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ASSESSMENT OF GROUND WATER LEVEL VARIATION IN RELATION TO LULC

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Abstract - This study aims to develop an intertwined approach for mapping and covering land use/ land cover (LULC) changes and to probe the impacts of LULC changes and population growth on groundwater position and quality using Landsat images and hydrological information in a Geographic information system (Civilians) terrain. All Landsat images (1990, 2000, 2010, and 2018) were classified using a support vector machine (SVM) and spectral analysis mapper (SAM) classifiers. The result of confirmation criteria, including perfection, recall, and F1, indicated that the SVM classier has a better performance than SAM. The attained LULC charts have an overall delicacy of further than 90. Each brace of enhanced LULC charts (1990 – 2000, 2000 – 2010, 2010 – 2018, and 1990 – 2018) were used as input data for an image difference algorithm to cover LULC changes. Charts of change discovery were also imported into a Civilians terrain and spatially identified against the spatiotemporal charts of groundwater position and groundwater quality. The results also show that the approximate Builtup area increased from227.26 km2(1.39) to869.77 km2(7.41), while vegetated areas (spreads, premises and auditoriums) increased from about76.70 km2(0.65) to290.70 km2(2.47). The observed changes in LULC are largely linked to the reduction in groundwater position and quality across the study area from the Oman Mountains to the littoral areas.

***Key Words*:** Groundwater level, Land use /Land cover change, Satellite imagery, GIS, Aurangabad

1. INTRODUCTION

Groundwater is an extremely important resource across numerous corridors of the world; especially where face water is of limited force or is of poor- quality groundwater comes into the script. Groundwater provides drinking water entirely or in part for as important as 50 of the global population and accounts for 43 of all of water used for irrigation. Worldwide,2.5 billion people depend solely on groundwater coffers to satisfy their introductory diurnal water requirements

. Groundwater extremity in the recent times has come a global concern as its vulnerability increased with lesser frequency and magnitude. Since the twentieth century, the groundwater birth strongly increased around the world. The emergence of the ultramodern pumping system and electrification in pastoral areas has led to the increase in groundwater birth from 312 boxy kilometers/ time in 1960s to about 743 boxy kilometers/ time in 2000. According to a database of 2010, the groundwater birth is about 1000 boxy kilometers/ time and the major consumers are from Asia including India, China, Pakistan, Bangladesh and birth rate has been tripled over the 50 times and still rising.

India is the largest stoner of groundwater in the world. It uses an estimated260 boxy kilometers of groundwater per time- over a quarter of the global aggregate. further than 60 of irrigated husbandry and 85 of drinking water inventories are dependent on groundwater. Groundwater in India is a critical resource; an adding number of aquifers are reaching unsustainable situations of exploitation. Major corridor of the Indian aquifer system is showing a declining trend due to revision in the pattern of precipitation. However, in 20 times about 60 of all India's aquifers will be in a critical condition says a World Bank report, Deep Wells, If current trends continue. This will have serious counteraccusations for the sustainability of husbandry, long- term food security, livelihoods, and profitable growth.

One of the major causes of the change in water position is LULC changes together with expansive birth of groundwater from the shallow aquifer for husbandry, assiduity and other domestic purpose. Rapid urbanization and increase in erected-up areas increase the change of groundwater position due to environmental declination and concretion of soil face. Changes in spreads and irrigation increase evapotranspiration (ET) and groundwater recharge by irrigation return inflow tool to

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2. Literature Review

The understanding of land-use/land cover change has moved from simplicity to realism and complexity over the last decades. In the beginning, the studies were concerned mostly with the physical aspect of the change, but later, in the research agenda on global environmental change. Scientists realized that land surface processes influence climate because of the land use/cover change. In mid1970s, it was recognized that land cover change modifies surface albedo and thus surface atmosphere energy exchanges, which have an impact on regional climate (Otterman, 1974; Charney and Stone, 1975; Sagan et al. 1979). Much broader range of impacts of land-use/cover change on ecosystem, goods and services were further identified. Of primary concern are impacts on biotic diversity worldwide (Sala et al. 2000), soil degradation (Trimble and Crosson, 2000), and the ability of biological systems to support human needs (Vitousek, 1997; Praveen, B. 2017)

Historically, humans have been modifying land to obtain the essentials for their survival, but the rate of exploitation was not the same as it is today. Recent rapid rate of exploitation has brought unprecedented changes in ecosystems and environmental processes at local, regional and global scales. Presently, land use/land cover changes encompass the environmental concerns of human population including climate change, biodiversity depletion and pollution of water, soil and air. Today, the monitoring and mediating the adverse consequences of land use/land cover change while sustaining the production of essential resources has become a major priority of researchers and policy makers around the world (Erle and Pontius, 2007). Unsustainable human activities are becoming key environmental concern as they deteriorate the quality of water in the. The relationship between landuse and water quality helps in identifying threats to water quality rivers (Ding et al., 2015) and builts an understanding of about 'access' to sanitation is crucial for human survival (Parveen et al., 2015). (Praveen et al., 2017).

Prakasam (2010) studied land use/land cover change over a period of 40 years in Kodaikanal taluk, Tamil Nadu. In this study major changes have been observed like area under built-up land and harvested land has increased whereas the area under forest and water body has decreased. Javed and Khan (2012) studied land use land cover change during due to mining activities from 2001 to 2010. The study revealed that significant decrease has been observed in dense forest area, cultivated land and water body, however settlement, wasteland land and uncultivated land has increased mainly due to anthropogenic activities.

Kuemmerle (2009) observed the conversion of cropland to grassland in Arges¸ County in Romania which he related to the rapid changes in socio-economic, demographic and institutional conditions after 1989. Similarly, Brown (1995) states that more recent changes in land use have been dominated by losses of agricultural land. In particular, in eastern China there has been an unprecedented conversion of arable land into built-up uses following rapid industrialization. While Kebrom Tekle and Hedlund (2000) reported increases in the size of open areas and settlements at the expense of shrub lands and forests in twenty-eight years (between 1958 and 1986) in Kalu District, Southern Wello, Ethiopia. Similarly, Woien (1995) reported increase of homestead in studies made in the central highlands, during 1957 and1986 attributing it to increase in population density.

Human activities which are mainly driven by socio-economic factors bring out changes in non-built-up and built-up land despite restrictions by physical conditions (Long et al. 2007). Land use change, including land transformation from one type to another and land cover modification through land use management, has altered a large proportion of the earth's land surface. The aim is to satisfy mankind's immediate demands from natural resources (Meyer and Turner, 1992; Ventouse et al. 1997).

The worldwide changes to forests, farmlands, waterways and air are being driven by the need to provide food, fiber, water, and shelterto more than six billion people. Global croplands, pastures, plantations and urban areas have expanded in recent decades. This expansion is accompanied by large increases in energy, water, and fertilizer consumption, along with considerable losses of biodiversity (Foley et al. 2005).

Bisht and Kothyari (2001) have carried out land cover change analysis of Gurur Ganga watershed in Uttaranchal. The study from 1963 to 1996 and 1986 to 1996 revealed that the area under agriculture and settlement has increased whereas the forest and barren land show decline in area. Dhinwa et al. (1992) studied land use change of Bharatpur district, the analysis in the studyreveal that forest cover hasbeen depleted whereas wasteland undulating terrain with or without scrub and rock out crops has been increased during 1986 to 1989.

3. CONCLUSIONS

It's veritably important to study land use land cover which changes and degraded day by day due to natural causes like climate variability or climate change performing cataracts failure, or anthropogenic causes due to industrialization and urbanization numerous further reasons also there explained in literature review and tells easily how land use land are affecting, literature review are important for policy timber and taking opinions to save terrain declination. There are numerous ways which are used in monitoring and assessment of land use land cover like remote seeing and Civilians and GPS.

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