



## Hydrogeological assessment along fault zone in Bhimgethi-Devasthan section of Gulmi/Baglung districts

### Background

Springs are the sole dependable sources of water in the hilly region for peoples' daily needs. The distribution of spring resources can be affected by the fracture-dominated damage zone and clay-rich gouge and breccia present in the Badi Gad Fault. The present study focuses on the hydro-geological condition along the active fault zone. Based on the fieldwork with a questionnaire survey, the study examines the characteristics of natural mountain springs with regard to geology, type of springs, slope, aspect and discharge rate.

Study area lies in the Gulmi and Baglung districts, west-central Nepal of about 350 km west from Kathmandu valley. It belongs to hilly region experiencing the sub-tropical to alpine climatic condition with altitude ranging from about 820 m to 2425 m above sea level. The overall drainage system is dendritic makes deep v-shaped valleys. The major river system includes the Badigad Khola, Darlin Khola, Kut Khola and the Nisi Khola.

### Methods

The methods that are adopted to achieve the objectives of the research are summarized as a desk study, fieldwork, data interpretation and analysis. Firstly, the desk study was constructed using a variety of sources which includes review of relevant literature, journals, bulletins, published and unpublished papers. Field traverse was selected for the geological study and tracing of the fault line. Likewise, spring inventory is a fundamental part of the research; data on spring sources and their distribution were collected from the questionnaire survey recording the information using a designed inventory sheet.

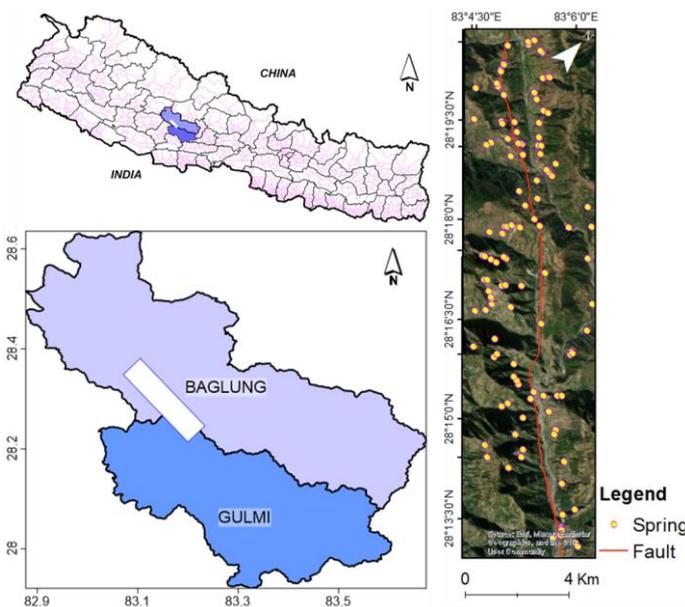


Figure 1: Study area with spring locations



Figure 2: Observed springs

### Results

Geologically, the study area comprises low-grade meta-sedimentary rocks equivalent to an autochthonous units of the Nawakot Group and is overlain by the metamorphic crystalline rocks. Lithology consisting the rock types mainly pelitic and psammitic phyllite, metasandstone, slate, massive to extensively brecciated dolomite, quartzite and schist.

There were a total of 122 springs identified, all of which are perennial. Concerning the spring origin in the study area shows most of the springs are fracture dominated because of highly fractured and deformed bedrock. The carbonate rock shows the highest discharge rate even on the southwest slope as being contact and fracture spring. But the discharge rate of springs has been decreasing greatly near the fault year after year because of land mass movement/shear-induced landslides.

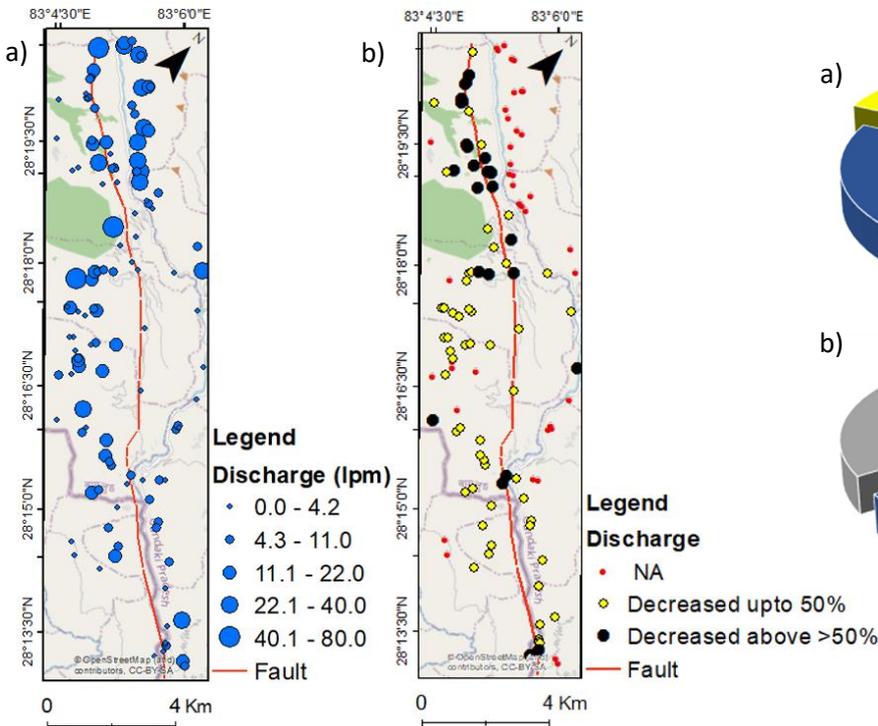


Figure 3: a) Discharge variation of springs measured in pre-monsoon season, 2022 and b) water volume situation of springs in last ten years

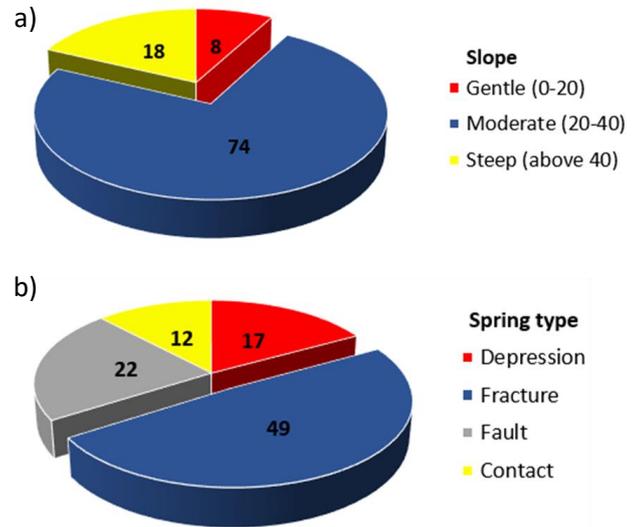


Figure 4: Distribution of springs a) in slope and b) types of spring (all data are presented in percentage)

## Remarks

The hydrogeological distribution of the specific region is closely connected to various factors like geology, topography, climate, land use/land cover and other human activities. Furthermore, the fault zone can create a major issue as its movement can generate shear-induced landslides. Our study shows that the water volume of the spring resources is going to be depleted near the fault zone and this situation is increasing every year. The spring resources are shifted to lower elevations because of mass movement. So, the villagers have facing a water deficit so badly in recent years. The increased mass movement could pose a serious issue for deficiency of spring resources or possibly dried-up springs in future.

## FOR FURTHER INFORMATION:

Government of Nepal

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