

## Strategy to Increase the Adoption of Watershed Technology in Rainfed Areas

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### INTRODUCTION

Conservation of biotic resources on watershed basis has been proved as best approach for increasing the productivity of such areas by many researchers and is getting immense popularity today. A most common problem of dryland and rainfed areas is soil erosion. This problem is severely found in the state of Rajasthan. Most of the districts of the state has been delineated as drought prone for many years. Considering the problems, government of Rajasthan has started a programme on Integrated Watershed Development in collaboration with World Bank in 1990. But, merely formulating the policies and introduction of programmes will not serve the purpose unless the technical know-how reaches to its ultimate users in an effective way and the constraints which hinderance the adoption of technology by the farmers should be identified. Keeping this in view, the present study on IWDP was carried out with the following specific objectives :

- 1 To find out the technological gap in the knowledge and adoption towards watershed technology among the farmers.
- 2 To identify the constraints being faced by the farmers in adoption of water-

shed technology.

- 3 To suggest an appropriate strategy for fulfilling the gap in knowledge and adoption of watershed technology.

### METHODOLOGY

Out of the thirty districts of Rajasthan, only four districts namely Udaipur, Jodhpur, Ajmer and Bhilwara were identified for IWDP. Only Udaipur district was selected for the study since it possessed largest area under the IWDFP. All the three tehsils namely Nathdwara, Girwa and Mavli which were taken under the project included in the study. In all five villages, three from Nathdwara and one each from remaining two tehsils were sought on proportionate basis. The 50 percent (114) of the total population (228) was drawn as sample through proportionate sampling method.

To measure the knowledge of farmers towards Integrated Watershed Development (IWD) practices, a knowledge test was developed and pre-tested. Dichotomous continuum i.e. 'Yes' and 'No' was used to record the response 'one' score was given to correct (Yes) response and 'zero' to wrong (No) one. Maximum possible score were 136. Details of knowledge test is as under :

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Sr. No.	Aspects/Activities	No. of items	Sr. No.	Constraints related to*	No. of items
1.	Planning and management	25	1.	Planning and Management	14
2.	Soil and water conservation	20	2.	Soil and Water Conservation	13
3.	Animal and pasture development	39	3.	Animal and pasture development	29
4.	Crop production (Dry farming)	31	4.	Crop production	31
5.	Horticulture & forestry	21	5.	Horticulture and forestry	19
	Total	136	6.	Extension and Education	14

Similarly for measuring the adoption level of watershed technology by the farmers, a five point continuum i.e. fully, partially, little, very little and not at all adopted was used. In all, 31 items under different practices of IWDP were included. Details of adoption test is given as under :

Sr. No.	Practices	No. of items
1.	Soil and water conseration	4
2.	Crop production (Dry farming)	12
3.	Horticulture and Forestry	3
4.	Animal and pasture development	11
	Total	31

For measuring the constraints in adoption of various IWD practices being perceived by the farmers, a four point continuum i.e. very much, so-s0- or average, very little and not at all was applied. The aspects included in constraints are as under :

\* Of the above mentioned items all the items were not mentioned in Table 3, only first 5 items which ranked first are presented in the table.

The personal interview technique was used to record the response. Various statistical methods such as mean score, mean percent score, etc. were applied for analysis of data.

## RESULTS AND DISCUSSION

For the success of any development programme, it is imperative that farmers must have a good knowledge of its various components. Only then desirable extent of adoption could be achieved. Hence, it is essential to study the constraints being perceived by the farmers in adoption and on appropriate strategy suggested.

(a) Technological gap in knowledge of farmers towards major activities of IWDP :

Table 1 devuldges that, farmers had maximum knowledge towards 'Planning and Management' asects of IWDP (50.88 MPS) as the gap in knowledge was rela-

**Table 1. Technological gap in the knowledge of farmers towards major components of IWDP.**

Sr. No.	Major components	MPS	Gap per cent	Rank
1.	Planning & Management	50.88	49.12	V
2.	Soil and Water conservation	30.88	69.12	III
3.	Animal & Pasture development	34.12	65.88	IV
4.	Horticulture & Forestry	27.03	72.97	I
5.	Crop production	27.45	72.55	II

tively less i.e. 49.12 per cent as compared to other aspects. While gap in knowledge with respect to "animal and pasture development" was 65.88 per cent. Further, the knowledge towards 'soil and water conservation, which is a most important component of IWDP, was only 30.88. MPS depicting a wide gap of around 70 per cent. Analysis of data further revealed that there was a considerable gap of nearly 73 per cent in the knowledge of farmers about crop production (dry farming) and 'Horticulture and Forestry' practices.

Above findings indicate that, a wide gap in the knowledge of farmers existed towards different components of watershed technology. It leads to conclusion that since this project was launched two years back, intensive effects to provide

watershed technology to the farmers has to be made by the concerned departments by way of organising vocational training courses and providing adequate skills to enable them to have greater knowledge and acceptability of the technology.

The findings of Kumar and Dhawan (1992) was also in close confirmity with the above findings.

(b) Technological gap in the adoption of watershed technology

Observation of Table 2 reveals that, adoption of Crop production (Dry farming) practices by the farmers was relatively higher (around 29 MPS). Whereas, gap in adoption of 'soil and water conservation' and 'animal and pasture development' practices was around 72 per cent. The

**Table 2. Technological gap in the adoption of watershed technology among farmers.**

Sr. No.	Major practices	MPS	Gap per cent	Rank
1.	Soil & watershed conservation	27.57	72.43	III
2.	Crop production (dry farming)	28.74	71.26	IV
3.	Horticulture & Forestry	4.68	95.32	I
4.	Animal & pasture development	27.53	72.47	II

condition of 'horticulture and forestry' practices was very poor with respect to its adoption as there was a wide gap of 95 per cent.

Above results indicate that, the adoption of watershed technology by the farmers was, though not to the expected level but the project has definitely helped the beneficiaries in increasing the knowledge and adoption of watershed technology. Constant and continuous efforts are still needed on the part of the project executives to go a long way in popularizing the practices of watershed technology among the farmers through appropriate extension methods and technologies.

These findings were also supported by the findings of Verma (1991) who reported that watershed programmes are helpful in

increasing the adoption of land and livestock based activities by the farmers.

(c) Constraints in adoption of watershed technology

Besides, measuring the technological gap in knowledge and adoption of watershed technology, the constraints being perceived by the farmers in adoption of this technology were also identified so an appropriate strategy could be suggested to fulfil the gap obtained so far.

Table 3 revealed that, in 'planning and management' aspect of IWDP, lack of coordination and cooperation from NGOs was realised as major constraint with 83.62 MPS. While lack of knowledge about the objectives of IWDP and regular evaluation by the district and local watershed development committees were realised as

**Table 3. Technological constraints being perceived by the farmers in adoption of watershed technology.**

Sr. No.	Constraints related to	MPS
<b>A. PLANNING AND MANAGEMENT</b>		
1.	Lack of knowledge regarding the objectives of IWDP	62.86
2.	Soil and water management	59.06
3.	Untimely advise	58.93
4.	Lack of regular evaluation by the district and local watershed development committee	61.69
5.	Co-ordination and co-operation from NGOs.	83.62
<b>B. SOIL AND WATER CONSERVATION</b>		
1.	Lack of technical knowledge	78.06
2.	Untimely availability of material for the construction of SWC structure (check dam, Anicut, vegetative barriers etc.)	68.70
3.	Apathy of field functionaries	64.03
4.	Inadequate attention on natural ponds	63.15
5.	Proper maintenance of SWC structures	56.43

Strategy to increase....

Sr. No.	Constraints related to	MPS
<b>C. ANIMAL AND PASTURE DEVELOPMENT</b>		
1.	Lack of knowledge regarding A.I.	91.80
2.	Knowledge about Silvi-pasture system	90.63
3.	Costly animals of improved breed	88.88
4.	Unavailability of cheap and timely concentrate	82.74
5.	Lack of improved breeding bulls	81.57
<b>D. CROP PRODUCTION</b>		
<b>A. Improved agricultural technology &amp; chemical fertilizers:</b>		
1.	Scarce irrigation facilities	85.66
2.	Costly improved seeds	82.74
3.	Inadequate agricultural technology for the hilly and rainfed areas	81.86
4.	Costly fertilizers	80.40
5.	Knowledge about recommended agronomic practices	74.84
<b>B. Seed and soil treatment and plant protection measures</b>		
1.	Lack of improved implements (spray etc.)	98.53
2.	Technical knowledge about plant protection measures	95.60
3.	Untimely advise/technical information	94.14
4.	Timely availability of chemicals	89.46
5.	Chemicals are costly	88.39
<b>C. Marketing problems</b>		
1.	Lack of storage facilities	99.99/100
2.	Crop insurance, appropriate price in the absence of regular markets.	97.06
3.	Structure of cooperative	93.55
4.	Improper marketing facilities	85.66
5.	Farmers bounded to sell their products to local merchants	76.60
<b>D. Horticulture and Forestry</b>		
1.	Unaware of agro-forestry	86.25
2.	Inadequate irrigation facilities	83.90
3.	Sufficient nurseries	65.50
4.	Technical knowledge	59.64
5.	Knowledge about sowing methods in nurseries	46.78

Sr. No.	Constraints related to	MPS
<b>E. EXTENSION AND EDUCATION</b>		
1.	IWDP has not given any place on mass media like (T.V. & Radio)	97.65
2.	Lack of education and motivation	84.50
3.	Field functionaries do formality to cover the area	74.84
4.	Lack of regular training camps and field visits for the farmers	63.44

second and third major constraints (around 62 MPS) by the farmers in the 'planning' aspect.

Lack of proper management of soil and water and untimely advise by the Field Functionaries (FFS) were observed as other important constraints. Under the aspect of 'soil and water conservation' (SWC), the main constraint perceived was lack of technical knowledge (78.06 MPS) followed by untimely availability of material for the construction of SWC structures with 68.70 MPS. Other important problems with regards to soil and water conservation were, apathy of FFS (64.03 MPS), inadequate attention on natural ponds of the area (63.15 MPS) and proper maintenance of SWC structures (56.43 MPS). As far as constraints related to "animal and pasture development" are concerned, the most realised problems were lack of knowledge about "Artificial insemination", and 'silvi-pasture' system where 91.80 and 90.63 MPS were assigned respectively by the farmers. Besides above, costly animals of improved breeds, availability of cheap and timely concentrates and lack of improved breeding bulls were also perceived as important hinderances by the farmers in this aspect.

In the 'crop production' (Dry farming) aspect of IWDP, all the constraints

were grouped into three major sections i.e. constraints related to improved agricultural technology and chemical fertilizers, related to seed and soil treatment and plant protection measures and marketing problems. Scarce irrigation facilities and costly improved seeds were observed as major problems with 85.66 and 82.74 MPS, respectively by the farmers in adoption of improved agricultural technology. On the other hand, in the field of seed and soil treatment and plant protection measures, the most felt problems were : lack of improved equipments (98.53 MPS) and technical knowledge (95.60 MPS). As far as marketing problems are concerned, lack of storage (warehouses) facilities, crop insurance and poor structure of cooperatives in the watershed area were realised as severe constraints where 100, 97.06 and 93.55 MPS were assigned by the farmers.

Being an integrated approach, in addition to above narrated aspect, 'Horticultural and Fforestry' practices were also taken under IWDP. The major constraints in this aspect were unawareness of farmers about 'Agro-forestry' followed by 'inadequate irrigation facilities with 86.25

and 83.90 MPS, respectively. Insufficient nurseries and technical knowledge were other important problems existing in the watershed area. 'Extension and Education' are two basic aspects which are considered to be root stone for any development programmes. Any problem in these aspects may reduce the effectiveness of that particular programme. Here, in case of IWDP, constraints related to extension and education aspects were also identified. The major constraints were that, IWDP has not given any place on mass media (97.65 MPS), lack of education and motivation (84.50 MPS), apathy of FFs (74.84 MPS), regular training camps and field visits for the farmers (63.44 MPS).

Above findings were also in line with the findings of Gill *et al.* (1991) Kumar and Dhawan (1992) and Singh (1991).

### IMPLICATIONS

The following strategy might be suggested on the basis of knowledge, adoption and constraints being faced by the farmers towards watershed technology :

- (i) Before initiating the watershed projects, a comprehensive study of the background of the farmers and the watershed area regarding socio-economic status, available water resources (natural ponds etc.), soil profile, topography, climatic conditions, communication and transport facilities etc. should be carried out.
- (ii) An instructional plan of watershed development activities and their objectives should be prepared for the farmers and broadcasted on mass media like Radio, T.V. etc.
- (iii) A local watershed Development Committee involving one farmer from each beneficiary family should be made which will evaluate the progress of the programme regularly. Besides this, higher authority of the project should also see the working of local committee timely.
- (iv) Complex aspects of watershed technology should be modified into simple practicable practices.
- (v) Watershed development programmes should be implemented in a phased manner i.e. in the first phase all land based activities should be taken. All the live-stock based activities should be included in the second phase.
- (vi) Emphasis must be given on need based activities.
- (vii) Co-operation of farmers must be sought by involving them at planning stage. Help of opinion leader may be taken for this.

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