

INTEGRATING GROUNDWATER POTENTIAL MAPPING AND APPROPRIATE TECHNOLOGY-BASED WATER SCREENING SYSTEMS TO ENHANCE CLEAN WATER RESILIENCE AND CLIMATE ADAPTATION IN LEMBU PURWO VILLAGE, KEBUMEN, CENTRAL JAVA, INDONESIA

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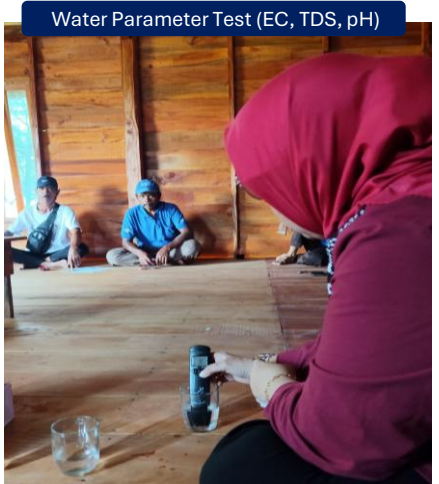
- Lembu Purwo Village** faces a recurring decline in groundwater quantity and quality each year, along with droughts. Therefore, several initial activities were carried out under the **SDGs program**, including:
- **Education on the Importance of Clean Water for Health and the Environment.**
 - **Groundwater sampling;** water samples are collected from several locations in agricultural areas.
 - **Simple Water Quality Evaluation;** basic tests are conducted to determine whether the water is suitable or not suitable for domestic and public health purposes.
 - **Visual Comparative Test (Preliminary Study),** comparing the characteristics of several water sources (coastal surface water, groundwater collected from residential areas, and bottled drinking water) by simple visual observations (physical parameters such as color, turbidity, and odor). This activity aimed to communicate differences in water quality to the local community in an easy-to-understand way.
 - **Observation of Land and the Surrounding Environment Conditions.**
 - **Environmental Assessment,** including the identification of environmental conditions associated with changes in soil characteristics and the measurement of soil temperature at several observation points.
 - **Remote Sensing Analysis** was conducted to monitor changes in land cover and hydrological patterns, supporting adaptation strategies to longer and unpredictable dry seasons.



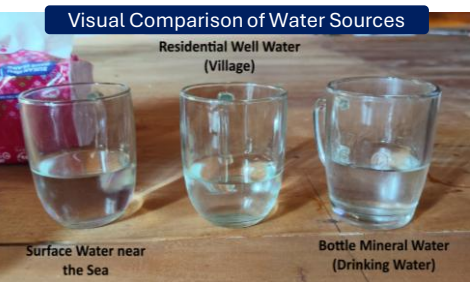
Community Education Session



Water Sampling in the Field



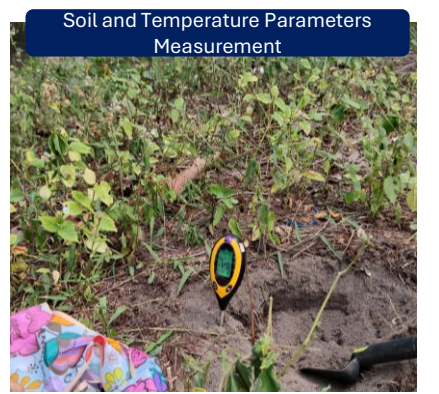
Water Parameter Test (EC, TDS, pH)



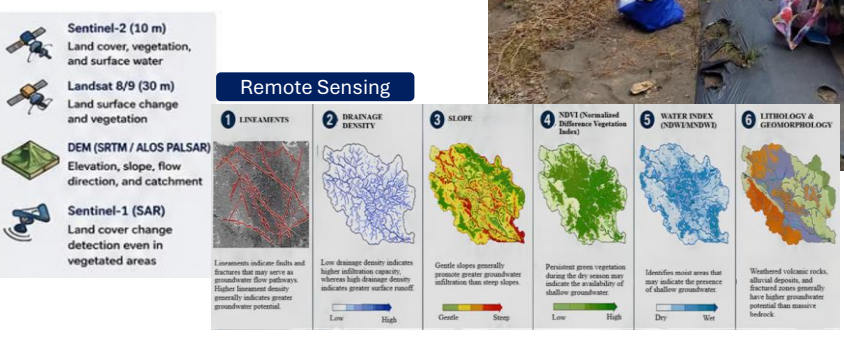
Visual Comparison of Water Sources



Field Observation (Agricultural Area) and Soil Sampling



Soil and Temperature Parameters Measurement



Remote Sensing

- Sentinel-2 (10 m)**
Land cover, vegetation, and surface water
- Landsat 8/9 (30 m)**
Land surface change and vegetation
- DEM (SRTM / ALOS PALSAR)**
Elevation, slope, flow direction, and catchment
- Sentinel-1 (SAR)**
Land cover change detection even in vegetated areas

1 LINEAMENTS

Lineaments indicate faults and fractures that may serve as groundwater flow pathways. Higher lineament density generally indicates greater groundwater potential.

2 DRAINAGE DENSITY

Low drainage density indicates higher infiltration capacity, whereas high drainage density indicates greater surface runoff.

3 SLOPE

Gentle slopes generally promote greater groundwater infiltration than steep slopes.

4 NDVI (Normalized Difference Vegetation Index)

Persistent green vegetation during the dry season may indicate the availability of shallow groundwater.

5 WATER INDEX (NDWI/NDSD)

Identifies moist areas that may indicate the presence of shallow groundwater.

6 LITHOLOGY & GEOMORPHOLOGY

Weathered volcanic rocks, alluvial deposits, and fractured zones generally have higher groundwater potential than massive bedrock.

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