

ANNUAL REPORT (2016 - 2017)



People's Science Institute
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ABOUT PEOPLE'S SCIENCE INSTITUTE (PSI)

People's Science Institute (PSI) is registered as a society in New Delhi under the Societies Act (1860) and the Foreign Contributions Regulations Act (FCRA). Its stated mission is, "To help eradicate poverty through the empowerment of the poor and the productive, sustainable and equitable use of available human and natural resources." Operationally it provides technical and managerial support to communities and organizations that work with them, implements development programs, undertakes public interest research and policy analysis. The Institute is known in India's voluntary sector for its pioneering work in the fields of community-based natural resources and watershed management for improved livelihoods, environmental quality monitoring, river conservation and dissemination of appropriate technologies.

PSI has active units for natural resources management, disaster mitigation and response, environmental quality monitoring and innovative projects. Each unit implements development projects, undertakes research and provides training as well as professional support. The Institute has a competent staff of socially conscious engineers, scientists and social workers to carry out these tasks. This annual report outlines the major activities of each group in 2016-17.

I. NATURAL RESOURCES MANAGEMENT

The Natural Resources Management (NRM) Group executes PSI's natural resource management activities. It strives to help rural communities fulfill their basic needs in a sustainable, socially just, democratic and self-reliant manner through community-led micro-planning. The village development plans primarily focus on promotion of food and livelihoods security, participatory watershed development and building appropriate local institutions. It also undertakes research in improved agricultural practices, hydrology, water technologies, NRM institutions and policies.

In 2016-17, the NRM Group continued with the implementation of the participatory livelihoods' development work as a response to the 2013 Uttarakhand Floods Disaster. Two new programs were initiated during the year for (i) sustainably providing safe drinking water and sanitation in ten hamlets of Bageshwar block in Bageshwar district with financial support from The Hans Foundation (New Delhi) and (ii) upscaling sustainable agricultural practices in Bahadrad block of Haridwar district under Mission Sunhara Kal (MSK) of ITC, Kolkata.

I.1 Response to Uttarakhand Floods Disaster of 2013

During FY 17, PSI in partnership with local community organizations and VOs, continued its Participatory Livelihood Rehabilitation Program to facilitate over 2000 households in 22 villages

in (i) Madhu Ganga valley, Ukhimath block (Rudraprayag district), and (ii) Revati and (iii) Saryu valleys of Kapkot block (Bageshwar district). The program is financially supported by Star India (for Madhu Ganga and Revati valleys) and Axis Bank Foundation (for Saryu valley), besides donations received from hundreds of generous individuals and enterprises.

During the year, the project's focus was on increasing the livelihoods resources and incomes of a larger number of beneficiaries, and strengthening democratic village institutions who were locally implementing the various activities. The major activities undertaken during the year are summarized below.

I.1a Institution Building

Each program village has at least a Gram Swaraj Samiti (GSS), a Mahila Swaraj Sangathan (MSS), Savings and Credit Groups (SCGs), Farmers Interest Groups (FIGs), and User Groups (UGs), to lead the development of the village and move towards *Gram Swaraj* in their villages. The activities related to reinforcement of these institutions, undertaken during the year along with their status are briefly described below.

- (i) **Gram Swaraj Samitis (GSSs)** : In each valley, the Livelihood Development Teams (LDTs) of PSI and its partner VOs and PSI's subject experts assisted the GSSs in implementing their livelihood development plans (LDPs). GSS members planned and extended livelihoods development activities to many of the uncovered BPPL households.

Table1: Status of GSSs

Cluster (Villages)	Total Households	Number of GSS	Total Members	Female Members	BPPL Members
Madhu Ganga (5)	669	5	71	34	37
Revati (8)	819	8	78	40	38
Saryu (9)	559	9	75	44	42
Total (22)	2,047	22	224	118	117

- (ii) **Mahila Swaraj Sangathans (MSSs) and Mahila Mangal Dals (MMDs)**: The Mahila Swaraj Sangathans (MSSs) of Revati and Saryu valleys, and Mahila Mangal Dals (MMDs) of Madhu Gangavalley held regular meetings for identifying critical issues of the local women. An important focus was on community plantations and their protection and maintenance.

Table2: Status of MSSs

Cluster (Villages)	Total Households	Number of MSSs/MMDs	Total Members	BPPL Members
Madhu Ganga (5)	669	5	244	127
Revati (8)	819	7	245	113
Saryu (9)	559	9	79	53
Total (22)	2,047	21	568	293

- (iii) **Savings And Credit Groups (SCGs)**: There are 89 SCGs (out of these 25 groups were formed before PSI's interventions) in the three clusters. Their members organise monthly

meetings to deposit their savings and for interloaning. In the Revati cluster, some of these groups have been linked with NABARD and the National Rural Livelihood Mission (NRLM).

Table 3: Status of SCGs

Cluster (Villages)	Total Households	Number of SCGs	Total Members	BPPL Members	Total Savings (Rs.)	Total Inter Loaning (Rs.)
Madhu Ganga	669	16	172	169	2,66,552	77,000
Revati	819	48	424	141	167,263	52,300
Saryu	559	25	243	102	630,737	446,000
Total	2047	89	837	412	1,064,552	575,300

(iv) Farmer Interest Groups (FIGs): Fifty three FIGs have been formed in the three clusters. About 42 percent of the families are members of these FIGs of which 61 percent belong to the BPPL category. The FIGs are encouraged to take collective decisions related to planning of crop cycles, especially vegetables, and their marketing.

Table 4: Status of FIGs

Cluster (Villages)	Total Households	Number of FIGs	Total Members	BPPL Members
Madhu Ganga	669	19	317	207
Revati	819	23	385	209
Saryu	559	12	159	112
Total	2,047	54	861	528

(v) Formation of GSS Sangathans: In November 2016, the process of forming cluster-level GSS federations was initiated in all the three valleys. Each GSS nominated three persons (two GSS members and one member from another village institution) to the cluster GSS Sangathan. These Sangathans are responsible for extending the livelihood activities and promoting convergence with government programmes.



Meeting with GSS members in Revati cluster

I.1b. Community Mobilization

In FY '17, Aam Sabhas, GSSs, MSSs, SCGs and FIGs met in all the villages of the three valleys. The progress of implementation of different livelihood activities and other village level issues were discussed in these meetings.

A one-day awareness-cum-felicitation camp was organized by all the GSSs in Madhu Ganga cluster at Raonlenk village on September 30, 2016. The objective was to felicitate progressive farmers, institutions and individuals for their special efforts in community mobilisation, institution building and livelihoods development and thereby motivate other people and to provide information about government schemes for the villagers. Nineteen progressive farmers and seven institutions were felicitated in the camp. The farmers, PSI's partner organization (MVDA), the health department and the Vivekanand School displayed exhibitions. Ms. Asha Nautiyal, ex MLA was the Chief Guest at the occasion. Officials from Krishi Vigyan Kendra (KVK) Guptkashi, animal husbandry and horticulture officers informed about their schemes.



Felicitation camp in Madhu Gangacluster

I.1c Capacity-Building

Capacity-building activities undertaken in the three valleys are summarized below.

- (i) **SCI Trainings:** Farmers' in all the five villages of Madhu Ganga cluster and six villages of Revati cluster were trained in the system of crop intensification (SCI) for un-irrigated paddy and kidney beans (*rajma*).
- (ii) **Training on grading, packing and marketing of vegetables:** Training on grading, packing and marketing of vegetables was organized for the Farmers' Interest Groups (FIGs) and other farmers in four villages of Madhu Ganga cluster and six villages of Revati cluster.
- (iii) **Farmers' Exposure Visit:** Nine vegetable growing progressive farmers (including six women) from Revati and Saryu clusters visited Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni and Krishi Vigyan Kendra (KVK), Kandaghat among other places in Himachal Pradesh in June 2016 for interactions with vegetable growers, farmers' associations and scientists. Ten farmers from Revati cluster visited the Krishi Vigyan Kendra (KVK), Kafligair with the help of VPKAS, Almora.



Exposure visit of FIG members to Solan, (H.P.)

I.1.d Livelihoods Development Activities

PSI and its partner organizations (POs) continued to promote household-level farm and off farm interventions besides common property resource based activities like springs' rejuvenation, irrigation works, etc. These are outlined below.

(I) Farming Activities

Vegetable cultivation: In Kharif 2016, 714 farmers (including 442 BPPL farmers) from the three clusters cultivated various vegetables (tomato, brinjal, capsicum, chilly and cabbage) on 10.4 ha. The value of the total produce was over Rs. 14 lakhs while almost 19 tons of vegetables were sold bringing a net income of Rs. 4.26 lakhs. The production is purely based on Low External Input Sustainable Agricultural practices emphasizing more on use of vermi-compost and appropriate spacing. The area under vegetables increased four times compared to 2015 and the net income from sale more than doubled.

Table 5: Details of Vegetable Cultivation in Kharif 2016

Cluster	Total Farmers (BPPL)	Total Area (ha)	Total Production (Q)	Value of Produce (Rs. in lakhs)	Total Sale (Q)	Net Income (Rs. in lakhs)
Madhu Ganga	439(241)	6.5	309	9.25	51.5	1.54
Revati	275(191)	3.9	207	4.14	120.5	2.40
Saryu	245(147)	2.6	50	1.00	16.0	0.32
Total	959(589)	13.0	566	14.39	188.0	4.26

Note: Per farmer average production is about 57 kg and the estimated value is Rs. 1455. 384 farmers (40 per cent) sold their produce whose estimated average sale per farmer was about Rs. 1100.

(ii) Spice cultivation: Convergence with the government's GRAMYA scheme helped 377 farmers in the Revati cluster to grow ginger on 3.5 ha during Kharif 2016. In Madhu Ganga cluster the farmers chose to grow garlic in the Rabi season.



Vegetable Cultivation in Madhu Ganga and Revati valleys

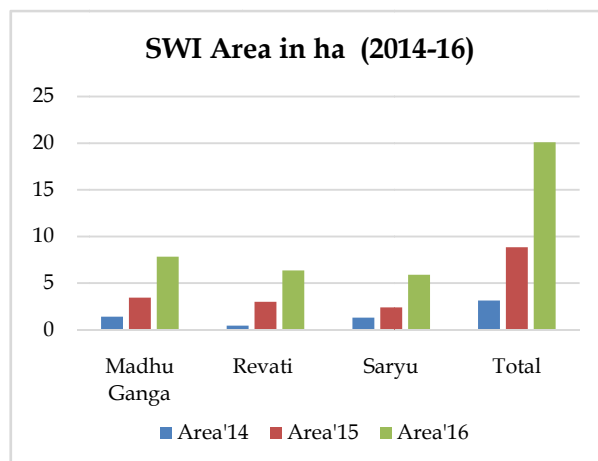
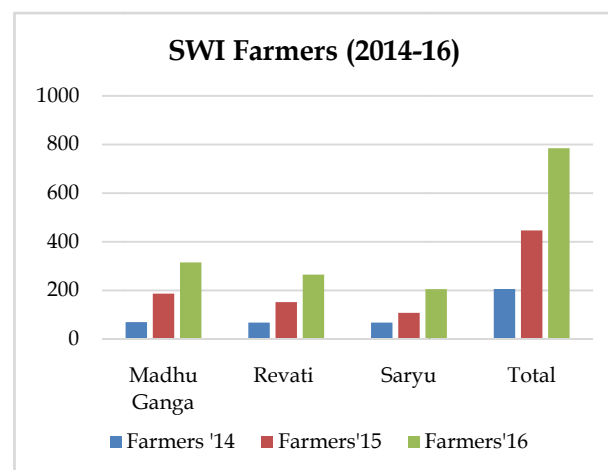
Table 6: Status of Spice Cultivation in Kharif and Rabi 2016

Cluster	Kharif 2016		Rabi 2016	
	Total Number of Farmers (through Convergence)	Total Area in ha (through Convergence)	Total Number of Farmers (through Convergence)	Total Area in ha (through Convergence)
Madhu Ganga	-	-	516	6.20
Revati	377 (215)	3.50 (2.10)	265	1.44
Saryu	265 (70)	2.46 (0.79)	109	1.25
TOTAL	642 (285)	5.96 (2.89)	890	8.89

(iii) **System of Crop Intensification (SCI):** During Kharif 2016, 1122 farmers from the three clusters adopted SCI techniques for various crops over a total area of 1339 nalis (26.78 ha). Though there was a marginal increase in number of farmers (7 per cent) adopting SCI techniques, the coverage area increased by 25 per cent from Kharif 2015. The incremental SCI grain yields ranged from 18 to 79 per cent in the different valleys. The performance was much better than Kharif 2015, where incremental grain yields ranged between 9 to 35 per cent, indicating that farmers improvised techniques with more experience.

Table 7: Number of Farmers practicing SCI (Kharif 2016)

	Paddy Direct Seeded		Paddy Transplanted		Kidney Beans		Finger Millet		Maize	
	Farmers (Area in ha)	% Grain Yield Incr	Farmers (Area in ha)	% Grain Yield Incr	Farmers (Area in ha)	% Grain Yield Incr	Farmers (Area in ha)	% Grain Yield Incr	Farmers (Area in ha)	% Grain Yield Incr
Madhu Ganga	75 (1.42)	33	-	-	452 (11.12)	53	-	-	-	-
Revati	87 (1.7)	21	55 (1.1)	40	117 (3.58)	79	108 (2.0)	18	63 (2.28)	52
Saryu	-	-	56 (1.18)	60	109 (2.40)	38	-	-	-	-
Total	162 (3.12)	27	111 (2.28)	50	678 (17.10)	55	108 (2.0)	18	63 (2.28)	52



In Rabi 2016-17, 785 farmers from the three clusters adopted the System of Wheat Intensification (SWI) on over 1000 nalis (20.1 ha), representing a 76 percent increase in the number of SWI farmers and 127 percent increase in the area planted over the previous year.

(II) Off-Farm Livelihoods

- (i) **Poultry:** During the year more households, especially BPPL, got interested in rearing kuroilers as it provided a very good income. An additional 171 poultry sheds were built during FY '17, taking the total number of poultry units to 329. Each participating family was given 25 chicks at the start. The growth of the birds was found to be proper in all the three clusters. A survey of 200 units showed an average annual income of Rs. 3,500 from the sale of chicks and eggs. About 40 per cent of the chicks are still remaining which will bring additional income.

Table 8: Status of Poultry Rearing

Cluster	Villages	Total Poultry Units	BPPL Households	Number of Chicks Distributed	Income from Sale of Chicks* (Rs.)
Madhu Ganga	5	116	78	2900	167,000
Revati	4	110	82	2450	225,400
Saryu	4	103	77	2577	252,325
Total	13	329	237	7,927	644,725

* Reported for 200 units



Poultry shed and poultry unit in Madhu Ganga cluster

- (ii) **Bee-Keeping:** In a pilot, bee-keeping groups were formed in Revati (18 households) and Saryu (5 households) valleys. They visited Devalsari for training on bee-keeping and interactions with bee-keepers. The trained farmers were provided 80 boxes for bee-keeping. The farmers of Revati cluster made an annual income of Rs. 1,28,000 (an average income of Rs. 7,000 per household).

(III) Natural Resource Based Activities

- (i) **Fodder Plantation:** In order to improve fodder availability for cattle, plantation of fodder trees on community lands and slips of Napier grass on private field bunds was done in all the clusters in July-August 2016. For fodder tree plantation, *kisan* nurseries were raised by BPPL households and women's groups. Local institutions, particularly MMSs and MMDs, led the community fodder tree plantation. Monitoring of tree plantations will be undertaken in summer of 2017 followed by gap filling activities in the monsoon season along with additional area coverage.

Table 9: Details of Fodder tree and Napier Grass Plantation

Cluster	Community Plantation		Individual Grass Plantation	
	Fodder Trees Planted	Area Planted (ha)	Beneficiary Households (BPPL)	Napier Grass Slips Planted
Madhu Ganga	9,875	10.7	128 (80)	14,320
Revati	12,160	13.5	165 (85)	18,250
Saryu	7,444	7.5	142 (73)	16,835
Total	29,479	31.7	435 (238)	49,405

- (ii) **Springs recharge:** In the Revati cluster, springs recharge work (including trenching and plantation activities) was done in Siri and Sama villages.



Recharge zone treatment at Jugga Pani source in Siri village

Construction of trenches was initiated in July 2016, followed by plantation in August. The size of trenches was decided based on the site conditions. In all 315 trenches were dug in the two recharge zones (150 in Siri and 165 in Sama) along with plantation of about 1700 Napier grass slips on the bunds of the trenches. In addition, 1525 fodder trees were

planted in the recharge area. Digging of trenches and plantation works is expected to increase the flow of water in the springs over a period of time and would take care of water needs of the beneficiary households (29) especially during the lean season from April to June. The discharge of these sources is being regularly monitored to study the impact of the spring shed development activities.

Table 10: Details of Spring-shed Development Activities

Cluster	Village	Name of Spring (Beneficiary HH)	Recharge Area (ha)	Number of Trenches	Fodder Trees Planted	Napier Grass Slips Planted
Revati	Siri	Jugga Pani (12)	1	150	700	500
	Sama	Bhula Road (17)	1.5	165	825	1200
Total		(29)	2.5	315	1,525	1,700

(IV) Engineering Works

All the proposed engineering works like irrigation schemes (except one micro-irrigation scheme in Kandara hamlet of Ransi village in Madhu Ganga cluster), drinking water schemes, construction of diversion drains, retaining/protection walls were completed by March 2017. One irrigation tank in Kandara was later damaged due to land subsidence. User groups have further been formed for proper distribution of irrigation/household water and maintenance of the schemes.



Irrigation tank in Sama village

Table 11: Drinking Water & Irrigation Schemes Completed

Cluster	No. of Completed Schemes	Beneficiary Households (BPPL)	Area Irrigated (ha)
Madhu Ganga	Drinking Water - 2	109 (71)	-
	Irrigation -2	50 (29)	1.12
Revati	Drinking Water - 2	62 (27)	-
	Irrigation - 8	227 (116)	9.35
Saryu	Drinking Water -3	48 (23)	-
	Irrigation - 4	110 (98)	2.50

(V) Livelihoods Activities under Convergence Funding

Apart from the livelihoods activities supported by Axis Bank Foundation and Star India, other development works (footpaths, retaining walls, check dams, diversion drains, foot over bridge, bath rooms, and drinking water schemes) were planned to be done in convergence with other agencies, mostly through government programs. Out of the 69 such activities proposed in the

three valleys, 51 activities were completed by March 2017. The remaining 18 proposals have been passed by the Gram Panchayats and submitted to the concerned departments.

Table 12: Status of Works under Convergence

Cluster	Proposed	Completed	Value of Works Completed (in Lakhs)	Proposals submitted by Gram Panchayats to Departments
Madhu Ganga	14	11	38	3
Revati	26	23	28	3
Saryu	29	17	107	12
Total	69	51	173	18

(VI) Skill Development

Educated rural youths in the three clusters, as in other rural areas of India, generally find it difficult to overcome the admissions barriers to good quality higher education. Hence they find it difficult to compete in the formal job market. At the same time, VOs have difficulty in finding good quality field workers who are willing to live in the villages. In response to these twin problems, in August 2016

PSI initiated a Development Practitioners' Training (DPT) course to develop human capital for the non-profit sector.

The ten months' certificate program at PSI is targeted to give XIIth standard pass rural youths a good grasp of rural development basics and exposure to practice. Selections were based on recommendations of the GSS or teachers from all the three clusters, followed by written tests and interviews. Out of seven students selected, one dropped out after a month. The remaining six completed the course. Two have been hired by PSI as project staff and the remaining four are undergoing additional field training before final placement.

(VII) Program Monitoring

All through the year, the POs and LDTs organized internal monitoring of the program activities and provided valuable inputs to the communities at the Aam Sabha meetings. Senior colleagues from



Practical training on engineering measures



Ms Akriti Kapoor from PwC interacting with GSS and SCG members in Sama village.

PSI also made regular field visits to guide and monitor the program. In addition, quarterly review meetings were organized with the POs. The project was also reviewed at monthly meetings with PSI's program team and at PSI's Core Group meetings. Field visits were made by representatives of the major donors to monitor progress. These included Mr. Pankaj Babbishi from ABF (Saryu cluster) and Ms Akriti Kapoor from PwC India (Revati cluster).

I.2 Sustainably Providing Safe Drinking Water and Sanitation

In November 2016, PSI started a new program to sustainably provide safe domestic water and sanitation in 10 hamlets of Bageshwar block in Bageshwar district. This program is financially supported by The Hans Foundation (THF). The hamlets identified by THF currently face acute shortages of drinking water. Although Jal Nigam and other agencies have developed drinking water schemes in some of these villages the water discharge in the sources of existing schemes has gone down over the years and there is no program for the recharging the spring sources. Institutional mechanisms for the protection of the recharge zones, maintenance of the schemes and equitable distribution of safe water do not exist.



Women mainly collect drinking water in the selected hamlets

PSI has proposed community based water resource management (including spring shed development) to mitigate the problem of drinking water availability in the selected hamlets. The overall goal of the proposed program is to develop awareness, institutional mechanisms and capacity building of local communities for providing safe drinking water sustainably and fulfilling the minimum standards. The project activities include (i) mobilizing local communities to establish Village level Institutions (VLIs) and/or strengthen existing local institutions, and (ii) study the hydro-geology of existing springs and prepare Detailed Project Reports (DPRs) through participatory planning to provide safe drinking water and sanitation facilities in the selected hamlets.

The progress of the various program activities up to March 2017 is briefly given below.

I.2a Reconnaissance Surveys

The selected hamlets are scattered all over Bageshwar block. Recce surveys were conducted in November to all the hamlets for making a rapid situation assessment and informing local communities about the program. Hamlet level meetings were organized for the purpose. Visits were also made to the existing springs and streams, to measure discharge and test water

quality. The recce surveys helped in delineating the water and sanitation problems and related local conflicts. Based on the information collected, changes in the hamlets identified by THF were made and submitted to THF for approval.

Table 13: Demography of the selected Hamlets

S. No.	Hamlet	Village	Number of Households		
			SC	General	Total
1	Rupail	Joshi Paldi	5	19	24
2	Malaizer	Dwarson	0	12	12
3	Basanichina	Purkot	0	9	9*
4	Darimthok	Gunakot	0	17	17
5	Dubagarh	Matela	24	0	24
6	Khoulkhan	Khoulseer	6	24	30
7	Paarkhet	Bedi Bagair	0	16	16
8	Santeshwar	Saat	0	4	4
9	Samgair & Chundhar	Amsarkot	0	33	33
10	Jalthola	Gurna	3	13	16
		Total	38	147	185

I.2b Community Mobilization

Before starting the DPR planning exercises, community mobilization was done in all the ten hamlets. Panchayat Pradhans, ward members and members of other VLIs like Mahila Mangal Dals and SCGs were contacted and mobilized to participate in the PRA exercises.

I.2c DPR Preparation The DPR preparation involved:

- (i) **PRA and Household Surveys:** PRA exercises included social mapping, resource mapping, seasonality analysis and venn diagrams to understand issues related to water dependency, access, distribution systems and related problems. This was followed by household surveys for estimating demand and supply gaps. Focus group discussions were held to understand local knowledge/information about the



Village meeting in Paarkhet Hamlet, Bedi Bagair village, Bageshwar



Social map prepared during PRA in Khoulkhan Hamlet, Khoulseer village, Bageshwar

source and community responses (need and willingness to participate in the program).

- (ii) **Study of Hydrogeology and Water Quality:** A geologist and a water quality expert from PSI visited all the 10 hamlets to study the existing springs, their hydrogeology, land use pattern of the recharge area and its ownership and the potential for revival of the spring. The springs' water quality and of other sources were tested for pH, TDS, fecal coliform (qualitative), total hardness, nitrate, chloride, iron and alkalinity.
- (iii) **Socio-technical feasibility:** Socio-technical feasibility of various options for drinking water supply were undertaken looking into the resources required, costs, covered households, possible conflicts, etc. Designs and estimates were prepared for various construction activities like silting chambers, pipelines and storage tanks. Wherever possible, a spring shed development plan was prepared. The planning of a water distribution system was done with users' participation.
- (iv) **Institutional Systems:** A hamlet level Users Water and Sanitation Sub-Committee (UWSSC) will be formed which will be linked with the Panchayat water and sanitation committee. This committee will be responsible for the operation and maintenance of the established system in future.

The DPRs once finalized, will be submitted to THF for further approval. Thereafter the implementation of the plans will be initiated. In the meantime, community mobilization activities, and formation and strengthening of UWSSCs will be undertaken.

I.3 Upscaling Sustainable Agriculture in Bhadrabad Block, Haridwar

From January 2017, a pilot project "Upscaling Sustainable Agriculture Practices in Bhadrabad block of Haridwar district" was started under Mission Sunhara Kal (MSK) supported by ITC Saharanpur. Most rural families in Haridwar district still practice agriculture, even though the city has become an industrial hub since its inclusion in Uttarakhand in 2000. ITC has an industrial unit at SIDCUL (State Industrial Development Corporation Limited) in Roshanabad area of Haridwar. Observing the vagaries of climate change in its neighboring area, ITC approached PSI to undertake promotion of sustainable agricultural practices in Bhadrabad block through its CSR commitment.

PSI initially undertook a 3-month (January to March 2017) pilot project. Its objectives were to (i) Develop village level agricultural plans enhancing climate change adaptations for promoting sustainable food security; (ii) Establish and strengthen agri-business centers and cluster level farmers' schools, and (iii) Promote organic farming and kitchen gardening for production of vegetables to meet household needs in a cluster of three villages (Meerpur Muajarpur, Aurangabad and Tanda Banjara) located adjacent to the Rajaji National Park. It is envisioned that the cluster will serve as model for the implementation of sustainable agriculture practices in the socio-economic context of Haridwar district.

The key achievements of the pilot project were:

- Setting up of field office, and capacity building of the field team for sustainable agriculture planning
- Organization of village level awareness camps and formation of FIGs
- Micro-level planning to prepare agricultural plans for all the three villages
- Initiation of entry point activities by successfully demonstrating the construction of NADEP compost pits and kitchen gardens.
- Training of local masons for construction of NADEP compost pits
- A zero tillage machine, trans-planter, reaper were purchased for the Custom Hiring Center (CHC).
- Liaison with the block agriculture and horticulture departments.



A Demonstration NADEP Compost Pit



Demonstration of Kitchen Garden

The sustainable agriculture development plans include agricultural interventions like the System of Crop Intensification, conservation agriculture, kitchen gardens, commercial vegetable cultivation, NADEP composting and GW recharge activities like renovation of community ponds, farm ponds, dykes, soak pits and gabions. For sustainable implementation of the agricultural plans, various institutions (including FIGs, Farmers' Field Schools and Custom Hiring Centers) have been proposed. Once these plans are approved, they will be implemented over the next year along with plans preparation in three more villages.

I.4 Integrated Watershed Management Programme (IWMP) Training

A 4-day training course on IWMP was organized for villagers from Kullu district of Himachal Pradesh on December 26-29, 2016. The topics covered included basic concepts and principles of watershed, the IWMP Common Guidelines, its institutional framework, community mobilisation, formation of user groups, benefits sharing, and soil and water conservation principles and methods. Case studies of Ralagan Siddhi and Sukhomajri were discussed to

highlight many of the above concepts. The participants were taken on an exposure visit to Sahastradhara to see the soil and water conservation work of the IISWC.

I.5 Workshops and Meetings

During the year, various workshops and meetings on relevant subjects were organized or attended by the NRM team as briefly described below.

a) STARS Forum Conference

Mr. Puran Bartwal attended a 2- day STARS (Skills Training Advancement in Rural Societies) Forum conference organized at CORD, Sidhbari, Kangra district on December 10-11, 2016. The theme of the conference was "Entrepreneurship and Self Employment Opportunities for the Economically Backward". Its objective was to serve as a catalyst for livelihood opportunities for the most vulnerable people. People from different parts of the country shared their experiences.



Participants in the STARS Forum Conference at Sidhbari, Dharamshala (HP)

b) Multi-Stakeholder State-level Consultative Workshop on Collaborative Disaster Management Systems (DMS) for Enhanced Preparedness and Response in Himalayas

The consultative workshop was organized by Pragya on December 20, 2016 at Hotel Madhuban, Dehradun. It aimed at sharing the lessons from the DMS Himalaya project on strengthening community preparedness for disaster response in the Indian Himalayas through implementing a citizens-led Disaster Management System. The event brought together stakeholders in the Disaster Risk Reduction (DRR) sector including government agencies, research institutions, response and relief organizations among others. Mr. Puran Bartwal represented PSI at the workshop.

c) Other Meetings and Workshops

Members of the NRM group represented PSI at (i) a workshop on Appropriate Technologies at Development Alternatives, Delhi on April 6, 2016; (ii) a presentation-cum-discussion meeting of the Hazards Centre's ongoing activities at New Delhi on June 5, 2016; (iii) a consultative meeting on Vision, Strategy and Action Plan on Rural Economy, Safety Nets and Social Inclusion at Niti Aayog in New Delhi on August 11, 2016; (iv) AP Stewardship Meeting in Delhi on September 13, 2016; (v) a meeting of the National Consortium on SRI in Delhi on September 26, to advocate a central government program on SRI; (vi) a CSR Summit, Mumbai on September 27-28, 2016; (vii) a Climate Change conference at Dehradun on November 23, 2016; (viii) Vikas Sangam, Pune on December 6-7, 2016; (ix) a meeting on Improvised Water Mills at UREDA, Dehradun on January 27, 2017 and (x) a Youth Sangam, in Bhopal on February 3-5, 2017.

Dr. Debashish Sen made presentations on the System of Rice Intensification at (i) Cornell University, US on September 6, 2016 and (ii) International Agricultural Congress, New Delhi on November 25, 2016.

I.6 Remarks

Under the Uttarakhand Floods Disaster response program, the focus of the NRM group was mostly on extending field support to the Gram Swaraj Samitis (GSGs) and other village level institutions for implementing the livelihoods development plans. The goal was to increase the household and BPPL coverage, farm and off-farm production and household incomes. Review of the institutional processes and the work done by the GSSs was therefore a regular feature in all the three valleys.

Under community mobilization and capacity building, meetings of VLIs like GSS, MMD/MSS, SCGs and FIGs were regularized. Training and exposure visits were especially organized for the capacity building of members of FIGs. MSSs/MMDs were motivated to protect and maintain their community plantations. For upscaling and sustaining the program, valley level federations, GSS Sangathans, were formed in all the three valleys. They need to interact more regularly with the VLIs and attend to their problems and establish links with government departments for development of the clusters and beyond.

The area under vegetables and spice cultivation has increased three to four times as compared to 2015 and incomes from sale increased about 2.5 times. Under vegetables, farmers preferred growing tomato, brinjal, capsicum, chilly and cabbage according to the local soil conditions, micro-climate and markets. Similarly, ginger, turmeric and garlic were preferred spice crop. The coverage under vegetables and spices is still inadequate (less than 50 per cent of the households barely covering a *nali* (200 sqm per farmer). The volume of vegetables produced is therefore still not enough to establish marketing linkages beyond the clusters. More efforts are needed to identify areas suitable for vegetables and spices, and strengthen FIGs for achieving higher

household level income gains. The newly irrigated areas (13 ha), have a high potential for enhancing vegetables production for which crop planning needs to be undertaken.

Under the System of Crop Intensification, much better adoption rates and incremental gains were obtained in kidney beans (in Kharif) and wheat (in Rabi). In kidney beans, as compared to 2015, there was a 30 percent increase in the number of adopting farmers and a 40 percent increase in the area covered. Similarly, in the case of wheat, as compared to 2015, there is about 75 percent increased adoption by farmers and 126 percent increase in the area covered. A good potential is also being seen in direct seeded paddy under SCI in Madhu Ganga and Revati valleys, where adoption of un-irrigated paddy increased about four times as compared to 2015. More focused attention needs to be provided by the FIGs.

Under off farm livelihood activities, out of the 329 poultry units supplied with chicks, about 60 percent units were ready for business (upto March 2017) while the size of chicks in the rest was small. The average income earned by about 200 poultry farmers from the sale of chickens is Rs. 3,200 over the year. In addition income was also earned from the sale of eggs. The biggest challenge in poultry farming is sustaining the units. For the above, mother units have been established in all the three valleys which can supply chicks on demand. Since feed consumption in kuroiler is very high, accessing feed at affordable prices is another major challenge. Efforts need to be made to organize local farmers for preparing and selling feed through local produce. The cost-benefit analysis of poultry keeping also needs to be undertaken more carefully.

Community plantations (32 ha in three valleys) need to be monitored on a regular basis involving the concerned MSSs/MMDs. Survival rates of the plantations will be estimated in the summer of 2017, after which gap filling activities will be planned. New areas need to be identified for community plantation. Efforts also need to be made to increase the coverage (number of households as well as area) under Napier grass plantation on field bunds and other private lands. Increase in fodder availability is expected to enhance milk production leading to possible establishment of micro dairies in each cluster.

About 75 per cent of the convergence activities proposed in the three clusters had been completed up to March 2017. Proposals for the remaining activities await approval by the block officials. They are being followed up by the GSS Sangathans and PSI teams. Some of the critical activities (those related to household and irrigation water needs) have to be given more priority for convergence funding.

The active involvement of GSSs and other VLIs is essential for effective delivery of program objectives and their sustainability. In the coming year special efforts will be made in this direction through the recruitment of *Lok Sevak/Sevikas* from the village communities. They will ensure regular meetings of the VLIs and interaction with the GSS Sanghs. Special training courses could be organized for the different institutions as per their requirements. Special efforts will be made to enhance fodder plantation, vegetable and spice cultivation, SCI in kidney beans and wheat, and possible establishment of dairy units and market outlets for the clusters.

Cluster level community facilitation centers will be established in the coming year where villagers can have access to computer training, a library, internet services, agricultural inputs, soil and water quality tests, etc. More educated youth will be identified from the three clusters and trained either for vocational skills (like computers, videography, etc.) or as development professionals to support the livelihood developmental activities. New villages are likely to be added in the Revati and Madhu Ganga clusters in where livelihood planning activities will be undertaken.

For the water and sanitation program in Bageshwar district, the implementation of the DPRs will be initiated in the coming year after THF's approval. More efforts will be undertaken to strengthen the UWSSCs and mobilize village communities for better sanitation practices. THF has approached the NRM group to undertake a similar initiative in eight additional villages in a remote part of Kapkot block of Bageshwar district under its Integrated Village Development Program.

I.7 Financial Statement

NRM Groups Financial Statement (2016-17)

Project	Funding Partner	Opening Balance	Income	Utilization	Balance
		(Rs.)	(Rs.)	(Rs.)	(Rs.)
Uttarakhand Flood Disaster	Individual Donations	22,529,484.36	1,156,000.00	3,311,370.03	20,374,114.33
Uttarakhand Flood Disaster	Star India Pvt. Ltd.	28,126,951.21	775,688	11,542,624	17,360,016
Uttarakhand Flood Disaster	Axis bank	3,258,983.64	2,102,436	5,411,558	-50,138
Uttarakhand Flood Disaster	IIT-UK	395,441.05	0	395,441.05	0.00
WUR	RRA-Hivos, ICCO, WU & OXFAM	144,275.00	0	50,777.06	93,497.94
WSRP	Stoop Consultant	38,287.00		38,287.00	0.00
Jal Dhara Bhageswar	The Hans Foundation	0.00	689,000.00	676,593.00	12,407.00
Mission Sunehra Kal	ITC Limited	0.00	957,005.00	1,026,960.67	-69,955.67
Total		54,493,422.26	5,680,129.00	22,453,610.32	37,719,940.94

II. ENVIRONMENTAL QUALITY MONITORING

The objectives of PSI's Environmental Quality Monitoring Group (EQMG) are to monitor environmental quality in the public interest, develop user-friendly environmental quality monitoring techniques build the capacities of VO's and citizen's groups to gather and interpret pollution data and encourage public action for pollution mitigation. In 2016-17, EQMG was primarily engaged in working on Participatory Groundwater Management (PGWM) – now in a second phase. The Group moved into a third phase of its fluorosis mitigation program in Dhar district (M.P.). It was also engaged in providing technical support services to other organizations. Activities carried out during the year are highlighted below

II.1 Participatory Groundwater Management

PGWM is an Arghyam-funded program. Its aim is to develop and promote models for sustainable and equitable use of groundwater resources in India. PSI is the lead partner for the Himalayan region. It has been promoting PGWM practices in five villages of Thanakasoga panchayat in Sirmour district (H.P.) since 2011. The second phase of its program, which began in August 2014, has focused on deepening and extending PGWM principles and practices in the Himalayan region and also in some new geographical regions. It also explored the potential for extending PGWM in an industrial area. All the activities were carried out under three components – Training, Action Research & Advocacy. Details of the 2016-17 activities under each component are elaborated below.

II.1a Training

Training is an important component of PGWM. Its objective is to create a pool of para-hydrogeologists working on groundwater resources.

Since 2011, PSI has organized 11 training workshops. Follow-up with past participants revealed that the participants from technical and academic backgrounds used their new knowledge to carry out research or further studies. Participants belonging to the



Figure 1: Participants of the workshop organized in Himachal Pradesh

voluntary sector and the individuals working at grass roots level tried to apply the knowledge gained in the field.

Hence in 2016-17, PSI attempted a shift from training professionals and researchers to training communities and field staff VOs in PGWM. One such training workshop was organized in Himachal Pradesh in August, 2016. It was attended by the villagers belonging to Meherna, Tharu and Dargela Panchayats and the field staff of CORD and SARDHA organizations. The response was encouraging. Besides 26 registered participants, a number of villagers voluntarily attended the sessions organized in the villages. The training focused on the water cycle, groundwater, sanitation and hydrogeology, monitoring of water quality and the need for community involvement in maintaining the local groundwater resources. The participants assured their full co-operation to CORD if it came up with a spring shed development program in their villages.

A similar training workshop was scheduled to be held in June, 2017 in Darjeeling for the field staff of *Community Health Advancement Initiative (CHAI)*.

II.1 b Action Research

PSI began an Action Research (AR) project in Thanakasoga Gram Panchayat in 2011. The major activities included facilitating communities to treat the recharge areas of local springs, clean their baoris, regularly measure discharge and rainfall and monitor water quality. In 2016-17 some major outcomes of these efforts were visible. Fig 2 shows a significant increase in the discharge of a treated spring in Luhali village.

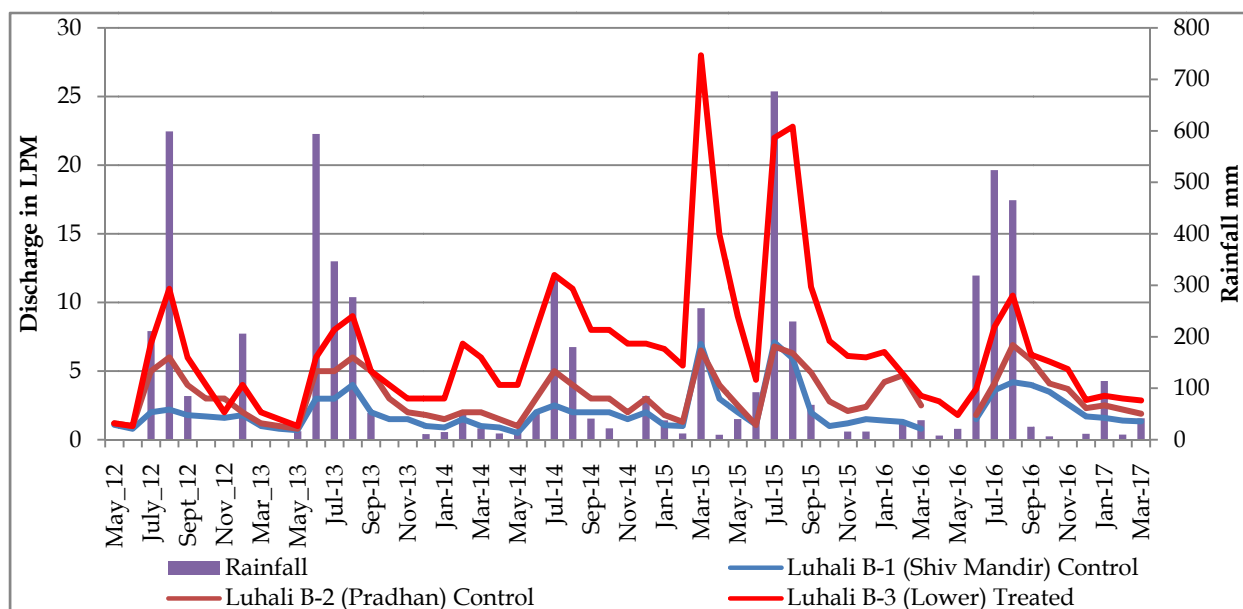


Figure 2: Hydrograph of Luhali Springs

Fecal contamination of spring water was kept under control with the help of social fencing. There was a steady decline in fecal coliform contamination between 2012 and 2015. However,

after 2015, there has been an increase in contamination (Fig 3). This could be attributed to a sudden increase in the use of toilets in these villages (Fig 4).

A survey conducted by PSI in December 2016, showed that 95% of the households in these villages were now using their toilets for defecation. Poorly constructed soak pits could lead to percolation of fecal contaminants into the groundwater. In a mountain terrain, the slope, direction of flow of waste water and secondary openings in the rocks facilitate this process and even allow the spread of contaminants in other directions.

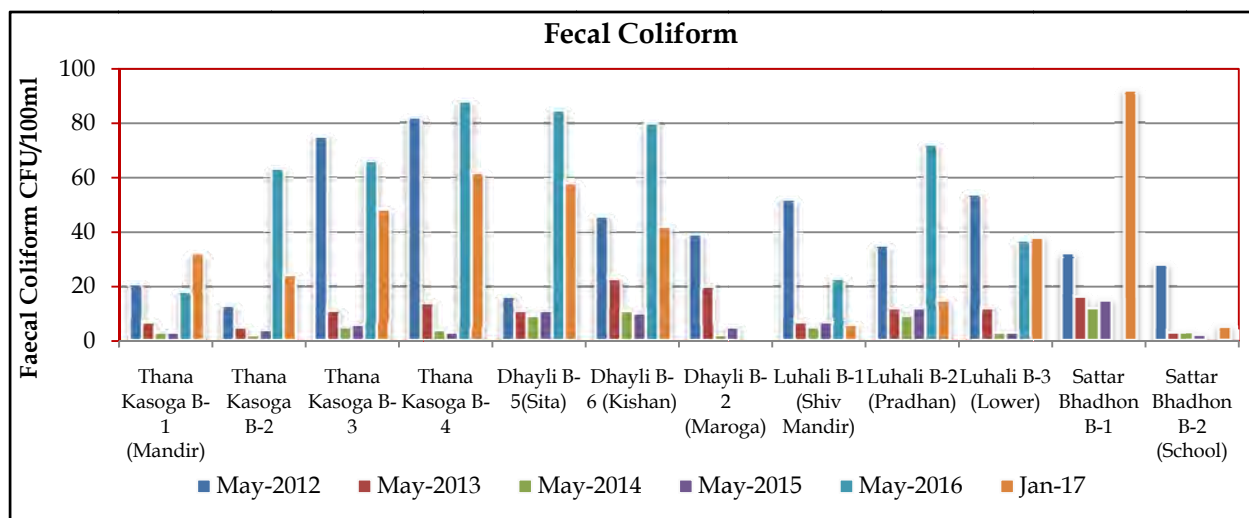


Figure 3: FC contamination trends at different sites

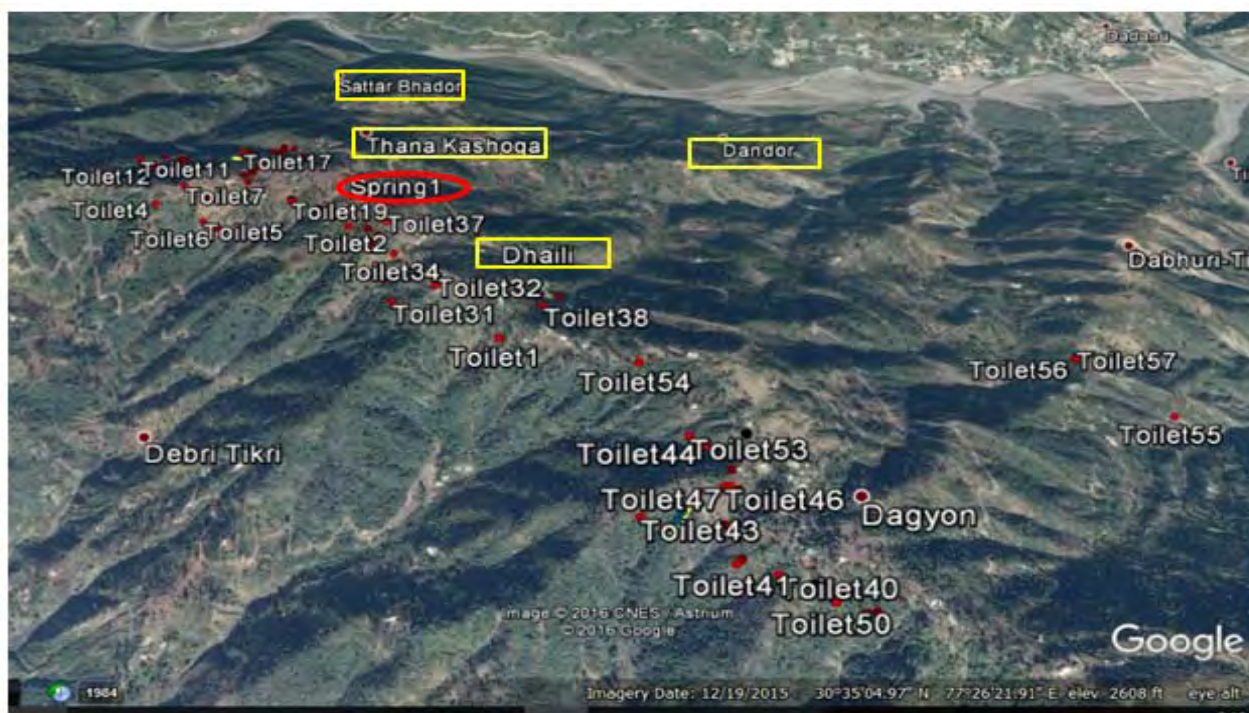


Figure 4: Construction of toilets at our AR site Village Spring
Village Spring

Extending SCI: Enhanced water availability due to increased spring discharge enabled availability of water for irrigation. The villagers were motivated to try out SCI (System of Crop Intensification) and SWI (System of Wheat Intensification) techniques of farming as these techniques yield more grain but consume less water.

With the SWI technique, the average productivity of irrigated wheat went up from 2.42 ton/ha to 3.9 tons/ha for grains while the straw yield increased from 3.3 ton/ha to 4.8 ton/ha (Fig.5). Later the SCI technique was introduced for maize and chilli yielding more produce.

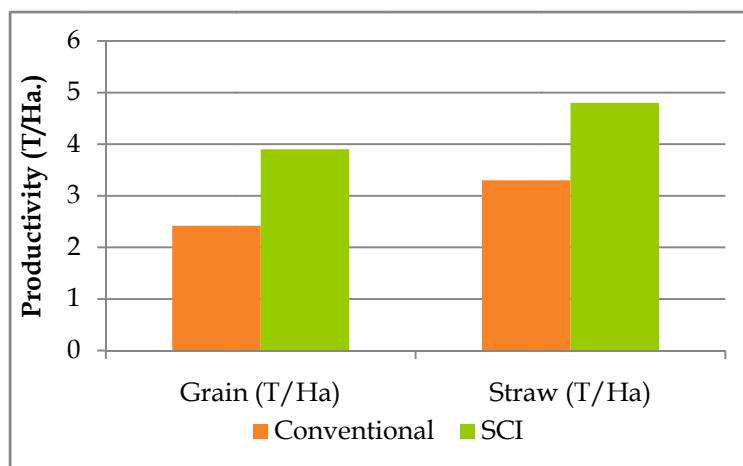


Figure 5: Average productivity of wheat

These pilots were carried out with a small number of farmers. Introducing SCI for grains, vegetables and spices has helped farmers (58 out of 242 households) earn additional income. In Luhali village, Jay Singh earned around Rs. 20,000/- with over 200 kg production of garlic. In Thana village, Roshan Lal grew 11 quintals of tomato and made a profit of Rs. 35,000.

Considering the growing variations in rainfall pattern due to climate change and increasing groundwater shortages, SCI and SWI can be a desirable climate resilient practice.

Exploring PGWM in an Industrial Area: Asia's largest pharmaceutical hub, the Baddi-Barotiwala-Nalagarh area is spread over 318 sq km in Solan district (H.P.). Around 5000 industrial units are located here. Most of them are heavily dependent on GW and release their effluents into River Sirsa (Fig 6).

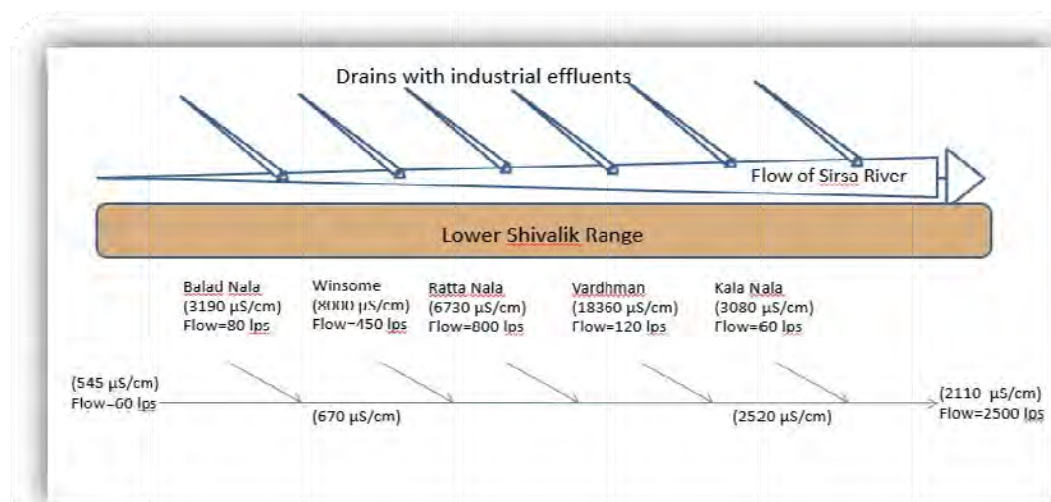


Figure 6: Flow diagram for River Sirsa (Values in brackets indicate conductivity)

Source: People's Science Institute, preliminary study, 2015-16

As shown in the above figure, the discharge of water in River Sirsa increases from 60 lps to 2500 lps as it transits through the BBN area. Most of this water is in the form of effluents from industries. This effluent water is the GW that has been extracted by industries and released into the streams.

Despite the growth of industries, the largest share of land in the area is still devoted to agriculture, which is also dependent on the same water resources as the industries. There are also a number of human settlements in the area. PSI is trying to assess the level of threat to the area's groundwater resources and to bring together all these stakeholders to create a participatory groundwater management plan. During the next couple of months we will attempt to quantify the GW extracted by industries, the impact of effluent discharge on GW quality, the impact on agricultural production and the conflicts between industries and farmers based on people's perceptions in a selected watershed area. We will then attempt to suggest a participatory approach to water management in this area. The CII Northern region office has expressed a willingness to collaborate in this work.

II.1c Advocacy

An advocacy workshop on "Reviving Springs in Uttarakhand" was organized by PSI on June 21-22, 2016 in Dehradun. The workshop was attended by the Chief Secretary of Uttarakhand along with several senior state and central government officials besides Springs Initiative partners and CBOs. The aim of the workshop was to develop a program for reviving springs in Uttarakhand. As a follow up to this workshop, in October 2016, a draft programme outline was presented by PSI at a consultative meeting organized by the Chief Secretary. This meeting was attended by senior state officials. A five member task force was formed during the meeting to prepare a one year pilot program to revive about 100 springs and a multi-year program to revive 5000 springs in Uttarakhand. Unfortunately, however, this plan did not materialize due to a change of the Chief Secretary in November 2016. No further developments have taken place yet.

II.2 Introduction of PGWM in New Geographical Regions

As mentioned earlier, the focus of the PGWM phase II program was to extend the principles of PGWM in new geographical areas. For this purpose, PSI began implementing the PGWM principles in all its major ongoing programs in Uttarakhand (Bageshwar dt), M.P. (Dhar and Panna dts) and Nagaland. All these locations are in different geological areas and have different GW-related issues. Some of the project details are mentioned below.

II.2a Fluorosis Mitigation in Dhar District (M.P.)

PSI is working in fluorosis-affected villages of Dhar district since 2013 to provide safe drinking water to fluorosis-affected largely marginal communities. This initiative is based on application of PGWM principles. They have been successfully applied in five villages while work is in progress in three more villages. More than 800 families (around 3400 people) have benefitted so far. The interventions were based on local hydrogeological studies, groundwater quality

monitoring and strong community mobilization which resulted in identification of fluoride safe water source (mostly open wells), preparation of operation and maintenance plans, monthly contributions and sharing of fluoride safe water by the communities.

The program has helped in increasing availability of safe drinking water and its equitable distribution. It has resulted in health improvements in terms of reduction in urinary fluoride concentration (Fig 7), joint pain and noticeable straightening of legs after consuming fluoride safe water.

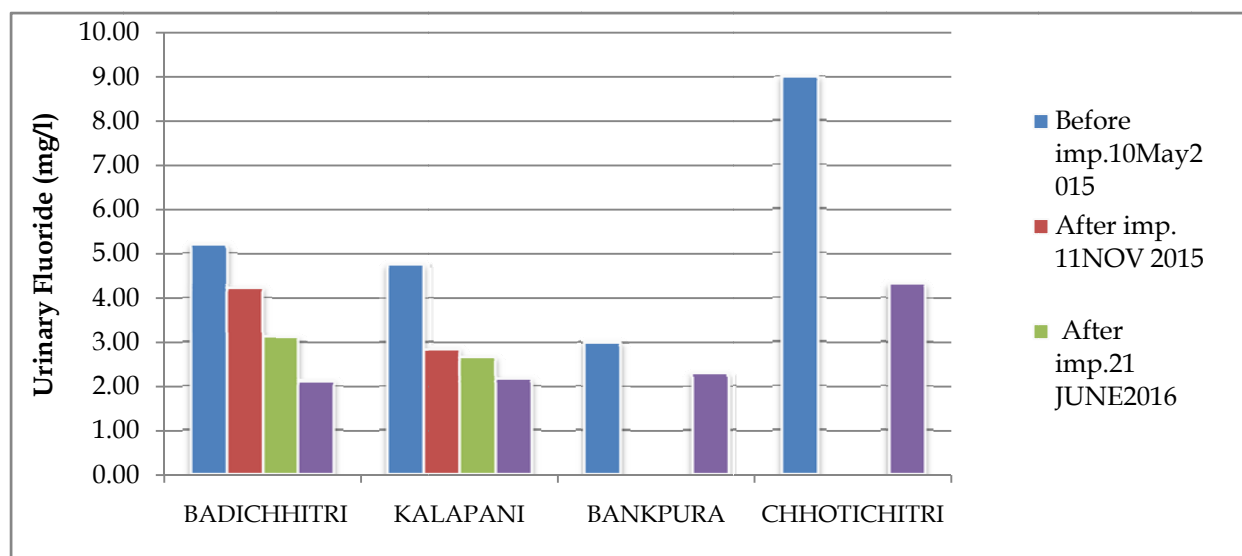


Figure 7: Reduction in urinary fluoride concentration

Looking at the positive health impacts, the program has been extended by 3 more years (2017-2020) for implementation in 12 more villages. In these new villages, along with fluorosis mitigation, the focus will also be on sanitation and hygiene education.

II.2b Community Based Spring shed Development in Nagaland

Lives and livelihoods of rural people in Nagaland are more dependent on springs and small mountain streams than on big rivers. In spite of abundant rainfall, springs are drying up primarily because of deforestation and changes in rainfall pattern. In order to speedily develop climate smart villages, the Department of Land Resources, Nagaland initiated a one year pilot program involving the local communities to rejuvenate one spring in each of the state's 11 districts. PSI provided the technical support and field facilitation in this program. Selection of springs based on the water demand and hydrogeological conditions, demarcation of recharge area and planning of recharge measures (Fig.8) has been completed for all the 11 springs by PSI. Two capacity building training workshops were also organized for DoLR officers and staff, WDT members and village representatives. Implementation of recharge activities has been initiated at all the sites. Strengthening of Village Level Institutions (which are the Village Councils in Nagaland) and finalization of village water security plans is in process. The program will benefit more than 600 households.

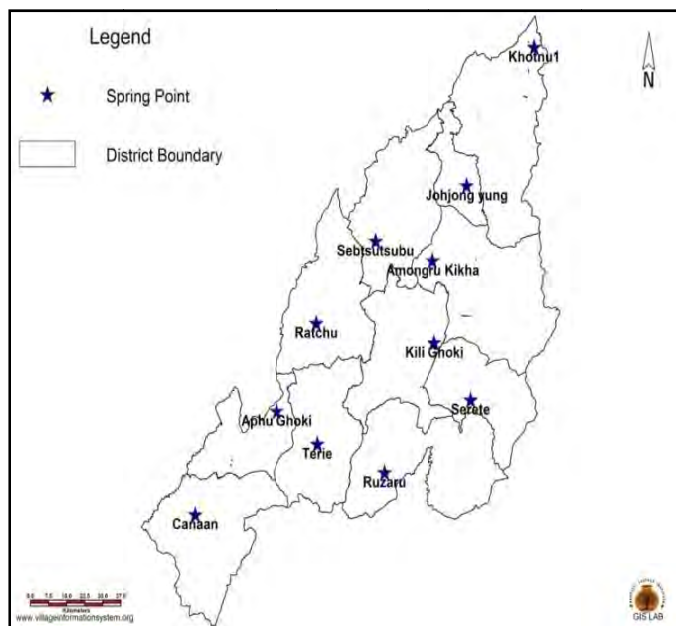


Figure 8: Springs selected for the Nagaland pilot program

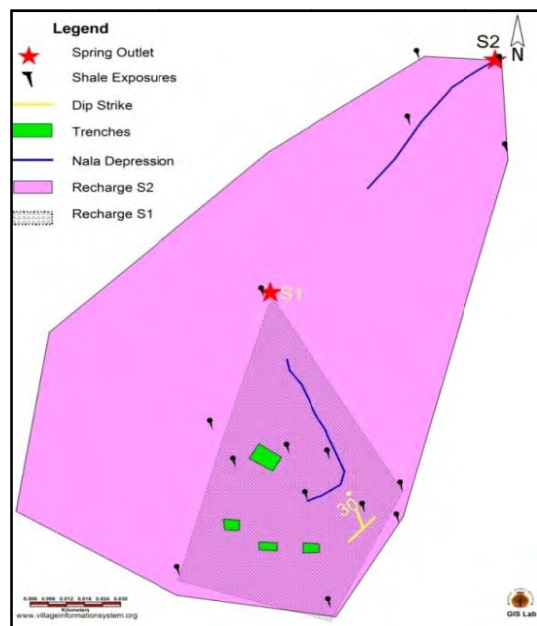


Figure 9: Conceptual diagram of spring recharge area in Gidemi village, Phek district, Nagaland

II.2c Situation Analysis for Piloting PGWM Principles under BRLF Program

PSI is supporting BRLF-funded (Bharat Rural Livelihoods Foundation) VOs to demonstrate PGWM activities in 11 pilot villages of Sheopur, Udaipur and Yavatmal districts. In Sheopur district (M. P.) all the selected villages are dependent on groundwater sources, especially wells which are drying up due to overexploitation. In Udaipur district, Rajasthan, a recce in Dheemri village showed that most of the wells and shallow tube wells go dry during summer. Six pilot villages in Yavatmal district, Maharashtra have also been visited.

Under this multi-year programme, PSI will train the local BRLF partners in the basics of hydrogeology, geological and aquifer mapping, water quality monitoring and the concept of PGWM. The major objective is to help the BRLF partners initiate PGWM in the selected pilot villages in order to reduce drinking water problems.

II.3 Other Activities

II.3a Training Workshop under Neeranchal Program

The Neeranchal National Watershed Development Project was initiated by the Department Of Land Resources, GoI in 2015 to influence the Integrated Watershed Management Programme (IWMP) outcomes by providing technical and financial support to concerned organizations. PSI was asked to assist in Jabalpur district in Madhya Pradesh for this work. After completing a situation analysis, a training workshop was organized for IWMP officials comprising of DPOs, geologists, engineers, social workers and field staff from Dewas and Jabalpur zones. The

workshop was jointly organized by PSI and SPS, Dewas in January 2017. The officials were briefed about PGWM and its importance. Further, they were trained in the use of geohydrology, geological mapping, water quality monitoring and sharing & management of groundwater resources.

II.3b Groundwater Sanitation Nexus

PSI carried out a year-long research study in Almora with the financial support of Arghyam to identify transport pathways of microbial contaminants in the groundwater sources, springs and naulas. An inventory of 52 *naulas/dharas*, including their water quality status was prepared. The study was based on hydrogeological investigations, seasonal water quality monitoring at 17 selected sites and a survey of around 100 households. The study showed that contamination of groundwater sources largely depends upon sewage disposal practices. Direct discharge of sewage into the drain and soak pit toilets contribute more to contamination than septic tanks (Fig 10). The findings will be presented to local stakeholders in Almora in June, 2017.

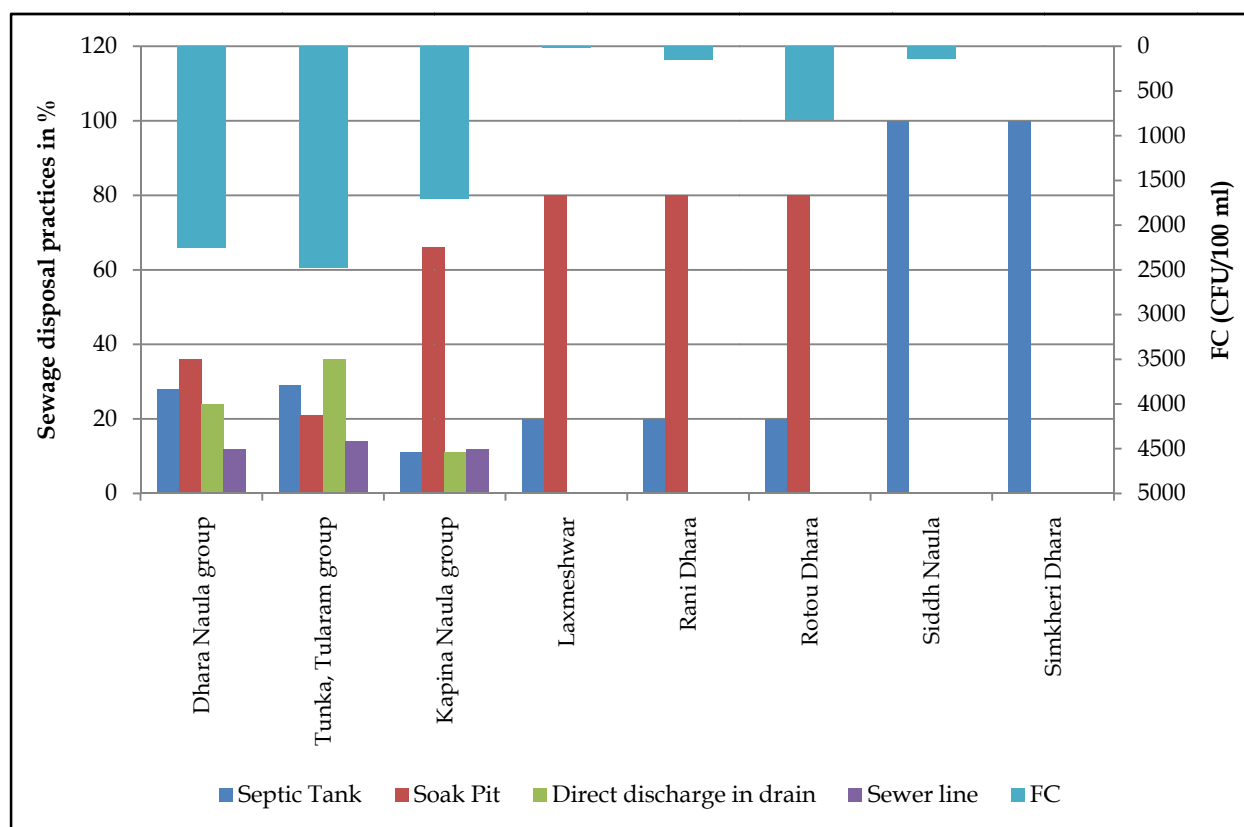


Figure 10: Sewage Disposal Practices vs FC (Monsoon 2016), Almora

II.3c Alaknanda Study

PSI is carrying out a research project in collaboration with HNB Garhwal University, titled "Ecological Monitoring and Status of Fish Fauna in Hydropower-affected Alaknanda-Bhagirathi-Ganga Rivers". PSI's role in the study is to examine how large hydropower projects

have impacted livelihoods in Alaknanda Valley. Two large 'run-of-the-river' projects have been selected for this purpose -- the 400 MW Vishnuprayag project at Lambagad, and the 330 MW Alaknanda Project at Srinagar. A reconnaissance survey of 23 villages was conducted in January in the Srinagar area and 4 villages near Joshimath. Based on the observations of this recce, four villages in Srinagar and two in Joshimath were selected for a detailed study focusing on changes in agriculture, animal husbandry, availability and access to water and people's perceptions about spiritual and cultural ties to the river.

II.3d Collaboration with Chitrakoot University

In 2016-17, PSI tried to promote and facilitate inclusion of courses on PGWM in various courses at Chitrakoot University, MP. A consultative workshop was organized November 16-18, 2016 at the university to design degree and diploma courses on PGWM. A field visit was also conducted. The workshop was attended by Heads and Professors of various university departments. It was decided during the workshop that a special paper on PGWM will be introduced under the courses – M.Sc Geology, M.Sc Environment, M.Sc Agriculture, MSW and Civil Engineering. To begin with, two dissertation topics related to assessment of groundwater and impact of effluents on River Mandakini have been assigned to some of the students.

II.3e Water Quality Monitoring

PSI's EQM laboratory in Dehradun tests water samples and also produces low cost water testing kits which are purchased by various organizations all over the country. In 2016-17, 236 drinking water samples and 360 water samples from PSI's project sites were tested in the lab. Most of the drinking water samples came from local institutions like Lal Bahadur Shastri National Academy of Administration, CEDAR, Doon School, etc. The group sold 65 water testing kits and 18 kit refills.

II.4 Workshops

- a) **Training New Team Members:** In 2016-17, Nitin Rana underwent training in geohydrology at ACWADAM in Pune.
- b) **Workshop at IIT Roorkee:** PSI encourages its members to attend capacity building programs outside the Institute. Two colleagues attended a training course organized by the Department of Hydrology, IIT Roorkee on BASINS/HSPF, June 6-14, 2016. BASINS (Better Assessment Science Integrating Point and Nonpoint Sources) is a multipurpose environmental analysis system designed to help regional, state, and local agencies perform watershed- and water quality-based studies. Such watershed modeling is an important tool for assessing the impacts of watershed management on the health of water resources.
- c) **Workshop at Solan:** A workshop on 'Developing Strategic Advocacy Action Plan For Implementation of Safe Water Policy/Commitments' was organized by Fresh Water

Action Network South Asia (FANSA) on July 21- 22, 2016. Its focus was to discuss issues related to water quality. PSI shared its experiences of groundwater quality management in Thanakasoga, Dhar and Singrauli.

- d) **Knowledge & Information Dissemination:** Case studies based on PSI's successes in Dhar district were prepared, primarily for dissemination through the internet. These included:
<http://www.indiawaterportal.org/articles/how-water-brought-village-together>
<http://www.indiawaterportal.org/articles/bringing-potable-water-villagers-dhar>

II.5 Remarks

In 2010, PSI became a part of a consortium of VOs funded by Arghyam to promote the equitable and sustainable use of groundwater through participatory resource management. PSI gained experience while implementing PGWM at Thanakasoga panchayat. Its team members were also formally trained in hydrogeology and supported by ACWADAM. Today, PSI has emerged as a leading proponent of PGWM and spring shed development in India's Himalayan region.

Inclusion of PGWM principles in all our ongoing programs has gained us some new experiences. PSI has shown that PGWM is possible in geologically different locations and for different sources of water (springs in Thanakasoga, wells in Dhar and Bundelkhand). It can be promoted in areas of safe water scarcity and can be linked with water-related health problems prevalent in an area. The success achieved has helped build the team's confidence in carrying out PGWM in different areas and also training others. Throughout the year, the group was engaged in providing various support services to other organizations. With its success stories, PSI has been able to influence even state governments to take up necessary actions for community based spring shed development. Shifting over to training the communities rather than the professionals was a new initiative taken up this year which might prove to be useful in the coming years.

The community-managed fluorosis mitigation programme in Dhar district has been extended to 12 more villages. The outcomes of this program have been appreciated by several organizations.

Working in Nagaland has been a good learning experience for us as the area is a sedimentary terrain and the major rock type is sandstone which is not so predominant in PSI's other project areas. Secondly, since Nagaland is a predominantly tribal area, working with the communities is quite challenging as the Village Councils take all the decisions related to village development and well-being of the communities. PSI is also working towards establishing new collaborations in other North-Eastern states, particularly in Meghalaya, and Mizoram for spring shed development and training programs.

Needless to mention, when the work expands, maintaining its quality becomes more difficult. More number of competent colleagues are required in the group. Hiring people from the communities where the project work is going on can provide more working hands and lead to meaningful work provided a system is developed and followed to guide these people and to

supervise their work. EQMG needs to build its capacity to improve the quality of its work with better planning, managerial skills and proper allocation of work as there are some long term and bigger projects in the pipeline.

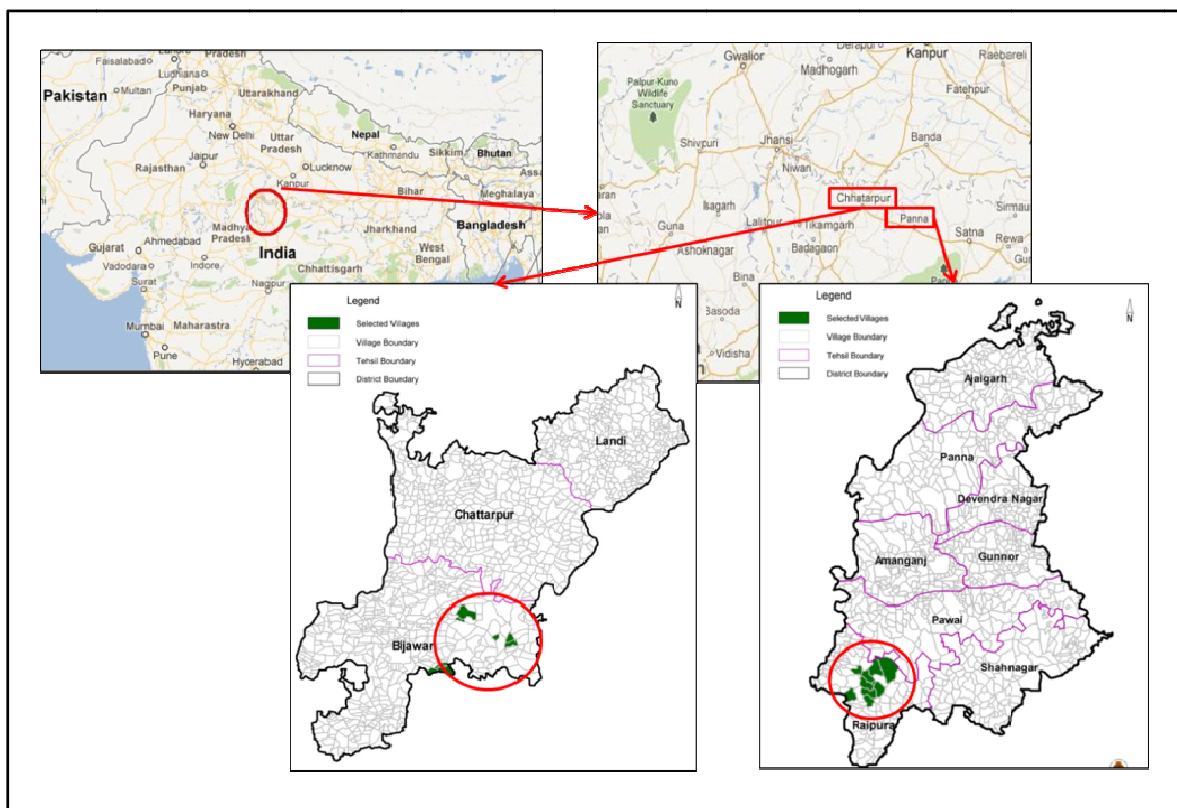
II.6 Financial Statement

EQM Group Financial Statement (2016-17)

S. N o.	Project	Funding	Opening Balance (Rs.)	Income	Utilization	Balance
		Partner		(Rs.)	(Rs.)	(Rs.)
1	Frank Water	Frank Water	848,121.36	894,949.30	1,190,836.07	552,234.59
2	PGWM-II	Arghyam	1,133,374.00	3,397,684.00	2,426,139.05	2,104,918.95
3	GW SAN	Arghyam	-	958,150.00	670,560.00	287,590.00
4	GGET	Guru Ganga Envirotech Trust	(108,868.00)	-	-	(108,868.00)
5	UNDP	United Nation Development Programme	80,433.90	113,046.00	193,479.90	-
6	WWF-India	WWF-India	418,875.00	-	81,369.00	337,506.00
7	BRLF	ACWADAM	331,454.00	355,124.00	662,257.00	24,321.00
8	CTC	Chawla Techno Const. Pvt. Ltd.	44,075.00	-	46,226.00	(2,151.00)
	Total		2,747,465.26	5,718,953.30	5,270,867.02	3,195,551.54

III. INNOVATIVE PROJECT GROUP

In 2002 the Innovative Projects (IP) Group pioneered the Gram Swaraj Abhiyan concept at PSI as a community-led developmental response to the starvation deaths in western Orissa. This innovative and very effective social process was appreciated by many. In 2010 the Ministry of Rural Development, Government of India approached PSI to replicate the effort in Bundelkhand as this region had witnessed repeated droughts in the last decade. From 2011 till 2013 the Group focused on the Gram Swaraj Abhiyan (GSA) program in Bundelkhand with the Ministry's support through NIRD. After successfully completing the program in 15 panchayats (40 villages) of five districts in Bundelkhand, the Group launched another three year program in 20 villages of Chhatarpur and Panna districts with the financial support of Tata Education Trust, Mumbai in December 2013.¹



Location map of working area of the Gram Swaraj Abhiyan program

In addition to the Gram Swaraj Abhiyan program, PSI's GIS lab is operated by the IP group which has developed a web-based Village Information System for various states like Uttarakhand, Himachal Pradesh and the Bundelkhand region, providing a wide range of

¹ Partner organization in Chhatarpur district, Chetna Samaj Seva Shiksha Evam Vikas Samiti (CSSSVS) has been directly implementing the project activities and reporting Tata Trust. Hence the following report is in context of Panna cluster alone where PSI is directly working.

information relating to demography, infrastructure and natural resources in visual and data form.

III.1 Gram Swaraj Abhiyan

PSI's Gram Swaraj Abhiyan is a long term programme for drought mitigation and poverty eradication. It aims to enable and empower communities in remote parts of Bundelkhand to initiate self-reliant development in a sustainable and socially just manner. It combines self-help with improved governance and convergence of funds from government schemes. The expected outcomes of after three years of the second phase were:

- Improved food security and income through improved agricultural productivity by increase in food grain production by more than **10 quintals per household**.
- Improved availability of water for irrigation with 25% households in the village having access to irrigation.
- Increase in the average annual income by **Rs 17000** per household for 1000 households.
- VLIs to sustain self-reliant development and good governance.
- Long term goals developed in the villages by the community and followed up in the *Gram Sabhas* of 10 villages.
- An approach for natural resource development through community mobilisation for the Bundelkhand region.



Crop cutting demonstration of mustard-RP 09



Promotion of farm pond for life saving irrigation



Demonstration of solar lift pump

The first year of the programme (Dec'13 – Nov'14) focused on preparing VDPs through community-based micro-planning, creating a trained cadre of local resource persons, mobilizing communities and establishing VLIs. The second year (Dec'14-Nov'15) focused on implementation of low cost livelihood enhancement activities like – SRI, vegetable cultivation, fodder development, agro-forestry, etc.; construction of physical works (farm ponds and earthen dams), convergence through government schemes and strengthening the VLIs for better planning, implementation and monitoring of development activities and laying out a long-term road map for the development of the region. The third year (Dec'15-Nov'16) focused more on strengthening the livelihood activities, implementation of physical works through community participation, convergence with government funds and strengthening VLIs. The programme got an extension till May 2017 for completion of some of the project activities like construction works, strengthening newly formed FIGs, etc.

III.1a Overall Output

Status of expected outputs against proposed, as in March 2017

S. No.	ACTIVITY	PROPOSED	ACHIEVEMENT
Micro-level planning			
1	Selection of villages	10 villages in 3 Panchayats of Panna	COMPLETED
2	Creation of Teams	3 <i>Sahayaks</i> , 3 <i>Village engineers</i> , 3 MTs + 10 VLRPs, 10 <i>LokSevaks</i>	COMPLETED (as per requirement)
3	Preparation of VDPs	10 VDPs	COMPLETED
4	Capacity building of local cadre of youth	20 local resource persons	COMPLETED (as per requirement) Preference was given to recruiting local youths in the field team. Capacities have been built in various areas - engineering works for soil and water conservation, agriculture interventions, livelihood interventions, importance of VLIs, government schemes, governance, etc.
Implementation of VDPs			
1	Convergence with government schemes	Rs. 18,200,000	EXCEEDED. Rs. 32,937,000 converged through: i. MGNREGA: Rs. 14,094,000 ii. Gram Panchayat's approved budget Rs. 11,252,000 iii. Fresh approvals of Rs.7,356,000 for toilets construction iv. For Biogas Rs. 135,000 v. Vidhayak Nidhi Rs. 100,000
2	Through TATA Trust fund	Rs. 3,000,000	IN PROGRESS Rs. 2,275,159 has been spent so far. Other works are in progress and will be completed by May 2017.
3	Local Contribution	Rs. 429,750	EXCEEDED. Contributions total Rs. 871,735

S. No.	ACTIVITY	PROPOSED	ACHIEVEMENT
Village Level Institutions (VLIs)			
1	<i>Aam Sabha</i> and <i>Gram Sabha</i>	Regular at least in 80% villages	COMPLETED. <i>Aam Sabha</i> and <i>Gram Sabha</i> regular in 9 villages resulted in convergence of Rs. 32,837,000
2	Women's Organizations (Mahila Mangal Dals)	In all 10 villages	ESTABLISHED. Regular meetings in all 10 villages resulted in increased participation in <i>Aam Sabha</i> , <i>Gram Sabha</i> , and initiation of several social actions. Strong participation in activities like kitchen gardens, Haat Bazaar, <i>Mahua</i> collective, etc.
3	SHGs	Need based	Established 10 SHGs, 133 members, with net saving of Rs. 60,000 and inter loaning amount upto Rs. 125,000.
4	Gram Swaraj Samitis	In all 10 villages	COMPLETED. Establishment of GSS in every village, resulted in planning, implementation and monitoring of works implemented by PSI, strengthening of <i>Gram Sabha</i> and establishment of Gram Kosh of Rs. 303,674.
Livelihood Interventions			
1	Farm-based livelihood interventions	As below	Coverage: 866 families
1.1	SRI (Kharif season)	500 farmers	COMPLETED. 480 farmers, 104 ha
1.2	SWI (Rabi season)	300 farmers	COMPLETED. 573 farmers, 224 ha
1.3	Kitchen garden	NA	COMPLETED. 530 families. Establishment of a seed bank in each village.
1.4	Vegetable cultivation	NA	COMPLETED. 153 families, 7.65 ha
1.5	Promotion of Organic Farming	With above farmers	COMPLETED. Use of <i>Panchgavya</i> and <i>Matka Khad</i> by above farmers
1.6	Fodder development	Increased availability by 30-40%	PARTIAL. 62 families. ²
1.7	Agro-forestry	NA	COMPLETED. <i>Aonla</i> , <i>Guava</i> , <i>Subabul</i> plantation benefitting 212 families.
2	Off-farm livelihood interventions	Establishment in each village	Initiated in 9 villages in the form of either Haat Bazaar, <i>Mahua</i> or dairy collective, SHGs Net coverage: 237 families

² There are several reasons because of which villagers abstain from growing fodder on their farm bunds – (i) plentiful fodder is available from nearby forests for some of the villages, (ii) *Anna Pratha* (free grazing) is prevalent in this region, (iii) tribal people mostly rear cows which are of local breed and reared not for milk but as serving for draft animal, and (iv) green fodder on field bunds can attract more wild animals.

S. No.	ACTIVITY	PROPOSED	ACHIEVEMENT
Soil and Water Conservation Measures			
1	Construction of RWH and soil-water conservation structures	Irrigation coverage of 25% households (250 HH)	IN PROGRESS but exceeded target. So far net coverage of 283 families for irrigation in the form of farm ponds (98) and/or ECD (208) additionally, drinking water measures = 158 families and field bund = 46 families Net coverage of 443 families (BPPL=151, C,D = 221)
VIS and DSS preparation			
1	DSS – preparation of base maps	10 villages	COMPLETED
2	Creation of database	10 villages	COMPLETED
3	Creation of thematic maps for villages	10 villages	COMPLETED
4	Web loading of DSS and VIS	Maintaining data for 13 districts of Bundelkhand	VIS has been upgraded to Census 2011 and published on www.villageinformationsystem.org
Overall Output			
1	Net coverage of families	1000 households	Net coverage of 971 families including- on-farm, off-farm activities, drought proofing measures (out of total 255 families belong to BPPL category and 514 belong to poorest category as per the PRA wealth ranking)
2	Improved food security	Increased food grain production by 10 quintals per household	Additional production of cereals and pulses by 3Q/HH and vegetables 2Q/HH
3	Income enhancement	Rs. 17,000/per family annually	Rs. 13,614/family in 2015-2016 for targeted 971 families

III.1b Project Impact

- (i) **Strong Village Level Institutions:** The communities have come to know of their rights and the proof is in terms of convergence. *AamSabhas* have made efforts to get most of the proposed works of VDPs approved through the Gram Panchayats. In the process, *Gram Sabhas* have become strong. A cadre of skilled rural development workers has also been created in the cluster.

Women's participation in decision making and development activities has increased as evident through their active participation in the meetings of MMDs, *Gram Sabhas*, and convergence *shibirs* etc. Many social actions have been accomplished in the villages because of the women being more organized. Exemplary social actions are:

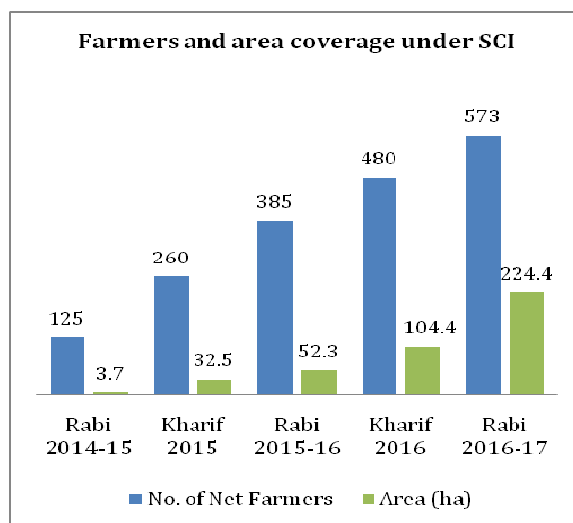
1. Electricity connection is revived by complaining at Tehsil and later at CM helpline in Jhaladumari, Birampura village.

2. Action against alcoholism in banning sell of liquor by outsiders to villagers in Bilpura panchayat.
3. Fighting corruption - Initiation of collective land mutation by pressurizing *Patwari*, *Tehsildar* and collectrate in Fatehpur Panchayat.
4. Pressurizing Vidhayak to release Rs. 100,000 for solar drinking water scheme, threatening not to vote next time if not done, Makkepala village.

In terms of women's economic empowerment, 10 SCGs have evolved out of the MMDs. Most of the works related to livelihoods have been initiated by the collective actions of women (SCGs and MMDs). In 2015-16, SHGs took up the *Mahua* Collectives initiative in which 13 qtl *Mahua* were collected, stored, and sold collectively in 4 villages benefiting 78 women. It earned them a profit of Rs. 19000. This year women SHGs have collected 40 qtl of *Mahua*. The activities are fully managed by women's organizations.

Another important initiative by a larger MMD in Bilpura was to start their own Haat Bazaar, which benefitted 51 families with a net annual income enhancement of Rs. 21,000/family. In the future these groups are expected to function as strong institutions in the local democratic framework. The ultimate aim is to make women's participation stronger in the *Gram Sabhas*. The women's groups have taken up issues like drinking water availability, health, education, etc. In the long run, women's Self Help Groups (SHGs) are expected to function as strong, capable local democratic institutions besides exerting pressure on *Aam Sabhas* and *Gram Sabhas* for ensuring transparency and accountability in development activities.

More village development activities are being identified at *Aam Sabha* meetings through the village communities and therefore the process has become more participatory. The VLIs have been able to mobilize Rs.1.12 cr worth of village development activities under various government schemes (as per the approved budget of Gram Panchayat plan 2015-16) and another Rs. 73.56 has been approved and being implemented for the construction of toilets. Rs. 140.94 lakhs have been proposed for the MGNREGA "shelf of projects" under drought proofing activities. Implementation of developmental activities is being done through various VLIs in the 10 GSA villages. Community development works are also being monitored by the GSSs.



- (ii) **Enhanced Crop Productivity:** Panna district received only 60% and 65% of its average annual rainfall in 2014 and 2015 respectively. In 2016 it witnessed flash floods. The high variability of rainfall, seriously affected agricultural production across 2014-16. Initially, it was difficult to convince farmers about the merits of SCI as their major concern was with the *stability* of their crop production rather than *increasing* it. PSI's initial efforts therefore focussed on establishing successful demonstrations with the aid of progressive farmers. This was followed by frequent dialogues with the communities and by exposing farmers to the demonstration plots at various growth stages of the SCI crops. Subsequently, SCI was promoted in 2015 and 2016, with various crops: wheat, maize, black gram, chick pea, and mustard. The number of farmers practicing SCI grew steadily from 125 to 573 while the area under SCI expanded dramatically from 3.7 ha to 224.4 ha.

Scaling up of SCI was accomplished by training local youth and/or progressive farmers as village level resource persons (VLRPs). They provided timely support to farmers and monitored the SCI fields. Dialogues with farmers to address doubts, exposure visits to successful demonstration fields, inter-village farmers' interactions, and post-harvest felicitation of progressive farmers were some of the tools used for mobilizing farmers and stimulating their curiosity about SCI. Learning and modifying the application of SCI in the context of farm conditions, rainfall pattern, and labour availability was a two-way process in which farmers participated, raised concerns, and made appropriate changes at various phases of the cropping cycle.

Despite the extreme weather/climatic conditions, SCI with its variations has proved to be promising climate-smart techniques that can help farmers to not only minimize their risks but in fact to enhance their yields (Table 2). It was observed that as farmers gained experience and skills, they were able to improvise by manipulating the practices for different crops according to their farm and climatic conditions.³

Performance of SCI and Traditional Sowing in Drought and Excess Rain Years

Crops	2014 (Drought Year)			2015 (Drought Year)			2016 (Excess Rains)		
	Avg. Grain yield (T/ha)		% Incr.	Avg. Grain yield (T/ha)		% Incr.	Avg. Grain yield (T/ha)		% Incr.
	Trad.	SCI		Trad.	SCI		Trad.	SCI	
Paddy	1.83	2.53	38 %	2.53	3.7	46%	2.83	4.27	51%
Maize	-	-	-	2.2	3.4	55%	-	-	-
Black Gram	-	-	-	0.72	1.08	50%	1.14	1.55	36%
Wheat	2.2	2.9	32%	2.75	3.72	35%	2.5	3.4	36%
Chick Pea	1.46	2.14	47%	0.64	0.8	25%	0.77	0.96	25%
Mustard	-	-	-	0.72	0.92	28%	0.74	0.92	24%

³ Ravandale, S., Niranjan, V., & Sen, D.: "Building Climate Resilience". *LEISA India*, pp 5-9, June 2017.



Clockwise from top: Crop cutting of Paddy; Weeding on PBold mustard plot (line sowing); locally fabricated multi-grain seeder - *Tifan* and farmer using *Tifan* for line sowing

(iii) **Increased Self Sufficiency in**

Vegetables: The first round of sowing vegetables (tomato, brinjal, chilli, bitter gourd, bean, cucumber, and bottle gourd) in kitchen gardens was done in the 2015 Kharif season, with 400 women farmers. They harvested Rs. 1500 to Rs. 2400 worth of vegetables per household from the kitchen gardens. In November 2015, they sowed carrots, radish, beet, cabbage, and cauliflower. The women have also established seed banks in the villages for easy availability of seeds. Now, 530 women farmers do kitchen gardening on 200 sq. ft. plots. About Rs. 4000 to Rs. 5000 worth of vegetables are produced annually from them.



Adaptation of SCI technique in vegetable cultivation

- (iv) **Construction of Soil and Water Conservation Structures:** Seed money was granted by the Tata Educational Trust to initiate some soil and water conservation activities as entry point activities and also to demonstrate the construction of such structures through community participation. The physical works for demonstration through the Trust's budget component were chosen from the set of works identified during micro-level planning through consensus in the *AamSabhas* and executed by *Gram SwarajSamitis*. In the process *Gram Koshs* were established through *Shramdaan* and *Anshdaan*.



**Pitching of ECD in Bilpura through
Shramdan**



**Construction of drinking water well in
Birampura village**

Table 1: Status of Construction of Physical Works

Activity	Proposed Number	Number Completed	Number In Progress
Farm ponds	100	84	14
Earthen Check Dams (ECD) repair	6	5	1**
New ECD	1	0	1
Solar Lift Drinking water scheme	2	0	2
New well for drinking water	2	1	1
Staggered contour trenches for drinking water well	1	1	0
Recharge area treatments (Dykes)	4	2	2
Farm bunds	46	37	11
** All six ECDs were repaired. But one ECD got damaged in the heavy rainfall of 2016. Hence repair work has been re-initiated.			
Other: Biogas construction through convergence	10	2	8

So far, 443 families have benefitted from the above measures, out of which 283 families have irrigation water, 158 families get drinking water while 46 farmers have made field bunds.

- (v) **Capacity Building:** Various training programmes were conducted in 2016/17 for capacity building of the local communities and cadre of talented local resource persons.

Details of training programmes conducted in 2016-2017

S. No.	Programme	Duration and Place	Objective	No. of Participants
1	Exposure to Milk Dairy	April 2016 Sanchi Dairy, Chhatarpur	- To understand dairy operations - Storage of milk, refrigeration, and determination of fat - Precautions against milk spoilage - Learning to operate a community level center	5 members mainly village level resource persons
2	One day <i>Shibir</i> on convergence	May 2016 Shahnagar block, Panna	- Mainly organized for GSS members and addressed by CEO and other government officers. - Obtain information on various rural development schemes including - horticulture, MGNREGA, agriculture, etc. - Presentation of micro-plans by GSS members - To seek converge the funds for the activities in MLPs	116 persons from 10 villages (55 female and 61 male)
3	Celebration of Women's Day	March 2017 Siharan, Panna	- To provide a platform for MahilaMangalDals to interact with government officials - Celebrate the strength of women's organizations - Felicitation of women and men who did remarkable, innovative work in the programme activities - Interactions with government officials for knowledge sharing on the various avenues for women to participate and strengthen themselves economically and socially.	More than 150 persons from 10 villages
4	Goat rearing exposure	January 2017 Mahoba, Uttar Pradesh	Selected members of SHGs and MMDs were taken to a Goat Fair in Mahoba to understand the importance of goat rearing, varieties, income, etc.	NA
5	Pashu Sakhi training	February 2017	To train selected SHG/MMD members as PashuSakhis, i.e., para-workers for providing health services, vaccinations, etc. for goats	10

(vi) **Families Covered by the Programme:** Out of the total families, 971 families (79%) benefitted from one or more programme activities. BPPL (Below Perceived Poverty Line)⁴ and poor category families (as per wealth ranking)⁵ constituting 28% and 48% of the total have been covered under various interventions. So far 75% of the total BPPL and 88% of poor category families have benefitted as the needy families have been strategically selected in a participative manner to lift them out of poverty.

S. No.	Panchayat	Village	Total HH	Total BPPL families	C,D category families	On-farm activities	Off-Farm activities	Soil & water conservation works	Net Beneficiary families	BPPL	C & D category
1	Fatepur	Lakhanchori	68	5	39	58	0	37	62	6	36
2		Ghutehi	69	17	15	60	17	18	62	13	24
3		Aloni	52	35	16	47	30	52	52	35	23
4		Makkepala	118	23	52	99	58	76	111	12	68
5	Birampura	Birampura	170	93	102	112	11	71	131	70	73
6		Jhaladumri	103	7	27	83	16	4	84	6	20
7		Sonmaukhurd	173	16	98	118	4	8	122	10	68
8	Bilpura	Bilpura	253	40	129	160	32	140	197	32	105
9		Saraikhera	60	26	32	55	34	29	57	25	31
10		SonmauKalan	158	78	73	74	35	8	93	46	66
			1224	340	583	866	237	443	971	255	514

(vii) **Annual Income Enhancement:** Incomes accruing from various programme activities have been quantified based on primary data. The total annual income enhancement through various activities is Rs. 13,219,206 for the whole programme. For targeted families of 971, the net annual income enhancement works out to be Rs. 13,614 per family. The income analysis shows that among the SCI crops, SCI in pulses and RP09 mustard has yielded higher returns on acreage. Per household income enhancement is high through Haat Bazar, dairy and vegetable cultivation but market linkages can be an up scaling constraint. Strengthening market linkages can fetch more benefits through such activities.

III.2 GIS

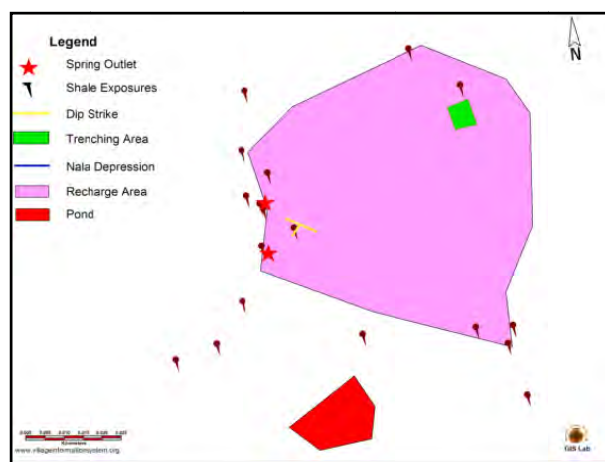
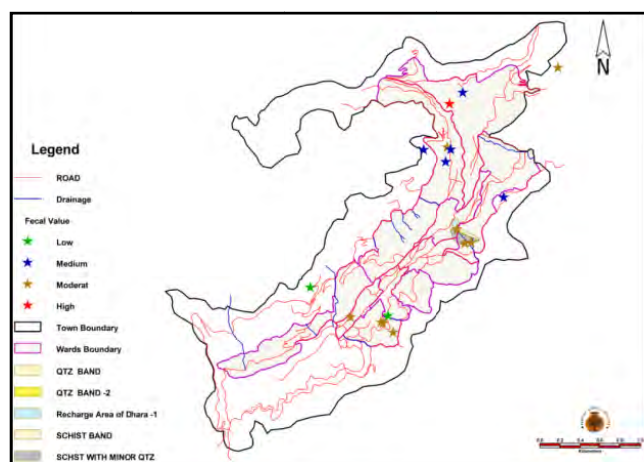
In 2016-17, the GIS lab completed the digitization of Arunachal Pradesh and three districts (Darjeeling, Cooch Behar & Jalpaiguri) of West Bengal. This involved processes like image

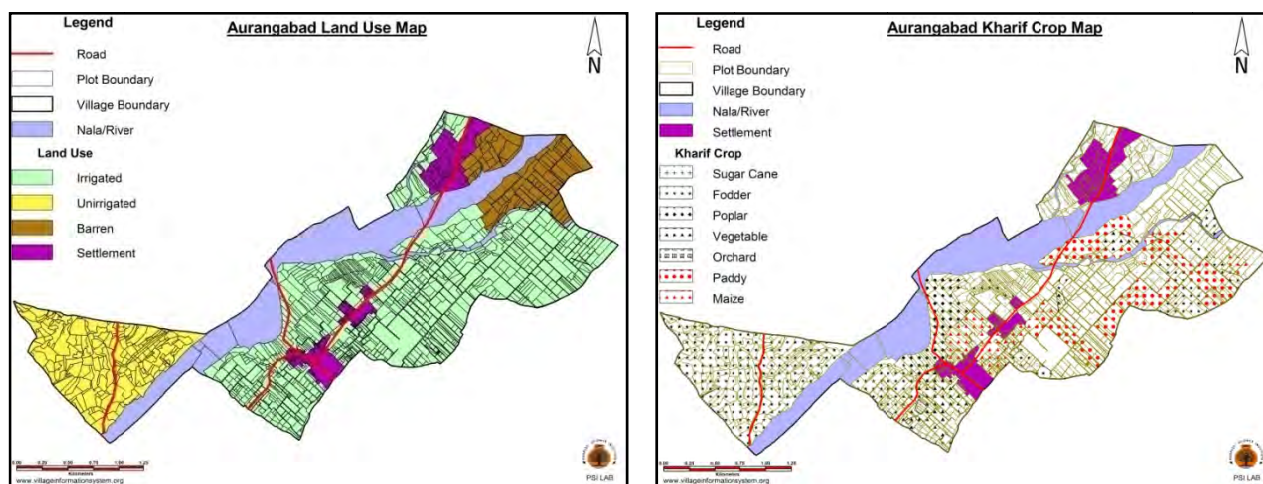
⁴ BPPL is determined on the basis of household survey where income in all the form is monetized and average expenditure for households calculated. If the income of the family is lower than average household expenditure of the village, the family falls under BPPL.

⁵ During social map exercise of PRA, villagers ranked the households into four categories from well off to poor – A,B,C,D. This is the perceived wealth ranking as per the villagers based on certain criteria like – land holding, other income sources, livestock etc.

registration and attachment of secondary data of census 2011 along with the village location. Work for Assam is in progress. During the year, the lab also facilitated the work related to other projects at PSI by preparing various maps. Given below are some examples of maps prepared by PSI's GIS team.

- (i) Map showing location of proposed micro hydro power projects of UREDA, Uttarakhand for Tehri Gharwal, Bageshwar and Chamoli districts.
- (ii) Map showing range of fecal coliform in selected springs of Almora town.
- (iii) Geological maps of selected springs in different districts of Nagaland.
- (iv) Vulnerability map of Panna district of Madhya Pradesh based on census data of 2011.
- (v) Narmada river basin map of Madhya Pradesh.
- (vi) Drainage maps of six river basin of Uttarakhand.
- (vii) Thematic maps of three villages of Bhadrabad block, Haridwar district for sustainable agricultural planning.





III.3 Remarks

Overall, the project has created an environment of enthusiasm for participatory development through appropriate VLIs, community based natural resource management and collective action for social and economic activities. The main focus in the coming years in these villages will be implementation of intensive drought proofing measures (such as farm ponds, earthen check dams, etc.) through convergence (mainly through MGNREGA), strengthening of the VLIs for monitoring and implementation of the works, strengthening of current livelihood interventions and developing value-added supply chains. Existing SCGs will be further strengthened by bank linkages and by taking up more economic activities. Community-led strategies for enhancing productivity of natural resources and innovative livelihood opportunities will be promoted which include greater value addition for local NTFPs, agro-forestry/horticultural systems, improvement of quality of agriculture produces, value addition in agricultural production (e.g., vegetable farming and marketing of produce), and livestock rearing. In the coming year, the experiences and outcomes of this programme will be shared at various forums at district and state level to promote community based drought mitigation approach and also to converge funds from various schemes.

Based on the learning and success of this programme, the following programmes are emerging out:

1. Farmers of the Panna cluster are ready to take on the challenge of collective marketing of the agriculture produces i.e. paddy, pulses etc. NABARD's officials having visited the field area have expressed willingness to extend financial support through their flagship programme of "Farmers' Producer Company" for processing of agriculture produces (dehusking/deshelling, oil speller) and establishing supply chain for rice, pulses and mustard. Marketing strategies and form of institution (society/cooperative/company etc.)

has to be studied in further details and discussed among farmers before finalizing the institutional framework.

2. NABARD is also keen on supporting watershed development programme in the neighboring areas to promote drought mitigation measures and livelihood enhancement, as IWMP is not currently being implemented in this region. Efforts will be made to replicate the Gram Swaraj Abhiyan programme in another 10 villages (2000 ha) under NABARD's watershed programme.
3. Gram Swaraj Abhiyan programme is likely to be expanded in other districts i.e. Lalitpur, and Sonbhadra on the thematic of "Climate Change Adaptation", mainly for the promotion of rain water harvesting structures, and agronomic practices like System of Crop Intensification, vegetable cultivation, and kitchen garden.

III.4 Financial Statement

Financial Statement (2016-2017)

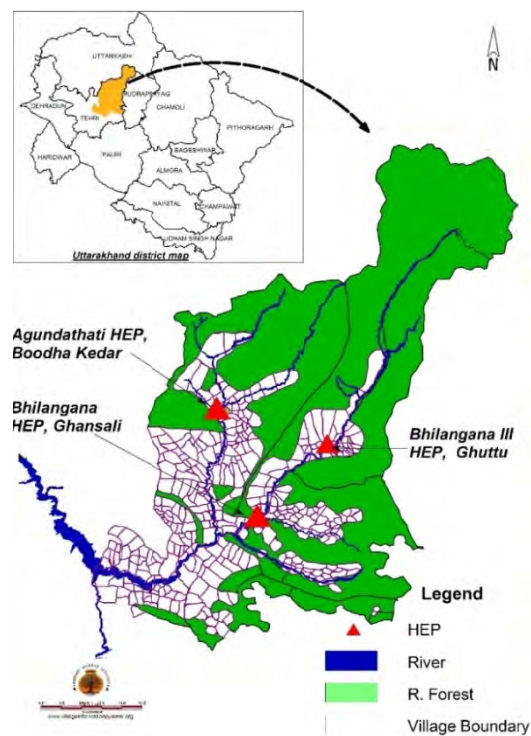
S. No.	Project	Funding Partner	Opening Balance	Income	Utilization	Balance
			(Rs.)	(Rs.)	(Rs.)	(Rs.)
1	Natural Resource Management through Community Mobilization in Bundelkhand region of M.P.	Tata Education Trust	2,043,082.22	5,210,434.77	5,137,661.66	2,115,855.33

IV. OTHER PROJECTS & ACTIVITIES

IV.1 HI-NEX

Hydropower-Irrigation Nexus (HI-NEX) was a two year research project initiated by the University of Arizona in partnership with PSI, ICIMOD (Nepal) and the University of Delhi. The study was carried out during 2015 and 2016. The aim of the project was to strengthen synergies and minimize trade-offs between hydropower and irrigation systems to improve gendered livelihoods and enhance ecosystem services in Uttarakhand.

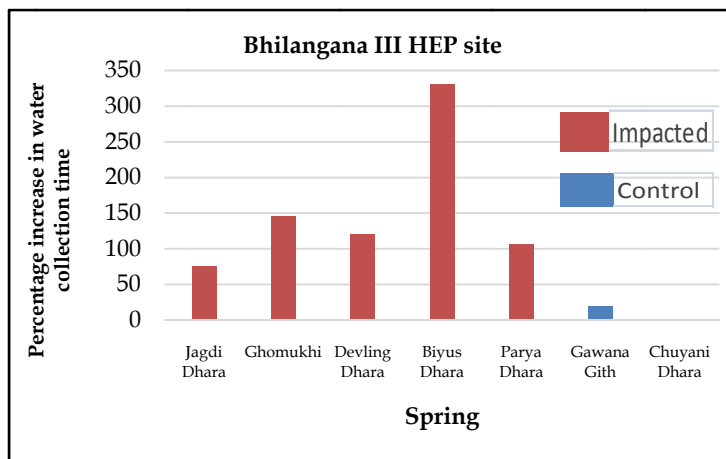
In March 2016, a stakeholders' workshop was conducted in Dehradun, where research findings were shared with representatives of different government departments (UREDA, UJVNL, PTCUL, Forest and Irrigation), non-government institutions (TERI, ICIMOD, CEDAR, Jansamarth) and other subject matter experts. Based on the feedback received at this workshop, it was decided to undertake further studies on impact of hydro-electric projects (HEPs) on (i) availability of household water, (ii) irrigation and agricultural produce, (iii) ecological health of river, and also to investigate performance of micro-power projects of UREDA.



Map of Selected HEP Sites in Bhilangana

IV.1a Impact of HEPs on Household Water Availability

Springs are the main sources of drinking water in the mountain villages and are also used for irrigation in a few villages. It was found that while discharge had decreased in springs in the impacted and the control villages, a trend that is being observed across the Himalayan region, the decrease was much more in the impacted villages. This may be attributed to the hydrogeology of these



springs being disturbed during the construction of the diversion tunnels (or channels) which involved heavy blasting.

IV.1b Impact of HEPs on Irrigation and Agricultural Produce

A study was conducted focusing on how changes in the *guhls*, caused by the hydropower projects, affected farmers whose lands were located long the various reaches of the *guhls*. It was found that agricultural losses due to decreased availability of irrigation water varied along the length of the canal. Those with land located at the tail end of the canal, who received water last, reported the maximum decrease in agricultural output.

Nature and Extent of Impacts on Irrigated land

Project	Village (Total Households)	Total Irrigated Land (Ha)	Impacted Irrigated Land in Ha				HHS Affected (Per Cent)	
			Land Sold to HEP	Total Loss of Irrigation Water	Reduced Water Availability	Muck Affected Land		Total Area Impacted (Per Cent)
Agunda-Thati	Chani (135)	28.41	0.5	7.53	0	0.57	8.60 (28)	127 (94)
Bhilangana III	Davling (110)	17.57	3.34	0	9.84	5.8	13.18 (75)	105 (95)
	Chakar Gaon (40)	7.65	0	0	7.65	0.15	7.65 (100)	40 (100)
	Niswaliahat Gaon (33)	1.95	0	0	1.87	0	1.87 (96)	33 (100)
Bhilangana	Phalenda (125)	15.33	0.03	0	1.97	0.15	2.15 (14)	50 (40)
	Saruna (77)	13.69	0	0	2.74	0	2.74 (20)	65 (85)
Total	6 Villages (520)	84.60	3.87	7.53	24.07	6.67	42.14 (50)	420 (81)

Source – Focus Group Discussions and Land Use Mapping, June to October, 2015

Reduced water availability due to decreased river flows or spring discharge

- More than half of the irrigated area impacted
- More than two third of the resident households affected

Differential Impacts on Irrigation Commands

Project	Reach	Sampled HHs	Pre-HEP			Post-HEP	
			Irrigated Area (Ha)	Production (Tons)		Loss of Agricultural Produce in Tons* (in Per Cent)	
				Rice	Wheat	Rice	Wheat
Agunda-Thati	-	37	2.56	5.1	3.2	5.1 (100)	3.2 (100)
Bhilangana III	Upper	33	4.56	13.6	10.0	3.0 (22)	0.7 (7)
	Middle	33	4.42	12.0	10.0	3.8 (32)	2.8 (28)
	Lower	33	5.05	11.3	10.4	4.3 (38)	4.4 (42)
Bhilangana	Upper	17	2.28	7.2	3.6	2.2 (30)	0.5 (13)
	Middle	17	2.44	8.8	4.3	2.8 (32)	0.6 (15)
	Lower	17	2.74	8.9	5.2	4.0 (44)	1.1 (21)

The figures reported for Bhilangana HEP are of pre-negotiation period
Source: Household surveys (187 Households), August–September, 2016

- Reduced productivity for both wheat and rice
- Highest loss in tail reaches of *guhls*
- Least losses in Bhilangana villages

IV.1c Bio monitoring Study of Bhilangana River

In December 2016, PSI's EQM team conducted a bio-monitoring study of River Bhilangana at the three dam sites studied in this project, to assess its ecological health. At all three sites, there was a sharp decline in the number of macro-invertebrate families and the total count of specimen found downstream of the diversion weir, as compared to upstream. This figure recovered somewhat downstream of the powerhouse, but not entirely.

	Agunda Thati			Bhilangana-I			Bhilangana-III		
	U/S of Barrage	D/S of Barrage	D/S of Power House	U/S of Barrage	D/S of Barrage	D/S of Power House	U/S of Barrage	D/S of Barrage	D/S of Power House
Number of families	14	11	6	10	7	6	14	8	10

IV.1d Final Policy Workshop

PSI hosted a day-long workshop on November 11, 2016 to share research outcomes from the project with state policymakers and receive their feedback. It was attended by senior state officials, including representatives from state agencies involved in the hydropower sector, local

NGOs, subject matter experts, members of the press, and representatives from WLE and the HI-NEX project partners. The key recommendations that emerged from the project were:

1. Fair and participatory EIA and SIA must be a mandatory part of the approval process for small hydropower projects also.
2. A platform should be created for negotiations between developers and affected communities for all projects.
3. The compensatory afforestation should be made more transparent and participatory.
4. Lift irrigation powered by local electricity supply from hydropower can enhance local irrigation potential and community benefits.

The main recommendations that were made by the attendees at the end of this workshop were:

- The creation of specific cells where local communities can address their complaints regarding the project, which would give them the opportunity to raise issues such as those regarding compensatory afforestation
- It is necessary to establish more specific links between hydroclimatic changes in glacial systems and the risks they pose to projects downstream
- Negotiations relating to compensation for potential damage be estimated with the communities aid during planning phase and these costs be included in the project budget in the DPR phase
- It was suggested that PSI adopt and develop a small hydropower project and demonstrate how community managed micro hydropower projects can be run successfully and equitably



- A manual be created for project engineers that they can refer to in the design stages of future projects

IV.1e Community Level Workshops

A series of community-level workshops were organized in Bhilangana Valley on December 17-19 within the areas impacted by the Bhilangana, Agunda-Thati and Bhilangana III HEPs. Their goal was to present the findings to the community members. Invitees included not just the surveyed villages, but also villages where similar hydropower projects are proposed.

The findings were presented through a series of posters. Pamphlets were also distributed amongst those present. The workshop in Chani, one of the most severely impacted villages, was attended by a large number of people, many of whom were vocally opposed to the dam that had been built close to their winter settlement. According to them, they are currently embroiled in an expensive legal battle with the developer over damages resulting from the dam and the subsequent protests by the community members.



Participants at the other two sites also shared their experiences with hydropower projects. A common sentiment at all the three workshops was that the people felt misled regarding the compensation during the process of land acquisition. There was a great mistrust of the developers. A number of other issues were also voiced, ranging from the lack of water for cremation ghats to the incitement of local conflicts by developers.

IV.1f Research Outputs

The following research outputs have been produced by PSI from the HINEX project:

1) Technical Notes:

- Understanding Livelihood Impacts of Small Hydroelectric Projects: A Case Study from Bhilangana Basin of Uttarakhand, India
- Irrigation-related Livelihood Impacts of Small Hydropower Projects: A Case Study from Bhilangana Basin of Uttarakhand, India
- Hydroelectric Project Induced Deforestation and Compensatory Afforestation: Experiences from Bhilangana Basin of Uttarakhand
- Community Managed Micro and Mini Hydroelectric Projects: Experiences and Lessons from Uttarakhand

- 2) **Policy Brief:** The Irrigation-Hydropower Nexus in the Ganga Headwaters: Policy Recommendations for Small Hydropower in Uttarakhand (in collaboration with University of Arizona).
- 3) **Research Paper:** A research paper is under preparation highlighting livelihood impacts of small hydropower projects.

IV.2 Internship at PSI

Each year, PSI hosts a large number of interns. Our internship program generates valuable benefits for both the interns and us. It not only provides the interns an opportunity to develop new skills and gain exposure to field work but also provides us short-term assistance and their fresh outlook about our ongoing projects leading to new ideas and creative solutions. Being an Institute which also works for social upliftment, we consider hosting interns as a good way to give back to the next generation of socially concerned people.

This year PSI hosted 13 interns from reputed institutes like Govind Ballab Pant University, Allahabad; Tata Institute of Social Sciences (TISS) Guwahati campus, Assam; Azim Premji University, Bengaluru; and Kumaon University, DSB Campus, Nainital.

IV.3 Financial Statement

Financial Statement (2016-2017)

S. No.	Project	Funding Partner	Opening Balance	Income	Utilization	Balance
			(Rs.)	(Rs.)	(Rs.)	(Rs.)
1	Hi-Nex	University of Arizona	-154,950.00	3,093,475.30	2,938,525.30	0.00
2	WF	Winterline Foundation	173,323.00	0	173,323.00	0.00
	Total		18,373.00	3,093,475.30	3,111,848.30	0.00

V. CAMPUS BUILDING

After the approval of the campus architectural plan by the Mussoorie Dehradun Development Authority (MDDA), in March 2016 PSI had initiated the construction of its campus building. The foundation stone of building was laid on March 14, 2016. Earlier it had sought the services of M/s P. Jain & Co., a Dehra Dun based firm of architects for designing the campus building. The building will have three floors with a total area of 1425 sq.m., designed to accommodate upto 72 persons apart from space for an environmental quality testing lab, a large library, a conference hall and a meeting room, two guest rooms and two dormitories for interns and trainees. It would also have features of green building like rain water harvesting tank, passive solar devices, recycling of waste water, part power generation from photovoltaics. The estimated cost of the proposed building is Rs. 4.20 cr.



During 2016-17, the construction work of the building continued under the supervision of PSI's Chairperson Dr. K.S. Chawla, who also heads CTC Pvt. Ltd., a construction company based in New Delhi. By April 2017, the frame structure of the building had been completed and the brick wall work had been initiated. The plans for plumbing works, electricals, and furniture layouts have also been finalized with the help of M/s P. Jain & Co. The construction work is likely to be completed by December 2017.

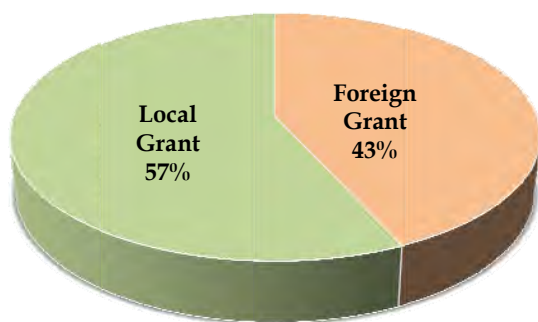


VI. FINANCIAL REPORT

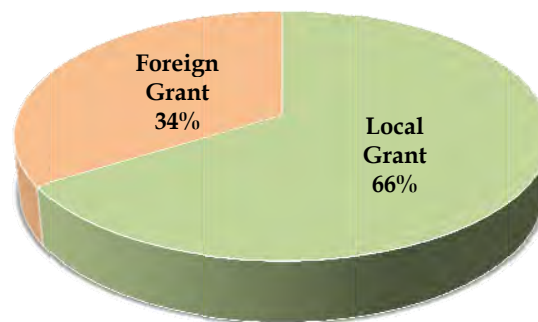
PSI's balance sheet and consolidated income and expenditure account for 2016-2017, ending March 31, 2017 are attached as Annexures 1a and 1b.

During the year the Institute generated grants worth Rs. 1,73,52,617.69 and donations worth Rs. 22,98,041.00. Other receipts from consultancies, sale of products and publications amounted to Rs. 52,86,426.63. Adding the opening balance and other incomes the total income for 2016-2017 amounted to Rs 8,46,02,235.06. The Institute spent Rs. 4,07,72,548.82, leaving a balance of Rs. 4,38,29,686.24. Unutilized grants carried forward amounting to Rs. 4,01,40,127.78 the surplus transferred to the capital fund is Rs. 36,89,558.46

The pie-charts below show the sourcing of income from local grants and foreign grants for 2016-2017 & the previous year.



2015-16



2016-17

The main donors for local and foreign grants are listed below. PSI is thankful to all of them for their support.

Indian: Tata Education Trust, Star India Pvt. Ltd., Axis Bank Foundation, Arghyam , UNDP, ITC Ltd., ACWADAM and Land Resource Department, Nagland.

Foreign: The Hans Foundation, Frank Water, University of Arizona, and Axis Bank Foundation.

VII. EXECUTIVE BOARD 2016-17

Dr. K.S. Chawla	Chairperson	Geotechnical Engineer
Mr. A.K. Roy	Treasurer	Chemical Engineer
Dr. Kshama Metre	Member	Medical Practitioner
Dr. Navin Juyal	Member	Scientist
Ms. Vibha Puri Das	Member	Political Scientist
Ms. Tinni Sawhney	Member	Rural Management
Dr. Debashish Sen	Director (Ex-Officio)	Scientist

VIII. PSI STAFF 2016-17

S. No.	Name	Date of Joining	Date of Leaving
1	Vargish Bamola	04.01.2016	
2	Bhupendra Bartwal	01.11.2013	
3	Puran Bartwal	03.01.2011	
4	Kusuma Bhatt	20.03.2017	
5	Malavika Bhatt	03.12.2014	20.01.2017
6	Rakshita Bhatt	01.03.2017	
7	Ravi Chopra	27.06.1988	
8	D.N.Dwivedi	17.08.1998	
9	Pankaj Kumar Dwivedi	13.02.2017	
10	Anil Gautam	01.03. 2002	
11	Sreedip Ghosh	16.03.2016	29.07.2016
12	Vishal Gupta	16.12. 2011	31.12.2016
13	Shashi Joshi	20.04.2016	05.11.2016
14	Pushpa Juyal	21.12.1992	
15	Surendra Kaintura	01.10. 2012	
16	Vikram Kaushal	01.02.2017	



S. No.	Name	Date of Joining	Date of Leaving
17	Chetan Kawley	16.01.2017	
18	Neha Khandekar	01.03. 2014	29.04.2016
19	Ranjana Khare	01.12. 2011	
20	Hriday Khattry	18.08.2014	10.03.2017
21	Manoj Kumar	10.07. 2006	
22	Ravinder Kumar	01.02. 2014	
23	Darshan Lal	01.06. 2013	
24	Mohd. Tavish Malik	12.01. 2015	02.03.2017
25	Poonam Mall	05.06. 2014	11.07.2016
26	Raman Mishra	01.10.2015	
27	Priyanka Negi	01.11.2016	
28	Ravi Nirajan	06.06.2016	18.10.2016
29	Vinod Nirajan	15.01.2014	
30	Bhagwati Pandey	20.03.2017	
31	Vishal Patel	18.11.2015	
32	Anchal Prajapati	18.04. 2013	10.10.2016
33	Amit Petwal	01.11.2016	
34	R.S. Prasad	01.11.1994	
35	Puja S. Raghuvanshi	01.11. 2013	
36	Nitin Rana	19.09.2016	
37	Surender Singh Rana	01.06. 2012	
38	Ramesh Rawat	16.09. 2004	
39	Dinesh Raturi	15.04.2015	
40	Subhash Rawat	01.06. 2002	
41	Ankit Saxena	05.06.2014	30.11.2016
42	Debashish Sen	01.03.1988	
43	Anita D. Sharma	02.07. 2012	
44	Devansh Sharma	01.03.2016	30.06.2016
45	Dinesh Sharma	02.10.1997	
46	Rajesh K. Sharma	20.08.1998	16.05.2016
47	Aprajita Singh	07.09.2016	
48	Mahendra Singh	01.01. 2008	



S. No.	Name	Date of Joining	Date of Leaving
49	Vikram Singh	01.02. 2000	
50	Yashpaul Singh	03.01. 2011	
51	C. Tripathi	15.06.1988	
52	Khrolhieve-u-Tushah	15.06.2015	
53	Kuldeep Uniyal	09.03.2015	
54	Ravish Raj Yadav	05.06.2014	04.06.2016