

INTEGRATED WATERSHED MANAGEMENT AND PEOPLE'S PARTICIPATION

A CASE STUDY OF ICHALAHALLA WATERSHED

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ABSTRACT

Integrated watershed management project was carried out in Gadag district of Karnataka State under the guidance of Geological Society of India, Bengaluru. The project was facilitated by KVK, Hulkoti which mobilized the farming community of 6 villages through organization of awareness camps, seminars and water literacy camps in the villages. Series of training programmes on soil and water conservation, rain water harvesting and production technology in major crops were organized. After mobilizing the community, various soil and water conservation treatments were carried out in all the 6 watershed villages covering 5000 ha area. The intervention has made major impact on increased ground water availability resulting in sufficient water for irrigation. The area under commercial crops has been increased with pulses, oilseeds, horticulture and other commercial crops replacing the less productive cereal crops and the cropping intensity has also increased. The productivity of major crops and net returns per unit area in the watershed area has also increased. Thus, improving socio-economic condition of farmers.

INTRODUCTION

The natural streams in entire rainfed areas of Northern Karnataka remain dried up almost throughout the year except for a day or two after heavy rains, the streams flow. This is a clear indication of improper management in rain water harvesting both in agricultural fields and various primary, secondary & tertiary streams. In order to put up a model for rejuvenation of streams in Northern Karnataka, K.H. Patil Krishi Vigyan Kendra, Geological Society of India, Department of Water Resources, GOK and Zilla Panchayat, Gadag took up the initiative in rejuvenating the stream. The inspiration and motivation were provided by Shri Rajendrasingh Magsaysay Award Winner and Shri R.H. Sawakar, Secretary,

Geological Society of India under the leadership of Shri D.R.Patil, Ex MLA & President, JalBiradari, Karnataka Chapter and Shri H.K.Patil, Honorable Minister for Rural Development and Panchayat Raj, Government of Karnataka.



The planning process was initiated for rejuvenation of Ichalahalla stream flowing across nine villages in Gadag Block. Among these, six villages viz., Nagavi, Harthi, Mallasamudra, Asundi, Hulkoti and Hirehandigol constituted the intervention sites



for planning in 5000 hectares of area. The quick method of collecting necessary data was accomplished by employing various PRA (Participatory Rural Appraisal) tools. The data indicated that the Ichalahalla stream that originates in the hillocks of Nagavi village in Gadag block was a life line few decades back for the farmers of these villages. Due to siltation over a period of time, the stream has dried up resulting in decreased water table in catchment area especially near both banks of the stream. This had severely affected the irrigation potential in the area. As a result, there has been decreased productivity of crops apart from increased marshy land owing to occurrence of flood during heavy rains.

INTERVENTIONS

1) Community mobilization, Awareness and Training programme

Considering the importance of rejuvenation of Ichalahalla stream, KVK mobilized the village community of six villages and organized 13 awareness camps covering 1685 participants and four seminars were organized wherein 1150 farmers participated. For these programmes Mr. Rajendra Singh, was invited and water literacy camps were organized in the villages. About 38 training programmes were organized on rain water harvesting and 1336 farmers participated. Fifteen exposure visits were organized for 453 farmers (Table:1).

Table:1 - Awareness and Training programmes

Sl. No.	Activities	No.	No. of participants
i)	Awareness Camps	13	1685
ii)	Seminars	04	1150
iii)	Training programme on rain water harvesting	38	1336
iv)	Exposure visits	15	453



Awareness and training programmes

These activities have created a significant impact in the form of increased awareness on importance of rainwater harvesting for rejuvenation of the stream. As a result of these activities, the village community of Asundi and Harthi villages came forward to construct two percolation tanks with the voluntary contribution from all stakeholders. On contrary, some farmers in Nagavi village were reluctant to cooperate in the planning process fearing that the proposed treatments for rejuvenation of stream would make them deprived of water for irrigation. However, this issue was tackled by proposing construction of two big tanks across the stream in their village vicinity.

2) Linkages established for Construction of Water Harvesting Structures :

The extension activities and the training programmes have largely helped the village community in building the positive attitude towards construction of water harvesting structures. KVK facilitated the necessary linkages for construction of water harvesting structures. Details of linkages established are presented in Table 2.

Table:2 – Linkages established

Sl. No.	Linkage established	Type of linkage
i)	Watershed Development Department, Gadag district, Gadag	✚ Construction of checkdams across Ichalahalla stream and water tanks in Nagavi village
ii)	Minor Irrigation Department	✚ Construction of farm pond in watershed area
iii)	Zilla Panchayat (DRDA), Gadag district, Gadag	
ii)	Jala Samhardhan Project, Govt. of Karnataka	✚ Construction of farm ponds
iii)	Department of Water Resources Govt. of Karnataka	✚ Financial Assistance

3) Soil and Water Conservation Treatments carried out in Watershed areas

Linkages established with Zilla Panchyat, Department of Water Resources Govt. of Karnataka, Watershed Development Department and Jala Samhardhan Project of Govt. of Karnataka coupled with constant motivation of KVK has resulted in getting cooperation of village community and farmers were motivated to takeup soil and water conservation activities. The activities taken in watershed area has been presented in Table-3.

Table:3 - Treatments carried out for Rejuvenation of Ichalahalla stream

Sl. No.	Components	Quantity (Ha/no.)
1	Bunding (Ha.)	5000
2	Construction of waste weirs (No.)	1985
3	Construction of farm ponds & sunken ponds (No.)	160
4	Boulder checks (No.)	137
5	Rubber checks (No.)	18
6	Gully checks (No.)	56
7	Loose Boulder Structures	27
8	Check dams (No.)	16
9	Check dams cum cause-way	2
10	Dredging and formation of earthen bund on either side of stream (Rmtr)	15500
11	Water tanks(No.) 25 ha. area	2



Rain water harvesting structures

In the catchment area, about 5000 ha of area was covered under bunding work. 1985 waste weirs, 160 farm ponds, 137 boulder checks, 18 rubble checks, 56 gully checks, 27 loose boulder checks were constructed. Across the primary and secondary Nala, 16 Check dams, 2 Check dams cum cause way were constructed. The Nala was widened through dredging for about 15500 rmts. At the beginning of Nala, two big tanks were constructed for rain water harvesting.

OUTCOME AND IMPACT OF INTERVENTIONS

1) Recharge of Ground Water :

As a result of construction of water harvesting structures, borewells and wells got recharged in the vicinity of structures. There has also been a significant increase in the number of newly dug borewells over a period of time. This has been depicted in Table-4.

Table:4 - Status of bore wells and open wells

Year	Bore wells (Nos)		Open wells (Nos)	
	Existing bore wells recharged	Newly dug borewells	Existing wells recharged	Newly dug open wells
Ist Year	12	11	14	3
IInd year	7	5	7	0
III year	2	5	5	0
IV Year	1	3	1	0
Total	22	24	27	3



Rejuvenation of Open wells and Bore wells

Out of total 33 existing borewells in the catchment area, 22 borewells were recharged and 24 new borewells were dug by the farmers. There were 34 open wells before intervention period which were not functional. Over the period of time, 26 open wells became functional as a result of recharge of ground water.

2) Increased area under irrigation :

Two water tanks built at Nagavi village across the Ichalahalla stream has resulted in increased ground water availability to the farmers near the vicinity of the tanks. Same is the case in Asundi and Harthi villages where two percolation tanks were built and the borewells adjacent to percolation tank got recharged. Extent of increase in area under irrigation is presented in Table-5.

Table : 5 – Details of increase in irrigation area

Year	Extent of increase in area (ha)	Cumulative total area under irrigation (ha)
Before intervention	--	67.84
1 st year	94.9	162.74
2 nd year	59.88	222.62
3 rd year	34.59	257.21
4 th year	16.16	273.37
Total	205.53	--

Area under irrigation in the Ichalahalla catchment area increased to almost three times after 4th year of intervention compared to pre-intervention period. Area under irrigation was increased from 67.84 hectares during pre-intervention period to 205.53 ha after 4th year of intervention. This has been a significant indicator of the outcome of the interventions in water harvesting structures.

3) Increased Flow Period of Stream : Apart from increased area under irrigation, the water logged area in the watershed area has been drastically reduced. It was reduced from 864 hectares during pre-intervention period to 28 hectares in post intervention period. Area affected by floods has also been reduced from 1258 hectares to 63 hectares. Period of availability and duration of water flow in Nala has increased from 6-7 months to 10-12 months in year. Quality of water was improved. This has been depicted in Table-6.

Table:6 - parameters indicating increased flow period of stream

Particulars/Parameters	Before Rejuvenation	After Rejuvenation
i) Area under water logged condition	864 ha	28 ha
ii) Area affected by flood	1258 ha	63 ha

Particulars/Parameters	Before Rejuvenation	After Rejuvenation
iii) Duration of water flow	6-7 Months	10-12 Months
iv) Availability of water in the stream for drinking purpose	6-7 Months	10-12 Months
v) Quality of water	Not good	Good



Rejuvenation of Ichalahall stream

4) Evolution of New Cropping Pattern : During pre intervention period, farmers used to cultivate greengram, jowar, wheat and to some extent groundnut under irrigated condition in the catchment area of Ichalahalla stream. Owing to interventions through rain water harvesting structures, there has been a change in cropping pattern. Commercial crops like Sunflower, Maize, Groundnut, Banana, Vegetables and Flower crops have been introduced. Area under cereals crops was reduced from 2043 ha during pre intervention period to 984 ha in post intervention period. Area under pulses was increased from 1268 ha to 1719 ha. Area under oilseed crops was increased to 1391 ha from 1052 ha. Seed production of onion is also a major activity taken up by the farmers in Nagavi and Mallasamudra villages [Table-7].

Table:7 - Change in cropping pattern at Ichalahalla catchment due to Rejuvenation

	Before Treatment (Ha.)	After Treatment (Ha.)
Cereals	2043	984
Pulses	1268	1719
Oil seeds	1052	1391
Horticulture & other commercial crops	637	853
Total	5000	5000



Introduction of new cropping system in watershed area

The table clearly indicates that the availability of irrigation water has helped farmers to shift from cereals to pulses, oilseeds and horticultural crops which are commercial in nature and bring increased income to the farmers.

5) Change in cropping intensity in watershed villages

There has been significant increase in the cropping intensity in watershed villages. Area under single cropping has been reduced and area under double cropping is significantly increased. This is mainly due to availability of soil moisture to the crops. Area under double cropping was increased from 1423 ha during pre-intervention period to 2474 ha in post intervention period. Area under relay cropping was also enhanced from 910 ha to 1290 ha. This is presented in Table – 8.

Table: 8 – Change in Cropping Intensity

Cropping pattern	Before treatment (ha)	After treatment (ha)
Single cropping	3067	1236
Double cropping	1423	2474
Relay cropping	910	1290
Total	5000	5000

6) Enhanced crop productivity

Due to availability of enhanced soil moisture in the fields through bund formation & waste weir construction, increased irrigation water availability and adoption of integrated crop management technologies through training & front line demonstrations, the average yield of the major crops has increased to considerable extent. Productivity of Greengram was enhanced from 5.0 quintal to 7.5 quintal per hectare. The productivity of Groundnut was significantly increased from 14.25 to 20.50 quintal per hectare. The productivity of Jowar was four times increased compared to pre-intervention period (Table-9).

Table-9: Enhanced Productivity in Major Crops

Sl. No.	Crops	Yield (Qtl/ha.)	
		Before rejuvenation	After rejuvenation
1	Greengram	5.00	7.50
2	Groundnut	14.25	20.50
3	Sunflower	4.89	7.50
4	Maize	35.40	40.46
5	Jowar	5.20	20.00
6	Chilli	3.90	5.80
7	Onion	28.00	40.00
8	Cotton	6.25	7.50
9	Bengalgram	5.60	6.50

7) Increase in Net Returns: As a result of enhanced productivity per unit area due to various measures, there was increase in net returns per hectare in various crops. This increase is enormous considering the net returns before rejuvenation was taken up. The increase in net returns is depicted in Table-10.

Table-10: Increase in Net Returns per hectare

Sl. No.	Name of the crop	Net returns per /ha (Rs.)
i)	Greengram	8750
ii)	Groundnut	18750
iii)	Maize	11000-12100
iv)	Jowar	22200
v)	Chilli	15200
vi)	Onion	9600
vi)	Cotton	9375
viii)	Bengalgram	2700

8) Increase in availability of man days:

During the pre-intervention period, farmers especially small and marginal farmers and landless agricultural labours were not engaged throughout the

year as most of the area was under single cropping system. The interventions made in natural resource management coupled with promotion of crop technologies has resulted in increased crop intensity and productivity which in-turn enhanced availability of mandays for both man and women from 58 to 105 days/annum and 72 to 278 days/annum respectively. The same has been depicted in Table-11.

Table-11: Man days increased due to technological intervention

Category	Before the project	At completion of the project
Men	58 man days/annum	105 man days / annum
Women	72 man days/annum	278 man days/annum

CONCLUSION

The efforts made by all stake-holders to rejuvenate Ichalahalla as a model in Northern Karnataka has been successful. Its impact on availability of irrigation and drinking water almost throughout the year is enormous in a drought affected district like Gadag. As a result of more water availability, the cropping pattern was changed from cereals to oilseeds and horticultural crops. The productivity of various crops and the net returns per unit area were considerably significant. Hence, the efforts of all agencies including KVK were fruitful in solving the water problem and crop productivity constraints.

References

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