

**G. B. Pant National Institute of Himalayan Environment and Sustainable Development
(GBPNIHESD)**

JAL ABHYARANYA CAMPAIGN (JAC)

Terms of Reference (TOR) for Partner Agency

Phase I- Developing Spring Inventory

Time for executing work: 45 days (6 weeks)

1. Details of the Jal Abhyaranya Campaign Partner:
(Attach Annexure 1 for organization details)
2. Details of other stakeholders to be consulted
 - i. District Magistrate of the selected District;
 - ii. Gram Panchayat's Head (Pradhan);
 - iii. State Govt. Departments;
 - iv. Core Expert Member(s);
2. Partner Team shall have the following Terms of Reference (TOR), broadly covering the following:
Week 1:
 - i. To visit the District HQs to interact with DM to launch the JAC-2019;
 - ii. Collect list and contact details of Village Heads from district Panchayat Raj Officer;
 - iii. Collect all secondary information from State PHED/WATER SUPPLY DEPT.
 - iv. Engage team of field workers/surveyors for field work;
 - v. Contact all village heads and collect information about water sources and spring their villages and plan for field work by different teams.Week 2 onwards:
 - v. To train surveyors and thus capacity building in the target District;
 - vi. To survey each village and identify max two important springs in each village of the target District;
 - vii. To inventorize these springs on the given characteristics/ parameters and in the prescribed format (Appendix 1);
 - v. To identify one spring for development of Jal Abhyarannya and its Recharge Area/ Zone in the target district in next phase (Phase II).
3. The Jal Abhyaranya Abhiyaan (Water Sanctuary Campaign) reporting will be weekly basis by submission of the filled format of 20% of total villages each week.

Note: Budget is estimated based on number villages to be covered and assuming max 2 prominent springs each village and will be paid in two equal instalments. Second instalment will be released after 80% utilization and report submission. Institutional charges will be paid after completion of task.

Appendix I: Spring inventory Pro forma

A. General Characteristics of springs/general spring Information					
Spring Type (tick only)	Naula <input type="checkbox"/>	Seep <input type="checkbox"/>	Dhara <input type="checkbox"/>	Brook/Gadhera <input type="checkbox"/>	
Spring Code		Latitude*		Longitude*	
Name of spring		Elevation (amsl)		Accuracy	
Village/Block		District		State	
Surveyor Name		Date/Time			
*The surveyor needs to be static for at least 2-5 minute to acquire accurate location with greater accuracy using handheld GPS.					
B (1). Physical Characteristics of springs					
Parameters	Measured Value /type	Method/protocol	Rationale	Reference	
<i>Flow/Discharge: (l/sec)</i>		Using flask of known volume and a stop watch.	Physical characteristics of spring water depends upon the characteristics of recharge area, soil, and bedrock, depth of aquifer, precipitation etc. Physical characteristics are dominant factors influencing water supply in a watershed.	Negi and Joshi, 1996 , Valdiya and Bartarya 1989	
<i>Electric conductivity (μS)</i>		Using handheld EC and pH meter. The meter should be clean, have fresh batteries and calibrated.		White and Kues, 1992; D.W. Sada and K.F. Pohlmann. 2002	
<i>pH</i>					
<i>Temperature ($^{\circ} C$)</i>					
<i>Brook length</i>		Using measuring tape/High resolution satellite data		D.W. Sada and K.F. Pohlmann. 2002	
<i>Soil type</i>		NBSS&LUP maps.			
<i>Geology/ Rock type</i>		Expert field interpretation/ Geological survey of India Map		Tambe et al., 2009; Negi and Joshi, 2004	
<i>Spring Type</i> (Depression springs, Contact springs, Fault springs, Joint/Fracture spring, Karst springs).				http://www.indiawaterportal.org	
B (2). Chemical Characteristics of springs (Optional)					
Turbidity (NTU)		Turbidity meter	Chemical characteristics of spring water provide information about quality of water for drinking or irrigation purpose and its contamination level.	Van Everdingen, R. O., 1991; Kireet Kumar, Rawat, DS., 1996; Joshi, B. K. and Kothiyari, B. P., 2003;	
Na ⁺ (mg/L)		Flame Photometer			
K ⁺ (mg/L)		Flame Photometer			
TSS (mg/L)		Filtration			
Total Hardness		Titration			
Ca Hardness (mg/L)		Titration			
Alkalinity (mg/L)		Titration			
Calcium (mg/L)		Titration			
Magnesium (mg/L)		Titration			
F ⁻ (mg/L)		Ion electrode			
Sulphate (mg/L)		Photometer			
Nitrate (mg/L)		Ion electrode			
Chloride (mg/L)		Titration			
Bicarbonate (mg/L)		Titration			
500 ml of sample is sufficient to determine the complete list of major ion parameters. Sample collection methods and laboratory analysis should follow standard procedure and protocol to prevent contamination and accuracy of measurement.					

C. Other information					
<i>Associated Land use/land cover</i>	Forest <input type="checkbox"/>	Agriculture <input type="checkbox"/>		Valdiya and Bartarya 1989; Negi and Joshi, 1996	
	Wasteland/scrubland <input type="checkbox"/>	Built up/settlement <input type="checkbox"/>			
<i>Resource threat</i>	Drought <input type="checkbox"/>	Runoff <input type="checkbox"/>	Nutrient load <input type="checkbox"/>	D.W. Sada and K.F. Pohlmann, 2002;	
	Recreational activity <input type="checkbox"/>	Industrial Development <input type="checkbox"/>	others <input type="checkbox"/>		
<i>Degree of threat⁵</i>	Low <input type="checkbox"/>	Moderate <input type="checkbox"/>	High <input type="checkbox"/>		None <input type="checkbox"/>
<i>Scouring/Gully erosion</i>	Low <input type="checkbox"/>	Moderate <input type="checkbox"/>	High <input type="checkbox"/>		None <input type="checkbox"/>
<i>Conflicting issue</i>	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
<i>Confliction type</i>	Channel diversion <input type="checkbox"/>	Grazing <input type="checkbox"/>			
	Recreational activity <input type="checkbox"/>	Others <input type="checkbox"/>			
<i>Stressors</i>	Natural/Environmental (Drought, forest fire, erosion, landslide/avalanches)		Anthropogenic (Trampling, diversion, nutrient pollution, introduction of non-native plants and animals, others)		
<i>Ownership</i>	Government <input type="checkbox"/>	Public <input type="checkbox"/>	Private <input type="checkbox"/>		Tambe et al., 2009
<i>Spring Use</i> Primary=1 Secondary=2 Other=3	Drinking <input type="checkbox"/>	Clothing/Sanitation <input type="checkbox"/>	Agricultural <input type="checkbox"/>	Power/Industrial <input type="checkbox"/>	White and Kues, 1992
<i>Photograph</i>	Attached photo labelled with id (i.e. spring code) of photograph.				
D. Remarks: Brief description of spring under this section provides complete details of all parameters of a spring.					

⁵ Resource threat considers various factors that can impact the health of springs, in terms of both water quality and discharge. High threats usually mean difficult to restore. Low threats suggest that land/water managers may wish to keep the spring in its existing condition.

Please submit the filled format by e mail with supporting data to

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