

Improving performance of Irrigation project through PIM – A case study of Sunder Distributory system, Haryana, INDIA.

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ABSTRACT:- *Scarcity and gradual decrease in the share of water for agriculture in semi – arid regions poses a challenge to produce more crops per drop. Efficiency of irrigation projects is not upto expectations. Main reasons being the lack of maintenance of these projects and mismanagement of water at field level. Scheduling of irrigation is not conducive to the equity. Therefore, the tail enders of the canal system often do not get adequate water for their crops. Solution of this problem lies in handing over the management of irrigation field channels to the beneficiaries. This canal command is under small land holding condition of 3 ha. Field channels were in damaged condition and has been repaired and rehabilitated by brick lining after formation of Water User Association (WUAs). Previously, water losses, theft and wastage was huge. Farmers are trained regarding conservation, economical and judicious use and equitable distribution of water, efficient conveyance system and diversification of crops. Area under irrigation has increased. Crop pattern is changing for better future. There are less no. of disputes among farmers. After training of farmers, there is good awareness regarding irrigation related activities. Awareness of participation has evoked in farmers. 30 No. WUAs has been formed and remaining 47 are to be formed. Annual irrigation intensity has increased by 9.5%. Water saving due to efficient water management is 21.2%. Income of farmers and landless labourers has increased by 11% and has led to poverty alleviation. Revenue generated to the Irrigation Department has also increased by 10.4%.*

Keywords:- *Participatory Approach, Water Users Association, Water productivity, Judicious use of water, Poverty alleviation.*

Introduction

Irrigation Management had always been the responsibility of the state but the situation is now changing fast and in a number of nations enabling environment is being created for farmers to take over the management of water resources. The Govt. is becoming a facilitator and focusing on management of dams and main systems. The need is evident as the Govt. cannot be expected to do everything and moreover the incentives for farmers are much more and their stakes are higher in efficient and equitable management of water resources. Australia, United States, Japan, Spain, Mexico, Philippines, Turkey etc. are among many countries where management of irrigation has been transferred to farmers on a large scale and proved to be successful. The question is whether PIM can work in only developed states where education level is more, financial

position of farmers is better and a strong support system is present through private as well as public sector, as compared to developing countries where all these factors are lacking. The answer is affirmative due to reason that the cost goes down substantially when farmers manage irrigation system. Therefore, PIM is relevant to every country irrespective of its state of affairs, economic conditions, socio-political structure . PIM has been practiced in India too since ages. The ‘Kools’ have been completely created and managed by farmers in Himachal Pradesh and other lower Shivalik hills. Participation of stakeholders in irrigation management has been successfully implemented in a number of states in India such as Andhra Pradesh, Maharashtra, Madhya Pradesh, Gujrat etc. But the lead has been taken by Andhra Pradesh in this field when the irrigation management has been transferred to stakeholders upto the level of minors and distributaries. Haryana irrigation department has also implemented PIM at water course level.

Haryana had the concept of PIM in its own way through participation of stakeholders in management through the process of consultation and participation in decision taking at planning level. The Northern India Canal and Drainage Act of 1873 had the enabling provisions for participation of stakeholders in irrigation management, particularly for equitable distribution of water. This act has been replaced by the Haryana Canal and Drainage Act, 1974.

Haryana is mostly arid or semi-arid, with limited rainfall ranging from 300 mm in the southwest to 1100 mm in the northeast. Now Govt. of Haryana has brick lined water courses after formation of water users associations (WUA’s). These WUA’s made a wonderful contribution to the Govt. like checking of levels, quality of material and construction of water courses. These WUAs has taken full responsibility for repair & maintenance of these water courses

Methodology

The nature of the data is primary and secondary . Primary data has been collected after meeting and interviews with the farmers in the field and consulting with staff of Haryana Irrigation Department . Secondary data has been collected from annual administrative reports of Haryana Irrigation Department and from Haryana Irrigation Research and Management Institute (HIRMI) which is a premium research institute in this field.

Analysis and sampling of this data has been done to get valuable information so that there will be best and optimum use of water.

TABLE-1

Yearwise Irrigation Intensity

(Figures in ha)

Name of channel	Gross area(GA)	Cultur able comm and area(CCA)	Disch. Litre/sec	1999 -2000	2000- 2001	2001 -02	2002 -03	2003 -04	2004 -05	2005 -06	2006 -07	2007 -08	2008 -09
Sunder disty.	45396	41093	12558	51281	51239	49837	50108	51924	48494	51922	46363	50017	45565

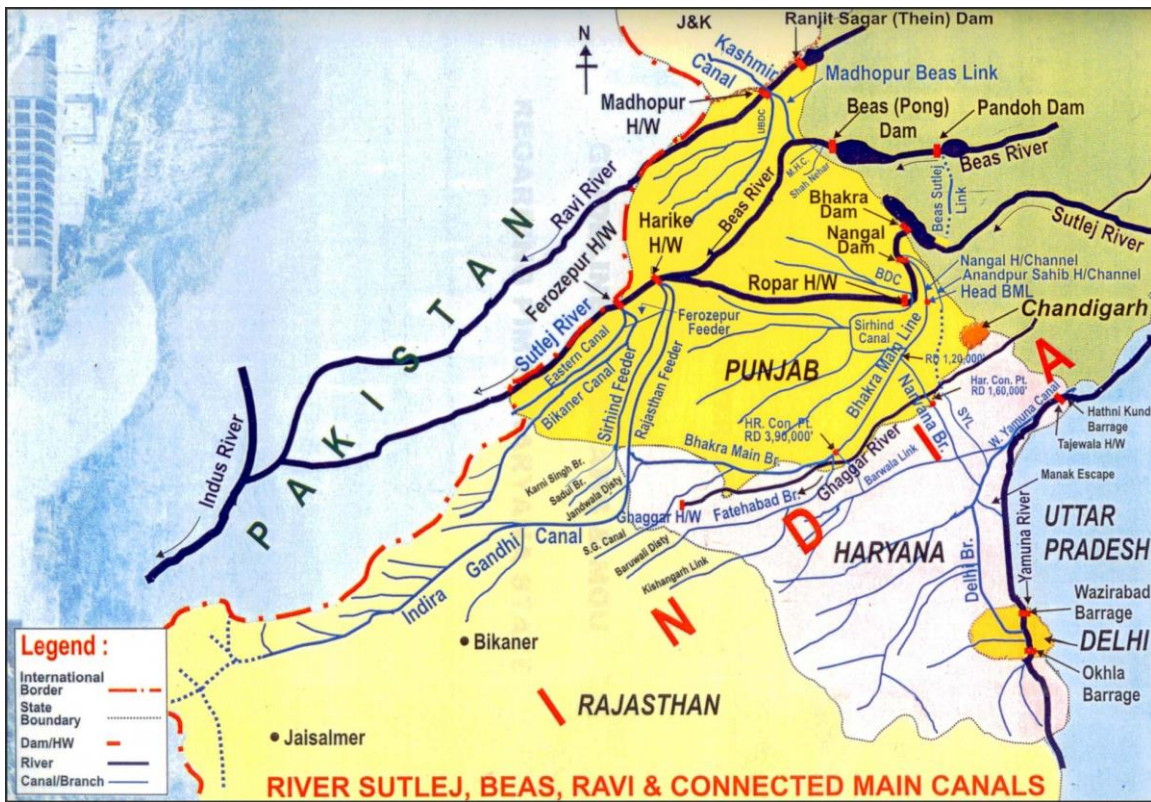
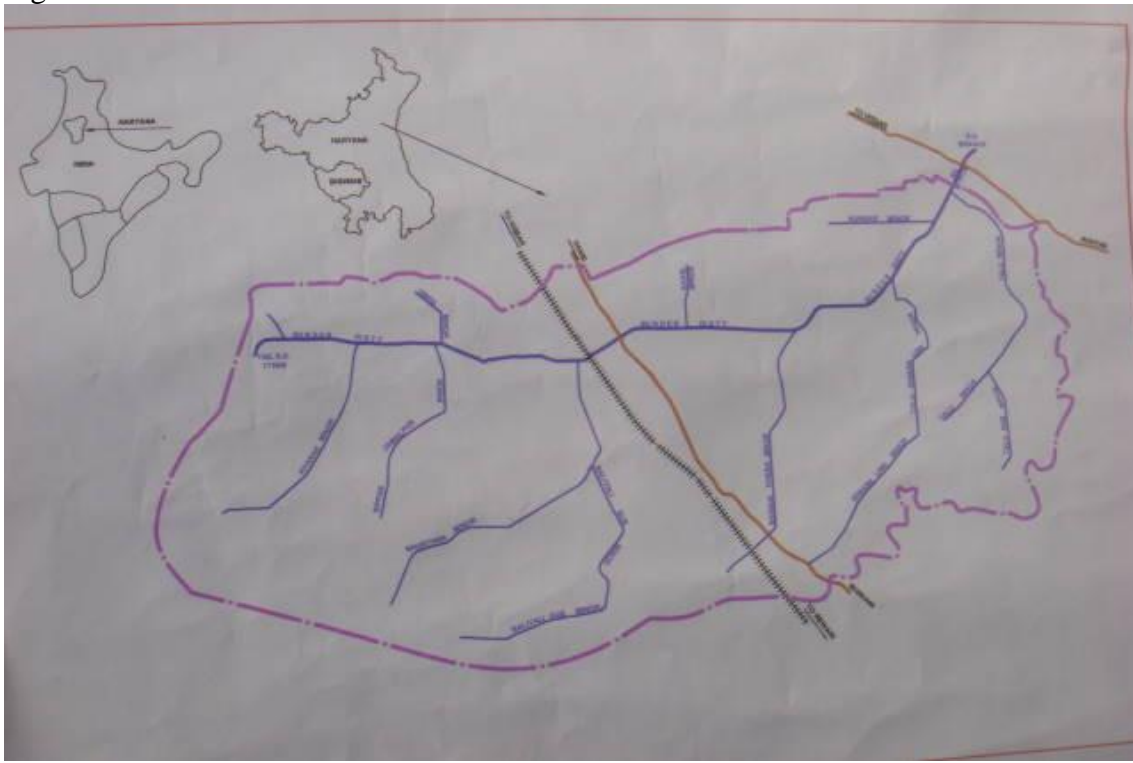


Figure-1



The study area comprises 45396 ha covering mainly the arid and semi-arid parts of South-Western Haryana which is located at 28° 46'N latitude and 76° 18'E longitude. Table I and figure I). Value of crop/ ha has been calculated in Table-II. Sunder Disty. has 77 outlets, out of which water courses of 30 outlets has been repaired/ rehabilitation. Studies were taken on chaks of 9 representation outlets located at head, middle and tail reaches, details of which are given in Table-III. Out of these representation chaks, 6 number water courses are repaired / rehabilitated and 3 no. water courses (wc) are unlined.

Value of Crop/ ha

TABLE –II

Kharif crop(kh)	Share of Area/ Ha	Production/Ha. In Qtl.	Rate/Qtl. (US Dollar)	Value (US Dollar)
Rice	1/7	40	38.38	219.31
Cotton	5/7	20	46.90	670.00
Bajra	1/7	20	12.79	36.55
				925.86 -----(A)

Rabi Crop	Share of Area/ Ha	Product/Ha In Qtl.	Rate/ Qtl. (US Dollar)	Value (US Dollar)
Wheat	1/3	40	23.45	312.67
Mustard	2/3	20	42.64	568.60
				881.27----- (B)

$$\text{Avg. Value /Crop} = \frac{\mathbf{A} + \mathbf{B}}{2} = \frac{\mathbf{925.86+881.27}}{2} = \text{US \$ } \mathbf{903.57}$$

Revenue generated to Govt. has been calculated in Table-IV.

The average annual rainfall in the study area is 450 mm. The area is facing following major water management problems.

- Untimely and inadequate canal irrigation water supplies.
- Unauthorized lifting of canal water in upper reaches .
- Very poor maintenance of water courses.
- High seepage losses in watercourses and distributaries.
- Brackish ground waters and overexploitation of ground waters.
- Mis-match between cropping pattern and water supplies.
- Ineffective water users' associations and
- Non-judicious use of irrigation water by the farmers.

Irrigation figures of Lined / Unlined Watercourses

TABLE-III

(Figures in ha)

Name of outlet at reduced distance (feet)	Wc Lined during the year	GA (ha)	CCA (ha)	Disch . Litre/ Sec.	Kh. 2005	Rabi 05-06	Kh. 06	Rabi 06-07	Kh. 07	Rabi 07-08	Kh. 08	Rabi 08-09	Kh. 09	Total cuvtivators Kharif 09	Av. land Holding size (ha)	Av. Irrigation (ha) (Before lining)	Av. Irrigation (ha) (After lining)	%age Increase in Av. Irrigation	increase in value of production @ 903.57 per ha(US Dollar)
26005-L	2006-07	284	273	45.88	198	216	176	260	218	270	233	272	225	116	2	207	236	10.62	26203.53
39815-R	2007-08	198	190	32.00	150	180	80	178	145	179	167	180	189	137	1	147	172	14.21	22589.25
41120-L	-do-	246	239	41.86	172	211	181	219	180	232	157	230	167	66	3	167	195	11.72	25299.96
57658-R	-do-	240	221	37.10	136	173	145	178	142	181	140	184	129	83	3	155	178	9.6	20782.11
60486-L	-do-	290	268	47.29	180	199	168	191	178	187	140	188	146	55	5	149	171	8.21	19878.54
101961-R	2006-07	289	263	44.18	68	58	76	56	72	109	35	70	38	52	5	45	65	7.60	18071.40
34835-L	Unlined	170	163	27.75	140	139	156	148	117	155	131	148	115	43	4				
48845-R	-do-	497	381	64.00	242	276	244	308	230	307	236	301	234	137	3				
64612-L	-do-	254	178	30.02	144	157	139	160	145	161	119	160	140	44	4				

Results and discussions

After lining and repair of damaged water courses, there is 21.2% saving of water. This saved water has been further utilized at the tail end of the chak.

Results reveal that annual irrigation intensity has increased by 9.5% and income of farmers and landless laboures has increased by 11% and has led to poverty alleviation. Av. size of land holding is 3 ha (Table-III).

Revenue generated to govt. has increased by 10.4% (Table IV).

TABLE –IV

Comparative Statement of Revenue collection (Abiana)

(US Dollar)

Sr. No.	Name of outlet at Reduced Distance (feet)	Before lining		After lining		Abiana increase	% Age Increase	Total length of W/C (in meter)	Length Repaired (in meter)	Expenditure
		Year	Abiana	Year	Abiana					
1	26005-L	2006-07	1058.32	2007-08	1167.80	109.70	10	8516.11	3851.15	44861.41
2	39815-R	2007-08	818.66	2008-09	918.12	99.47	12	2980.94	2133.60	19232.41
3	41120-L	2007-08	899.57	2008-09	1012.47	91.58	10	4632.96	3291.84	25522.39
4	57658-R	2007-08	756.82	2008-09	824.95	68.12	9	3965.45	2499.36	38528.78
5	60486-L	2007-08	832.20	2008-09	907.14	74.95	9	6541.01	3614.93	60895.52
6	101961-R	2006-07	305.65	2007-08	331.77	26.12	8	7452.36	5548.58	61130.06

L=left, R=right

There are less no. of disputes among farmers. After training of farmers, there is good awareness regarding agricultural/ Irrigation related activities. The awareness of participation has evoked in farmers. In Haryana State, PIM has gained success below outlet stage i.e. below water courses. Now the time has come that such water users association (WUAs) be motivated to participate even on minors, Distributaries, branches, drains etc. so that, in total, PIM may prove a success and Govt.'s burden on expenditure be reduced.

So participatory irrigation management (PIM) is the key to success.

REFERENCES

- Biswas A.K. (ED), 1976 systems Approach to Water Management, McGraw- Hill New York,.
- Brewer J., S. Kolavalli, 1999. Irrigation Management Transfer in India: Policies, Process and Performance, Oxford & IBH Publishing House, New Delhi.
- Cornea, M.M. and R. Meinzen-Dick, 1992. Design for Water Users Associations: Organizational Characteristics. In Developing and Improving and Drainage Systems, World Bank Technical Paper No. 178, Washinton, D.C.
- Freeman, D.M. 1989. Local Organizations for Social Development: Concepts and Cases of Irrigation Organization, Westview press, Boulder, Colorado.
- Groenfelt, D., 1998. Handbook on Participatory Irrigation Management, The Economic Development Institute of the World Bank, Washington D.C.
- Goldensohn, M.(also often referred to as ISP AN, 1994), 1994. *Participation and Empowerment: An Assessment of Water Users Associations in Asia and Egypt*, Irrigation Support Project for Asia and the Near East, Washington, D.C.
- Gulati, A., R.Meinzen-Dick and K.V. Raju, 1999. From Top Down to Bottom Up: *Institutional Reforms in Indian Canal Irrigation*, draft volume circulated for a National Workshop at Institute of Economic Growth, New Delhi.
- Hooja, R., 1997 (a). Promoting Water Users Associations in Participatory Irrigation Management: Some Reflections, *Indian Journal of Public Administration*, Vol. 43, No.3, Octorber-December 1997.
- **Narwal, Gulab Singh, 2009, *Participatory Irrigation Management (PIM): A working model in Haryana, M.phil (Management) Thesis, CDLU, Sirsa, Haryana, India.***
- **Narwal, Gulab Singh, 2010, *Participatory Irrigation Management (PIM) A working model in Haryana : A Case study of outlet chak RD 26615-R Padhana Minor, Nardak Water Services Division, Karnal, Presented Paper in 60th IEC meeting & 5th Asian Regional Conference held from 6 Dec. to 11 Dec. 2009 at New Delhi.***

summary and conclusions

The aim of every irrigation system is equitable timely adequate water supply to the individual farmer. The economic use of water, along with the other inputs is aimed at optimization of agricultural production. These aims are to be achieved by owner operators and users of the system jointly. The responsibilities of the two are to be clearly defined so that the conflicts are minimized. In over present system the owner is the government represented by the management staff at the middle and lower level in the irrigation department. The farmers are the users of the system. The responsibility of equitable water supply rests with the owner operator in the present working. It is logical that the responsibility of economic use of water should rest with the users i.e. farmers. As long as he is charged on crop area basis, this responsibility also is not felt by him. In the present system, the only responsibility of the farmer is to pay the irrigation charges irrespective of the quantum of water used. The other responsibility of maintaining the field channels in good condition is often neglected by the farmers. The reason is clear because he can get water even when he neglects his responsibility. The farmers do not realize their apathy towards the system is readily observed by the operators of the system who are not the beneficiaries of the system. This results in the deterioration of the system and the ultimate loser is the farmer. So if the system is not to deteriorate, the farmers should not only be the users and consequently a stranger to the system but he should share responsibilities in the operation of the system. To achieve this objective the farmers must involve themselves in operation and maintenance of irrigation water by forming WUAs.

Benefits to farmers for participation in water management through water users associations. (WUA)

- a) Water distribution is more equitable, economical and reliable.
- b) There is saving in the cost of management i.e. in the operation and maintenance charges.
- c) Conflict settlement is easier.
- d) Maintenance and repairs below outlet is done by the farmers to their satisfaction.
- e) The arbitrariness of the irrigation staff of high headedness of vested interest in the head reaches would be neutralized to a large extent.
- f) The management staff free from the water distribution problems will be able to concentrate on the repairs of canal system.

- g) The major advantage of farmers' participation in water management through WUAs will increase water use efficiency because the farmers come to know the value of water and they use it more economically.
- h) The WUAs with legal status can collect funds from the individual farmers, procure material such as brick cement and sand, skilled labour and execute repairs for entire length of the water course at a time so as to provide improved and systematic service to all the farmers. The Association can also keep vigil on tempering, intentional damage by any individual and recover the associated cost.
- i) Unauthorized use of water by miscreants is controlled.
- j) Economically beneficial cropping pattern can be decided by WUA to be followed by member farmers.
- k) Cordial relations are developed between farmers and main system operating agency i.e. Government.
- l) Better collection of water rates.