in such a way that everything from planning to execution shall be followed in a participatory approach down to the village community level. The scheme was created with the idea of natural resource management with hydrological unit as a base to develop water, forest and land. The purpose of this Mission on Water Conservation is to make villages self-sufficient in water use and thus provide a permanent solution to the demand of drinking water besides ensuring storage and conservation of water for making it available for irrigation. Since Water conservation technology emphasizes on water up-liftment techniques to facilitate recharge to ground water in the upper areas of watershed through mini percolation tanks instead of conventional dams in main valley. It can increase the benefits three times more and recharge the ground water by 10 times more.

Mukhya mantri Jal Swavalamban abhiyan (MJSA) Was started in the year 2016, with the aim to conserve water in Rajasthan. This project included construction of Water Harvesting structures and total land treatment which not only improves Ground water level in the state, but also benefits farmers.

From the above discussion, and case study it can be said that the development in the area with regard to Ground water level, agriculture, and land use pattern in the district have not been the same. The above findings are in agreement with Bhanwalal (2001) and Krishna, A. (2001), who worked on impact of national watershed development programmes on rain fed agriculture and found that many factors like, net cropped area, gross cropped area, cropping intensity etc also contributes to a large extent. V.Ratna Reddy (May, 2017) referred to this concept as intervention alleviation programme.

The above figures depicts the improvement in the hydro geological and ecological conditions of jhalawar district. The maximum % increase in net annual income in all categories of farmers have been observed. Jain et.al., carried out studies on IWDP programme in Udaipur district on beneficiary and non-beneficiary farmers. They observed that percentage increase in marginal farmers was more (36.7%). This statement is in contradictory with the above work which says that the annual increase in income for marginal farmers is only 8.83%, However, the overall income increased in farmers of all categories. This suggests the increase in Irrigation potential of marginal land which impacted increase in income from agriculture. This is not a normal trend.

## CONCLUSIONS:

Finally, it can be concluded that the beneficiaries in terms of annual income were found to increase by 16.4% for small farmers, 8.83% for marginal farmers, 6% for large farmers followed by 5.3% for medium farmers in terms of agriculture. In terms of dairy, the increase

was found to be 15.3% for small farmers, followed by 14.87% for marginal farmers and 8.0% for medium farmers.

## REFERENCES:

V.RatnaReddy, Economic & Political weekly. Vol.52, issue No.09, Dec, 2017.

Impact Assessment of Watershed Development Projects in Rajasthan LNRMI Hyderabad - 2010.

Ashvini Kumar Jain, S.S. Burak, D.C. Pant and H.K. Jain, An Economic Analysis of watershed development project in Udaipur district of Rajasthan, *Annals of Arid zone* 49(2): 127-130, 2010.

Badal P.S, Pramod Kumar and Geeta Bisaria (2006), "Dimensions and Determinants of Peoples' Participation in Watershed Development Programmes in Rajasthan" *Agricultural Economics Research Review*, Vol. 19, No.1, January-June, pp. 57-69.

Kolavalli, L.S. and J. Kerr (2002), "Mainstreaming Participatory Watershed Development", *Economic and Political Weekly*, Vol. 37, No.3, January 19, pp. 225-242.

Krishna, A. (2001), "Moving from Stock of Social Capital to Flow of Benefits: The Role of Agency", *World Development*, Vol. 29, No. 6, pp. 925-943.

Fan, S. and P. Hazell (2000), "Should Developing Countries Invest More in Less Favoured Areas? An Empirical Analysis of Rural India", *Economic and Political Weekly*, Vol.35, No.17, April 22-28, pp. 1455-1464

Nalatawadmath, S.K, M.S. Rama Mohan Rao and M. Padmaiah (1997), "Joladarasi Model Watershed Development Program in Bellary District of Karnataka-A Diagnostic Evaluation", *Journal of Rural Development*, Vol.16, No.2, April-June.

Deshpande, R.S. and V. Ratna Reddy (1990), "Social Dynamics and Farmer's Society: A Case Study of PaniPanchayat," *Indian Journal of Agricultural Economics*, Vol. 45, No. 3, July-September.

Bhanwarlal (2001), Impact of National Watershed development project on Rain fed Agriculture in Alwar district of Rajasthan, *Agric.SciDigest*, 21 (3) :157-160, 2001

Singh.P.K. *et al.*, (1995). *J.Rural Develop.*, 14:107-116.

Ninan, K.N. and Lakshmikanthamma, S. 1994, Sustainable development: the case of Watershed development in India, *International Journal of Sustainable World Ecology*, 1:229-238, pp.

P.Sudha rani and Nalla naresh, Integrated watershed Management Programme at Gunjala Village- A Case Study, *International Journal of Research in Engineering and Technology*, Volume 4, Issue 4, April 2015



Government of India ministry of water resources central ground water board ground water  
information jhalawar district Rajasthan

IJSER