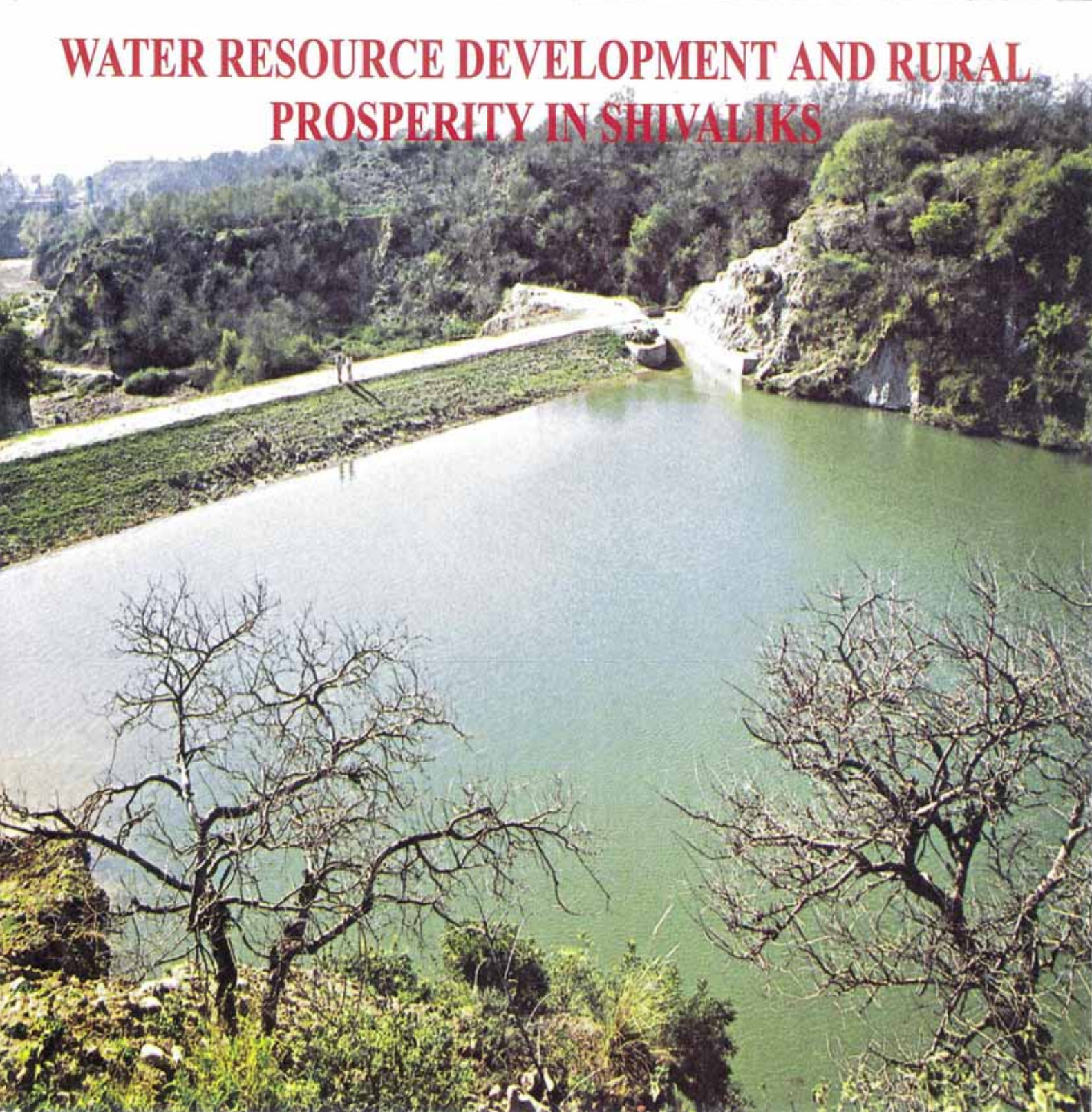
WATER RESOURCE DEVELOPMENT AND RURAL PROSPERITY IN SHIVALIKS



INTRODUCTION

The state of Haryana has only 4% of its geographical area under forest and over a third of the same is degraded. The state forest policy envisages to increase the forest cover to 25% over the next 15 years. The Haryana Community Forestry Project (HCFP) supported by the European Commission, having 9 years operational period (Dec. 1998 - June 2008), assumes high relevance to achieve this policy objective by adopting participatory approaches of development. The HCFP targets disadvantaged groups who are primary users of biomass, particularly women, landless, small and marginal farmers and users of common property resources, by promoting farm forestry and afforestation of common lands and degraded sandy areas.

In the typical semi-arid sub-tropical monsoon type of climate, the Shivaliks of Haryana receive a mean annual rainfall of 1200 mm, of which about 80% is received in three monsoon months. Several projects including Sukhomajri demonstrated the technical feasibility, economic viability and social acceptability of harvesting surplus monsoon rainwater and its efficient use during the post-monsoon dry period for drought proofing and flood moderation.

People in the Shivaliks are engaged in rearing livestock, putting grazing pressure on hilly watersheds, and rainfed farming with common crop failures. The focus of the HCFP in this area, therefore, lies in the construction of water harvesting earthen dams (WHD) and the protection of the associated catchment areas with active collaboration of Village Resources Management Committees (VRMC). The HCFP plans to construct 18 WHDs in the Shivaliks region. Out of these 12 WHDs were constructed during 2001-2004, five during 2004-05 and the remaining one is proposed for the year 2005-06.

Year of construction	No of dams	Project Villages	
		Ambala Division	Yamunanagar Division
2001-2002	2	Bharauli	Ibrahimpur
2002-2003	3	Kaimbwala Mirpur	Bhagwanpur
2003-2004	7	Turon Dhandion Banswal Mandapa	Kansli Thaska Kathgarh
2004-2005	5	Mawas Rana/Mirpur II Bhediwala/ Turon II	Nanheri Nawangaon

FOCUS ON SUSTAINABILITY

In the fast replication of Sukhomajri concept of water resources development, several issues related to sustainability were not properly addressed in the past and became the primary reason of poor performance. HCFP addressed such issues to ensure sustainability of project interventions. Some of the steps taken are as under:

Field Manual: Due to the absence of a simple reference source to which field staff could refer for planning and design, a field manual on WHDs was prepared, which outlined the entire methodology to be adopted, including planning, design, preparation of cost estimates, tips on construction and maintenance, community participation, formation of VRMCs and their roles and responsibilities.

Formation of VRMCs: Strong dialogue with the community, assessing their needs and perceptions, level of commitment and formation of VRMCs, was made a pre-requisite for any WHD project. It was made clear that WHD would form a part of the village development plan and villagers have to actively participate in planning and execution and be responsible for its maintenance and operation.

Cost Sharing: To ensure effective participation and develop a sense of ownership, VRMCs were asked to generate a social fund of Rs. 30,000 through local collections and meet the cost of digging and refilling the water conveyance system from this fund. The VRMCs would sell water to beneficiaries at mutually decided rate and generate funds for dam maintenance.

Employment Generation: All the labour in the construction work is engaged from the village with the consent of VRMCs. Preference is given to poor, landless and scheduled castes.

Social Fencing: A condition is laid down that the village community would restrain from taking livestock for grazing in the forest land and the VRMC executive would exert social pressure to impose effective closure.

DETAILS OF WATER HARVESTING DAMS

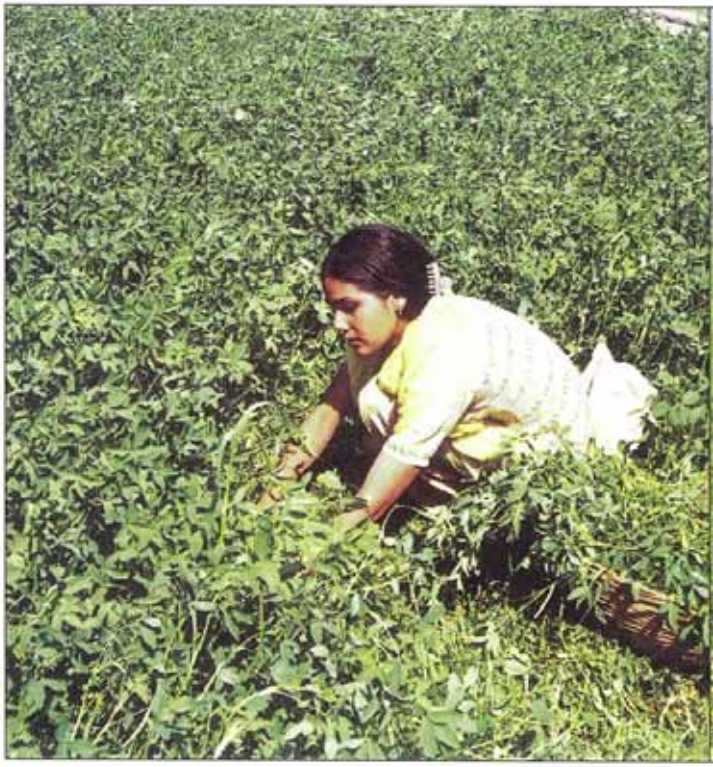
The sites for the dams were selected carefully to ensure maximum storage of water and flow through gravity. The runoff from 1028 ha. of forest lands was harvested in these 17 WHDs to create a water storage of 260.98 ha. m at a total cost of Rs. 421.93 lakhs.

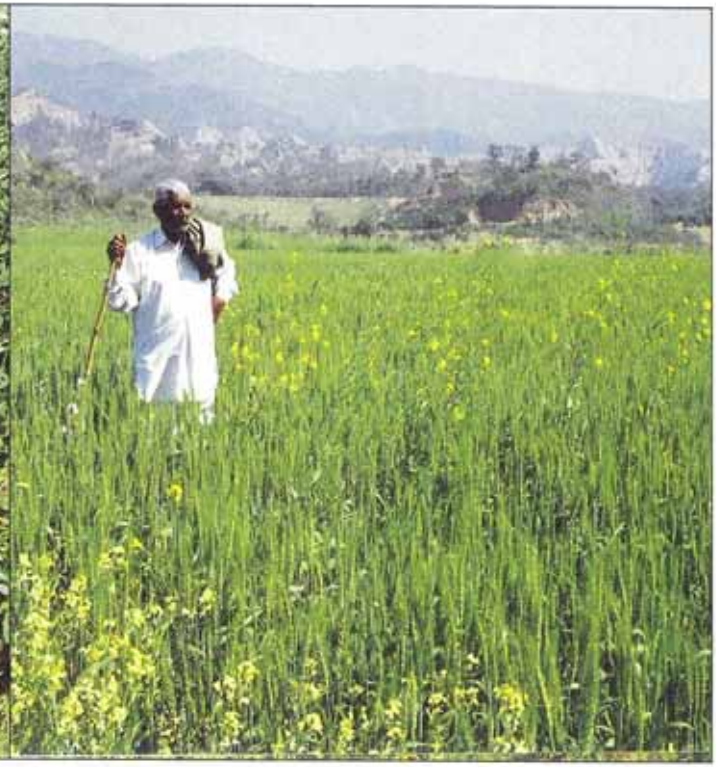
S. No.	Year of Constr.	Village	Forest Catchment Area (ha.)	Storage Capacity (ha. m)	Total Height (m)	Top Length of dam (m)	Total Cost (Rs. in lacs)	Labour Cost (Rs. in lacs)	Command Area (ha)
1	2001-02	Bharauli	90	24.70	14.0	120	31.22	24.24	93.5
2	2001-02	Ibrahimpur	30	13.25	9.0	129	8.80	5.94	52.6
3	2002-03	Kaimbwala	50	17.50	14.5	110	21.10	15.25	35.0
4	2002-03	Mirpur	70	24.50	14.5	85	25.55	18.27	60.0
5	2002-03	Bhagwanpur	26	9.10	12.0	140	16.46	12.45	20.0
6	2003-04	Turon	65	15.53	14.7	117	28.62	22.00	50.0
7	2003-04	Dhandion	31	9.86	14.0	96	17.10	13.27	45.0
8	2003-04	Banswala	23	9.79	14.0	77	15.43	10.72	31.0
9	2003-04	Thaska	25	5.10	12.0	70	12.18	8.46	40.0
10	2003-04	Kathgarh	40	8.44	14.0	85	17.51	13.87	42.0
11	2003-04	Kansli	32	7.07	12.0	94	14.23	10.56	43.0
12	2003-04	Mandappa	145	15.61	15.0	79	27.27	20.11	70.0
13	2004-05	Mawas	32	8.11	14.0	100	25.81	20.78	36.0
14	2004-05	Bhediwala	46	13.83	14.0	110	30.97	23.02	32.0
15	2004-05	Rana	54	19.54	14.0	95	25.58	15.38	60.0
16	2004-05	Nanheri	145	29.97	15.0	210	19.50	44.30	67.0
17	2004-05	Nawangaon	124	29.08	15.0	200	54.60	48.79	90.0
		Total	**1028**	**260.98**			**421.93**	**327.41**	**867.1**

Labour component formed about 77.6% of the total cost

In case of seven sites 100% water run off, at four sites 78 to 91% and at six sites 58 to 70% was harvested. The harvested rainwater provides the facility of supplemental irrigation in the rainfed command area of 867.1 hectares at a cost of Rs. 48,660/- per ha compared to Rs. 1.20 lakhs per ha through canal irrigation. The cost per cubic meter of earth fill varied from a lowest of Rs. 40.02 to a maximum of Rs. 51.90.

The dams are made after following a complete social development process involving discussions, resolutions, PRA and demand driven need based micro-planning. The community generates a social fund varying from Rs. 30,000 to 55,000 before the system operates. The digging and filling of pipelines is carried out by the villagers. Water is shared by all households including landless. Reservoir water is democratically auctioned every year. In case of village Bharauli the reservoir was auctioned for Rs. 18,000 in the first, Rs. 35,000 in the second and Rs.35,600 during the third year of operation to persons of Bharauli with commitment to pay 50% in advance, charge water rent @ only Rs. 10/hr and maintain the system during the tenure of the contract. The VRMC accounts were opened in a bank and their records are regularly inspected. Regular training programmes and exposure visits are arranged for capacity building.





CROP PRODUCTION AND NET RETURNS

The benefits of WHD at Bharauli were critically analysed by establishing baselines for crop and milk production. Due to the availability of irrigation water from the water harvesting dam the overall net return from the agricultural command area increased from Rs. 2.36 lakhs in 2001-02 to 12.91 lakhs during 2004-05. Vegetable seed production became common after assured supply of water.

Area, yield, production and net return from different crops in Village Bharauli.

Crop	Area (ha)			Mean Crop Yield (quintals/ha)			Total Production (quintals)			Net Return (Rs.)		
	2001-02	2002-03	2004-05	2001-02	2002-03	2004-05	2001-02	2002-03	2004-05	2001-02	2002-03	2004-05
Rabi Crops	61.28	56.32	55.55	18.35	30.8	G-29.58	1124.50	1734.00	1643.30	43,245	204,104	233268
Wheat						1875.00	1225.60	1875.00	1975.00			
Taramira	2.24	-	-	0.80	-	-	1.79	-	11.25	-15,421	-	
Mustard *	-	-	-	-	-	-	-	-	11.25	-	-	12375
Gram	0.3	0.32	0.55	7.33	8.25	G-13.64 S-14.54	2.20	2.64	7.50 8.00	924	444	10474
Lentil	1.11	0.50	0.35	1.68	5.50	2.50	1.86	2.75	0.875	-5,713	-750	420
Onion	1.61	2.08	1.20	229.7	295.50	246.88	369.74	613.60	296.25	60,569	97,022	44367
Onion seed	-	-	1.27	-	-	3.84	-	-	4.875	-	-	190439
Radish seed	13.08	15.68	18.10	5.33	7.50	7.00	69.72	117.60	126.75	11,721	69,196	61841
Cauliflower seed	0.25	2.40	2.55	4.16	4.93	5.15	1.04	11.83	13.125	7,731	98,010	112810
Carrot seed	0.92	2.40	-	4.60	6.0	-	4.23	14.50	-	58,177	209,100	-
Berseem (f)	2.99	4.80	5.32	120	1850	320.37	358.80	888	1704	-33,413	-46,080	15716
Total	**83.78**	**84.50**	**84.89**	-	-	-	-	-	-	**1,27,820**	**6,31,046**	**6,81,710**
Kharif Crops												
Paddy	-	16.00	11.75	-	60.00	G-58.13 S-34.94	-	960.0	683.00 410.50		134,000	86268
Maize	62.9	51.00	50.10	18.50 21.30	30.60 43.00	G-26.00 S-32.47	1163.65 1339.77	1560.60 2193.00	1302.50 1626.50	18,367	64,413	97372
Forage Crops	21.6	17.50	18.05	208.60	250.40	- 408.45	- 4505.76	- 4382.00	15.50 7372.50	89.748	109,287	418169
Toria	-	-	0.30	-	-	5.00	-	-	10.00	-	-	9
G.Nut	-	-	0.20	-	-	G-50.00 S-60.00	-	-	10.00	-	-	6110
Pulse	-	-	0.40	-	-	G-3.75 S-6.25	-	-	1.50 2.50	-	-	1485
Total	**84.50**	**84.50**	**80.80**	-	-		-	-	-	**1,08,115**	**3,07,700**	**6,09,413**
Summer Fodder	-	2.85	-	-	282.68	-	-	805.62	-	-	35,018	-
Grand Total										2,35,935	9,73,764	12,91,233

* Raised as mixture with wheat crop F=Fodder, G=Grain, S=Straw/Stalks

MILK PRODUCTION

Livestock is an important asset of the local community, but scarcity of forage was restricting milk production. The availability of green forage helped increasing the milk yield. The value of milk sold per year increased by 41.9% from Rs. 9.14 to 12.97 lakh.

Livestock status and milk production in village Bharauli

Livestock statistics	Position during		% increase (+) or decrease (-)
	2001	2004	
Number of livestock			
Buffaloes	335	393	+12.3
Cows	82	79	-3.7
Milk yield (kg/day)			
Buffaloes	2.55	3.65	+44.0
Cows	1.8	2.21	+22.8
Value of milk sold/year by 89 families (lakh Rs.)	669 9.14	837 12.97	+24.0 +41.9
Value of milk sold/ family/year/(Rs.)	11717	14567	+24.3

GENDER AND EQUITY

In the constitution of VRMCs, the position of Vice President and 30% seats in the executive are reserved for women. Scheduled Castes are offered at least one seat in the executive. Women link workers engaged from each village act as motivators so that interests of women are protected. In the meetings all women are invited and their views are solicited. They are gradually opening up and hesitations are fading away.

Migration of men with livestock, causing a lot of inconvenience to women, has been eliminated after implementing water harvesting projects. No longer is a large number of women seen going to the forests for fodder and fuelwood collection, as most of them now spend time on their farms helping men in agricultural operations.

The landless families get some land on rent and raise their own fodder (barseem) crop for stall feeding. In addition to gainful employment in dam construction, most of the landless are in demand as farm labourers.

CHANGES IN PROJECT VILLAGES

The changes are sweeping across villages covered under water harvesting initiatives of Haryana Community Forestry Project. Awareness about the rights and responsibilities is increasing due to constant dialogue with the communities. A glaring example of this was witnessed at village Mirpur where a reservoir full of water behind a 14 metre high dam activated the sleeping dry land farmers beyond imagination. 27 farmers raised summer fodder for the first time. The stored rain water ensured timely sowing of kharif crops in 100 acres of command area. The availability of water

further prompted many enterprising farmers to raise paddy over 21 acres after perfect land leveling. Bumper crop of maize was harvested because two irrigation cycles could be provided from stored water. Even sorghum was irrigated which provided sufficient fodder for livestock. "No need to migrate with livestock this year because there is no dearth of fodder in Mirpur" said one of the farmers. Water is surely a catalyst for fast economic growth.

At village Turon, six pumping sets were used to lift water from the gully bed to irrigate wheat crop sown on elevated terraced fields at Rs. 40/ha per irrigation. These fields now receive water from the dam and farmers pay only Rs. 10/ha. All pumping sets have been removed and are used for chaff cutting.

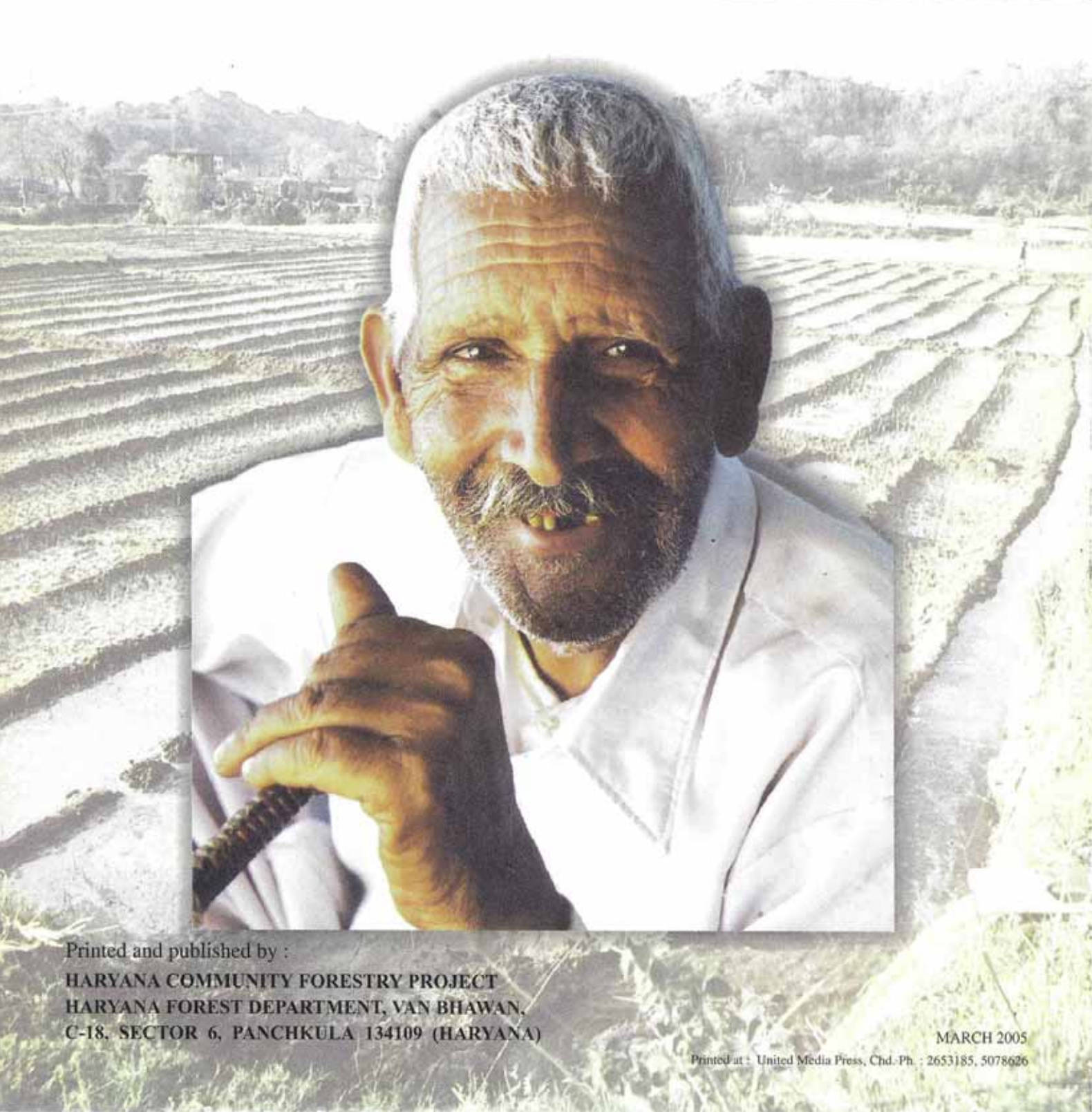
MEASURES AGAINST SILTATION

The biggest challenge of Shivalik watersheds is to ensure flow of sediment free water to reservoirs, lakes and ponds. Inadequate vegetation cover on young, loose, friable and highly erodible soils cause pre-mature siltation of water bodies. The HCFP took adequate care to check the risk of siltation by adopting vegetative and engineering measures in the drainage lines including construction of check dams and coffer dams. Desiltation with community efforts (Sharamdan) is organised once a year during summer months.

SOME CONCERNS

Most VRMC executive members are either illiterate or not trained to write accounts. Though training courses are organised for executive members, but members change when new executives are elected. Quite often, office bearers are not available in the village. The services of link workers are taken to keep track of transactions and ensure maintenance of records. There is no system of proper audit of accounts. Sometimes the cashier keeps the money for a number of days before depositing in the bank. However, the democratically elected VRMCs are vigilant in detecting and correcting questionable practices.

The participatory approaches adopted in water harvesting projects have increased the flow of benefits to the community, reduced the risk of floods and droughts and regenerated denuded forest catchments. The HCFP provides VRMCs an opportunity to own, manage and maintain the assets. This optimism stems from commitment of the project management, support from the funding agency, dedication of field staff and motivation of rural communities.



Printed and published by :
HARYANA COMMUNITY FORESTRY PROJECT
HARYANA FOREST DEPARTMENT, VAN BHAWAN,
C-18, SECTOR 6, PANCHKULA 134109 (HARYANA)

MARCH 2005

Printed at : United Media Press, Chd. Ph. : 2653185, 5078626