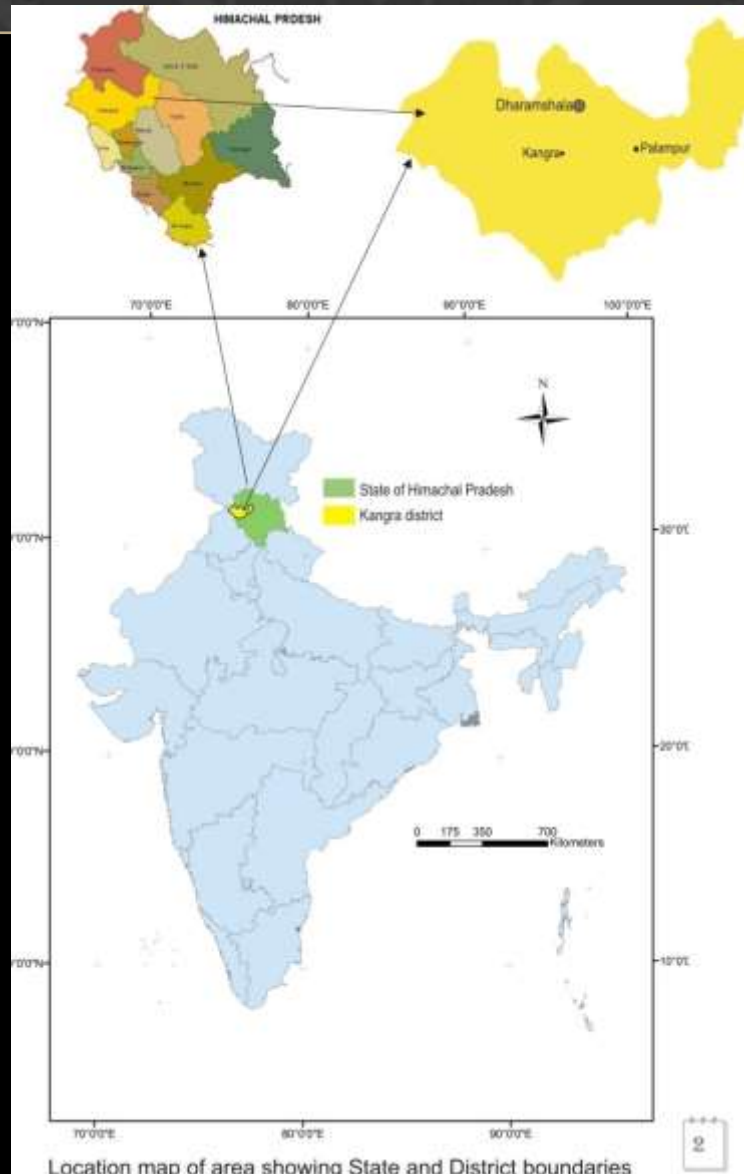


# BOHAL SPRING CASE STUDY



**ACWADAM**  
**Plot no.4, Lenyadri Society, Sus Road, Pashan Pune**  
**Phone:020-25871539**  
**Email: [acwadam@vsnl.net](mailto:acwadam@vsnl.net)**

# LOCATION



# ISSUES WITH BOHAL SPRING

- Bohal Spring is located in Bohal Village, 4 km north of Palampur town
- Tapped for drinking water supply by Palampur Municipal Committee in 1952
- Reduction in discharge is observed in last 10-15 years
- Deterioration in water quality because of human intervention in spring vicinity
- Neugal river is tapped to meet the current demand



# OBJECTIVE OF THE STUDY

- To create a hydrogeological map for the spring and its catchment
- Characterization of the spring
- To identify recharge zone of the spring
- To create spring management plan for protection and conservation of spring

# DEMAND, SUPPLY & AVAILABILITY

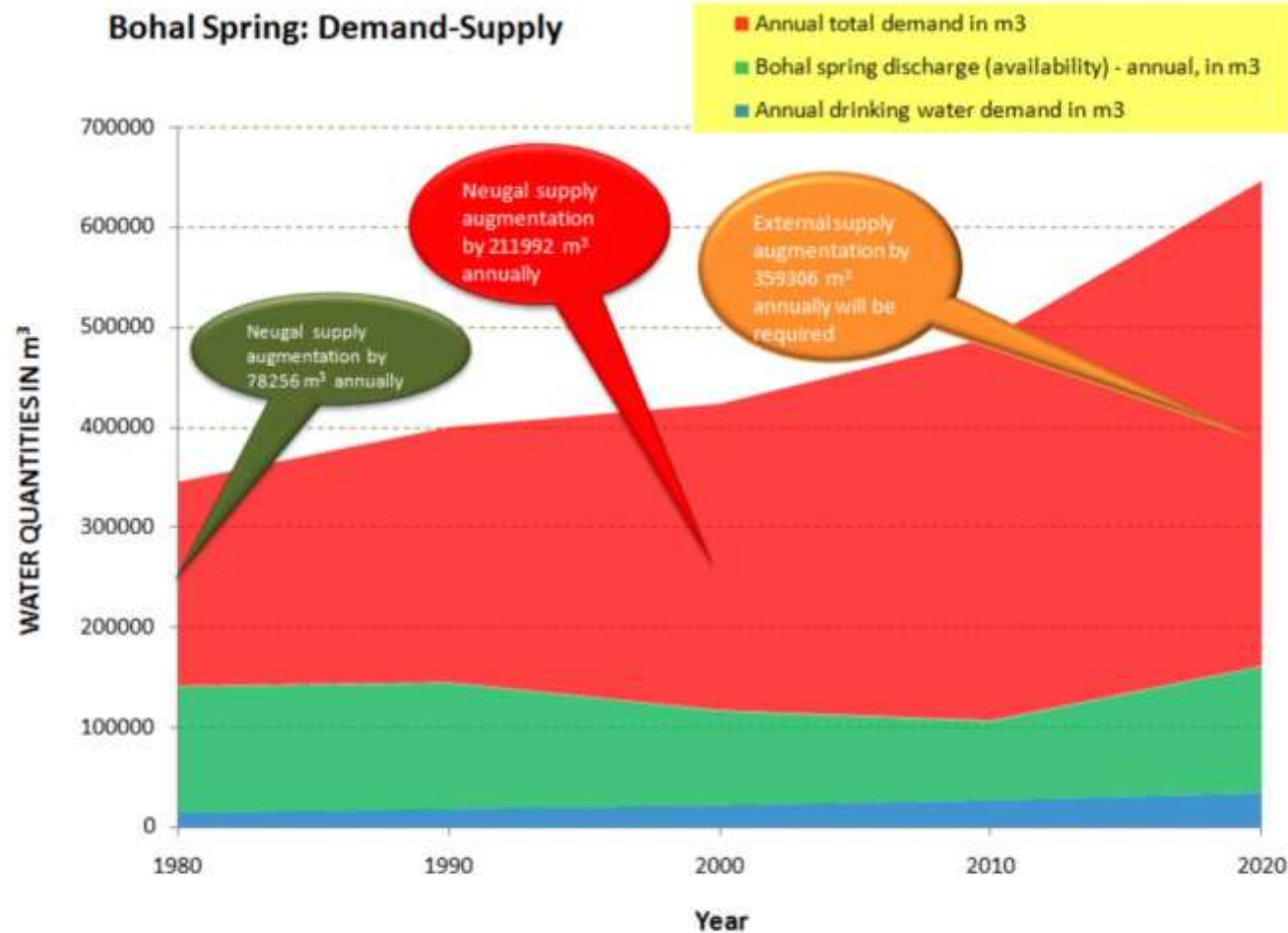
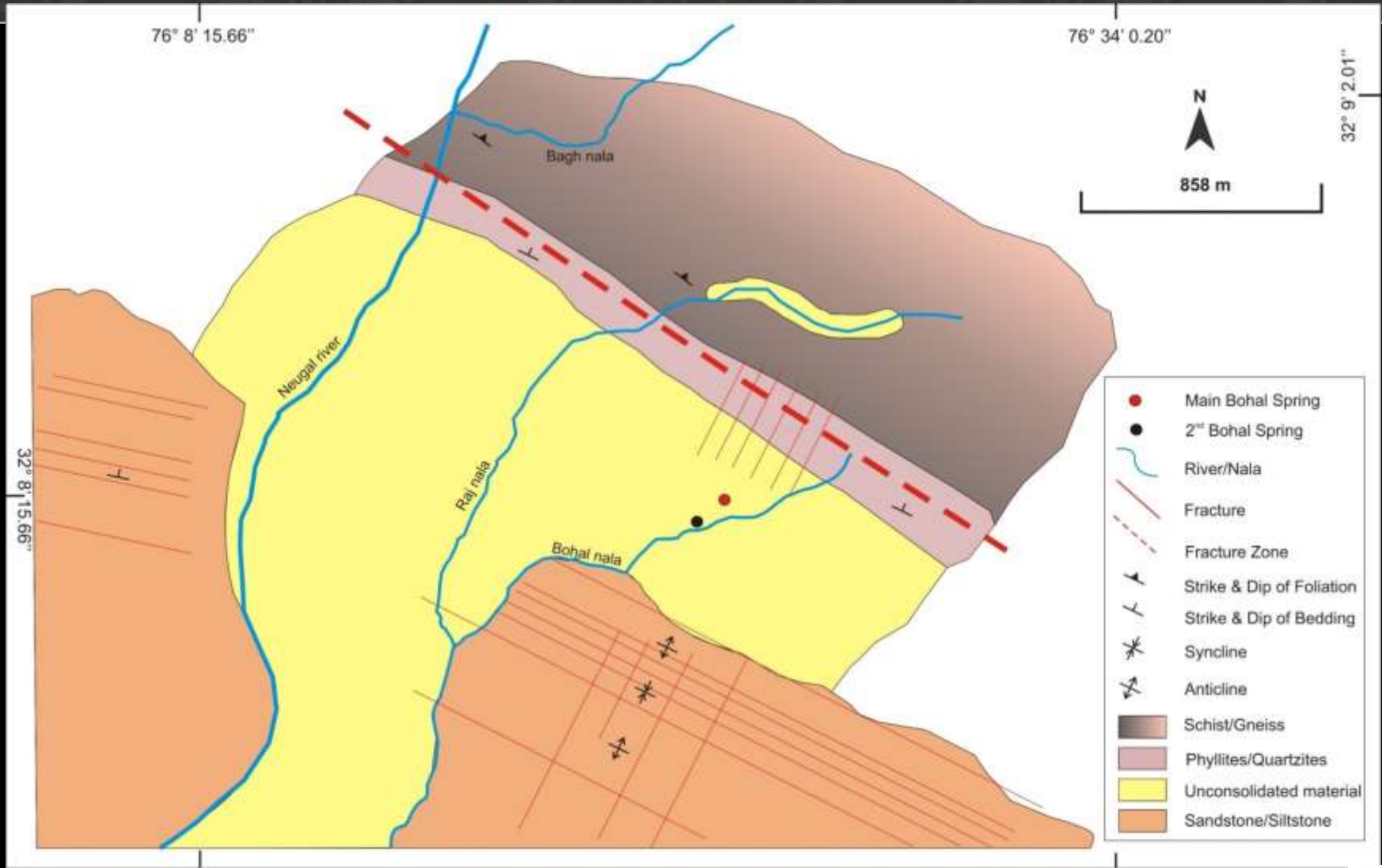


Fig. 3.2: Timeline of demand-supply-availability - Palampur town

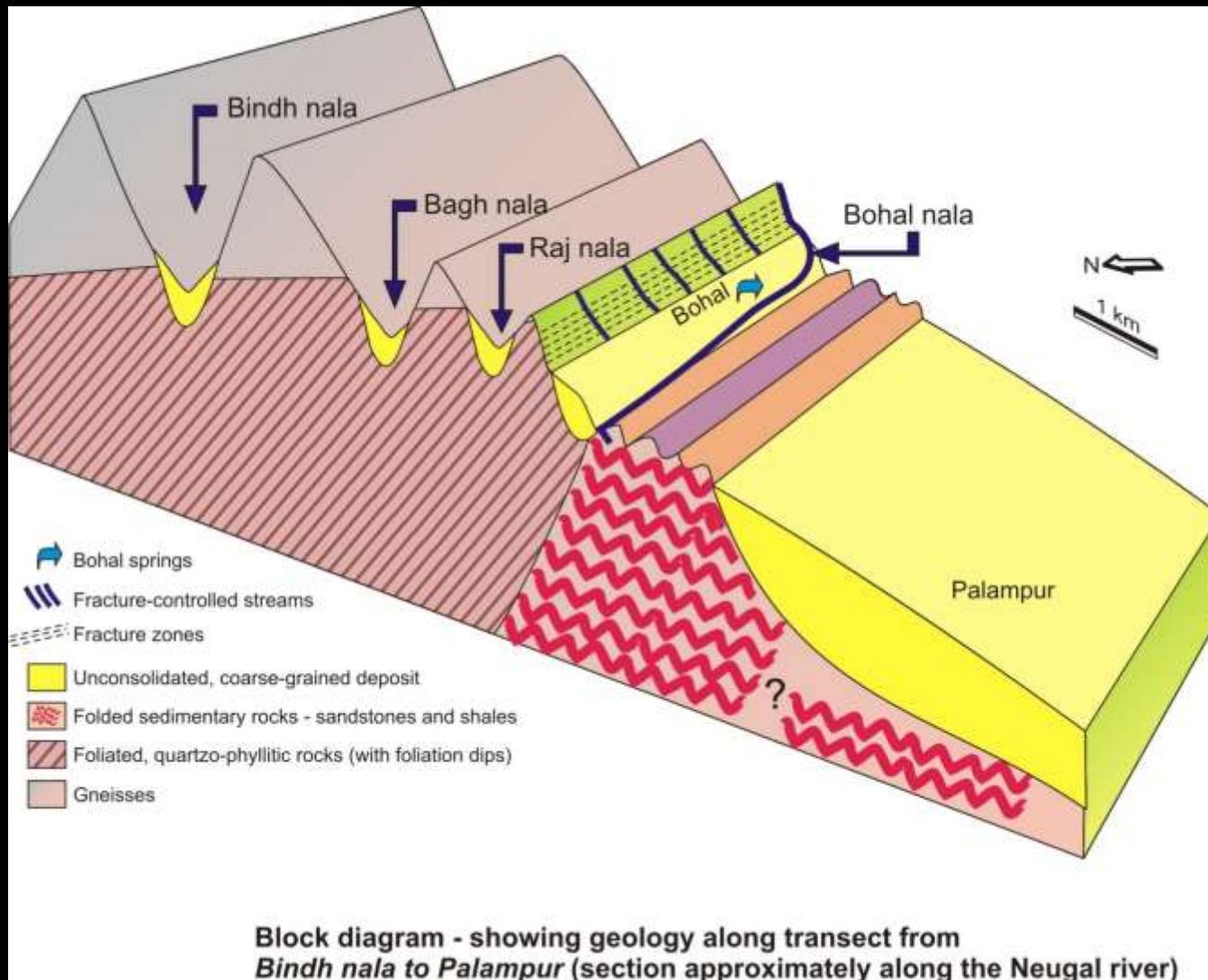


# GEOLOGY

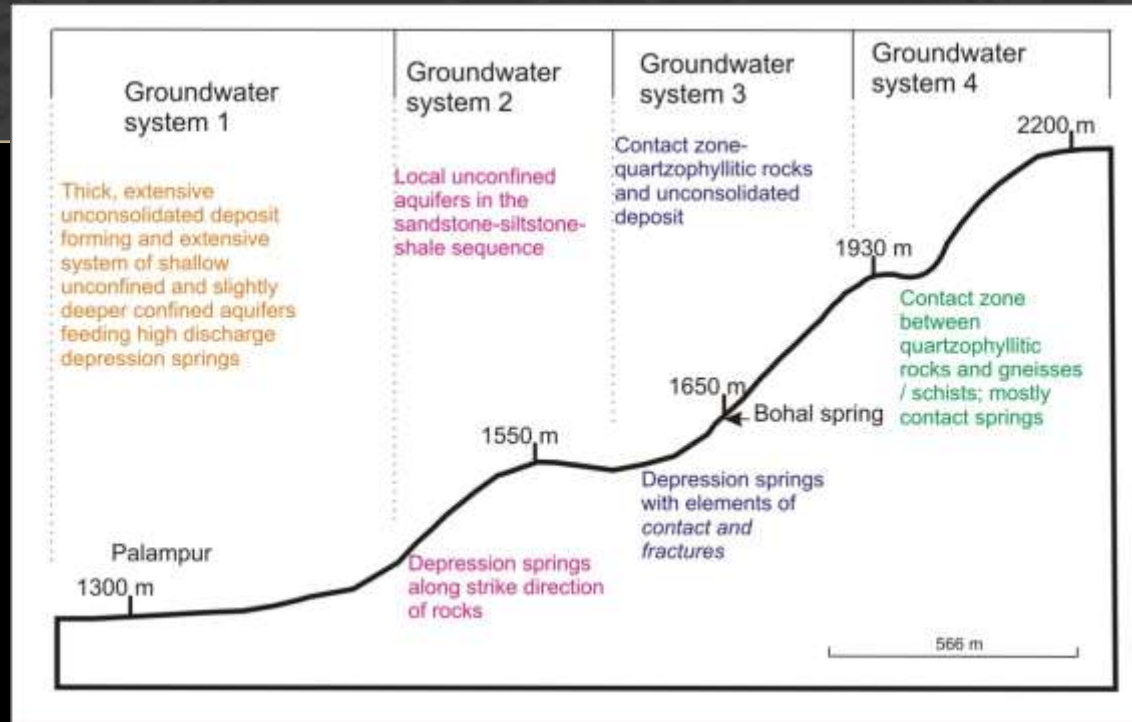


Geological map of the Bohal spring System

# GROUNDWATER SYSTEM OF PALAMPUR



# GROUNDWATER SYSTEM OF PALAMPUR

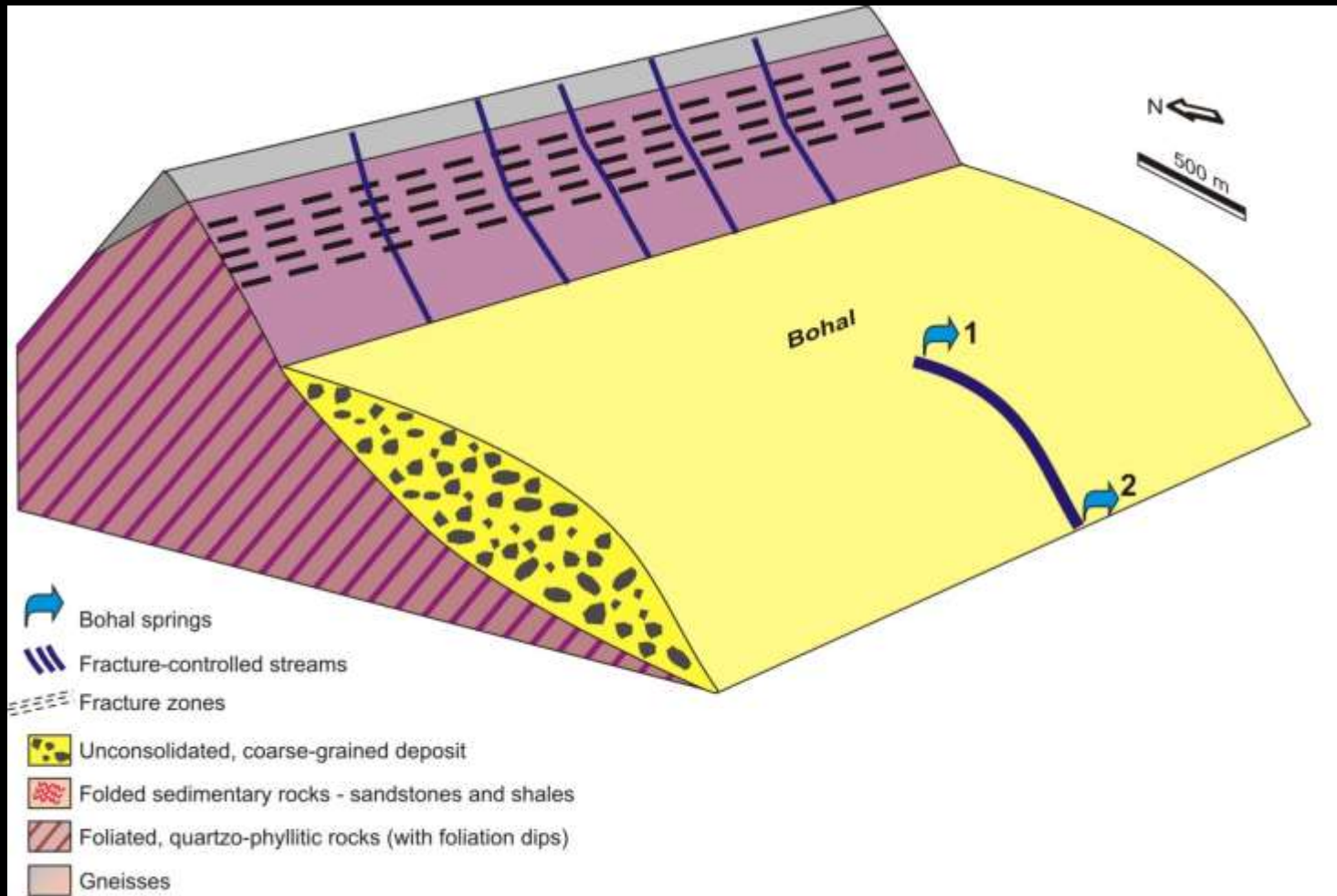


Groundwater System	Elevation	Geology	Type of Spring/Aquifer
GW System 1	1250 m to 1350 m	Unconsolidated deposit	Unconfined Aquifer
GW System 2	1350 m to 1500 m	Sandstones, Siltstones, Shales	Depression/Fracture springs
GW System 3	1500 m to 1900 m	Unconsolidated deposit, Quartzite-phyllite, Phyllite	Depression/Contact springs
GW System 4	1900 m and above	Gneiss, Granites	Fracture springs





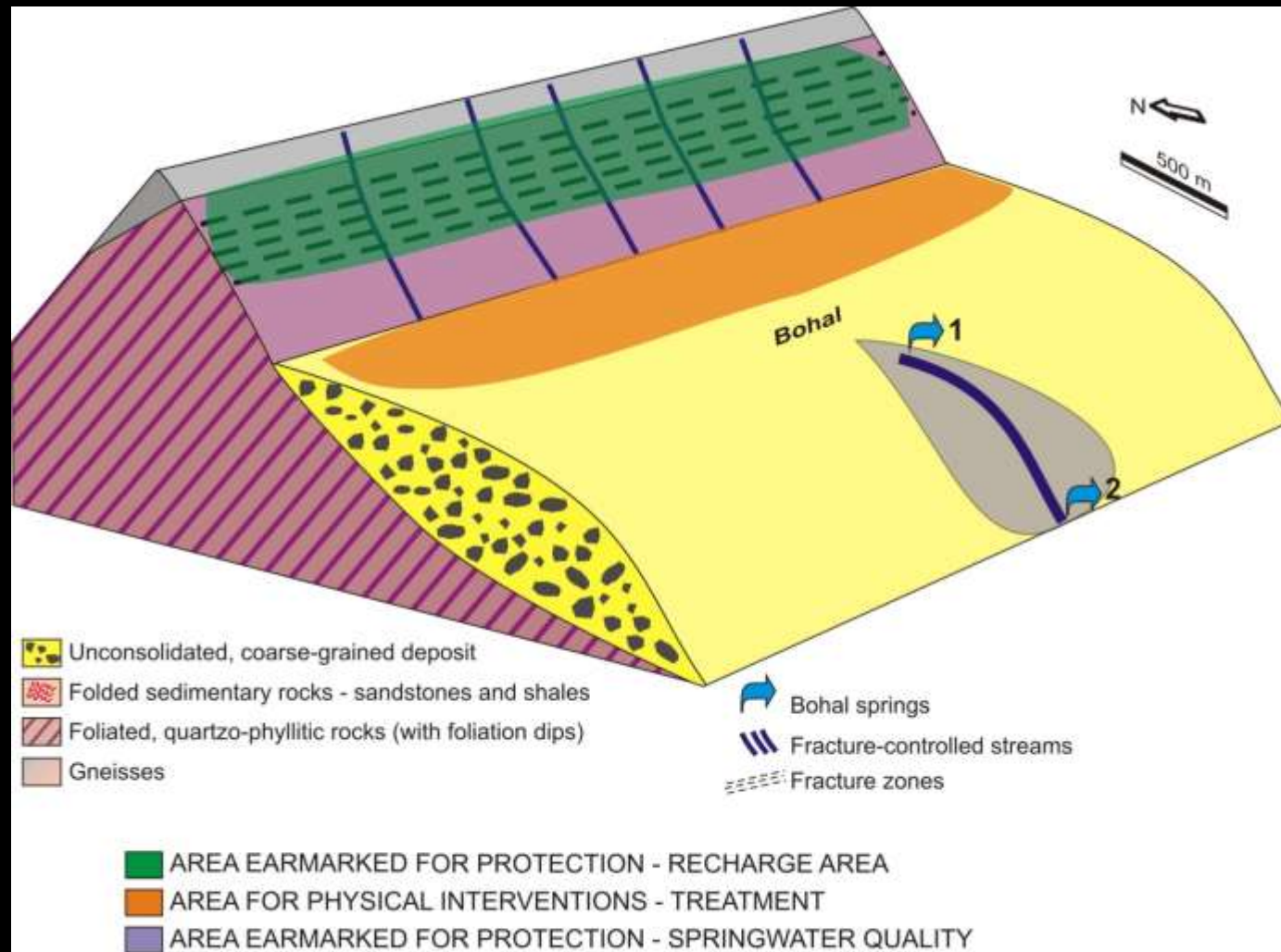
# GEOLOGY OF BOHAL SPRING



**Block diagram - showing geology around the Bohal springs**



# MANAGEMENT STRATEGY FOR BOHAL SPRING



**Fig. 3.1: Block diagram - showing management strategy for Bohal springs**

# RECHARGE RECOMMENDATIONS





# RECHARGE RECOMMENDATIONS



# RECOMMENDATION FOR BOHAL SPRING MANAGEMENT

S.N.	Recommendation	Stakeholders ( <i>Responsibility</i> )
<b>(A) Protection Related</b>		
1.	Recharge zone protection in the forest area	<ul style="list-style-type: none"> <li>Bohal village community (<i>Social regulatory norms at community level</i>)</li> <li>GTZ-HPEDS Team (<i>Facilitation, mobilization and co-ordination between community, forest department and PMC</i>)</li> <li>PMC (<i>Back-up / incentivisation of recharge zone process protection</i>)</li> <li>Forest Department (<i>Overarching back-stopping support</i>)</li> </ul>
2.	Regulating the 300 m radial zone around Bohal springs	<ul style="list-style-type: none"> <li>Bohal village community (<i>Social regulatory norms at community level</i>)</li> <li>PMC (<i>Supporting and incentivizing the process</i>)</li> <li>GTZ-HPEDS Team (<i>Facilitation, mobilization and co-ordination between community and PMC</i>)</li> </ul>
<b>(B) Treatment Related</b>		
1.	Physical measures of catchment treatment to augment spring discharge	<ul style="list-style-type: none"> <li>FD (<i>Investments for structures</i>)</li> <li>PMC (<i>Providing matching investment to effort</i>)</li> <li>Bohal community (<i>Participation in implementation</i>)</li> <li>GTZ-HPEDS Team (<i>Technical guidance and facilitation</i>)</li> </ul>

<b>(C) Rainfall Monitoring</b>		
1.	Regular monitoring of existing rain gauge	HPEDS
2.	Installation of new rain gauge near Bohal spring, suitably secured	<ul style="list-style-type: none"> <li>Bohal community (<i>Measurement on daily basis</i>)</li> <li>PMC (<i>Provide grants for supporting instrumentation, installation, operation and maintenance</i>)</li> <li>GTZ-HPEDS Team (<i>Technical guidance, data collation and compilation</i>)</li> </ul>
<b>(D) Spring Discharge</b>		
1.	Setting up appropriate system for discharge measurement	<ul style="list-style-type: none"> <li>GTZ-HPEDS Team (<i>Technical aspects, including establishing an improved system of measurement</i>)</li> <li>PMC (<i>Provide grants for installation of measurement system</i>)</li> </ul>
2.	Monthly discharge measurement of both Bohal springs	<ul style="list-style-type: none"> <li>GTZ-HPEDS Team (<i>Data collection, compilation and analysis</i>)</li> </ul>
<b>(E) Water Quality</b>		
1.	Monthly in-situ water quality testing	<ul style="list-style-type: none"> <li>GTZ-HPEDS Team (<i>Technical aspects, data collection, collation and analysis</i>)</li> <li>PMC (<i>Provide grants for equipment</i>)</li> </ul>
2.	Seasonal (May and October) detailed water quality testing	<ul style="list-style-type: none"> <li>GTZ-HPEDS Team (<i>Collection of samples for detailed water quality testing</i>)</li> <li>PMC (<i>To facilitate testing of parameters by appropriate lab</i>)</li> </ul>
<b>(F) Demand Management</b>		
1.	Separation of Bohal and Neugal water and using Bohal water for drinking purpose only	<ul style="list-style-type: none"> <li>PMC (<i>Facilitate and co-ordinate process of separation, functional process including 'retrofitting' of distribution etc.</i>)</li> <li>GTZ-HPEDS Team (<i>Technical support in planning and implementation</i>)</li> </ul>

# CHALLENGES AT GROUND LEVEL

- Gap between demand and availability
- Sensitization of Bohal and Palampur communities
- Consensus building and formal agreement between PMC and Bohal Village
- Institutional and legal aspects
- Water quality issues (separation of drinking and household water)



# FORMATION OF VFDS AND AGREEMENT WITH PMC

- Formation of VFDS under HP PFM Rules 2001 (VFDS is authorized to manage local forest )
- A Formal 20 years Agreement between PMC and Bohal VFDS
- VFDS will protect and manage the forest in the area
- Specific VFDS will protect the High Infiltration Zone (HIZ) in the forest
- In case of Human disturbance VFDS will take action according to their bylaws and also seek help from FD



- PMC will pay annually Rs. 10000/- with 10% increase after every 5 years, to Bohal VFDS
- Ban on grazing in the forest and recharge area
- Controlled grass cutting tree lopping for fodder in the forest
- Ban on fuel wood collection in recharge area
- Ban on any kind of stone mining in the recharge area
- Each family will contribute their labour to uproot the weeds from the forest, once in every year



# AGREEMENT BETWEEN PMC & VFDS BOHAL

## Memorandum of Agreement

Between

Palampur Municipal Council

And

Village Forest Development Society  
(VFDS), Bohal-Odi

Date - 16 October 2010

अनुमोदित  
V.F.D.S.  
Bohal-Odi  
ग्राम वन विकास समिति  
बोहल-ओडी डा.0 नारीस (ब.ब.ल.)  
रा.00 पालम्पुर-176001  
जिला कांगड़ा (हि.प्र.)

Municipal Council  
Palampur  
President  
Municipal Council  
Palampur (Rang. x) H.P.

### Background

The residents and Mahila Mandal's of the hamlets of Bohal, Mandai and Odi, of Bohal revenue village in Bundala Panchayat have been protecting their local forest area since the year 2000 and have successfully regenerated it. Now, however, the forest is facing renewed pressures for local subsistence use from both within and outside the village. Accordingly, the hamlets have come together to form a Village Forest Development Society (VFDS) to protect and manage the forest for the long term, both to meet their subsistence needs and to benefit from its environmental services, and also to sustain a healthy forest for future generations. However, they recognize that closing the forest will impose costs on the residents who will have to reduce fuel wood and fodder collection and grazing from the forest. Thus, protecting and managing the forest into the future as it regenerates, and balancing subsistence use and environmental services, is a challenge.

The Palampur Municipal Council has a long-term relation with the village of Bohal. In the 1950s, the village had provided access to the water from the Bohal spring to the city, and for many decades this spring water was the primary source of water supply for Palampur town. Despite other sources now in use, this is still the cheapest, most reliable, and good quality water source for the city. However, over the decades the water discharge of the spring has been declining and is currently in the region of 2.5 to 3 liters per second in the lean season.

A recent study by hydro-geologists has identified the potential infiltration and recharge areas for the Bohal Spring. The study suggests that protecting the forest area above Bohal village and undertaking some water harvesting activities can help increase infiltration and recharge of ground water in the area and likely maintain and even increase the discharge of the Bohal spring.

Accordingly, the PMC and the Bohal VFDS have come together with the common objective of implementing an adaptive management plan to manage the forest in a manner that is likely to improve the discharge and water quality in the Bohal spring based water supply system.

### The two parties

Palampur Municipal Council, henceforth referred to as **PMC**, is an elected body under the **Himachal Pradesh Municipal Act 1994**.

The Village Forest Development Society (VFDS), Bohal, henceforth referred to as **VFDS Bohal**, is registered as a Society under the **Societies Registration Act of 1860**, under the HP Participatory Forest Management rules of 2001. The HP PFM rules authorize elected VFDS to protect and manage local forest areas. The VFDS has membership from the hamlets of Bohal, Odi and Mandai of Bohal revenue village in Bundhala Panchayat. A copy of their registration certificate is attached (annex 1)

अनुमोदित  
V.F.D.S.  
Bohal-Odi  
ग्राम वन विकास समिति  
बोहल-ओडी डा.0 नारीस (ब.ब.ल.)  
रा.00 पालम्पुर-176001  
जिला कांगड़ा (हि.प्र.)

Municipal Council  
Palampur  
President  
Municipal Council  
Palampur (Rang. x) H.P.



# AGREEMENT BETWEEN PMC & VFDS BOHAL

## Description of the area that is the subject of the agreement – the high infiltration zone (HIZ)

The VFDS Bohal is protecting the area that broadly falls in the I/n classed forest area called U 13 P Birni. This falls in Bundala beat, and Palampur range and division and was formerly classified as shamlat dehi in revenue records.

The hydrological study has identified a broad zone within this forest that is likely to have a high potential for infiltration and groundwater recharge that will eventually benefit the Bohal spring – the High Infiltration Zone.

## Objective of the agreement:

The primary objective of this agreement is to support the implementation of the Bohal VFDC forest management plan and specifically the implementation of the sub-plan for the High infiltration zone (HIZ).

The HIZ sub-plan lists activities to identify, protect and manage the infiltration zone to maintain and enhance infiltration and ground water recharge, which will likely lead to improved discharge in the Bohal Spring based water supply system. An additional objective is to maintain water quality.

A secondary objective is to identify options and seek support for improving sanitation and meeting the subsistence fuel wood and fodder requirements of the village.

## Actions for each party

### 1. Steps to be taken by the VFDS Bohal

- VFDS Bohal will protect and manage the overall forest area as per the vision of their twenty-year management plan as per their byelaws.
- Specifically the VFDS Bohal will protect and manage the High Infiltration zone (HIZ) identified in the forest for a period of twenty years as per the prepared sub-plan and map (attached as annex 2).
- In case of any naturally occurring or human use or disturbance in the HIZ that is contrary to the sub-plan, the VFDS Bohal will enforce their sub-plan conditions as per their byelaws in the first instance and seek support from the Forest Department if required.

### 2. Steps to be taken by the Palampur MC.

- Recognizing that the protection will require additional effort as well as possible opportunity costs, and in return for protecting the identified forest area, the Palampur MC will provide financial support to the Bohal VFDC. The extent and terms are as follows.

  
V.F.D.S.  
Bohal-Odi  
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ग्राम वन विकास समिति  
बोहल-ओदी डा:0 नजीर (बन्दला)  
राह:0 पालम्पु 2-1780061  
जिला कांगड़ा (हि:990)

III

  
Municipal Council  
Palampur President  
अध्यक्ष/प्रधान/सचिव  
ग्राम वन विकास समिति  
बोहल-ओदी डा:0 नजीर (बन्दला)  
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## 3. Terms

- This agreement is for a period of 20 years from the date of signing.
- The PMC will start with an initial payment of Rs.10,000 per year. The amount payable will increase by 10% after every five year.
- The payment will be made once a year, at the beginning of the protection period in the month of October. The payment will be made by cheque, bank draft, or bank transfer in favour of VFDS Bohal-Odi.

## 4. Monitoring and release of payment

- VFDS will invite the PMC for a joint transect twice a year one in the spring or summer and once after the monsoon for a visual assessment of the implementation of the High infiltration zone sub-plan.
- PMC or anyone appointed by the PMC on its behalf can visit the forest at any time to monitor the same.
- The PMC and VFDS Bohal will fill an indicative checklist after their HIZ forest transect and sign it jointly. A draft checklist for this purpose is attached and will be finalized after the first transect undertaken on signing of the agreement (annex 3).
- The checklist will include, in addition to assessing the forest condition and implementation of the sub-plan, measurement of spring discharge in the Bohal spring.
- The payment will be released after the checklist is signed and handed over to the PMC in September - October. In case the PMC representatives are unable to visit the forest, the VFDS Bohal will undertake the forest transect and submit the signed checklist to the PMC.


## 5. Adaptive nature of sub-plan and agreement.

Both parties recognize that implementation of this agreement and the HIZ sub-plan will be undertaken in a spirit of adaptive management. There may be occasions where there are small deviations from the sub-plan, or larger disturbance due to natural processes like fire or cloudburst etc and these would require adaptive responses. Accordingly the following adaptive guidelines are agreed:

- For small damage, either noticed by the VFDS on its own, or in the joint transect – the VFDS will ascertain and take action as per its rules with warnings, fines, etc, and record in its proceedings register.
- For large-scale damage whether due to natural or human use or disturbance, the VFDS will take action as per its byelaws and also inform the PMC and coordinate with the DFO or DFO's representative and the Panchayat representative to ascertain causes and take any preventive action.

  
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राह:0 पालम्पु 2-1780061  
जिला कांगड़ा (हि:990)

IV

  
Municipal Council  
Palampur President  
अध्यक्ष/प्रधान/सचिव  
ग्राम वन विकास समिति  
बोहल-ओदी डा:0 नजीर (बन्दला)  
राह:0 पालम्पु 2-1780061  
जिला कांगड़ा (हि:990)



# AGREEMENT BETWEEN PMC & VFDS BOHAL

- c. If large-scale damage is due to human cause, the PMC may discuss with the VFDS Bohal if any reduction or postponement in payment is warranted for that year. Postponement may be for up to 6 months. Reduction may be from 10 to 40% depending on severity of damage.
- d. Changes in the management plan will be handled as per the bye-laws of the VFDS. For any change in the sub-plan and management of the HIZ, the VFDC will consult the PMC. The closure of grazing is however a permanent condition and not open for change, without the explicit consent of the PMC.
- e. Additional activities may be undertaken by the VFDS and PMC under this broad agreement on mutually agreed terms and conditions.

## 6. Review and renewal and termination of agreement

- a. This twenty-year agreement will be monitored annually as mentioned above. In addition, it will be reviewed every four to five years to ascertain that implementation is on track and to ascertain whether there is any impact on the spring flow.
- b. Both parties are free to terminate the agreement on one year's notice.

## 7. Additional support

- a. In addition to the above financial support, the PMC will, to the extent feasible, support and assist the Bohal VFDC in achieving its mission of protecting the forest and exploring alternative options for the subsistence and sanitation requirements of its residents.
- b. The Bohal VFDC is free to seek additional support for its village development and forest management and protection activities as well as to benefit from its protection activities for the provision of forest environmental services.

## 8. Action-Research to support the agreement

- a. Both PMC and Bohal VFDC agree to support the basic monitoring of the forests and water related parameters as well as any other parameters that can help understand the functioning and impact of the agreement.

Date - 16 October 2010

Place - Hotel T-Bud Palampur

(Ann Devi)

President

V.F.D.S

Bohal-Qdi

अध्यक्ष / प्रधान / अध्यक्ष

ग्राम वन विकास समिति

बोहल-ओदी डा. 0 नाडीर (चम्पा)

सहो पालपुर-1-176061

जिला कांगड़ा (हिमाचल)

(Ajit Baghel)

President

Municipal Council

Palampur

उपमहानगरपालिका

सुन्दरबन नगरपालिका

पाल्पुर (कांगड़ा) हि.प्र.

ग्राम वन विकास समिति बोहल ग्राम वन प्रबंधन योजना का उल्लंघन करने वाली को जुर्माना करेगी।

## जुर्माना वसूली तालिका

वर्ग	जुर्माने की दर
चराई	
मेढ या बकरी	20 प्रति
गाय, बैल, भेस, घोडा, खम्बर इत्यादि	15 प्रति
चारा पत्ती, घास, बालू	50 प्रति व्यक्ति
निग्रम तोड़ने पर	100 प्रति व्यक्ति
झाल सचय क्षेत्र	
नुकसान करन पर	100 प्रति व्यक्ति
अन्य	
कम नुकसान	50 प्रति
अधिक नुकसान	500 प्रति
मेढ काटने पर कनेटि वन विभाग को लिखित सूचना देनी ताकि वन विभाग उचित कार्यवाही कर सके।	

नाम	पद	हस्ताक्षर
श्री मात देवी देवी	अध्यक्ष	देवी देवी
अनु देवी	प्रधान	अनु देवी
मालिका देवी	उप प्रधान	मालिका देवी
रक्षा देवी	साथीय	रक्षा देवी
सत्या देवी	कोषाध्यक्ष	सत्या देवी
श्री अमर सिंह	सचिव	श्री अमर सिंह
श्री निमिला देवी	सदस्य	निमिला देवी
मालिका देवी	सदस्य	मालिका देवी
कसामी देवी	सदस्य	कसामी देवी
सिमरी देवी	सदस्य	SIMRI
सदस्य देवी	सदस्य	सदस्य देवी

अध्यक्ष / प्रधान / अध्यक्ष  
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