National Mission on Himalayan Studies (NMHS)

NMHS Annual Progress Report

1. Project Information

Project ID:	NMHS-2018/SGP - 01	**Sanction Date:**	21.12.2018

Project Title:	Rejuvenation the Kosi River of Kumaun Himalaya through field intervention and people´s participation
BTG:	Water Resource Management

PI and Affiliation (Institution):	**Shri K.K. Pant** Principal Investigator District Developmental Officer (DDO) Vikas Bhawan, Almora, Uttarakhand
Name & Address of the Co-PI, if any:	**Dr. Vasudha Agnihotri** Co-Principal Investigator Scientist – D GB Pant National Institute of Himalayan Environment & Sustainable Development, Kosi Katarmal, Almora, Uttarakhand

Structured Abstract - detailing the current year progress [Word Limit 250 words]:	A total of 14 micro watersheds were selected in Hawalbagh and Takula block, Almora with in kosi watershed for water conservation activities (Figure 1 (a)-(g); Annexure I). Two recharge zones (Deolikhan and Simtola recharge zones) were selected for pilot based studies in Hawalbagh block of Kosi watershed, Almora, Uttarakhand. Comprehensive mapping of different ordered springs was done based using Digital Elevation Model (DEM). The monitoring of 1st to 3rd ordered was done daily for discharge measurement and at every 15 days for water quality assessment. The automatic water level recorder was installed at the 3rd order stream of the Deolikhan recharge zone (Kyala village) and at the 2nd order stream in the Simtola recharge zone (currently damaged by unknown people) (Figure 2; Annexure I). The socio-economic and governance system of targeted springs were also documented. Before starting the work on water conservation structures, hydrogeological mapping was carried out, with the help of GeoExterra company, for understanding the geomorphology and aquifer status of the area. Based on that, the conceptual hydrogeological layout of the springshed was created and the possible areas were identified for the preparation of water conservation structures. The rejuvenation work was conducted in two ways i.e. mechanical and biological. Biological measures involved the plantation of tree saplings and the grass plantation to hold the soil cover and increase infiltration of rainwater. Check Walls and wired fencing is being done to protect the saplings from animals and forest fires. The mechanical measures involved digging of Infiltration Holes, Infiltration Trenches, Ponds to retain the runoff during rainfall over mountain slopes. Concrete Check dams and Bio-check dams are being constructed at specific sites such as in second/third order streams flowing down the steep gradient (Figure 3). After all the efforts in the

	first year, about 360 million liters of rainwater has been trapped in such structures during monsoon which might be available for percolation down the rocks through joints and fractures.

Project Partner Name	Affiliations	Role & Responsibilities
Dr.Vasudha Agnihotri	GB Pant National Institute of Himalayan Environment & Sustainable Development, Kosi Katarmal, Almora, Uttarakhand.	Continuous monitoring of water resources in Gadhwali & Simtola recharge zones (approx. 147 hectares area).

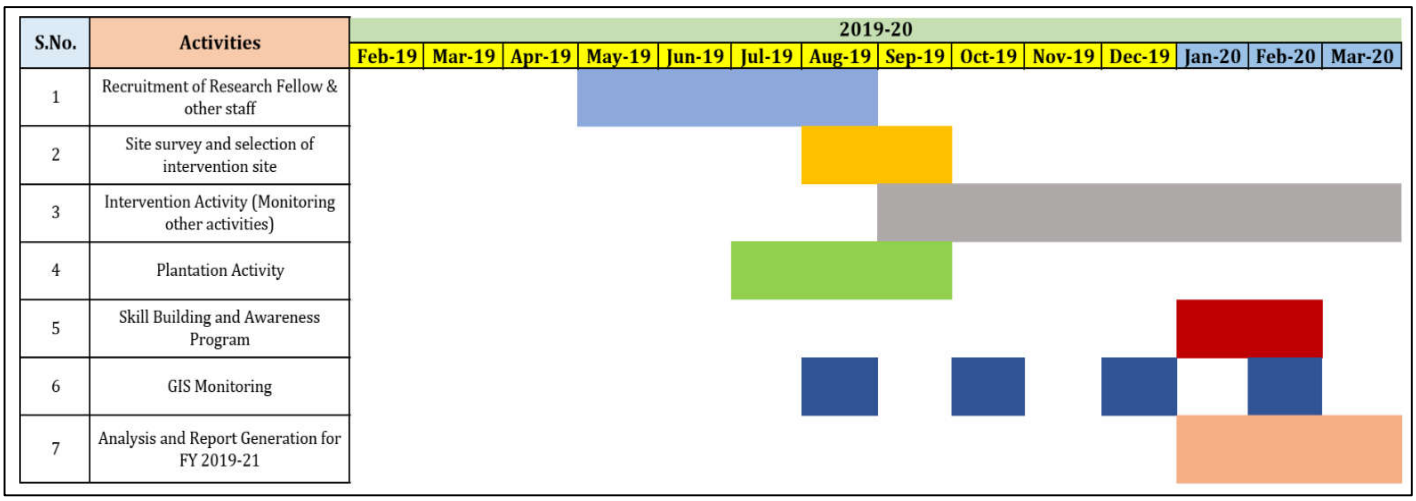
2. Project Site Details

Project Site:	14 Recharge Zones (Deolikhan, Simtola, Riyuni, Dharpani, Kausani, Binasar, Jariyakholi, Gananath, Mayolikhan, Dinapani, Syahidevi, Lod Bhatina, Airadeo, Chuniya) Pilot sites were selected in Deolikhan & Simtola recharge zone of Kosi watershed			
IHR States Covered:	Uttarakhand			
Long. & Lat.:	S.No	Recharge Zones	Co-ordinates of Centroids of Polygons	
			Latitude	Longitude
	1.	Simtola	29° 36' 53.9665" N	79° 41' 07.5662" E
	2.	Deolikhan (Gadhwali)	29° 38' 27.3303" N	79° 34' 54.1273" E
	3.	Dharpani Dhar	29° 51' 17.6425" N,	79° 30' 41.5332" E
	4.	Kausani	29° 50' 34.3705" N,	79° 37' 01.2506" E
	5.	Binasar	29° 50' 34.3705" N,	79° 37' 01.2506" E
	6.	Jariyakholi	29° 47' 02.0362" N,	79° 40' 45.8706" E
	7.	Gananath	29° 44' 39.8416" N,	79° 40' 35.9680" E
	8.	Mayolikhan	29° 42' 19.3613" N,	79° 43' 38.1363" E
	9.	Dinapani	29° 40' 05.9927" N,	79° 41' 17.9162" E
	10.	Siyahidevi	29° 34' 57.4247" N,	79° 33' 20.5109" E
	11.	Riyuni	29° 40' 32.2515" N,	79° 32' 07.0756" E
	12.	Chuniya	29° 46' 22.9585" N,	79° 33' 24.3919" E
	13.	Airadeo	29° 43' 07.6378" N,	79° 34' 37.1060" E
	14.	Lod Bhatina	29° 48' 52.8218" N,	79° 33' 46.4827" E
Site Maps* (No.):	14 maps (Figure 1 a-g; Annexure – I), Pilot project sites (02) (Figure 4; Annexure II)			

Site Photographs* (No.):	Site photographs in Annexure II

*Attach a separate Descriptive Annexure/ Files (.JPG, .TIFF, etc.).

3. Project Activities Chart w.r.t. Timeframe [Gantt or PERT]



4. Financial and Resource Information

Note: A separate bank account is expected to be opened for NMHS Project as per the provision of Direct Beneficiary Account (DBA) as laid out by the Govt. of India and also facilitate the audit of accounts. The interest earned out of the NMHS project funds should be reported clearly in the utilization certificate.

Total Grant:	3,04,94,400.00	Grant Received Date:	01-02-2019
1st Installment	1,48,40,800.00		

Project Partner(s)	Affiliations/ Institution	Budget Allocated to	Work Done by each Project Partner
Partner 1	GB Pant National Institute of Himalayan Environment & Sustainable Development	Dr. Vasudha Agnihotri Scientist – D Co- Principal Investigator	All scientific works of water quantity and quality monitoring, site survey, geological and geophysical surveys etc.
Partner 2	Forest Division, Almora	Divisional Forest Officer	Preparation of nurseries, plantation activities, and intervention works are being carried out over forest land.
Partner 3	Department of Horticulture, Vikas Bhawan, Almora	Chief Horticulture Officer	Preparation of nurseries, and ensuring availability of plant saplings for mega plantation activities.

Partner 4	Department of Agriculture, Vikas Bhawan, Almora	Chief Agriculture Officer	For creating and ensuring availability of plant saplings for mega plantation activities.
Partner 5	Department of Education	Chief Education Officer	Organizing mass awareness programmes for 'Saving Kosi River' in institutions and schools at district level.
Partner 6	Integrated Livelihood Support Project (ILSP)	District Program Officer	Co-partner for public participation and creating mass awareness among rural population.

Project Staff Information:

S. No.	Name	Qualification	Designation	Fellowship/ Wages paid	Remarks
1.	Shivendra Pratap Singh	M.Sc. (Applied Geology) Ph.D. (pursuing)	Field Officer	17,800.00	
2.	Devendra Chauhan	M.Sc. (Geology)	Junior Project Fellow	17,800.00	
3.	Gopal	B.A.	Field Assistant	10,000.00	
4.	Munna	B.A.	Field Assistant	10,000.00	

5. Equipment and Asset Information

S. No.	Equipment Name (Qty)	Details (Make/ Model)	Cost (`)	Date of Installation	Photographs of Equipment*	Lowest Quotation, if not purchased
	Equipment 1	Water level recorder (02)	65000+ 18% GST per water level recorder	18 Jan 2020	**Attached in Annexure - III**	**Not Applicable**
	Equipment 2	Multiparameter Analyzer	656775/- (including GST)			
	Eqipment 3	Garmin etrex GPS	10,000/-			

Note: **Attach a Descriptive Annexure/ File separately.**

6. Expenditure Statement and Utilization Certificate

Please update the annual Expenditure Statement and Utilization Certificate (UC) periodically.

Expenditure Information: (up to 24/02/2020)

S. No.	Financial Position/Budget Head	Funds Sanctioned	Expenditure	% of Total cost
I	Salaries/Manpower cost	12,40,800.00	6,68,888.00	53.90
II	Travel	4,00,000.00	1,04,788.00	26.19
III	Expendables &Consumables			
IV	Contingencies	3,00,000.00	2,44,373.00	81.45
V	Activities & Other Project cost	1,20,00,000.00	25,44,451.00	21.20
VI	Institutional Charges			
VII	Equipments	9,00,000.00	9,00,000.00	100
	Total	1,48,40,800.00	44,62,500.00	30.06
	Interest accrued	----		
	Grand Total	1,48,40,800.00		

Period	Expenditure Statement*	Utilization Certificate (UC)*
Annual	Annexure IV	Annexure V

***Attach the descriptive Annexure/ File in the prescribed NMHS format.**

7. Project Beneficiary Groups

Beneficiary Groups [Capacity Building]	Target	Achieved
No. of Beneficiaries with income generation:	**200 (for 3 years)**	**0**
No. of stakeholders trained, particularly women:	**70 (for 3 years)**	**0**
No. of capacity building Workshops/ trainings:		**1**
No. of Awareness & outreach programmes:		**2**
No. of Research/ Manpower developed:	**2**	**2**

8. Project Progress Summary* (as applicable to the project)

Description	Total (Numeric)	Description (**Name of descriptive Annexure/ File attached**) *
IHR States Covered	**1**	• Uttarakhand
Project Site/ Field Stations Developed:	14/ 2 field stations (Annexure I)	Annexure I (Figure 1 (a)-(g)) and Annexure II (Figrue 4 and 5)

No. of Patents filed (Description):	N/A	•
Article/ Review/ Research Paper/ Publication:	1	Chauhan Devendra Kumar, Singh Shivendra Pratap, Agnihotri Vasudha, Kumar Kireet (2019). Water quality of springs in Deolikhnan recharge zone of Kosi watershed. ENVIS bulletin, 27, 25-28.
New Methods/ Modelling Developed (description in 250 words):		•
No. of Training (No. of Beneficiaries):		•
Workshop:	*1*	•
Demonstration Models (Site):	*Under development*	• 2 sites
Livelihood Options:		•
Training Manuals:		• N/A
Processing Units:	.... (attach photos)	• N/A
Species Collection:		• N/A
Species identified:		• N/A
Database (Numeric/Images/GIS Maps, etc.):		Please incorporate the details of maps related to Deolikhan and Simtola recharge zone and show that in Annexure III

***Attach a separate descriptive Annexure/ File.**

***Note*: Numeric Database should be provided in .xls format. Photos/Maps should be submitted in high quality (min. 300 dpi res.) compatible formats *viz.*, JPEG, .JPG, .PNG, .SHP, etc. along with suitable figure legend/ caption.**

9. Project Linkages (with concerned Institutions/ State Agencies)

S. No.	Institute/ Organization	Type of Linkages	Brief Description
1.	GB Pant National Institute of Himalayan Environment	Scientific Research & Development	
2.	National Institute of Hydrology, Roorkee	Scientific Research & Development	
3.	Department of Remote Sensing & GIS, SSJ Campus, Almora.	GIS Maps preparation & updation of project works on site.	

***Note*: Attach a separate, descriptive Annexure/ File.**

10. Knowledge Products – Publication, recommendations, etc.

Time Period	Publications (Research Papers, Information Material, Policy drafts, Patents, etc.)

Annual [Year 2020]	Chauhan Devendra Kumar, Singh Shivendra Pratap, Agnihotri Vasudha, Kumar Kireet (2019). Water quality of springs in Deolikhan recharge zone of Kosi watershed. ENVIS Bulletin, 27, 25-28.

Note: **Attach a separate, descriptive Annexure/ File.**

11. Project Concluding Remarks

Kindly update the following Progress Parameters for the Reporting Period:

Project Objectives	Quantifiable Output against each objective	Progress made against Monitoring Indicators (specified in Sanction Letter)	Remarks
1. To supplement and support water conservation activities for rejuvenation of the Kosi River	The rejuvenation work was conducted in two ways i.e. mechanical and biological.	Details mentioned in Table 2 (Annexure-II)	
2. To monitor the water availability -in the Kosi river and its tributaries through flow and discharge measurements along with quality measurement	Discharge measurements, water level recording, and water quality estimation are regularly monitored in the two pilot sites of Gadhwali & Simtola recharge zones as two replicable models.	The stream treatment work is going on in two pilot sites, The impact will be analyzed on spring flow, ad water quality after the implementation of mechanical biological measures. The discharge measured from November 2019 to March 2020 is shown in Figure 6. Relationships with other factors will be analyzed after getting at least one year of data. The water quality data for December 2019 is shown in Table 1 (Annexure I). The general physical and chemical properties for all the springs were found below the acceptable limit except the iron content. Iron was present above the desirable limit (ie., 0.30 mg/L) in all the springs. The high iron content might be attributed due to the presence of Almandine Garnet which are found embedded in Garnetiferous Mica Schist.	
3. To develop the conservation models in	In two village panchayats viz. Gadhwali & Simtola, micro-watersheds have been	In Progress.	

selected villages and schools in 2 recharge zones of Kosi Watershed	identified, where water conservation measures have been implemented. Government Inter College, Hawalbagh is selected for the development of a water conservation model.		
4. Creation of an Institution for monitoring the Kosi river system	For the monitoring of the Kosi River Rejuvenation works a Kosi Cell has been established in the premises of Vikas Bhawan, Almora.	Monitoring of work carried out in 14 recharge zones is carried out through the cell (Figure 10)	
5. Skill capacity building of the local youth (SC/ST/Women) as a tourist guide and other activities in the upper Kosi watershed.	Mass Awareness Programs for increasing public participation have been conducted which included the promotion of biological measures such as plantation and also about water conservation. A massive public awareness campaign "Kosi River Rejuvenation Campaign", was launched from July 1, 2019, to July 17, 2019, under which new initiatives were taken to promote the *Kosi Pledge* along with daily prayers in prayer meetings in schools in two blocks constituting Upper Kosi Watershed, so that along with this continuous campaign to save Kosi river, students can be sensitized towards water conservation from childhood itself. The rallies at 35 different places on various dates by students of state schools, members of cooperative societies, NGOs, self-help groups, and the voluntary public were organized in the vicinity of the Kosi river course.	1. Kosi Shapath (Pledge) : On school days during morning prayer Kosi Pledge is recited, to create awareness & make them realize the importance of water conservation & river rejuvenation. 2. Kosi River Rejuvenation Rallies from 25.01.2020 to 10.02.2020 organized by teachers & students in different villages, towns within Kosi watershed. (11 Rallies) 3. Essay & Speech competition regarding water conservation & river rejuvenation organized at schools. 4. Organizing Kosi Class on every third Saturday of a month.	

	Under the awareness campaign, painting and poster competition were organized in two phases in state schools on Kosi Bachao "Save River Kosi" and water conservation, the first phase was held at the school level and the second phase was held at the block level. Another new initiative was taken in the second phase Kosi Regeneration Campaign in which a two-hour Kosi class was organized on 06 July 2019 in every school falling in Kosi Watershed. In the Kosi class, lectures were given to the students regarding water conservation by the teachers of the schools, government officials, and experts in water conservation.		

Methodology (in brief):	The NMHS-SGP funded Kosi River Rejuvenation project objectively concerns with the revival of depleting water levels in the Kosi River of the Kumaun region. Himalayan range of Almora, springs, and other streams in the region are the main source of water present in the Kosi river. On a pilot basis, monitoring of the quality and quantity of water is being carried out in two pilot sites in regular intervals. Apart from it, 14 recharge zones have been selected in the Hawalbagh and Takula blocks where mechanical works such as the digging of infiltration holes, trenches, ponds, etc., and construction of concrete and bio check dams are being constructed. A topographic map is developed using ArcGIS (version 10.1), which shows the surface relief, which means undulation of the ground surface, and which type of slope present at the ground (gentle slope and steep slope). Geophysical Resistivity surveys have been carried out for aquifer mapping. 23 springs, of different orders, have been identified in three catchments (A, B, and C) of the Deolikhan recharge zone (Figure 2). Out of those, 9 springs have regular water flow since November 2019. The selected springs are being observed for their discharge rates and water quality since November 2019. Water level recorders are established on the third-order stream of the Deolikhan recharge zone and data have been collected since January 2020. Major rock type of the recharge

	zones has been identified eg Deolikhan Recharge Zone have various types of Metamorphic rocks such as Garnetiferous Mica Schist, Quartzite and Quartz veins which are highly fractured. The water quality was found affected by high iron content as its concentration is higher than the acceptable or desirable limit which might be due to the weathering of Almandine Garnet which is found embedded in Garnetiferous Mica Schist (Table 1; Annexure-II). The mass awareness programs, for Kosi river conservation, in schools, SHGs, and at village levels are being conducted at regular intervals.
Major Research Achievements:	The project got first prize under the national water mission by the Ministry of Water Resources based on the efforts taken for conserving the Kosi river.
Brief Conclusion - the current year progress – during the reporting period (point-wise):	• A geophysical resistivity survey has been completed for pilot sites in Devalikhan and Simtola recharge zones, which will be helpful for the identification of potential locations for making water conservation structures (Figure 1). • GIS Mapping of the selected sites has also been completed. • Flow and discharge data are being collected and analyzed at regular intervals). • The target for skill development of the local youth, women, and students at various schools in the perspective of water conservation is achieved. However, more citizens are encouraged to participate with the help of various departments such as Education, Horticulture, Forest, ILSP, etc. at the district level.
Progress Achieved (%):	20%
Remaining work to be done:	The water conservation structure has to be made in the pilot sites along with other recharge zones. The sites for these structures were identified based on a geophysical survey.

Kindly attach the descriptive Annexure/ Files separately for the segments marked for the detailed description required. Please fill the NMHS Progress Report pro forma as applicable with respect to time and other requirements and return *via* post/ e-mail at: nmhspmu2016@gmail.com

Submitted to:
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Submitted by:
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Institution (Seal): जिला विकास अधिकारी अल्मोड़ा
Dated (dd/mm/yy):