PARTICIPATORY INTEGRATED WATERSHED MANAGEMENT

A Success Story of 'Sukhomajri Project' (Haryana), INDIA

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The Problem- Natural Resource Degradation

- Excess runoff and soil loss from both arable and non-arable lands.
- Severe land degradation resulting in denudation of hills and loss of bio-diversity.
- Burgeoning human and cattle population leading to heavy dependence on forest.
- Erratic distribution of rainfall causing periodic moisture excess and stress.

Overgrazing in nearby hills led to denudation

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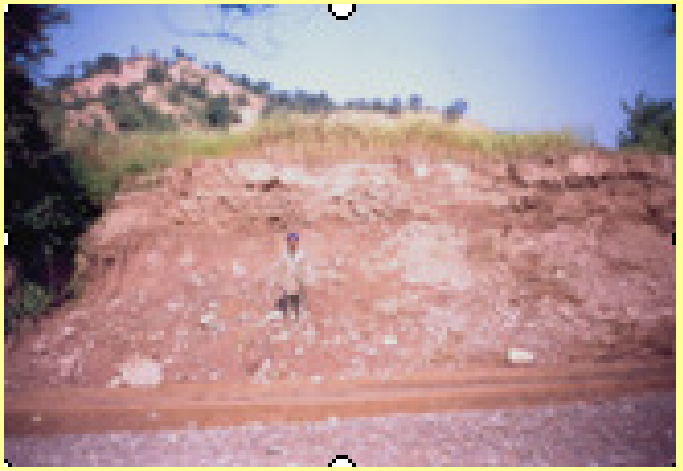
The Problems: Natural Resource Degradation

- Indiscriminate felling of trees and uncontrolled grazing.
- Frequent crop failures, small land holding (less than 1.0 ha.), low agricultural income forcing villagers to keep large numbers of goats and cattle.
- Low input use efficiency,
- Migration of cattle and human population from villages



Agricultural fields are washed away with heavy flow of water

From “Sukhna” Lake to “Sukhomajri”

- An artificial lake “Sukhna” created in 1958 in Chandigarh .
- Lost 65 percent of its capacity with in 20 years.
- Sediment delivery was estimated 141 tones / ha./ year .
- Out of 4214 ha of total catchment area 25 percent was identified most vulnerable falling in Sukhomajri belt.
- Agricultural fields of the village were converted into 20 meter deep gorge from runoff coming from 4.2 ha. hilly catchment.
- During 1975, CSWCRTI identified the problem area and treated it with suitable conservation measures .

A view of Sukhna Lake in Chandigarh

Major Components of the Sukhomajri Model

- Closure of catchment area against grazing and cutting of trees and grasses.
- Construction of about 200 staggered contour trenches per hectare in heavily eroded 4.3 hectares of watershed area for improving the moisture regime of the impoverished soil.
- For controlling sediment from the gullies a series of check dams , grade stabilizers and debris basin from the locally available stones were constructed in the degrade catchment area .

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Major Components of the Sukhomajri Model

- Vegetative measures consisted of planting of tree species like Khair *(Acacia Catechu)* and Shisham (*Dalbergia sisso),* in the pits and Bhabbar grass *(Eulaliopsis binata)* at the mounds of the trenches, and also *Agave americana* and *Ipomea cornea* at the critical areas to protect the soil against erosion The species were selected on the basis of their adaptability and economic value.
- Construction of earthen reservoirs to store excess monsoon rainwater for supplemental irrigation to agricultural fields by gravity flow method

Hill Resource Management Society

- A Water User's Association was formed on September 12, 1981to take care of the irrigation water among villagers. The WUA later emerged as Hill Resource Management Society (HRMS) which was duly registered under Society's Registration Act, 1860.

- It has an Executive Body to run the affairs of the society. The HRMS has a set of written bye-laws.

The main responsibilities of HRMS are as under:

- **Protection of catchment area from grazing and illicit cutting of trees.**
- **Distribution of irrigation water from dams among all its members equitably , at the rate to be fixed from time to time.**
- **Maintenance of dams , water conveyance systems and other assets.**
- **Renting the reservoir for fish cultivation**
- **Utilization of society's funds for welfare activities in the village.**

Details of Rainwater Harvesting Dams at Sukhomajri

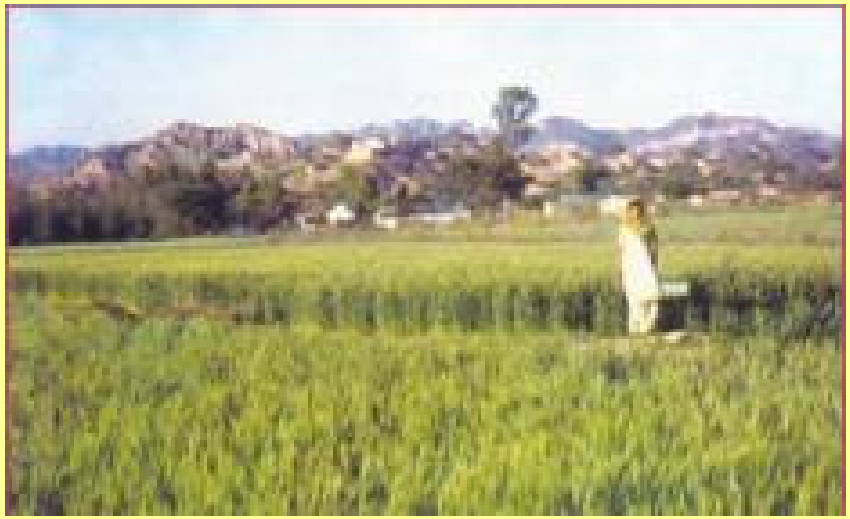
Details	Dams Nos.			
	1	11	111	1V
Year of construction	1976	1978	1980	1985
Catchment area (ha)	4.3	9.2	1.5	2.6
Storage capacity (ha-m)	0.8	5.56	0.95	1.93
Command area (ha.)	6	20	2	5
Cost (000, Rs).	72	109	23	150

Sukhomajri Dam

Change in Area (ha.) , Av. Yield (q/ha.) and Production (q) of Crops

Crops	Before the Project (1975-76)			After the Project (1999-2000)			Percentage increase		
	Area	yield	Prod.	Area	yield	Prod.	Area	yield	Prod.
Kharif									
Maize	8.73	6	52	26.73	19.5	521	207	225	901
Sorghum	4.7	80	376	12.86	140	1800	174	75	378
Pulses	0.56	3	1.68	-	-	-	-	-	-
Paddy	-	-	-	11.7	25	293	100	-	100
Rabi									
Wheat	8.6	8	69	46.1	27	1521	436	237	2104
Gram	2.26	4	9.04	-	-	-	-	-	-
Sugarcane	1.2	150	180	1.4	250	350	17	66	94

Bumper wheat crop taken with supplemental irrigation from harvested rainwater



Maize crop saved with one life saving irrigation in a drought year

Birth of "Social Fencing" Concept

- The dire need of irrigation water led to manifold increase in the crop production
- It worked as 'catalyst' in bringing about change in the attitude of people towards the hills.
- It was emphasized that the villagers must protect hilly watersheds from grazing and illicit cutting of vegetation if they wanted water in their dams.
- The villagers voluntarily offered to restrain themselves from grazing their cattle in the catchment area by framing rules to bring head loads of grasses from the hilly area and stall feed their animals.
- Slowly, the bare hill slops were seen covered with grasses and trees This new approach of protection of the forest area by people was called as 'Social Fencing'.

Denuded catchment during inception year of the project

Rehabilitated catchment due to Social Fencing

Tree Stocking (number per hectare) in Catchment Area of three Dams

Year	Dam No.		
	I	II	III
1980	103	64	27
1984	196	113	67
1988	288	161	112
1990	382	291	181
1992	393	415	211
Increase (%) in tree stocking over 12 years	281.56	548.43	681.48

Change in Composition of Animal Population

Milch cattle	Before Project	After Project	Change (%)
	1975	2000	
Buffaloes	79	257	225.31
Cows	14	13	(-) 7.14
Goats	246	45	(-) 82.04
Milk Yield (litres/day)	248	1018	310.48

Goats were gradually replaced by stall fed buffaloes

Income of HRMS (1986-87 to 2002-03)

Source of income	Amount
Sale of grass	11,90,394
Irrigation charges	36,980
Fish culture	48,500
Total	12,65,874

HRMS members of Sukhomajri in a meeting

Lessons from Sukhomajri

- **Peoples' participation must be ensured right from the beginning.**
- **The needs and the problems of the people must be identified at the outset.**
- **Unless a project is aimed at meeting their needs, solving their problems and mitigating their hardship, it may not succeed.**
- **Integrating local knowledge and culture and into improved system**

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Lessons from Sukhomajri

- **Watershed Management Projects should have short gestation period. The benefits should be available in shortest possible period.**
- **Constitution of a village society (HRMS) must be a pre-requisite before taking up such projects.**
- **The emphasis should be on sustainability and equity i.e., all the common property resources must be available to all sections of the society.**
- **Project authorities need to understand the difference in women's and men's roles and responsibilities related to the use of natural resources for sustaining livelihood systems.**