

**ENVIRONMENT IMPACT STUDY IN
HARYANA COMMUNITY FORESTRY PROJECT
VILLAGES**

Final Report

Submitted to

**Haryana Community Forestry Project
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Abbreviations

CPRs	-	Common Property Resources
DRDA-		District Rural Development Agency
EPA	-	Entry Point Activities
FGD	-	Focus Group Discussion
FYM	-	Farm Yard Manure
HCFP	-	Haryana Community Forestry Project
HFD	-	Haryana Forest Department
ISD	-	Institute for Sustainable Development
JBIC	-	Japan Bank of International Cooperation
LPG	-	Liquefied Petroleum Gas
NGO	-	Non-Governmental Organisation
OC	-	Organic Carbon
PRI	-	Panchayati Raj Institution
SC	-	Scheduled Castes
SHG	-	Self-Help Group
VRMC	-	Village Resource Management Committee

EXECUTIVE SUMMARY

BACKGROUND

A community Environmental Management Baseline Study was commissioned by Haryana Community Forestry Project in 2000-2001 in the first 60 project villages. The study was undertaken in order to understand the environmental implication of the activities planned under the project and to suggest environmental interventions that could be implemented in the project villages. A summary of findings of the Baseline Study indicated that there were 34 environmental issues which needed attention. For all significant environmental issues, environmental interventions that could be taken up either by HCFP or other State and Central agencies were suggested.

VILLAGE LEVEL INSTITUTIONS

Community involvement in various activities of the project was ensured through village level institutions like Village Resource Management Committees (VRMCs) and Self-Help Groups (SHGs), which were established to strengthen community participation. These institutions have played a major role in alleviating environment problems.

Village Resource Management Committees represent all sections of the society in each village, to whom intensive training was imparted by the project, in self-sufficiency, capacity building and plantation management. Being a sub-committee of the village *Panchayat*, which is the organ of local Self-Government based in the community itself, VRMC becomes the ultimate guardian and custodian of community forests, which are Common Property Resources of the village community.

The active involvement of women, who constitute nearly 50% of the rural population of the State, in community forestry development is a major challenge of the project as gender mainstreaming is mandated in the project design. An institution of SHGs was formed for social mobilization and economic and social empowerment of women. Through collective action and other dimensions of group dynamics, these SHGs have developed into social and economic affinity groups pursuing common interests, including environment.

THE PRESENT STUDY

An Environment Impact Assessment Study was carried out in 56 villages (four villages studied earlier were eventually rejected). There have been a number of project interventions in these first 56 villages, which are expected to have an impact on the local environment. The objectives of the present study were to assess:

- If the environment problems listed in the earlier baseline study have been alleviated and to what extent, or if they have not been alleviated;
- Environmental beneficial effects of various project interventions, not necessarily pertaining to the problems listed earlier;
- Environment awareness of VRMCs and SHGs.

APPROACH AND METHODOLOGY

The present study was concerned with the assessment of the following:

1. The extent to which environmental problems listed in the earlier Baseline Study (important and measurable ones) have been alleviated by project intervention and/or action taken by village level institutions.
2. What has been the general improvement in the area from an environmental point of view (apart from the problems listed in the Baseline Study), like the effects of plantations, *Johads*, organic farming, *Chulhas*, SHG environment action, etc.
3. What has been the role of village level institutions like VRMCs and SHGs in environmental improvements. Have they been active in bringing about change? What have they done to address environmental issues?
4. If there has been an increase in environmental awareness amongst the villagers and village level institutions like VRMCs and SHGs and whether these institutions are ready to bring about environmental improvements.
5. Soil improvements, specifically pertaining to pH and organic carbon, as a result of plantations raised.

Each of the 56 villages included in the present study was surveyed by the project team of the Institute for Sustainable Development (ISD), along with the villagers present, to have a first hand knowledge of the present environmental conditions of the villages and to find out if the environment issues raised in the baseline study have been attended to or if they have not been addressed.

The general improvements in the area, if any, were also observed. Focus Group Discussions (FGDs) in each village with villagers, VRMCs and *Panchayats* were held. Besides, FGDs were also held with SHGs (mainly women) in each village, separately. The two FGDs in each village were arranged to discuss the various environment issues raised as problems in the baseline survey.

The assessment of soil improvements as a result of tree plantations raised was done through determination of soil pH and organic carbon of soil samples taken from open and plantation areas which were analysed at the Soil Conservation Research Centre at Chandigarh.

ENVIRONMENT INTERVENTION IMPACTS

The present study deals with the 22 more important environmental issues (listed below) in these first 56 villages. The figures in brackets indicate the total number of villages that reported *Low*, *Medium* and *High* intensity of that particular environmental issue, in that order.

1. Dung cakes pressure on availability of Farm Yard Manure (0, 2, 0)
2. Fuelwood pressure on forest resources (6, 8, 3)

3. Pollution from *Chulhas* / Diesel engines (0, 6, 0)
4. Dust storms (17, 7, 3)
5. Disposal of domestic garbage (4, 3, 0)
6. Drainage of domestic wastewater (11, 14, 5)
7. Damages by wild life/blue bulls (12, 15, 26)
8. Pollution from *Hadda Rodi* / waste collection (6, 12, 3)
9. Poultry farm units – flies and foul smell (3, 2, 1)
10. Loss of crop land due to shifting sand dunes (1, 7, 0)
11. River, *Nallah* erosion (0, 0, 9)
12. Loss of long term soil fertility (1, 0, 0)
13. Salinisation of farm soils (1, 3, 8)
14. Pollution of *Johads* (7, 10, 14)
15. Wastage of domestic water (11, 11, 1)
16. Quality of drinking water (9, 10, 3)
17. Rising of water table (0, 3, 2)
18. Lowering of water table (9, 6, 2)
19. Damage to plantations (1, 1, 0)
20. Encroachment of *Panchayat* lands (3, 3, 2)
21. Termite attack on trees (13, 12, 1)
22. Illegal felling of trees (2, 0, 1)

There were a total of 336 problems at the time of the baseline study (year 2000), for these 22 environment issues, of which 117 problems were of *low* intensity, 135 of *medium* intensity and 84 of *high* intensity. Of these 336 environment problems, 63 issues (nearly 1/5) have been solved through various interventions, while 273 issues remain. Of these 273 issues, 53 (20%), 91 (34%), 87 (32%) and 42 (16%) are of *very low*, *low*, *medium* and *high* intensity respectively. 15% of the baseline problems have been alleviated to very low intensity level and the number of severe environment problems has come down by 50%. The major problems which still continue in terms of the number of villages involved and where the problems are of substantial, *medium* and *high*, intensity are: (i) Damage by wildlife/blue bulls – 46 villages, (ii) Pollution of *Johads* – 28 villages, (iii) Termite attack on trees – 26 villages, (iv) Wastage of domestic water – 22 villages, (v) Drainage of domestic wastewater – 21 villages, (vi) Quality of drinking water – 17 villages, (vii) Lowering of water table – 17 villages, and (viii) Fuelwood pressure on forest resources – 17 villages. These problems need to be addressed, to have a better environment in these villages.

GENERAL IMPROVEMENTS

Besides the various environment interventions made to offset the environment issues raised, a number of activities were undertaken by the residents of these villages, with the help of respective VRMCs, SHGs, and *Panchayats* and the HCFP

and the State Forest Department to have a general environmental improvement of the area. Though the number of activities carried out is large, the more specific activities towards general improvement of the environment and living conditions in the villages are: vermi-composting, smokeless *chulhas*, actions to protect plantations, actions against use of polythene bags and *Johad* pollution, garbage dumps, cleaning of village lanes and drains, water supply, dry pit latrines, etc.

CONCLUSIONS

The interaction of the ISD team with VRMCs, SHGs and the villagers has revealed that the interventions made by the HCFP have produced highly encouraging results. Not only have these interventions helped in tackling the specific environmental issues/problems (as listed in the baseline study), but the motivation and spread of awareness among the villagers has ensured the prospect of better environment and living conditions for them.

As a result of proper training and guidance provided to VRMCs and SHGs by the HCFP, essentially for the preservation and improvement of environment through community participation with active involvement of the *Panchayats*, they have responded positively, producing very encouraging results. It is worth mentioning that the SHGs, in coordination with VRMCs and with regular cooperation of the *Panchayats*, have successfully carried through the message of community participation across the village populace, involving numerous activities towards better environment and living conditions. The mindset of farmers has undergone a change for the better, with a sense of belonging and aiming for a better future for the community at large, as opposed to watching of personal interests alone.

With regard to soil improvements, specifically pertaining to pH and organic carbon, as a result of tree plantations raised, it was observed that organic carbon ranges from 0.31 to 1.21% under open areas and 0.43 to 1.29% under plantations. There is an increasing trend for organic carbon under plantations from that of open areas, which is expected. The pH ranges from 8.0 to 8.9 in open areas and 7.8 to 8.9 under plantations, indicating that there has not been a significant reduction in pH values under plantations. This is due to the fact that these villages are located in arid areas, with very young plantations, where the build-up of organic carbon is rather slow, the amount of organic matter added annually being oxidized due to high temperatures. The effect of plantations on reduction of pH would be seen only when these plantations are much older, producing the desired effect and bringing soil salinity under control through various soil amendments.

The specific activities, regarding the baseline issues and for general improvement of the villages have produced healthy results towards general improvement in the environment and living conditions in the villages.

1.0 INTRODUCTION

The Haryana Forest Department (HFD), supported by the European Union, is implementing the Haryana Community Forestry Project (HCFP), since 1998, targeting 337 villages in 37 Community Development Blocks of five project divisions in 11 districts of the State, for sustainable management of natural resources. The project has adopted a participatory approach in its various activities like project planning, implementation and monitoring, involving fully the village community through its community based institutions like Village Resource Management Committees (VRMCs) and Self-Help Groups (SHGs). The attempt has been to initiate a process of self-directed development with significant role in decision making specially by the disadvantaged groups, women (organized into SHGs or otherwise), village community and people dependent on common lands. The overall objective of the project is capacity building of rural communities to improve the natural environment and to preserve land fertility by sustainable management of natural resources through activities undertaken in a participatory manner.

A community Environmental Management Baseline Study was commissioned by the project in 2000-2001 through the Institute for Sustainable Development (ISD), New Delhi, with the help of an international consultant, Mr. Paolo Mori. The study was undertaken in order to understand the environmental implication of the activities planned under the project and to suggest environmental interventions that could be implemented in the project villages. It included an assessment of the:

- Village environmental conditions in the first 60 project villages, including assessment of forest cover, water, soil, fish and animal resources, bio-diversity, atmosphere, human habitat, waste management and pollution;
- Extent to which the *Panchayats* and VRMCs, had included environmental concerns in the village microplans prepared with the help of the project;
- Potential environmental impacts of micro-projects selected by the communities for implementation under the Project.

A final report "Community Environmental Management Study in Haryana Villages" was submitted to HCFP in June 2001. This report presents a detailed account of baseline environmental assessment of selected project villages. For each of the environmental components, major issues were discussed along with case studies from the villages.

A summary of findings of the baseline study indicated that there were 34 environmental issues which needed attention of which ten issues, presented below, were most important. The figures in brackets indicate the total number of villages that reported *Low*, *Medium* and *High* intensity of that particular environment issue.

1. Damage by blue bulls (12, 16, 29)
2. Pollution of *Johads* (8, 11, 15)
3. Drainage of domestic wastewater (11, 16, 5)
4. Dying of trees due to termite attack or other diseases (13, 12, 1)

5. Dust storms (17, 7, 3)
6. Wastage of domestic water (12, 11, 2)
7. Pollution from garbage collection/ *Hadda Rodis* (6, 12, 3)
8. Quality of drinking water (8, 10, 3)
9. Fuel-wood pressure on forest resources (8, 8, 3)
10. Lowering of ground water table (9, 6, 2)

For all significant environmental issues, environmental interventions that could be taken up either by HCFP or other State and Central agencies were suggested.

2.0 VILLAGE LEVEL INSTITUTIONS

As mentioned earlier community involvement in various activities of the project is ensured through village level institutions like Village Resource Management Committees and Self-Help Groups, which were established to strengthen community participation.

Village Resource Management Committees represent all sections of the society in each village, to whom intensive training was imparted by the project, in self-sufficiency, capacity building and plantation management. They were established to ensure collective participation and sustained development. Training is a significant component of VRMCs which are assisted to develop technical, managerial and social capacity to carry on community forestry activities even after project phase-out.

The process of formation of VRMCs was initiated by the Project since 1999-2000 with 50 VRMCs being added every year, and a total of around 330 at present. Six batches of VRMCs have been established. Each VRMC includes residents of a village and gives representation to all sections of the village, with roughly one-third women, one-third Scheduled Castes (SC) and landless households in the executive body. The VRMC is constituted in a general village meeting (*Gram Sabha*), which elects its executive body with four office bearers and other executive members. The executive body consists of 9-15 members. Being a sub-committee of the village *Panchayat*, which is the organ of local Self-Government based in the community itself, VRMC becomes the ultimate guardian and custodian of community forests, which are Common Property Resources (CPR) of the village community.

The active involvement of women, who constitute nearly 50% of the rural population of the State, in community forestry development is a major challenge of the project as gender mainstreaming is mandated in the project design. Women in Haryana have to be given an economic stake in the project by creating avenues of income generation for them. As a result an institution of SHGs was formed, in each village, for social mobilization and economic and social empowerment of women. Through collective action and other dimensions of group dynamics, these SHGs have developed into social and economic affinity groups pursuing common interests.

The project has promoted 180 SHGs in 101 villages with a total membership of 2,150, an average of 12 members per SHG. The membership ranges from 8 to 20 per group and all SHGs, except three, are exclusively of women only. The villages were selected on the basis of demand at microplanning level, relative poverty and the potential for success. The project provides a matching grant of Rs. 2,500/- to each SHG which has been successfully functioning for at least six months.

Training is an important component of SHG working and a SHG training manual has been prepared to train grass-root level workers including Link Workers and Non-Government Organisation (NGO) staff on various aspects of SHG development. Another important initiative is the preparation of a printed pictorial tool kit that is used to train SHG members. The kit is designed in such a way that one topic can be covered in one session. Each SHG has also been provided a mini-library with booklets on a wide variety of issues, to promote the concept of holistic development. In addition, the project has provided facilities for organising special SHG workshops, launching of awareness campaigns, organising skills training, literacy training, study tours and exposure visits for the SHGs.

With the growing strength and initiatives of SHGs, the project has launched a new initiative to consolidate the gains of this successful social mobilization venture. This consists of forming cluster associations of SHGs. Ten blocks level cluster associations of SHGs and one division level federation have been formed, beginning in 2005-06. The purpose of the associations/federation is to aid in mutual exchange of ideas and information, take steps to make available forward and backward linkages for micro-enterprises and to lend more visibility to the SHGs so as to make this a sustainable movement.

Most SHGs are members of these institutions, contributing Rs. 50-100 every month. The project has provided Rs. 25,000 each for these associations to set up their offices, build up infrastructure and carry out their basic functions. Executive members of the cluster association are given specialized training in managing these apex associations.

3.0 THE PRESENT STUDY

Of the first 60 project villages where a community environmental management baseline study was undertaken, an Environment Impact Assessment Study was carried out in 56 villages (four villages studied earlier were eventually rejected), for which baseline data was collected earlier. There have been a number of project interventions in these first 56 villages, which are expected to have an impact on the local environment.

The present study deals with the more important environmental issues in these first 56 villages. There are 22 environmental issues as listed below. The figures in brackets indicate the total number of villages that reported *Low*, *Medium* and *High* intensity of that particular environmental issue in that order.

1. Dung cakes pressure on availability of Farm Yard Manure (FYM) (0, 2, 0)
2. Fuel-wood pressure on forest resources (6, 8, 3)
3. Pollution from *Chulhas* / Diesel engines (0, 6, 0)
4. Dust storms (17, 7, 3)
5. Disposal of domestic garbage (4, 3, 0)
6. Drainage of domestic wastewater (11, 14, 5)
7. Damages by wild life/blue bulls (12, 15, 26)
8. Pollution from *Hadda Rodi* / waste collection (6, 12, 3)
9. Poultry farm units – flies and foul smell (3, 2, 1)
10. Loss of crop land due to shifting sand dunes (1, 7, 0)
11. River, *Nallah* erosion (0, 0, 9)
12. Loss of long term soil fertility (1, 0, 0)
13. Salinization of farm soils (1, 3, 8)
14. Pollution of *Johads* (7, 10, 14)
15. Wastage of domestic water (11, 11, 1)
16. Quality of drinking water (9, 10, 3)
17. Rising of water table (0, 3, 2)
18. Lowering of water table (9, 6, 2)
19. Damage to plantations (1, 1, 0)
20. Encroachment of *Panchayat* lands (3, 3, 2)
21. Termite attack on trees (13, 12, 1)
22. Illegal felling of trees (2, 0, 1)

The villages included in the present study are shown the **Table 1**. The frequency of these environment issues in terms of project divisions, community development blocks and villages are given in **Table 2**.

Table 1: Villages included in the present Environment Impact Study

District	Community Development Block	Villages included
<i>Ambala Project Division</i>		
Panchkula	Raipur Rani	Hangola Hangoli Kheri Haripur Tabar
Ambala	Shahzadpur	Tasrauli Nagla Jattan Rasidpur Korwa Khurd
	Naraingarh	Baktuha Dehar Nagla Rajputana
<i>Total</i>	<i>03</i>	<i>12</i>
<i>Kurukshetra Project Division</i>		
Yamunanagar	Bilaspur	Nagli Bhagwanpur Sultanpur Shergarh
Kurukshetra	Ladwa	Mukarpur Bodla
<i>Total</i>	<i>02</i>	<i>06</i>
<i>Hisar Project Division</i>		
Hisar	Hisar II	Banda Heri Gawar Rawalwas Kalan Sarsana Gorchi Balsamand
Fatehabad	Bhattu Kalan	Banawali Dhingsara Kirdhan Mehuwala
Sirsa	Nathusari Chopta	Bakrianwali Rupana Darda Nirwan Tarkanwali Makhosorani Kagdana Shakar Mandhori Rupawas
<i>Total</i>	<i>03</i>	<i>18</i>

District	Community Development Block	Villages included
<i>Bhiwani Project Division</i>		
Bhiwani	Bhiwani	Pahladgarh Dhana Ladanpur Dhana Narsan
	Loharu	Kurdal Alaudinpur Kharkheri
	Siwani	Morka Garwa Mithi Mandoli Khurd
<i>Total</i>	<i>03</i>	<i>10</i>
<i>Jatusana Project Division</i>		
Rewari	Jatusana	Parkhotampur Baldhan Kalan Babroli
	Nahar	Shyam Nagar Bhurtala Lula Ahir
Mahendragarh	Kanina	Sundrah Bewal Bhalkhi Mundain
<i>Total</i>	<i>03</i>	<i>10</i>
<i>Grand Total</i>	<i>14</i>	<i>56</i>

Table 2: Frequency of Environmental Issues

Division: Ambala

S. No	Environmental Issues	Frequency			Raipur Rani Block					Shahzadpur Block				Naraingarh Block		
		L	M	H	Villages					Villages				Villages		
					1	2	3	4	5	6	7	8	9	10	11	12
				Hangola	Haripur	Tabar	Hangoli	Kheri	Rasidpur	Tasrauli	Nagla Jattan	Korwa Khurd	Nagla Rajputana	Dehar	Baktuha	
1.	Dung cakes pressure on availability of FYM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Fuel-wood/ pressure on forest resources	-	-	1	H	-	-	-	-	-	-	-	-	-	-	-
3.	Pollution from <i>Chulhas</i> /Diesel engines	-	1	-	-	-	-	-	-	M	-	-	-	-	-	-
4.	Dust storms	1	-	-	-	-	-	-	-	-	-	L	-	-	-	-
5.	Disposal of domestic garbage	1	-	-	-	-	-	-	L	-	-	-	-	-	-	-
6.	Drainage of domestic wastewater	3	3	1	L	-	M	-	M	L	-	H	M	-	-	L
7.	Damages by wildlife/blue bulls	-	6	4	M	M	M	H	H	M	M	-	H	H	M	-
8.	Pollution from <i>Hadda rodil</i> waste collection	2	3	1	-	-	-	M	-	L	M	-	M	H	L	-
9.	Poultry farm units: flies and foul smell	2	2	1	-	H	L	M	M	-	-	-	-	-	L	-
10.	Loss of crop land due to shifting sand dunes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11.	River, <i>Nallah</i> erosion	-	-	5	-	H	-	H	H	-	H	-	-	H	-	-
12.	Loss of long term soil fertility	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.	Salinization of farming soils	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14.	Pollution of <i>Johads</i>	4	1	1	-	L	-	H	-	M	-	L	L	-	-	L
15.	Wastage of domestic water	2	4	-	-	M	L	-	-	M	-	M	L	-	-	M
16.	Quality of drinking water	1	-	-	L	-	-	-	-	-	-	-	-	-	-	-
17.	Rising of water table	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.	Lowering of water table	5	-	-	-	L	L	-	-	-	L	-	L	L	-	-
19.	Damage to plantations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.	Encroachment on <i>Panchayat</i> land	1	2	2	H	-	L	H	-	-	M	-	M	-	-	-
21.	Termite attack on trees	5	-	-	-	-	-	-	-	L	-	L	-	L	L	L
22.	Illegal felling of trees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Low intensity (L)		27	-	-	2	2	4	-	-	4	1	2	4	2	3	3
Medium intensity (M)		-	22	-	1	2	2	2	2	3	4	1	3	-	1	1
High intensity (H)		-	-	16	2	2	-	4	2	-	1	1	1	3	-	-
Total		27	22	16	5	6	6	6	4	7	6	4	8	5	4	4

Table 2 (Contd.)

S. No	Environmental Issues	Frequency			Bilaspur Block Villages				Ladwa Block Villages	
		L	M	H	13	14	19	16	17	18
					Nagli	Sultanpur	Shergarh	Bhagwanpur	Bodia	Mukarpur
1.	Dung cakes pressure on availability of FYM	-	-	-	-	-	-	-	-	-
2.	Fuel-wood/ pressure on forest resources	-	-	2	H	-	-	H	-	-
3.	Pollution from <i>Chulhas</i> /Diesel engines	-	-	-	-	-	-	-	-	-
4.	Dust storms	-	-	-	-	-	-	-	-	-
5.	Disposal of domestic garbage	1	-	-	-	-	-	L	-	-
6.	Drainage of domestic wastewater	1	4	-	-	M	M	L	M	M
7.	Damages by wildlife/blue bulls	-	2	4	H	H	H	H	M	M
8.	Pollution from <i>Hadda rodi</i> /waste collection	-	-	-	-	-	-	-	-	-
9.	Poultry farm units: flies and fowl smell	-	-	-	-	-	-	-	-	-
10.	Loss of crop land due to shifting sand dunes	-	-	-	-	-	-	-	-	-
11.	River, <i>Nallah</i> erosion	-	-	4	H	H	H	H	-	-
12.	Loss of long term soil fertility	-	-	-	-	-	-	-	-	-
13.	Salinization of farming soils	-	-	-	-	-	-	-	-	-
14.	Pollution of <i>Johads</i>	-	2	1	-	-	-	M	H	M
15.	Wastage of domestic water	4	-	-	-	L	-	L	L	L
16.	Quality of drinking water	-	-	-	-	-	-	-	-	-
17.	Rising of water table	-	1	-	-	-	M	-	-	-
18.	Lowering of water table	-	-	-	-	-	-	-	-	-
19.	Damage to plantations	1	1	-	M	-	-	L	-	-
20.	Encroachment on <i>Panchayat</i> land	1	-	-	-	-	L	-	-	-
21.	Termite attack on trees	4	1	-	L	M	L	L	L	-
22.	Illegal felling of trees	1	-	-	L	-	-	-	-	-
Low Intensity (L)		13	-	-	2	1	2	5	2	1
Medium Intensity (M)		-	11	-	1	2	2	1	2	3
High Intensity (H)		-	-	11	3	2	2	3	1	-
TOTAL		13	11	11	6	5	6	9	5	4

Table 2 (Contd.)

S. No	Environmental Issues	Frequency			Bhattu Kalan Block				Nathusari Chopta Block										Hisar-II Block					
		L	M	H	Villages				Villages										Villages					
					19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
			Dhingsara	Kirdhan	Mehuwala	Banawali	Rupawas	Rupana Darda	Kagdana	Bakriawali	Tarkanwali	Nirwan	Makhosorani	Shakar Mandhori	Rawatwas Kalan	Gawar	Banda Heri	Sarsana	Gorchi	Balsamand				
1.	Dung cakes pressure on availability of FYM	-	2	-	M	-	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
2.	Fuel-wood/ pressure on forest resources	4	4	-	-	L	M	L	M	-	-	-	-	-	-	L	-	M	M	-	L	-		
3.	Pollution from <i>Chulhas</i> /Diesel engines	-	5	-	M	-	M	-	M	-	M	-	-	-	-	-	-	-	-	-	-			
4.	Dust storms	2	4	2	H	-	-	-	-	-	M	L	-	L	M	-	-	M	-	H	M			
5.	Disposal of domestic garbage	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M	L	M			
6.	Drainage of domestic wastewater	6	3	4	-	L	H	-	H	M	L	L	L	-	H	L	-	M	-	H	L	M		
7.	Damages by wildlife/blue bulls	1	2	14	H	H	H	L	H	H	H	M	H	H	H	H	H	H	H	M	H	-		
8.	Pollution from <i>Hadda rodii</i> /waste collection	1	5	2	H	M	M	-	-	L	H	-	-	M	-	-	-	M	M	-	-			
9.	Poultry farm units: flies and foul smell	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
10.	Loss of crop land due to shifting sand dunes	1	6	-	-	-	M	-	L	-	-	-	M	-	-	-	-	M	M	M	M			
11.	River, <i>Nallah</i> erosion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
12.	Loss of long term soil fertility	1	-	-	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
13.	Salinization of farming soils	1	2	4	H	H	H	M	H	L	-	-	-	-	M	-	-	-	-	-	-			
14.	Pollution of <i>Johads</i>	1	5	12	H	H	H	M	H	H	H	H	H	H	H	H	H	M	L	M	M	M		
15.	Wastage of domestic water	5	6	1	M	M	-	-	L	L	L	H	L	L	M	M	M	-	-	-	M			
16.	Quality of drinking water	4	3	1	-	-	-	-	L	L	-	-	-	L	H	M	-	-	-	M	L	M		
17.	Rising of water table	-	2	2	-	M	-	-	-	H	-	-	H	-	-	M	-	-	-	-	-			
18.	Lowering of water table	1	4	1	-	-	-	H	L	-	M	-	-	-	M	-	M	-	-	-	M			
19.	Damage to plantations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
20.	Encroachment on <i>Panchayat</i> land	1	1	-	-	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M			
21.	Termite attack on trees	2	6	1	M	-	-	H	-	-	-	-	M	-	M	-	M	M	-	L	M	L		
22.	Illegal felling of trees	1	-	1	-	-	-	-	-	-	-	-	-	H	-	-	-	-	-	-	L	-		
Low intensity (L)		33	-	-	1	3	-	2	4	4	2	1	3	2	1	2	-	-	1	1	5	1		
Medium intensity (M)		-	62	-	4	3	5	2	2	1	2	2	3	1	4	4	3	4	4	6	3	9		
High intensity (H)		-	-	45	5	3	4	2	4	3	3	2	3	3	4	2	2	1	1	1	2	-		
Total		33	62	45	10	9	9	6	10	8	7	5	9	6	9	8	5	5	6	8	10	10		

Table 2 (Contd.)

Frequency of Environmental Issues

Division: Bhiwani

S. No	Environmental Issues	Frequency			Loharu Block			Siwani Block				Bhiwani Block		
		L	M	H	Villages			Villages				Villages		
					37	38	39	40	41	42	43	44	45	46
				Alaudipur	Kurdal	Kharkheri	Garwa	Mandoli Khurd	Mithi	Morka	Dhana Narsan	Dhana Ladampur	Pahladgarh	
1.	Dung cakes pressure on availability of FYM	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Fuel-wood/ pressure on forest resources	2	2	-	L	M	-	-	-	-	L	M	-	-
3.	Pollution from <i>Chulhas</i> /Diesel engines	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Dust storms	8	1	1	L	L	L	L	L	H	L	L	M	L
5.	Disposal of domestic garbage	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Drainage of domestic wastewater	-	1	-	-	-	M	-	-	-	-	-	-	-
7.	Damages by wildlife/blue bulls	6	1	3	H	H	M	H	L	L	L	L	L	L
8.	Pollution from <i>Hadda rodil</i> /waste collection	-	-	-	-	-	-	-	-	-	-	-	-	-
9.	Poultry farm units: flies and fowl smell	-	-	-	-	-	-	-	-	-	-	-	-	-
10.	Loss of crop land due to shifting sand dunes	-	1	-	-	-	-	-	-	-	M	-	-	-
11.	River, <i>Nallah</i> erosion	-	-	-	-	-	-	-	-	-	-	-	-	-
12.	Loss of long term soil fertility	-	-	-	-	-	-	-	-	-	-	-	-	-
13.	Salinization of farming soils	-	-	2	-	H	-	-	-	-	-	-	-	H
14.	Pollution of <i>Johads</i>	1	-	-	-	-	-	-	L	-	-	-	-	-
15.	Wastage of domestic water	-	-	-	-	-	-	-	-	-	-	-	-	-
16.	Quality of drinking water	2	6	1	-	M	M	M	M	M	H	M	L	L
17.	Rising of water table	-	-	-	-	-	-	-	-	-	-	-	-	-
18.	Lowering of water table	3	-	-	-	L	-	-	-	-	-	L	L	-
19.	Damage to plantations	-	-	-	-	-	-	-	-	-	-	-	-	-
20.	Encroachment on <i>Panchayat</i> land	-	-	-	-	-	-	-	-	-	-	-	-	-
21.	Termite attack on trees	1	2	-	M	M	-	-	L	-	-	-	-	-
22.	Illegal felling of trees	-	-	-	-	-	-	-	-	-	-	-	-	-
Low intensity (L)		23	-	-	2	2	1	1	4	1	3	3	3	3
Medium intensity (M)		-	14	-	1	3	3	1	1	1	1	2	1	-
High intensity (H)		-	-	7	1	2	-	1	-	1	1	-	-	1
<i>Total</i>		23	14	7	4	7	4	3	5	3	5	5	4	4

Table 2 (Contd.)

S. No	Environmental Issues	Frequency			Jatusana Block			Kanina Block				Nahar Block		
		L	M	H	Villages			Villages				Villages		
					47	48	49	50	51	52	53	54	55	56
				Babroi	Baldhan Kalan	Parkhotampur	Sundrah	Mundain	Bewal	Bhakhi	Lula Ahir	Shyam Nagar	Bhurtaia	
1.	Dung cakes pressure on availability of FYM	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Fuel-wood/ pressure on forest resources	-	2	-	M	-	M	-	-	-	-	-	-	-
3.	Pollution from <i>Chulhas</i> /Diesel engines	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Dust storms	6	2	-	M	-	-	M	L	L	L	L	L	L
5.	Disposal of domestic garbage	1	1	-	M	-	-	L	-	-	-	-	-	-
6.	Drainage of domestic wastewater	1	3	-	M	-	M	M	-	-	-	-	-	L
7.	Damages by wildlife/blue bulls	5	4	1	H	M	M	M	L	L	L	L	M	L
8.	Pollution from <i>Hadda rodil</i> /waste collection	3	4	-	M	M	M	L	L	L	-	-	-	M
9.	Poultry farm units: flies and foul smell	1	-	-	-	-	-	-	-	-	-	-	-	L
10.	Loss of crop land due to shifting sand dunes	-	-	-	-	-	-	-	-	-	-	-	-	-
11.	River, <i>Nallah</i> erosion	-	-	-	-	-	-	-	-	-	-	-	-	-
12.	Loss of long term soil fertility	-	-	-	-	-	-	-	-	-	-	-	-	-
13.	Salinization of farming soils	-	1	2	-	-	M	-	H	-	-	-	-	H
14.	Pollution of <i>Johads</i>	1	2	-	M	-	-	-	-	-	-	-	M	L
15.	Wastage of domestic water	-	1	-	-	-	-	-	-	-	M	-	-	-
16.	Quality of drinking water	2	1	1	L	H	-	-	-	L	M	-	-	-
17.	Rising of water table	-	-	-	-	-	-	-	-	-	-	-	-	-
18.	Lowering of water table	-	2	1	H	M	-	-	-	-	-	-	M	-
19.	Damage to plantations	-	-	-	-	-	-	-	-	-	-	-	-	-
20.	Encroachment on <i>Panchayat</i> land	-	-	-	-	-	-	-	-	-	-	-	-	-
21.	Termite attack on trees	1	3	-	-	-	-	-	M	L	-	M	M	-
22.	Illegal felling of trees	-	-	-	-	-	-	-	-	-	-	-	-	-
Low intensity (L)		21	-	-	1	-	-	2	3	5	2	2	1	5
Medium intensity (M)		-	26	-	6	3	5	3	1	-	2	1	4	1
High intensity (H)		-	-	5	2	1	-	-	1	-	-	-	-	1
Total		21	26	5	9	4	5	5	5	5	4	3	5	7

4.0 STUDY OBJECTIVES

The objectives of the present study were to assess:

- If the environment problems listed in the earlier baseline study have been alleviated and to what extent, or if they have not been alleviated;
- Environmental beneficial effects of various project interventions, not necessarily pertaining to the problems listed earlier;
- Environment awareness of VRMCs and SHGs.

5.0 APPROACH AND METHODOLOGY

Having undertaken a baseline environmental study earlier for the 56 villages included in the present study, an assessment was made of the extent to which the environmental problems listed in the previous baseline report have been alleviated through the village community, village level institutions (VRMCs, SHGs), NGOs and other interventions, or whether they have not at all been addressed. Accordingly, the present study was concerned with the assessment of the following tasks:

1. The extent to which environmental problems listed in the earlier baseline study (important and measurable ones) have been alleviated by project intervention and/or action taken by village level institutions.
2. What has been the general improvement in the area from an environmental point of view (apart from the problems listed in the baseline study), like the effects of plantations, *Johads*, organic farming, *Chulhas*, SHG environment action, etc.
3. What has been the role of village level institutions like VRMCs and SHGs in environmental improvements. Have they been active in bringing about change? What have they done to address environmental issues?
4. If there has been an increase in environmental awareness amongst the villagers and village level institutions like VRMCs and SHGs and whether these institutions are ready to bring about environmental improvements.
5. Soil improvements, specifically pertaining to pH and organic carbon, as a result of tree plantations raised.

Each of the 56 villages included in the present study was surveyed by the project team of the ISD (along with the villagers present) to have a first hand knowledge of the present environment conditions of the villages and if the environment issues raised in the previous report have been attended to or they have not been addressed. Information on the more important 22 environment issues mentioned earlier was collected in particular.

Apart from the survey, the general improvements in the area, if any, were also observed. Focus Group Discussions (FGDs) in each village with villagers, VRMCs and *Panchayats* were held. Besides, FGDs were also held with SHGs (mainly women) in each village, separately. The two FGDs in each village were arranged to

discuss the various environment issues raised earlier. Where the earlier environment issues were not addressed, the ISD team probed as to why these issues were not attended to. If there were any problems/difficulties, they could be stated.

The assessment of soil improvements as a result of tree plantations raised was done through determination of soil pH and organic carbon of soil samples taken from open and plantation areas which were analysed at the Soil Conservation Research Centre at Chandigarh.

6.0 ENVIRONMENT INTERVENTION IMPACTS

The impact of environment interventions in the first 56 project villages under study are summarized in **Table 3**. Considering the number of villages involved, there was a total of 336 problems, for the 22 environment issues mentioned earlier at the time of the baseline study (year 2000), of which 117 problems were of low intensity, 135 of medium intensity and 84 of high intensity (total 336). The major problems of higher intensity (17 villages or more) were: (i) Damages by wildlife/blue bulls, (ii) Pollution of *Johads*, (iii) Drainage of domestic wastewater, (iv) Dust storms, (v) Termite attack on trees, (vi) Wastage of domestic water, (vii) Quality of drinking water, (viii) Fuel-wood pressure on forest resources, and (ix) Lowering of water table, in that order.

Of the 336 environment problems, 63 issues (nearly 1/5) have been solved through various interventions while 273 issues remain. Of these 273 issues 53 (20%), 91 (34%), 87 (32%) and 42 (16%) are of very low, low, medium and high intensity respectively (**Table 3**). The major problems which still continue in terms of the number of villages involved and where the problems are of substantially medium and high intensity are: (i) Damage by wildlife/blue bulls – 46 villages, (ii) Pollution of *Johads* – 28 villages, (iii) Termite attack on trees – 26 villages, (iv) Wastage of domestic water – 22 villages, (v) Drainage of domestic wastewater – 21 villages, (vi) Quality of drinking water – 17 villages, (vii) Lowering of water table – 17 villages, and (viii) Fuel-wood pressure on forest resources – 17 villages, in that order. These need to be taken up as soon as possible, to have a better environment in these villages.

The details of interventions made in different villages, for various environment issues follow hereafter.

Table 3: Environment Interventions Impacts

S. No	Environmental Issue	Intensity of Issues (No. of villages - in a total of 56 villages)									
		Baseline (2000)				Present (2007)					
		Low	Medium	High	Total no. of Issues	Issues Solved	Very Low	Low	Medium	High	Total no. of present issues
1	Dung cakes pressure on availability of FYM	0	2	0	2	0	1	1	0	0	2
2	Fuelwood pressure on forest resources	6	8	3	17	0	7	9	1	0	17
3	Pollution from Chulhas/Diesel engines	0	6	0	6	0	0	2	4	0	6
4	Dust storms	17	7	3	27	14	10	2	1	0	13
5	Disposal of domestic garbage	4	3	0	7	0	0	5	2	0	7
6	Drainage of domestic waste water	11	14	5	30	9	3	9	8	1	21
7	Damage by Wildlife/ Blue Bulls	12	15	26	53	7	7	15	14	10	46
8	Pollution <i>Hadda Rodil</i> waste collection	6	12	3	21	12	4	1	3	1	9
9	Poultry farm units: flies and foul smell	3	2	1	6	1	4	1	0	0	5
10	Loss of crop land due to shifting sand dunes	1	7	0	8	3	2	3	0	0	5
11	River, <i>Nallah</i> erosion	0	0	9	9	1	0	4	1	3	8
12	Loss of long term soil fertility	1	0	0	1	0	0	1	0	0	1
13	Salinisation of farming soils	1	3	8	12	2	1	1	3	5	10
14	Pollution of <i>Johads</i>	7	10	14	31	3	3	6	9	10	28
15	Wastage of domestic water	11	11	1	23	1	2	9	10	1	22
16	Quality of drinking water	9	10	3	22	5	2	3	10	2	17
17	Rising of water table	0	3	2	5	2	0	1	1	1	3
18	Lowering of water table	9	6	2	17	0	1	3	7	6	17
19	Damage to plantations	1	1	0	2	1	1	0	0	0	1
20	Encroachment of <i>Panchayat</i> lands	3	3	2	8	1	1	3	1	2	7
21	Termite attack on trees	13	12	1	26	0	2	12	12	0	26
22	Illegal felling of trees	2	0	1	3	1	2	0	0	0	2
	Total	117	135	84	336	63	53	91	87	42	273

6.1 Dung Cakes Pressure on Availability of FYM

Nearly 60 to 70% of available dung was converted into dung cakes (Villages Dhingsara and Mehuwala) for use as fuel for local brick kilns and cooking with about 30 to 40% being used as manure. The closure of local bricks kilns, where dung cakes were used as fuel has drastically reduced this requirement. Besides, the availability of smokeless *Chulhas* which were provided by the HCFP has helped to a great extent in cooking though 40% of these *Chulhas* are not in working order. As a result, the farmers are now using much more FYM (60%) in their fields. In addition, the use of chemical fertilizers has also reduced and some farmers are using *vermi-compost* as well in the fields.

6.2 Fuelwood Pressure on Forest Resources

Fuelwood pressure on forest resources both in the villages and surrounding forests was observed in 17 villages of which three villages (Hangola, Nagli, Bhagwanpur) were of high intensity, eight (Mehuwala, Rupawas, Gawar, Bandaheri, Kurdal, Dana Narsan, Babroli, Parkhotampur) of medium intensity and six (Kirdhan, Banawali, Shakar Mandhori, Gorchi, Alaudinpur, Morka) of low intensity.

With the intervention of HCFP assisted by the HFD, the concerned VRMCs and *Panchayats*, and in certain cases the local NGOs, fuel wood pressure in most of the villages has been reduced by about 50 to 70%. HCFP has started a plantation drive by providing saplings and information about various plantation species to the villagers. There has been an awareness campaign for planting and protecting of plantations and forests. The project not only took steps to raise plantations on *Shamlat* lands but also gave villagers seedlings for planting on their holdings. The farmers are cooperating and have adopted the plantation drive to their benefit and at the same time are protecting the natural forest (Hangola, Gawar).

Smokeless *Chulhas* have been supplied by the HCFP to many villages (Bandaheri, Gawar) though 50% of the *Chulhas* have got broken due to poor maintenance by the users. Some villagers are making their own earthen *Chulhas* of similar design. Many villagers have obtained Liquefied Petroleum Gas (LPG) connections (Hangola, Bhagwanpur, Gawar, Gorchi, Banawali, Kirdhan, Rupawas, Kurdal, Alaudinpur, Morka) though they are being used sparingly. The VRMC has started looking after *Panchayat* forests and villagers causing damage to village woodlots are heavily fined by the VRMC (Gawar, Morka). Land owners have started growing trees on their own land (Gorchi, Kirdhan) and many villagers meet their fuel wood requirement from their own fields.

The landless villagers still depend on forest / *Shamlat* land though some landless labour obtain fuelwood in lieu of their labour charges from waste of cotton crops and mustard plants (Rupawas, Mehuwala, Babroli, Parkhotampur).

6.3 Pollution from Chulhas / Diesel Engines

Pollution from *Chulhas* and diesel engines was noticed in six villages namely, Tasrauli, Dhingsara, Mehuwala, Tarkanwali, Kagdana and Rupawas. Pollution is caused by the use of conventional *Chulhas*, which besides fuel wood, use dung

cakes and diesel used for operating diesel generating sets for pumping out underground water.

With the intervention of HCFP many villages are now operating pumps on electric supply rather than diesel engines (Dhingsara, Mehuwala) reducing pollution by about 25-30%. In village Rupawas where 300 diesel engine sets existed, there are only 250 diesel sets now, as they are being gradually replaced by electric driven water pumps. However, due to frequent power cuts the position in certain villages has not improved much (Tarkanwali, Kagdana) and the farmers are compelled to operate water pumps on diesel engines. There are also some flour mills inside some villages (Tarkanwali) and due to non-availability of electric power supply, these mills also run on diesel generating sets. The problem of electric supply needs to be looked into at the State level to reduce pollution.

Pollution has also been brought down by use of smokeless *Chulhas* which were supplied in some villages (Tarkanwali, Rupawas) though all of them are not in working condition, because some of them do not have any exhaust pipes. New houses being constructed are provided with proper chimneys (exhausts) by the villagers (Kagdana, Rupawas). LPG connections have been obtained in some villages (Tarkanwali) though they are being used sparingly.

HCFP intervention has caused the villagers in general to become conscious of the pollution due to smoke from *Chulhas* and diesel engines and have become concerned about the same though they are helpless to run diesel engines in the absence of regular power supply.

6.4 Dust Storms

As large areas of land are open and bereft of any vegetation, frequent hail and dust storms of various intensities have been experienced in about 27 villages of which three villages (Dhingsara, Gorchi, Mithi) have high intensity of dust storms, seven (Bakrianwali, Shakar Mandhori, Bandaheri, Balsamand, Babroli, Sundrah, Dhana Ladanpur) with medium intensity and 17 villages (Tarkanwali, Makhosorani, Alaudinpur, Kurdal, Kharkheri, Garwa, Mandoli Khurd, Dhana Narsan, Pahladgarh, Mundain, Bewal, Bhalkhi, Lula Ahir, Shyam Nagar, Bhurtala, Korwa Khurd) with low intensity. These dust storms throw up large volumes of dust and other suspended contaminants in the air thus polluting the atmosphere.

However, with various interventions and a massive plantation drive by HCFP, large areas in the villages have been brought under plantations under various schemes (Village Woodlots, Farm Forestry, Tree Groves etc) of the project and natural vegetation has come up as a result of protection of these areas (Korwa Khurd, Bandaheri, Gorchi, Dhingsara, Bakrianwali, Tarkanwali, Makhosorani, Shakar Mandhori, Pahladgarh, Dhana Ladanpur, Dhana Narsan, Alaudinpur, Morka, Garwa, Babroli, Bhurtala, Lula Ahir, Sundrah etc). Plantations have also been undertaken under the Watershed Management Scheme in some villages (Sundrah). Besides plantations, roads, streets and lanes have been made *pucca* in certain villages (Balsamand, Makhosorani). In fact, Government of Haryana has declared Balsamand as a model village. Besides the existing irrigation facilities through extensive canal irrigation, these facilities have been considerably improved, bringing

in more farm lands under cultivation. Wherever canal irrigation is not available a large number of private tubewells have been dug to provide irrigation to farm lands (Kharkheri, Alaudinpur, Kurdal, Makhosorani, Bakrianwali etc).

As a result of above interventions dust storms have been contained in a large number of these villages and the problem has been solved to the extent of 25 to 70% in villages like Balsamand, Korwa Khurd, Pahladgarh, Dhana Ladanpur, Mithi etc.

6.5 Disposal of Domestic Garbage

The problem of proper disposal of domestic garbage was observed in seven villages (Rasidpur, Bhagwanpur, Sarsana, Gorchi, Balsamand, Babroli, Sundrah) of which three villages (Sarsana Balsamand, Babroli) were of medium intensity and four of low intensity (Gorchi, Sundrah, Rasidpur, Bhagwanpur). Most of the domestic garbage is dumped close to the villages with the result that people living in these villages live under a very unhealthy environment. The conditions become worse during the rainy season with garbage flowing down into low lying areas, causing stagnation of dirty water, breeding mosquitoes and flies which are a cause of many diseases. Garbage dumps are seen in many places in the villages including animal waste.

There are at present no arrangements for the disposal of domestic and other garbage but with the awareness brought about by the HCFP some changes have come about in a few villages (Balsamand, Sundrah) where the conditions have improved to some extent. Villagers in Balsamand now collect their domestic waste and dispose it off away from the village habitation at designated dump sites. Similarly garbage is collected from individual houses and then dumped into *Kurdies* near the village. Garbage is not seen around the houses. In general, however, proper arrangements for disposal of domestic and other garbage do not exist.

6.6 Drainage of Domestic Waste Water

The absence of proper drainage of domestic waste water is a problem in about 30 villages. The problem is rated as high in five villages, medium in 14 and low in 11. This improper drainage is causing unhygienic condition in the village posing serious health problems and pollution of village lanes, by-lanes, roads and *Johads*. While a drainage system exists in certain villages (Baktuha), the surface drains spill over because the main drain is not cleared and remains choked. In some villages, however, the drainage system is still earthen, causing overflow of drainage water.

With the project intervention, the problem of domestic waste water drainage has been either completely solved in some villages or to a great extent in others (50% to 60%). With the help of the village VRMCs, *Panchayats* and Block Development Officer, *pucca* surface drains with a main drain have been constructed in many villages (Hangola, Tabar, Kheri), the main drain leading the waste water outside the village, where it is used for irrigation of crops. In other villages domestic waste water is collected in *Johads* (which are at present not being used) from where this waste water is pumped for minor irrigation of crops against payment to the respective *Panchayat* (Balsamand, Mehuwala). In fact, pump sets are available in certain villages with the *Panchayat* which can be hired by villagers for pumping waste water

out of *Johads* for minor irrigation. The other *Johads* which are otherwise available are used for collecting of rain water for the cattle. In some villages (Kagdana, Shakar Mandhori) while the drains flow into *Johads*, there are no main drains for removing this waste water for minor irrigation, thus causing pollution of *Johads*. In certain villages the village lanes, by-lanes and roads have been made *pucca* to avoid accumulation of waste water as it easily flows into the drains.

6.7 Damage by Wildlife / Blue Bulls

The damage to agriculture crops by blue bulls and other wildlife was noticed in 53 villages out of the 56 villages surveyed. Apart from blue bulls, other wildlife damaging the crops consists of leopard coming to prey on village cattle (Bhagwanpur), monkeys, wild bear, deer, rabbits and fox (Tabar, Sultanpur, Bandaheri, Banawali, Kharkheri, Morka). The problem has become serious with the population of blue bulls and other wildlife increasing, causing major damage to crops. Delegations from different villages and their VRMCs have approached the Government with the problem but no concrete steps have been taken so far. In fact, the delegations from certain villages suggested to the Government that these wild animals be allowed to be killed (Badola) or the Government should take suitable action in the matter, to save the crops from being damaged.

With no positive action by the Government, the farmers on their own have taken certain steps to keep off the blue bulls and other wildlife from damaging the crops. There has been a change of crop pattern in many villages (Hangola, Hangoli, Tabar, Rasidpur) from maize and mustard to paddy and sugar cane as the two latter crops are less attractive to wild animals. This change of crops has produced some good results with much less damage to crops, though the damage has been of varying degrees. In many other villages (Tabar, Nagli, Dhingsara) the farmers themselves keep a vigil on the crops along with some watch dogs who drive away the wildlife. In a large majority of villages, however, farmers have engaged guards to keep a vigil on the crops grown by them. These guards are armed in certain villages to drive away wild animals (Pahladgarh, Kurdal, Kharkheri, Babroli) by aerial firing which scares the animals with the result that they do not come again to the area. These guards are paid by the farmers both in cash and kind.

The engagement of guards has been largely successful and in many of the villages the problem of wildlife damaging the crops has been completely solved (Rupana Darda, Mehuwala, Nirwan, Tarkanwali, Makhosorani, Shyam Nagar, Lula Ahir, Bhalkhi) while in other villages the extent of damage has been low. With the increase in agricultural activity, more farmers are seen in the fields all the time which deters blue bulls coming near the fields (Bakrianwali). The canal network in certain areas (Makhosorani, Bakrianwali) serves as a barrier for the animals to cross into the fields for fear of being drowned. The stray dogs kept by the farmers also prevent wild animals coming near the fields as their young ones are attacked by the dogs.

6.8 Pollution from Hadda Rodi / Waste Collection

The sites for *Hadda Rodis* / Waste collection being within the village or close to the village cause serious problems of pollution, including foul smell, and are a source of health problems for the villagers. Of the 56 villages in this study there are 21 villages

faced with this problems, of which three villages are of high intensity, 12 of medium and six of low intensity.

With the intervention of HCFP assisted by the concerned VRMCs and *Panchayats*, pollution from *Hadda Rodis* / waste collection has been completely done away with or reduced to a considerable extent. In a majority of villages the sites for *Hadda Rodis* / waste collection have been shifted to a considerable distance (one to two km) outside the villages. In some cases these waste collection centres have been properly fenced on all sides with masonry walls so that no filth is spread by stray dogs or otherwise. In certain villages dead cattle are properly buried and not dumped in *Hadda Rodis* (Parkhotampur, Mundain). Educating the villagers and persuading them to desist from such actions has gone a long way to help reduce pollution from these waste collection centres. However, there are villages (Korwa Khurd, Nagla Rajputana, Babroli) where the problem still exists.

6.9 Poultry Farm Units

The existence of dirty and uncared for, poultry farms near habitations was observed in six villages (Haripur, Kheri, Hangoli, Tabar, Dehar, Bhurtala) of the 56 villages sampled. There was one village (Haripur) of high intensity, two of medium intensity and three of low intensity. The villagers were distressed over the incessantly growing number of flies and spread of disease in and around these poultry farms. The impact of the problem was such that it was affecting their daily routine. It was difficult for them to cook and eat their food due to the presence of flies everywhere in and outside of their homes. Guests were not willing to visit their villages. Poultry farm owners were not taking any steps towards prevention of flies in their area.

Women, therefore, organized themselves into groups, as they could not resist what all was happening in their area and affecting their lives. About 12 SHGs of Haripur, Kheri, Hangoli, Tabar, Garhi, Jaloli and Dhandhardu villages came together to form a cluster association named ***Jai Ma Sharda Cluster***. The cluster association has started regular monthly meetings, discussing various social topics with priority on issues directly related to their well being.

The issue of poultry farms was taken up for discussion during group meetings. The problem was brought to the notice of the poultry farm management and the people representing the area. However, this did not yield the intended results. Despite their persistent efforts, there was no sign of improvement. Pesticides were sprayed, but that was not enough. The poultry farm owners did not allow fogging in the affected area as it would affect their farm productivity. Finally, the community showed its resentment in the form of a road blockage to force immediate action in the matter. Lastly cluster members then put the matter before the District Collector. The issue was then addressed by the district administration when orders were issued to the poultry farm owners to use the recommended insecticide sprays for preventing breeding of flies and foul smell. Not having heeded to the instructions, poultry farm owners were fined for the same. They are now following the instructions and are using chemical sprays regularly, as a result of which the problem has been solved. The flies are gone, leaving the environment clean and further enhancing the recognition of women SHGs in the eyes of the village community, PRIs and the Government. The solution of the matter has undoubtedly boosted the confidence level of these women. Such efforts are highly valued and deserve to be applauded.

6.10 Loss of Crop Land due to Shifting Sand Dunes

The loss of crop land due to shifting sands was observed in a total of eight villages of which seven were of medium intensity and one village of low intensity.

With project drive for establishment of plantations and planting of moving sand dunes (sand dune fixation) the problem has been brought under control in some villages (Gorchi, Mehuwala, Tarkanwali, Morka) and solved to a great extent in others (Bandaheri, Balsamand, Rupawas), where plantations have been raised under the Project. In addition there have been improved and increased irrigation facilities by way of additional number of tube-wells dug in some villages (Morka). Cultivation has been increased and there has been a proper selection of crops (Rupawas).

6.11 River, Nallah Erosion

River and *Nallah* erosion has been rather serious, (high intensity) in nine villages (Hangoli, Kheri, Haripur, Tasrauli, Nagla Rajputana, Nagli, Bhagwanpur, Sultanpur, Shergarh), with the problem getting aggravated in some villages (Haripur, Nagli, Shergarh). About 5 acres of cultivable land have got washed away in Haripur and 50 acres in Nagli because of Nagli *Khola*. River Lohgarh flows through village Shergarh which is causing erosion of *Panchayat* lands and 30-40 acres of private land have been washed away. In spite of the representations made by the VRMCs and the villagers to higher authorities no action has been taken so far.

Soil erosion caused by Omla river was of major concern to the villagers in Hangola as their farm land was getting eroded. The VRMC took up the matter with the higher-ups and the *Kandi* Project authorities. As a result *Aakanda* and *Sarkanda* grass were grown in the affected area, which arrested erosion and the problem has got solved.

In another area in Hangola *Shamlat* land soil erosion was taking place over a period of time. The VRMC took up the matter with the Agricultural Department for erection of check dams, and they responded positively. The Department constructed the check dams and further erosion was not only arrested, but irrigation facilities got extended to about 50 acres of land abutting Hangola and adjacent villages.

However, the problem of soil erosion has got mitigated with the plantation drive by the HCFP and construction of some check dams which have helped contain erosion of land. Plantations have been raised on either side of the river (Tasrauli, Bhagwanpur, Sultanpur). Besides, *Sarkanda* grass has also been grown in the areas to check erosion of the soil (Sultanpur) though it has come up naturally in certain other villages (Hangoli). The problem, however, continues in some villages though with low rainfall in recent years the flow in the rivers/*nallahs* being less, the damage by soil erosion is also far less (Kheri, Hangoli).

6.12 Loss of Long Term Soil Fertility

The problem is reported in only one village (Dhingsara) where soil fertility is reduced. The villagers believe that soil fertility has gone down because of the use of chemical fertilizers like urea and spraying of insecticides, both of which are required in large quantities for cotton cultivation. However, according to the villagers, soil fertility has

improved considerably by increasing the area under *Jawar* cultivation from 10 to 50% of the area cultivated; correspondingly reducing the area under cotton cultivation. *Jawar* does not require urea, while insecticides are required in very small quantities as compared to cotton.

6.13 Salinisation of Farm Soils

Salinisation of farm soils has been noticed in 12 villages of which 8 villages are of high intensity, three of medium intensity and one of low intensity (Rupana Darda). The area covered by salinity is substantial both in *Panchayat* and private lands, in certain villages to the extent of 600 to 800 acres (Mehuwala, Parkhotampur). Salinisation has been mostly due to water logging after rains, because of insufficient drainage when water stagnates for a long time. The problem has aggravated in certain villages because the ground water and the tube well water used for irrigation are both saline (Mundain, Pahladgarh, Bhurtala, Kurdal), causing salinity.

As a result of intervention by HCFP, plantations of *fransh* (*Tamrix*) and *Eucalyptus* have been raised in certain village (Dhingsara, Kirdhan), which have been successful and helped to contain the problem to a great extent. In village Makhosorani construction of a large drain has been taken up to drain out water and prevent its collection in the fields to prevent further salinity. Gypsum has been applied in some areas (Parkhotampur) where salinity has got reduced. In some villages (Bhurtala) deep tube wells (325 to 325 ft) due to depletion of underground water table have been dug, which provide good water for irrigation.

6.14 Pollution of Johads

Pollution of *Johads* has occurred in 31 villages of which 14 have this problem of high intensity, 10 villages with medium intensity and 7 villages with low intensity.

Most of these *Johads* were previously used for storage of water (including rain water) for use by the cattle and for drinking purposes. But with supply of piped water to the villages, many of these *Johads* have become out of commission though some are still used for village cattle. Presently all domestic waste water from village households is allowed to flow into these *Johads*, resulting in serious problems of pollution including menace of flies and mosquitoes which cause many diseases. The tube wells adjacent to these *Johads* have also got contaminated. There are generally more than one *Johad* in each village.

The project has rehabilitated some *Johads* in certain villages (one in each village) and these *Johads* now store clean water (Gawar, Rawalwas Kalan, Gorchi, Banawali, Dhingsara, Kirdhan, Tarkanwali, Makhosorani). There are other villages where waste water is pumped out of the *Johads* and used for irrigation of the nearby farms (Balsamand, Mehuwala, Rupana Darda, Tarkanwali). In other villages main drains along with retaining walls for *Johads* have been constructed by the *Panchayats* and these drains carry waste water to nearby fields for irrigation (Haripur, Rasidpur, Mukarpur). With these efforts the problem of pollution of *Johads* has been solved to a great extent though many of the *Johads* are still polluted. There are however, some *Johads* in certain villages which carry clean water (Bhagwanpur, Gawar, Banawali, Kirdhan, Shyam Nagar).

6.15 Wastage of Domestic Water

Wastage of domestic water from water pipes was seen in 23 villages of which there were 11 villages, each of medium and low intensity and one village (Bakrianwali) of high intensity of water wastage. The primary reason for this wastage, in almost all the villages, is the absence of water taps with the result that water keeps on flowing out of the pipes all the time, causing, besides wastage of water, also flooding. The problem has increased due to increased number of domestic water connections and hand pumps. With water continuously flowing out of the pipes at lower elevations, domestic connections located at higher elevations do not get any drinking water from the pipes.

With Project intervention assisted by the concerned *Panchayats*, VRMCs, and SHGs the position has improved somewhat in some villages, though the problem continues in many other villages. In certain villages (Haripur, Tabar) the problem has been solved by the installation of water taps. In others (Baktuha) the SHGs have motivated the villagers to conserve water and prevent wastage through uncontrolled flow from domestic connections. In some villages (Mukarpur) the villagers make judicious use of pipe water and have also installed electric pumps with the result that the wastage of water has been controlled to a great extent. Villages like Shakar Mandhori have domestic pipe connections provided, mostly with taps. Besides, villagers have constructed underground tanks where surplus water gets stored so that there is minimal wastage. Additionally, certain households (20 Nos.) have installed overhead tanks for storage of water. These tanks are filled through electric pump sets. Bore wells have also been dug under the “Watershed Management Programme” and pipe connections extended to each household (Bhalkhi). It is impressed on the villagers to install taps on water pipes as not to allow any wastage of water. Wastage is relatively less from private pipe connections, though many private connections also do not have any taps (Nirwan, Bakrianwali). Certain households where the supply of water is limited, especially the backward community, have been supplied with plastic water tanks to store water (Nirwan).

6.16 Quality of Drinking Water

The problem of supply of potable drinking water to the villagers exists in 22 villages with the problem rated as high in three villages, medium in 10 and low in 9. This is mainly due to the saline nature of water at underground levels. The quality of drinking water has deteriorated in the last few years in some villages (Dhana Narsan).

Through the efforts of the villagers with the assistance of HCFP, respective *Panchayats*, VRMCs and SHGs, there has been considerable improvement in potable water supply. Deep tube-wells have been sunk in certain villages by the Government (Hangola, Babroli, Baldhan Kalan, Dhana Narsan) and the villagers given private water connections (Hangola). Underground water tanks have been repaired to prevent pollution of drinking water in other villages (Makhosorani). With the efforts of VRMCs and *Panchayats*, villages have also been provided with water reservoirs (Shakar Mandhori). This facility coupled with water pipe connections has ensured improved quality of drinking water, replacing earlier arrangement of supplying water to villages through a canal. In other villages tube-wells were sunk by

the Government through the efforts of VRMC and *Panchayats* for supplying good water (Rupawas). In others, while the existing water supply is good (Pahladgarh), the VRMC and SHG have jointly collected funds, through contributions by the villagers, and constructed drinking water tanks near the bus stand and school premises for the convenience of the school children and the villagers. In certain villages (Bewal), through financial assistance from the State Forest Department, the village well was made *pucca* and a drain constructed to drain off waste water, resulting in good quality water for the villages. Rain water is collected in underground *pucca* water tanks in villages where there is acute shortage of water (Morka), though in others (Mithi) the underground tanks may partly be filled with canal water.

6.17 Rising of Water Table

Water table has risen in five villages with the intensity of rise being high in two villages and medium in three villages. In fact, water table has gone down from 30 to 40 ft. to 80 to 90 ft, below ground level in one of the villages (Shergarh). In other villages it was as high as 1 to 4 ft. below ground level (Kirdhan, Shakar Mandhori). Water table has risen because of stagnant water and at times due to heavy rainfall.

The problem has been solved in some villages by construction of drains to take out stagnant water from water logged areas (Kirdhan), where water level has now gone down to about 15 ft below ground level. In other villages the rainfall having been less, the incidence of flooding has also reduced, resulting in lowering of water table.

6.18 Lowering of Water Table

Underground water table has receded in 17 villages with a high degree of recession in two villages, medium in six and low in nine. There have been two primary causes for this recession. Firstly, there has been considerable over-drawal of ground water due to change of crop pattern where the farmers have switched over from conventional maize and mustard to paddy and sugarcane, for better financial returns, both crops needing more water. Secondly, there has been an increase in the cropping area. Both these actions have caused proliferation of tube-wells, resulting in drawing of more underground water. There is some improvement in underground water table in some villages (Rawalwas Kalan, Rupawas). The proximity of an irrigation canal running through the fields has helped in improving the water table to about 40 to 50 ft. (Rawalwas Kalan, Makhosorani) below ground level.

6.19 Damage to Plantations

The damage to plantations (villages Nagli and Bhagwanpur) has almost been completely checked, because of a drive started by the HCFP for protection of forests and plantations. The VRMCs are taking an active role to ensure that no damage is caused to plantations, and villagers found guilty are fined, by the VRMC. The pressure on *Shamlat* land for collection of fuelwood and cattle grazing has drastically come down.

6.20 Encroachment of Panchayat Land

There have been some cases of encroachment of *Panchayat* and *Shamlat* lands in the past, involving eight villages (Hangola, Hangoli, Tabar, Tasrauli, Korwa Khurd,

Shergarh, Balsamand and Kirdhan). While through the efforts of the villagers, *Panchayats*, VRMCs, SHGs and the project authorities (Forest Department) a number of these encroachment have been got vacated in part or in full, encroachment continues in other cases. Some cases are sub-judice and need a direction from the court. Whenever the encroached land has been got vacated, it has been brought under plantations either partly or in full under village woodlots.

6.21 Termite Attack

Termite attacks were noticed in 26 villages with the problem being of high intensity in one village, medium in 12 and low in 13. The termite outbreak is at its peak in the summer months when it is dry and favourable for their multiplication and low during the rainy season. In many villages the termite attack has spread to adjacent crops, paddy in particular, (Nagla Jattan, Rasidpur, Baktuha, Sultanpur, Shergarh, Bodla, Kurdal, Mandoli Khurd, Lula Ahir, Mundain) thereby damaging the crops including cotton. In 2005 nearly 70% of groundnut crop was lost due to termite attack (Alaudinpur).

Generally, the problem has been contained to a large extent by the application of anti-termite chemicals like Aldrine, Maxin, Foret, Chlorofos, Indosulpha, Indofos, Chloripari, etc. though the use of these anti-termite treatments has produced varying results with these chemicals having no effect in certain villages (Sultanpur, Rawalwas Kalan). The problem has also been contained by the use of tobacco water solution in affected areas (Nagli) rather than spraying of chemicals like Aldrine, Maxin etc. This treatment has shown better results and is cheaper than the use of anti-termite chemicals.

6.22 Illegal Felling of Trees

Illegal felling of trees was seen in three villages (Nagli, Gorchi and Makhosorani) which has almost completely stopped in Nagli and Gorchi. With constant awareness programmes launched by the Haryana Forest Department, the villagers have realized the importance of forests and need for their conservation. The free supply of seedlings and other added incentives to the villagers have encouraged them to grow their own trees which has further helped in stopping illegal felling. The VRMCs together with the Forest Department have become more strict on illegal felling, which has resulted in the practice having almost stopped.

7.0 GENERAL IMPROVEMENTS

Apart from the details mentioned under Environment Intervention Impacts to offset the environment issues raised, a number of activities have been undertaken by the residents of these villages, with the help of respective VRMCs, SHGs, and *Panchayats* and the HCFP and the State Forest Department to have a general improvement of the area from an environment point of view as a result of the interventions made by the Haryana Community Forestry Project. Though a number of activities have been undertaken, some of the more specific activities towards general improvement of the environment and living conditions in the villages are described hereunder.

7.1 *Vermi-compost*

One of the major activities of SHG women in a number of villages has been the making of vermi-compost for use on their farm lands and selling part of it, after meeting their own requirements, to the Department or otherwise. In village Kirdhan the chairman of the VRMC and some forward looking villagers are making vermi-compost on a major scale for their own fields and also exporting the same to the neighbouring State of Himachal Pradesh @ Rs 250/- per quintal, having sold about 150 quintals in a year. The owner of an orchard also purchased vermi-compost for use in his orchard (15 acres). Under the vermi-compost scheme launched by the State Horticulture Department four more villagers took to making of vermi-compost on a major scale for which they have taken a loan of Rs. 4 lakhs. Some villagers, including the chairman, VRMC, have converted some areas into guava orchards and are using vermi-compost for the same.

Some SHGs (Baktuha) have observed that farm lands retain more moisture with the use of vermi-compost, thereby minimizing irrigation requirements, as also reducing the dependence on chemical fertilizers which has come down significantly. They are thus motivating villagers to use vermi-compost to their benefit.

The President of SHG (Tarkanwali) buys vermi-compost from other members and uses the same in her farm land for the last over 6 years. She is very happy as her crop yields have increased and now for the last 2 years she has stopped the use of Urea. The chemical spray has also been stopped by her. Instead, she is using the decoction of "*Neem, Aank and Aas Khand*" diluted in water. She feels that the irrigation requirement has come down to nearly half as the soil is able to retain more moisture with the use of vermi-compost.

The SHGs of village Bewal were felicitated for the efforts made to improve the environment, in particular for spreading the message and motivating farmers to use vermi-compost. The SHGs have sold compost to various users for about Rs. 12 lacs. The SHG Chief was honoured by the State Chief Minister on the International Women's Day for the community work done by her. On 58th *Van Mahotsav* day the Janak SHG federation was honoured by State Forest Minister for the efficient functioning of the federation comprising 426 women.

Landless villagers in particular, are generating some income through the sale of vermi-compost while others are using it on their farms as well. Making of vermi-

compost has however, been stopped in certain villages (Nagla Rajputana) as the Forest Department has stopped purchasing the same though it is made mostly for sale in certain other villages (Bhagwanpur).

7.2 Smokeless Chulhas

Smokeless *Chulhas* have been distributed by the Project and District Rural Development Agency (DRDA), in different quantities, in a number of villages (Rawalwas Kalan, Mandoli Khurd, Babroli, Shyam Nagar, Bhalkhi). All of these are not in working order due to poor maintenance by the owners, though in some villages these *Chulhas* are working properly (Babroli, Mandoli Khurd, Rawalwas Kalan, Shyam Nagar, Bhalkhi). The villagers are generally satisfied with the working of these *Chulhas* as according to them they consume less fuel (50% less) and reduce their cooking time. Most of them are in working condition.

The SHG women are inspecting these *Chulhas* from time to time and also educating the users about their benefits. They acknowledge that smoke no longer affects the eyes and blackening of cooking vessels has considerably minimized (Haripur). Though some villagers have claimed that these *Chulhas* consume less fuel-wood, SHGs have observed that consumption of fuel-wood has increased with the adoption of these *Chulhas* and suggest that their design should be improved to conserve fuel-wood (Haripur, Kurdal, Kharkheri). With motivation from SHG, the owners of all new houses in certain villages are constructing *pucca* chimneys in kitchens for proper exhaust of *Chulha* smoke (Dehar).

A schedule caste lady in village Nirwan is making earthen *Chulhas* of conventional design, as well as double *Chulhas* of improvised version (without pipe). She has so far sold 150 such *Chulhas*.

7.3 Plantations

The SHGs in close coordination with VRMCs and village *Panchayats* of many villages have been regularly and constantly educating and motivating the villagers through group discussion and rallies regarding the importance of environment protection and conservation with stress on raising of plantations on common as well as private lands where-ever possible. The SHGs have done a commendable job in monitoring the villagers in this regard. This has borne positive results as plantations have been raised on voluntary basis in most of the villages. It is worth mentioning that the chairman of VRMC in village Bhurtala is reported to have immense passion for planting and protection of trees. He has adopted two tree groves, fenced them and has taken upon himself to water and tend the plants. He has also been planting herbal plants, and has converted 1½ acres of land into an orchard which has given him an income of Rs. 2.50 lakhs in a year. He also makes use of vermi-compost for the plants. Having drawn inspiration from the VRMC Chairman's success in fruit growing some other villagers have also converted about 40 acres of their land into orchards.

A villager in Shakar Mandhori has planted "*Beri and Jhandi*" plants over an area of 1.5 ha of his land under the SDF model of HCFP. He was also given training in grafting by the Project, following which he carried out grafting work himself. He is

reported to have made a net profit of Rs 7,000/- a year ago and Rs. 16,000/- during 2007. He is motivating fellow villagers to follow his example and attributes his success to HCFP.

In village Bodla 2½ acres of vacant *Panchayat* land was converted into an orchard by the VRMC and *Panchayat* with the help of HCFP. The orchard has been leased out to 8 landless farmers for an amount of Rs. 6,000/- per year. Plantation drive has been specifically organized by the SHGs/ VRMCs on important occasions like Independence Day, *Van Mahotsav* Day etc. Nearly 1,000 plants obtained from Japan Bank of International Cooperation (JBIC) were planted through joint efforts by the villagers in the Veterinary Hospital premises of village Gawar as also around the *Johad*. The plantation drive is being regularly undertaken in village Rawalwas Kalan on the *Van Mahotsav* Day. The SHG/VRMC of this village have been receiving awards for the last 2 years for their praiseworthy contribution towards preservation and improvement of environment. The VRMC of village Shyam Nagar was also honored on *Van Mahotsav* Day by the Forest and Tourism Minister for similar work. The SHG and village *Sarpanch* contributed Rs. 1,500/- and Rs. 2,000/- respectively for plantation work on *Van Mahotsav* Day in village Gorchi. School children voluntarily made 200 pits on available land in their school where saplings were planted in Balsamand. A school boy of the village was given a prize for protecting plants against damage. In village Kurdal 50 trees were planted by school children. The SHGs, while motivating the villagers to plant more and more trees, also coined the slogan, "*Ped Uagao Haryali Lao*" in village Shyam Nagar. The VRMC out of its own funds got a 3 acre failed HCFP plantation replanted in village Kheri.

7.4 Plantation Damage

The SHGs, VRMCs and the *Panchayats* are making maximum efforts to keep the village woodlots and plantations on other common lands protected against any damage. However, damages are being caused nevertheless by miscreants or trespassers either by *cutting down* the trees or due to *illegal cattle grazing* or *excavation*. But the SHGs, the VRMC and the *Panchayat* do not drop their vigil and the culprits are invariably apprehended, suitably fined and warned for future. In village Nirwan a trespasser from Rajasthan crossed over for grazing of sheep. He was apprehended and a fine of Rs. 5,000/- imposed. Unable to pay the fine the shepherd parted with 6 of his sheep in lieu of cash fine. The sheep were auctioned by the VRMC/ *Panchayat*, yielding an amount of Rs. 3,850/- which was deposited in the VRMC account. Besides, a fine of Rs. 6,000/- was collected in this village from other offenders. In village Rawalwas Kalan a fine of Rs. 2,000/- was recovered, and a similar amount of fine was realised in village Rasidpur for illegal excavation. Likewise fines were also imposed and or warnings issued to offenders in other villages (Tarkanwali, Pahladgarh, Kurdal, Kharkheri, Mukarpur) for illegal grazing, cutting of trees or unlawful excavation to serve as a deterrent. In village Dhana Ladanpur its SHG contributed Rs. 400/- and got a Tree Grove fenced to protect it from trespassing.

With the assistance of the concerned VRMCs and the *Panchayats*, illegal excavation in village woodlots for taking out earth for their use was stopped by the villagers (Hangola, Rawalwas Kalan, Rasidpur). A fine of Rs.2,000/- was collected in Rasidpur and deposited in VRMC account. A similar amount of fine was recovered in

village Rawalwas Kalan for illegal excavation. Likewise fines were imposed or warnings issued to other offenders in other villages.

The illegal quarrying close to the village woodlots was stopped by villagers with VRMC assistance (Sultanpur). The trees in the woodlots of this village were got numbered by the VRMC to help quick detection of any damage to the trees. It is observed that in as many as 13 villages the SHGs, VRMCs and the *Panchayats* have meant serious business in safeguarding the village common property.

Some miscreants were responsible for setting fire to the village woodlots in certain villages (Tabar). However, timely action by the VRMC and the *Panchayat* in informing the police and the Forest Department resulted in three fire tenders being pressed into service which doused the fire and saved the village woodlot from major damage. The villagers also cooperated and participated in fire fighting.

7.5 Polythene Bags

The SHGs have been strongly advocating with the villagers use of conventional marketing bags made of cotton or similar material in place of polythene bags as the latter are a source of great environmental hazard. The SHG in Baktuha is educating villagers about the harmful effects of polythene waste by throwing it into the garbage dumps. However, SHGs have not met with the full desired success so far, except that the used polythene bags are now being dumped at designated places in some of the villages and not allowed to litter in the open, but people have not stopped using them.

SHG women in Dehar have been highlighting the ill-effects of using polythene bags. In order to motivate others they were first to minimize the use of polythene bags and switched over to cotton carry bags which they carry from home for day to day shopping. They are also educating the villagers about the benefits of cleanliness and have motivated each dweller to clean the area surrounding his/her own house to ensure overall cleanliness of the entire village.

7.6 Johad Pollution

With sustained efforts and follow-up, SHGs with the help of concerned VRMCs and *Panchayats* have managed to get the *Johads* of many villages cleared of pollution to a great extent. A *nallah* which was polluting the *Johad* (Tabar) was got repaired from funds raised through auction of some dry trees, by the concerned SHG and VRMC. In another village (Bandaheri) the *Johad* filled with dirty water was got drained out and cleaned, by the *Panchayat*. The village SHG got funds sanctioned by the Forest Minister for construction of a feeder channel from the irrigation canal into the *Johad*. In village Rawalwas Kalan the SHG and VRMC got the *Johad* rehabilitated through HCFP, for which they both contributed Rs. 1,000/- and 1,700/- respectively and an SHG member also put in two days of labour free of cost. Three SHGs (Gorchi), each having 10 members, contributed Rs. 10/- each for the rehabilitation of the *Johad*. One Baseri Devi worked for one month free of cost. Request has been forwarded to the Irrigation Department for construction of a water channel from the irrigation canal to fill the *Johad* with clean water. The bathing area for women in Rupana Darda *Johad* was cleared of weeds and cleaned by the SHG.

The VRMC of village Garwa incurred expenditure of Rs. 1,000/- out of Committee funds to take a large delegation of villagers to the Irrigation Department at Bhiwani for immediate construction of a feeder channel from the irrigation canal to fill the dried up *Johad* for use by the village cattle. The Department has constructed the channel and the *Johad* is now receiving water from the canal to meet the water requirement of cattle.

Due to the absence of a main drain in village Haripur, the domestic waste water flowing through surface drains was getting into the *Johad*, thereby polluting its water. However, with the action taken by the *Panchayat* a large drain has been constructed and the waste water is now drained into the fields where it is used for minor irrigation. The water quality of the *Johad* has now improved and the problem stands solved.

7.7 Garbage Dumps

The SHGs and VRMCs have taken keen interest in getting the *Kurdies* removed from within the premises of various villages (Dhingsara, Kurdal, Alaudinpur, Mandoli Khurd). In certain areas, plantations have been raised on the patches cleared of garbage dumps. In village Mukarpur the dumping of garbage inside the village has been reduced to half because of continuous pressure from SHG and VRMC.

7.8 Cleaning of Village Lanes and Drains

A concerted effort is being made by the SHGs, VRMC and the *Panchayats* through motivation and persuasion of villagers for carrying out the cleaning operation of lanes and drains to improve the hygienic conditions of the villages. The efforts have proved fruitful in many villages, out of which 9 villages stand out where villagers are periodically carrying out these cleaning operations. The villages are; Gawar, Banawali, Dhingsara, Lula Ahir, Mehuwala, Tarkanwali, Shakar Mandhori, Bhalkhi and Garwa. It is noteworthy that this cleanliness operation is carried out every month in village Banawali at the behest of the SHG and VRMC of the village.

As already mentioned earlier (*Para 6.6*) in certain villages, the village lanes, by-lanes and roads have been made *pucca* so that waste water of the village flows into the drains and does not accumulate, thereby keeping the village in hygienic conditions.

The drainage system for domestic waste water in village Tabar has considerably improved over the last 7 to 8 years due to the VRMC. Surface drains have been constructed in case of nearly 75% of dwellings. The waste water of these drains converges into a main drain leading to farm lands where it is used for minor irrigation.

7.9 Water Supply

A hand pump was installed from the contribution made out of the incentive money received by the villagers from Farm Forestry (Shergarh). Through persuasion and follow up by SHGs and VRMC with the Public Health Engineering Department a booster pump was installed in Rawalwas Kalan, by the Department to mitigate the water shortage in the village. A tube-well was got constructed (Shyam Nagar) as a result of sustained efforts by the SHG, VRMC and the *Panchayat*. Water tanks were

got drained out and cleaned by the respective *Panchayats* with active participation of VRMCs and SHGs (Bandaheri, Banawali).

The *Johad* in village Dhingsara which was got repaired by HCFP and made fit for fresh water storage was given out on contract for fishery purpose. The amount thus earned was utilized for making of two water tanks for use of the villagers by the VRMC.

There was acute shortage of water in village Garwa. Sensing that the Government would not solve the problem soon, the VRMC decided to get an existing but defunct tube-well rehabilitated, and contributed Rs. 15,000/- out of the Committee funds for this purpose. The well was drilled to a depth of 180 ft. by the joint efforts of the villagers and is giving good water yield. An electric pump set has also been installed in the well which pumps water into a surface tank with 10 outlets. The village *Panchayat* has also assured the villagers allotment of additional funds for other related works.

The water storage tank in village Nagli had got silted up. The VRMC and *Panchayat* approached the Forest Department and got it cleaned and restored to normal functioning. In village Mandoli Khurd the VRMC and villagers made contributions and constructed a roof over the open water tank.

The SHGs and VRMCs of different villages are constantly educating and motivating the villagers to conserve water and avoid wasting the same, specially drinking water usually caused due to piped water connections without proper taps. As a result the wastage of drinking water has been contained to a large extent with SHGs warning the villagers and fixing a fine of Rs. 500/- for defaulters where water connections are found without a tap (Baktuha, Nagla Rajputana, Nagla Jattan, Haripur).

7.10 Dry Pit Latrines

As a follow-up, to Government of India campaign, a sustained drive was initiated by the SHGs and the VRMCs of the concerned villages for the construction of dry pit latrines for individual houses. The hygienic benefits of these latrines, as opposed to open air defecation, were explained to the villagers. Accordingly dry pit latrines have been constructed in some villages (Banawali, Kirdhan, Mehuwala, Dehar). In order to discourage the villagers from open air defecation, the SHGs of some villages (Banawali) depute their volunteers in the mornings and evenings to deter the villagers from this practice with the result that open air defecation has drastically reduced, except for 4 to 5% of the village population. In some villages (Dehar) however, open defecation has reduced by about 25% only. The VRMC Chairman (Kirdhan) is the consultant on construction of dry pit latrines for the entire Bhattu Kalan Block.

7.11 Alcoholism and Drug Addiction

The SHGs of some of the villages have launched a crusade against alcoholism and drug addiction in which they have partly met with success. A liquor shop in village Bandaheri was got shifted by the SHG outside the village. Illegal sale of alcohol in village Parkhotampur was got stopped by the SHG through police action. A wine shop set up close to village Baldhan Kalan was also got removed by the SHG. The

SHGs of villages Rawalwas Kalan and Alaudinpur are trying to spread the message among the villagers about the ill-effects of alcoholism so that villagers stop drinking. However, they have yet to succeed in this pursuit.

The respective SHGs and VRMCs are making sustained efforts and are educating the villagers regarding the disastrous results of drugs. As a result, four villagers (Kirdhan) who were addicted to drugs and alcohol gave it up altogether. They were given some prizes in appreciation of their corrective action, to encourage others, also victims of drugs, to follow their good example.

7.12 Free Medical Camps

Free medical camps are set up from time to time in different villages as a result of the initiative from SHGs, VRMCs and the Project authorities. Such camps were set up at cluster level (Bhattu Kalan), in which SHG of village Banawali took part. On this occasion the concerned Conservator of Forests and the Forester made contribution of Rs. 1,000/- and Rs. 500/- respectively for the camp. A similar camp was also organized at village Korwa Khurd. A door to door vaccination drive was launched by the SHG in village Tabar. A blood donation camp was set up (Kirdhan) on late Prime Minister Indira Gandhi's birthday where 33 persons donated blood. Rallies were also organized for the Pulse Polio programme for the children (Bandaheri).

7.13 Female Foeticide

Rallies were taken out in certain villages (Shyam Nagar, Rawalwas Kalan) against female foeticide. There is a continuous effort on the part of SHGs, VRMCs and the *Panchayats* to encourage treatment of girl child at par with male child and the villagers are also by and large responding positively to this effort. The VRMC of village Mehuwala has promised giving awards to those villagers to whom female babies are borne to encourage parents to treat female children at par with male children. They also advise the villagers to celebrate the birth of girl child with distribution of sweets and beating of drums. This was actually done by SHG in village Parkhotampur.

The SHGs in certain village (Tabar) went round to ensure vaccination of pregnant women in the villages for proper health of these women.

7.14 Education of Children

The SHGs and VRMCs in association with *Panchayats* are motivating the villagers to send their wards to school. The VRMC of Dhingsara remains in constant touch with the school authorities to know about the admissions and drop-outs, if any. Parents of children who do not send their children to school are persuaded by VRMCs to send them for admission.

In order to ensure proper facilities for the school children various steps are being taken by the respective SHGs, VRMCs and the *Panchayats* within their limitations. Following measures were taken:

Village Rupawas

- A second water connection was got installed by the VRMC.

- The HRDF building being used by the school was got formally registered in the name of the school as a result of the efforts of VRMC and *Panchayat*.
- A portion of the land in the school premise was made into a small park by VRMC out of its own funds after it was properly levelled by the *Panchayat*.
- VRMC arranged some furniture and extension of electric connection, at a cost of Rs. 6,000/-, for the *Chetna Kendra* which is at present being used by the school.
- A tailoring school was set up by the VRMC with the help of *Panchayat* for girls. Twenty Scheduled Cast girls successfully completed one year's course. Each one of them was presented a sewing machine by the Social Welfare Department.

Village Makhosorani

- Three (3) acres of *Panchayat* land was allotted for a play ground for the school. The VRMC out of its funds got the ground properly levelled.

Village Alaudinpur

- The VRMC got a water tank installed for the school with financial help from the Forest Department under the Entry Point Activity (EPA) programme.

7.15 Mid-day Meals for School Children

The SHGs of 5 villages (Tabar, Rawalwas Kalan, Gorchi, Shyam Nagar, Shergarh) are associated directly with cooking or for the supervision to ensure hygienic food and cleanliness for mid-day meal for the school and *Anganwadi* Children.

8.0 SOIL IMPROVEMENTS

In order to assess the soil improvements, specifically pertaining to soil reaction (pH) and Organic Carbon (OC), as a result of tree plantations raised, soil samples were collected from all the villages both under plantations and from adjacent open areas, as far as possible. Samples were collected from 0-30 cm depth from open areas and analysed for pH and organic carbon. In case of plantations soil samples were collected from 0-15 cm and 0-30 cm depth and their organic carbon and pH, respectively, determined. Open areas adjacent to plantations, in most cases were not available for various reasons (sometimes a river bed was adjacent to the plantation area). In such cases open area samples had to be taken little further away from the plantations. This introduces an element of error in making proper comparisons of results.

As mentioned earlier, there is salinisation of many farms in these villages, some of them of high intensity. The area covered by salinity is substantial both in *Panchayat* and private lands, in some villages to the extent of 600 to 800 acres (Mehuwala, Parkhotampur). Salinisation has been mostly caused by water logging after the rains due to poor drainage. The problem is further aggravated in certain villages as both the ground as well as tube-well water used for irrigation, are both saline (Mundain, Kurdal, etc).

The plantations grown in these villages and sampled are very young, most of the plantations having been raised during 2000-01, 2001-02, two plantations in 2002-03 (Tasrauli, Morka), and one plantation in 2003-04 (Rasidpur). The oldest plantations are, therefore, six years of age. The more important species grown in these plantations are *Eucalyptus*, *Dalbergia sissoo*, *Acacia nilotica*, *Syzygium cumini*, *Mangifera indica*, *Azadirachta indica*, *Melia azedarach*, *Acacia tortilis*, *Acacia catechu*, *Tamrix auriculata*, *Ailanthus excelsa*, *Prosopis cineraria* etc. These plantations have generally been raised at a spacing of 4 x 2.5m.

The results of soil analysis of different villages for pH and organic carbon with regard to open areas and under plantations are not consistent and do not show any regular pattern/trend. This could possibly be due to open areas not being very adjacent to plantations sampled, soil salinity of these farms and the fact that plantation raised are too young to have produced any tangible effects. However, there are 11 villages where the results of soil analysis show some pattern for both open areas and plantations, with regard to pH and organic carbon. These results are shown in **Table 4**.

Table 4: Soil Analysis of selected Villages

Sl. No.	Name of village	Planting Year	Open areas		Plantations	
			0-30 cm		0-15 cm	0-30 cm
			PH (1:2)	OC (%)	OC (%)	pH (1:2)
1	Hangola	2001-02	8.6	0.51	0.62	8.7
2	Haripur	2001-02	8.4	0.62	0.70	8.3
3	Tabar	2000-01	8.7	0.51	0.56	8.6
4	Tasrauli	2002-03	9.2	1.21	1.29	8.5
5	Nagla Jattan	2001-02	8.7	0.66	0.74	8.0
6	Bodla	2000-01	8.0	0.82	0.98	8.0
7	Nirwan	2001-02	8.9	0.74	1.68	8.1
8	Kurdal	2000-01	8.8	0.27	0.43	8.9
9	Garwa	2001-02	8.3	0.82	0.90	7.8
10	Sundrah	2001-02	8.8	0.59	0.86	8.4
11	Bewal	2000-01	8.8	0.31	0.66	8.8

It is observed (**Table 4**) that organic carbon ranges from 0.31 to 1.21% under open areas and from 0.43 to 1.29% under plantations. There is an increasing trend for organic carbon under plantations from that of open areas, which is expected. With regard to pH the same ranges from 8.0 to 8.9 in open areas and 7.8 to 8.9 under plantations. There has not been a significant reduction in pH values under plantations. This is due to the fact that these villages are located in arid areas, with very young plantations, where the build up of organic carbon is very slow, the amount of organic matter being added annually is oxidized due to high temperatures. The effect of plantations on reduction of pH would be seen only when these plantations are much older to produce the desired effect and soil salinity is brought under control through various soil amendments.

9.0 CONCLUSIONS

The interaction of ISD team with VRMCs, SHGs and the villagers has revealed that the interventions made by the HCFP have produced highly encouraging results. Not only have these interventions helped in tackling the specific environmental issues problems (as listed in the baseline study), but the motivation and spread of awareness among the villagers has ensured the prospect of better environmental and living conditions for them.

The HCFP at various stages of the project has helped and encouraged formation of VRMCs, as well as SHGs, generally 2 to 3 in each village, predominantly of female members. With the aim of encouraging women empowerment, preference has been given to female SHGs, comprising average 12 members.

As a result of proper training and guidance provided to VRMCs and SHGs by the HCFP, essentially for the preservation and improvement of environment through community participation with active involvement of the *Panchayats*, they have responded positively, producing very encouraging results. It is worth mentioning that the SHGs, in coordination with VRMCs and with regular cooperation of the *Panchayats*, have successfully carried through the message of community participation across the village populace, involving numerous activities towards better environment and living conditions. The mindset of farmers has undergone a change for the better, with a sense of belonging and aiming for a better future for the community at large, as opposed to the trend of watching personal interests alone.

The specific activities, regarding the baseline issues and for general improvement of the villages, have produced healthy results towards general improvement in the environment and living conditions in the villages.