Press Release Draft

A three-day training-cum-workshop was organized at the SIRD, Jorethang from 31st May'2010 to 2nd June'2010 on use of geohydrology and GIS applications in the Dhara Vikas Programme initiated by the RM&DD last year, which is aimed at recharging the dying springs across Sikkim. The workshop was attended Dr. R. Madhav Rao, Mr. Phanindar…. , scientists from NIRD, Hyderabad; Mr. Manish Kumar and Ms. Radhika Kanade, research scholars from ATREE, Bangalore (www.atree.org), FF's from different blocks of the state and faculty from SIRD.

The workshop opened with general introduction followed by welcome address chaired by Mr. D. Bhutia Director, SIRD. Thereafter, Dr. R. Madhav Rao introduced the basics of GIS to the participants. This was followed by two and half days of field and theory sessions on the basics of geohydrology. This included imparting basic understanding about different kinds of springs, rock types and the inter-relationships between springs and the underlying geology. The participants were apprised about the formation history of the Himalayas and its impact on current geology. Experiences from a similar programme undergoing in the Uttarakhand Himalayas by CHIRAG (www.chirag.org) were cited to exemplify the standard methodology of conducting geohydrological surveys of springs for recharge. The next one and half days involved fieldwork where the staff visited three springs (Devithan Dhara, Block?, Dokhung Dhara, Block? and Jugedhara springs, Block?), where staff tried to learn the basic tools of understanding the geohydrology of the springs, rocks and its structural formations and identification of possible recharge zones and suitable recharge measures. The last half of the day was used to discuss other important issues like the importance of discharge measurements in understanding springs, biological contamination of springs and various methods of rainwater harvesting.

The remaining three days were focused learning the basics of GIS and its applications to improve the Dhara Vikas Programme.

Notes on the Springs Visited:

1. **Devithan Dhara:** The spring is perennial with varying discharges least of which at the point was around 1 lpm. The spring is appearing to be coming out of a fracture (running East-west) in the rock. The main rock type is phyllite with gneiss-like alternate banding of quartzite in places. It is hard and compact with a predominant dip towards North-east direction (can be faulty due to absence of a clinometer). A road cutting approximately 30 m above the spring shows the bed-rock exposure which is highly fractured (may be due to the road-cutting activities). The cutting shows exposure of parallel set of fractures along the dip direction. There is a thick zone of sediments above on the left of

the spring and there is agricultural landuse above the road. From the initial appraisal, the spring looks as a fracture-based one, which along with the North-easterly dips suggests that the recharge zone may be towards the left hand side of the spring and above. Since, the agricultural landuse is prevalent in the catchment, terrace leveling and small percolation pits could be considered as recharge measures. Also, small dugponds at the top will be good depending on the availability of land/slope. But before this a detailed study will be required to prove the observations. The spring is benefitting 13 households and the transient population of the Mangalbarey market. The spring needs to be modified to facilitate standard discharge measurement. There is spring zone has another discharge

2. **Dokhung Dhara:** The spring is perennial with slow discharge (1 lpm) at present. The spring is directly connected to a storage chamber. The geology above the spring is mainly comprised of loose sediments overlaying above the bedrock of quartzite (another black rock was found in the boulder but couldn't be identified. The sediments appear to be thickly deposited and may be acting as the aquifer for the spring, which on the first impression appears as a depression spring. There is a distinct change in the topography around the spring, further strengthening the impression. Based on this, the aquifer will consist of the whole sediment zone on either side of the spring i.e. the whole spring-shed with the upper boundary of the sediment zone acting as a potential recharge zone where depending on the terrain, dugponds, percolation pits and contour trenches etc. can be considered as recharge measures. The soil appears to be loose sandy and hence heavy measures should be restricted to gentler slopes only. However, a detailed study will be required to accentuate the observations. The spring benefits 56 households. The spring already under treatment under the spring-shed methodology.

3. **Jugedhara:** The spring cluster involves three springs occurring close to each other. The first spring Jugedhara 1, is at the base of the footpath and has a temple around indicating religious importance. The spring appears to of depression origin as there is a change in topography above it which is mostly sediment in origin, further stressed by the low discharge.

   The second spring Jugedhara 2, is apprx. 20 meters towards the right of the Jugedhara 1 lying in a gadhera/nullah covered with good vegetation. The spring is perennial with good discharge (could not be measured due to unavailability of suitable site) and has a protection checkdam created below. There are pipeline attached to the springs carrying water to the benefitted households which are apprx. 50 in number. The rocks from which the spring is coming out are phyllitic with an overlying band of quartzite. The dip of the phyllite is very steep whereas the quartzite beds are relatively gentler. The

quartzite beds show heavy fracturing indication of geological activity. Based on the these observations, it was felt that small-scale faulting may have happened at the site with the upper quartzite beds faulting and dragging the lower phyllites creating the steepness of the dip. Thus based on the preliminary observations, the spring appears to be fault-based. The dip is predominantly towards north-east and thus the possible recharge zone could be lying above on the left-hand side of the gadhera including the gadhera itself. This catchment should suffice for both the springs and recharge measures like percolation ponds, pits and checkdams in the gadhera could be constructed. Also, in the gadhera sub-surface structures can be tried out to see results. Detailed study should be done before starting any recharge measure. There is no place for measuring discharge and should be constructed in the form a small V-notch or a small collection chamber.

The third spring of the Jugedhara cluster could not be visited due to the busy schedule.