



RESEARCH PAPER

**Implications of Urbanization on Agricultural Land: A Case Study of
Khairpur District, Pakistan**

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ABSTRACT

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Sindh is the 2nd most populated province in the country, half of the population is settled in urban centers; this ratio is increasing day by day owing to privation of facilities and rural poverty. Khairpur district is the 5th largest urban area in Sindh, and growing rapidly, it has eight talukas 76 Union councils, 11 towns, and 6800 villages with 2.4 million population in 2017, a low percentage of the population is settled in urban areas which is 32.3%. But a rapid increase in urbanization has been observed in the last 10 years. A huge number of flood effectiveness shifted from villages to cities during the super flood 2010. Agriculture is the primary economic activity of this region, Date palm, cotton, sugarcane, banana and strawberry are the main crops. Due to unexpected population growth, the housing societies are developed around the main cities of District Khairpur. All those housing societies are developed over the agricultural land, which causes socio-economic deprivation in the research area. The study shows, the rapid urbanization and its impacts on agriculture land in the district.

Introduction

In 1900, all-inclusive, there were 6.7 rural residents to every urban dweller; currently, there is a smaller amount than one and predictions recommend nearby to three urban dwellers to two rural residents by 2025 (David & Gordon 2010). This has been underpropped by the speedy development in the economy of the world and the amount of gross world invention and of the thriftily active population functioning in services and industry meanwhile, most service and industrial creativities are in urban ranges (Bobyons, J.2004). Worldwide, the agricultural assembly has accomplished to meet the loads from a speedy growth in the amount of the labor force not producing nutrition and rapid variations in food loads towards more greenhouse gas emission-intensive food and liveliness. Nevertheless, hundreds of loads of urban residents face below nutrition nowadays, even though this is distant more connected to their absence of income than to a lack of volume to crop food (Yoshida, Set, et, al. 2019). Around very bulky urban population globally with profits so low that their nutritional and health status are at danger from any essential food value increase as come to be apparent with the increasing hunger amongst urban populations afterward the food price increases in 2007 and the first stage of 2008. UN predictions

propose that the world's urban population will develop by further than a billion people in the middle of 2010 and 2025, although the countryside population will barely raise at all. It is possible that the quantity of the worldwide population not making food will endure developing, like drive the number of central and upper-income customers whose dietetic selections are more get-up-and-go- and greenhouse gas emission concentrated and regularly extra land-intensive and wherever such variations in demand also carry main changes in the supply of chain and agriculture (U.N.O, 2019), (Heimlich & Brooks, 1993). Two crucial demographic variations currently in progress and probable to endure in the following few eras are the deterioration in population progression rates and the aging of the population. An aging people in more affluent nations may yield more individuals that need to and can live in rustic areas, nonetheless, this is best unstated not as de-urbanization but then again as the urbanization of rural regions, such people will also bunch around urban hubs with progressive medical facilities and other services that they need and worth (Lebedeva, 2008).

At present, the world population is growing rapidly, it was 750 million in 1950 and 7.8 billion has been recorded in June 2020 (Al-Thawwad, 2008). The data shows a fast grow-up graph of the world population. With the increase of population, Urbanization is also increasing rapidly. Asia is the most populous continent in the world and it is home to 54% population, but the urbanization ratio is lower than North America. In North America, 82% population is settled in urban centers owing to social, medical, and educational facilities. Except for this, the Caribbean region 81%, Europe 74% Oceania 68%, but the level of urbanization in Asia is 50% which is only higher to Africa (R.W.U.P, 2018), (Gomez-Villarino, & Ruiz-Garcia, 2021).

In the last 20 years, the migration from rural areas towards the urban area has been increased, but a sudden increase in this type of migration is observed during the flood 2010. A huge number of flood effectiveness shifted from villages to cities. There have been significant changes in land utilization. Land converted to urban uses is increasing. Energy and chemical fertilizers now come from urban centers, a huge number of workers, working for farmers belong to urban centers. (Orsini, F et al., 2014).

Literature Review

Population growth was recorded in Sindh since 1941, 4.1 million population was reported in 1941, 4.6 million in 1951, 6.4 million in 1961, 13.9 million in 1972, 19 million in 1981, 29.9 million in 1988 (Razzaq & Khalida 2012). 47.89 million in 2017 (PBS-2017). In terms of population and urbanization, Sindh is the most urbanized province, where more than 50% population is settled in urban sectors (GoP, 2002).

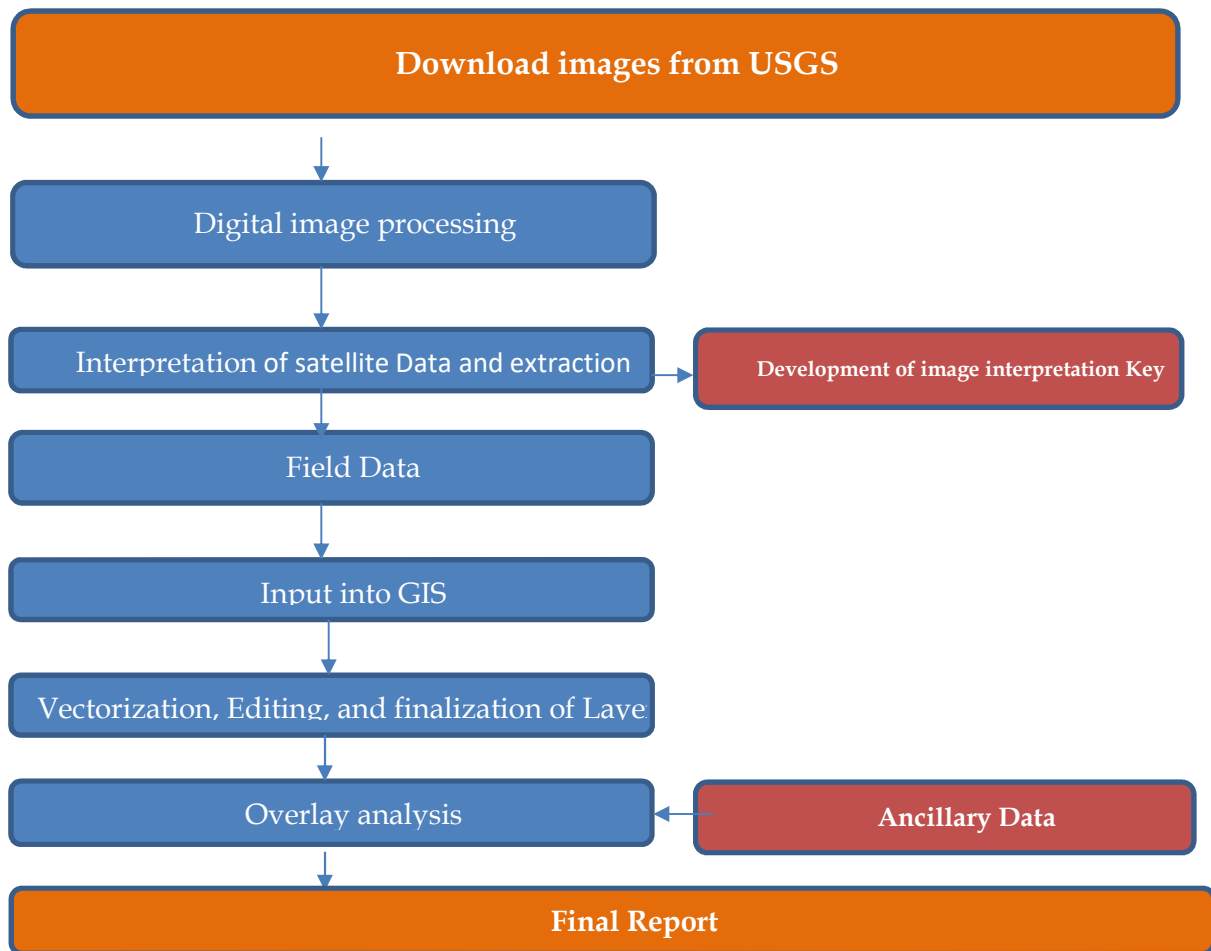
Geographically, the district is divided into two parts, Naro (Desert) (Eastern belt), and the fertile area (Western belt). The Naro is a barren land, contained dunes, connected with world-famous deserts Thar and Cholistan deserts, the population is very rare found in patches, an isolated dwelling type of settlement is found there. On the contrary, the western belt of the District is fertile, all the major cities of the district are available in this belt. Two main cities i.e Khairpur and Gambat taluka covered the 65% population of the district. The district comprised with 2.4 million population (PBS. 2017), but a low percentage of the population are settled in urban areas which 32.3%. But a rapid increase in urbanization has been observed in the last 10 years in the district.

In 2010, a large number of floods affected migrated from different districts of Sindh in Khairpur district. Two major cities of the district, Khairpur and Gambat cities were favorites owing to human basic facilities. But 18% of migrants were not shifted towards their own homes, the result was that housing societies were developed over the agricultural land.

Materials and Methods

The study was conducted to use the primary and secondary data collection techniques, the published data from research publications, periodicals of the relevant field were also collected. Different statistical models also were used in this study. Secondary data were provided by the Agricultural Land Conversion Project, based on an agricultural household survey of irrigated land conversion in the past years. The maps of the study area were prepared with help of ArcGIS 10.3, this research is based on satellite images of the last ten years (2010 to 2020) the images were downloaded from USGS earth explorer, Google Earth Pro, Google Earth Engine (Google time-lapse). The digital data were digitalized using GIS 10.3. A few software such as GIS 10.3, Microsoft office 2013 (Word, Excel) were used. (Chandio, N.H,et el., 2019). In the field, Garmin e Trex H, Global Position System (G.P.S), and Digital Camera were also used to record the coordinates and photographs. This method aims to prepare the latest maps with the help of GIS 10.3 and GPS (Elbeih. 2015). The methodological flow chart is also given below.

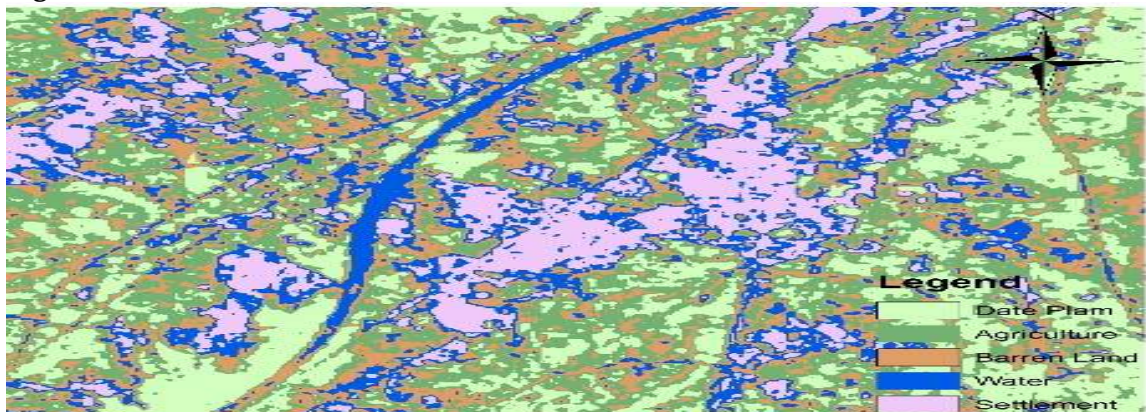
Flow Chart



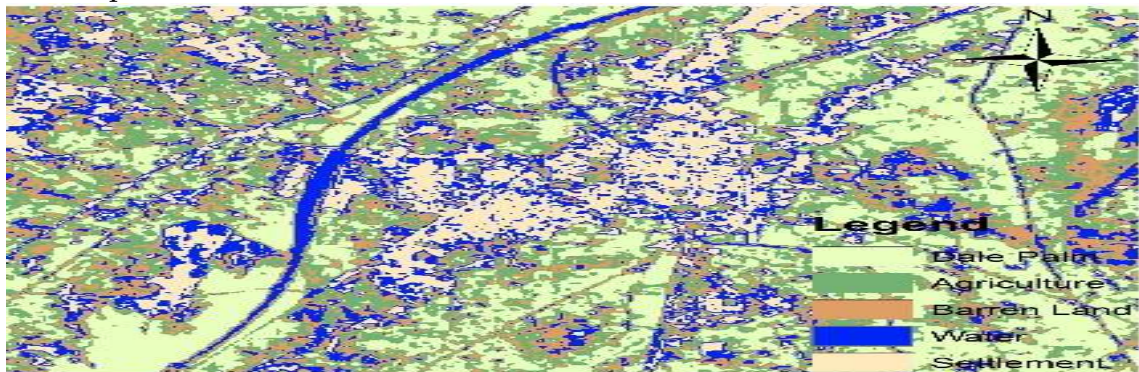
Results and Discussion

The results show that fast-growing urbanization was observed in district Khairpur from 2010 to 2020, a migration pressure and its impacts were also observed, the migration creates a few social issues, and were faced by district government i.e, law & order situation. Except this, the study has provided an opportunity to the government to start public awareness programs about the impact of rapid population on agriculture land. This study has also supportive to understanding the relationship between the agriculture and urbanization.

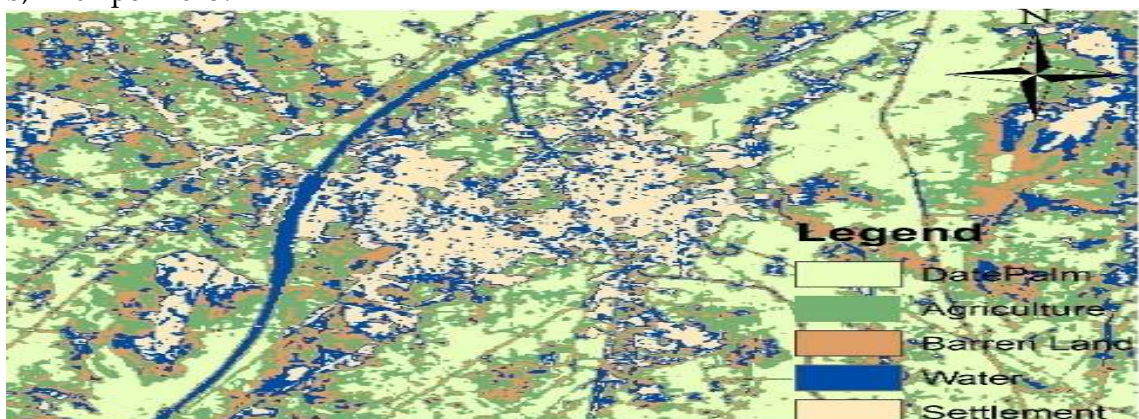
Fig: 3:



a, Khairpur 2010.

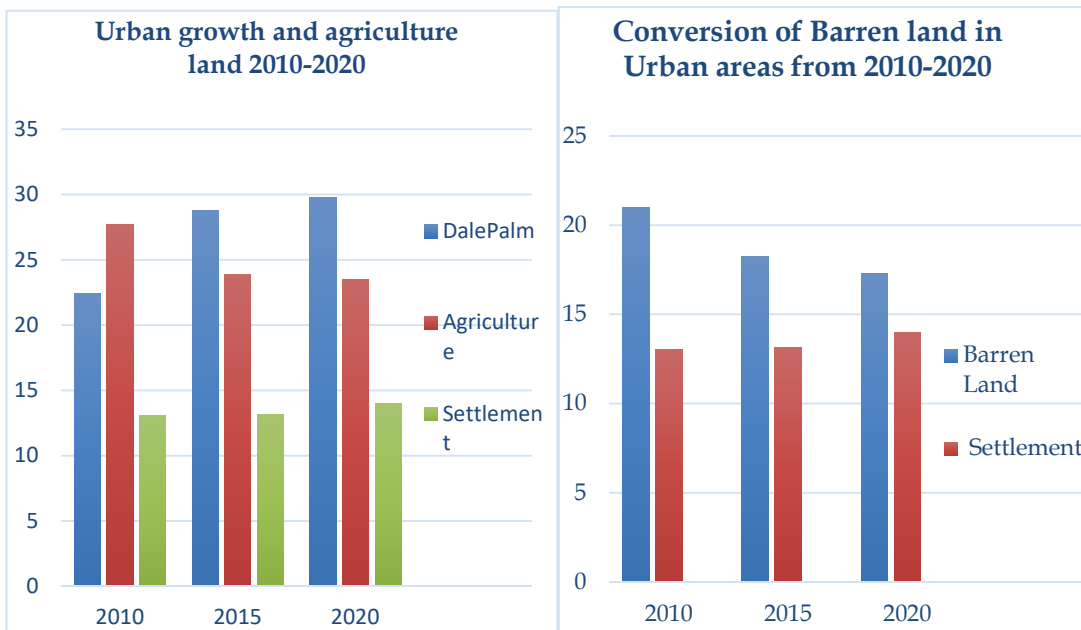
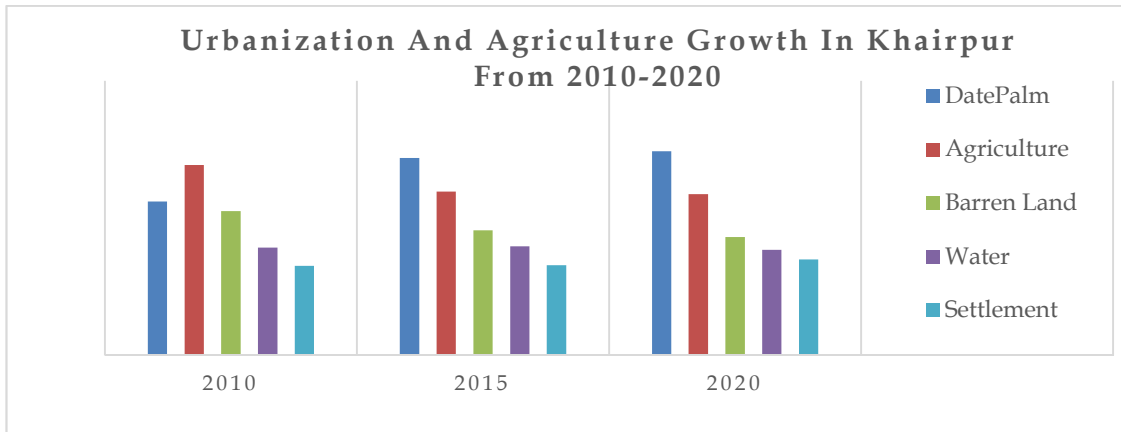


b, Khairpur 2015.



c, Khairpur 2020.

Image classification of Agriculture land conversion in urban sector in Khairpur taluka (2010 to 2020).



Urbanization in Taluka Khairpur (2010 -2020)

The satellite images for the selected period (2010, 2015, and 2020) were extracted by the help of GIS 10.3, and five classes were made namely, Vegetation, Date palm, water body, Barren land, and Settlement.

In 2010, The Agriculture sector was dominant as it covers 27.73 %, and the most dominant factor in agriculture was Date palm which covers about 22.44% subsequently Barren land covered about 21.2%, afterward water is an active class, as it covers 15.75% and at that time settlement covers 13.03 % respectively.

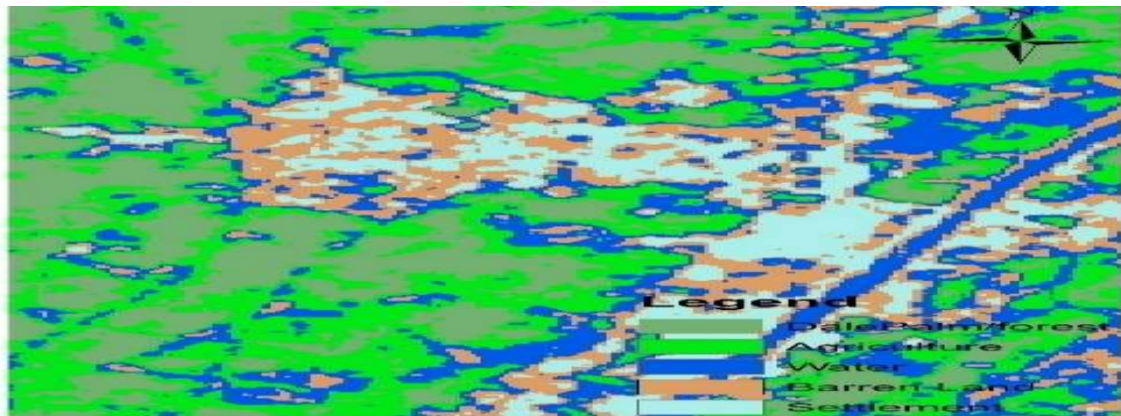
In 2015, again Khairpur is known as an agricultural district, Agriculture sector covers 25.90 %, and after that Date palm which covers about 23.50% then Barren land covers about 20.21%, there is no any change detect in water as it covers 15.70% and at that time settlement moves on to 14.69 % correspondingly.

In 2020, there is no countable loss in agriculture as it covers 24.5 %, Khairpur is a hub of Date palms as it covers most of the areas of city 21.72% consequently Barren land covers about 19.10%, water 15.51%, and this year settlement were increased as it covers 19.16 %.

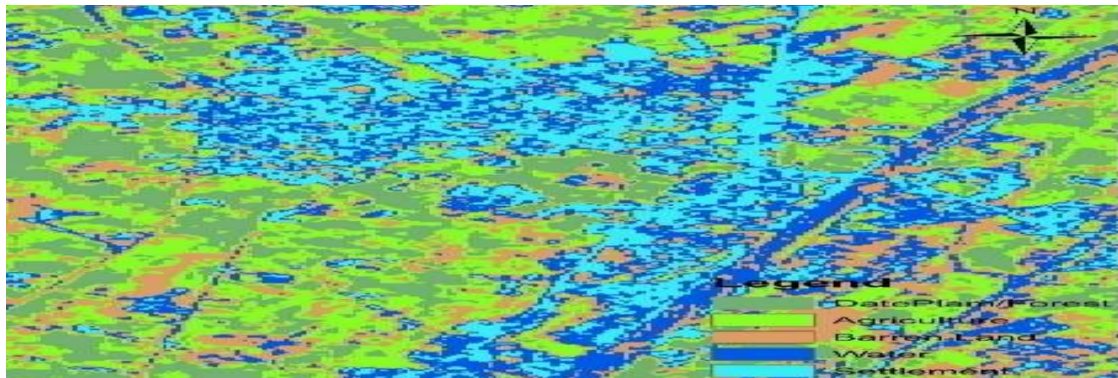
Urbanization in Gambat (2010 -2020)

The Gambat is one of the 8th Talukas and the second largest urban unit of the District, centrally located in dual carriage highway road and laying on the main railway line. Gambat has been more important owing to the crossing of the National High Way (NHA) amid the city, Gambat Institute of Medical Science (GIMS), and migration from rural areas towards the city was observed during the flood 2010.

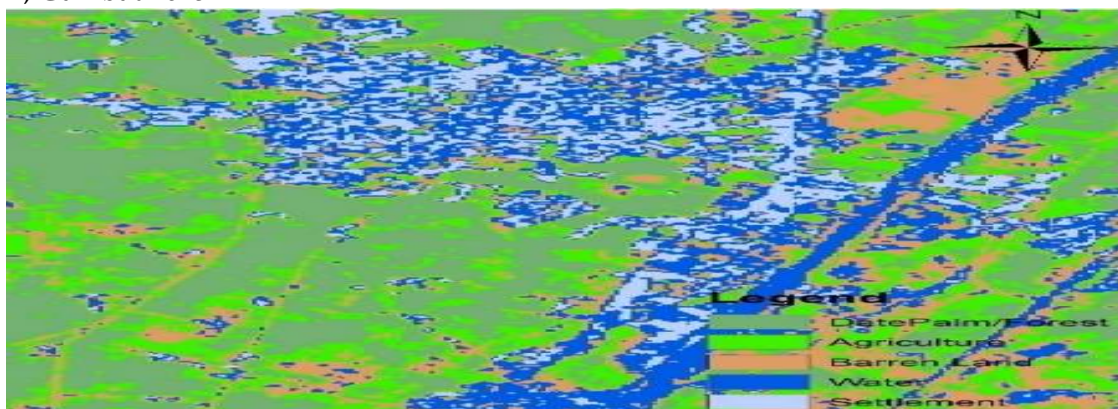
Fig: 4:



A, Gambat 2010



B, Gambat 2015

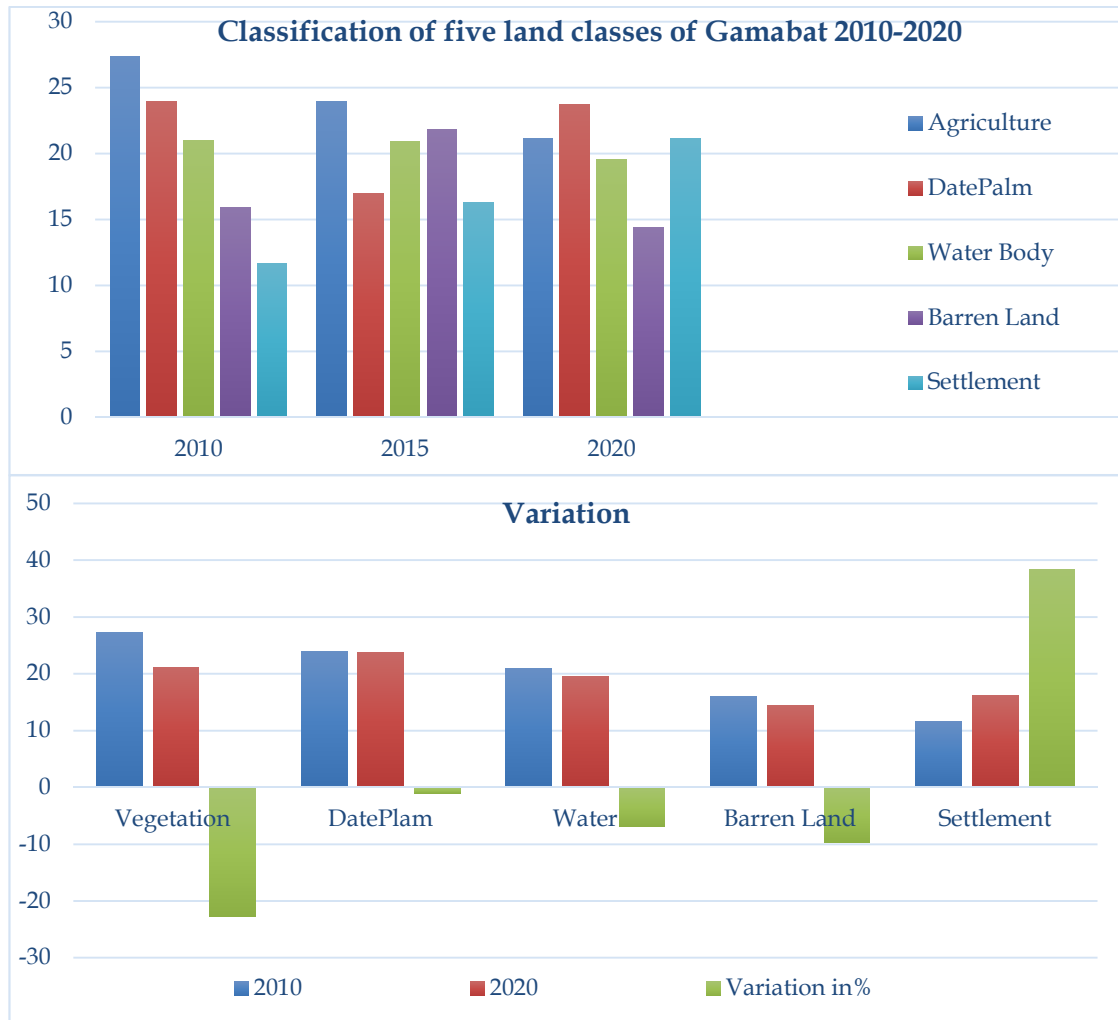


C, Gambat 2020.

Image classification of Agriculture land conversion in urban sector in Gambat taluka (2010 to 2020).

In 2010, the satellite images for the selected period (2010, 2015, and 2020) were extracted, and five classes were made namely, Vegetation, Date palm, water body,

Barren land, and Settlement. In a same year, the Agriculture land was lead as it insurances 27.37 %, and the utmost dominant influence in agriculture was Date palm which covers about 24.01% afterward Barren land covers about 15.94%, water is an active class which covers 21.0% and at that time settlement covers 11.68 % correspondingly.



In 2015, again Khairpur is Known as an agronomic district, Agriculture sector covers 23.94 %, and Date palm which covers about 16.99% then Barren land covers about 21.85%, there little bit change observed in water shed areas, it covers 20.95% and at that time settlement increased significantly as it covers 16.27 % respectively.

In 2020, There is variation in agriculture growth as it covers 21.15 %, afterward Date palms cover most of the parts of the district as it covers 23.76% There is a countable loss in Barren land as compared to last five years as it covers about 14.38%, water 19.55%, and this year settlement were increased as it covers 21.16 %.

Spatial Variation

Change detection constructed for a whole period of the study area that can be summarized as follows: 27.73 %, 25.90 %, 24.5 %, 27.37%, 23.94%, 24.5%, of land under Agriculture, Date Palm, water body, and barren land areas respectively in 2010 remained under the same land use and land cover category in terms of percentage in 2020. And change detection for settlement summarized as follows: 13.03 %, 14.69 %, 19.16 %, 11.68 %, 16.27 %, and 21.16 %.

Conclusion

Pakistan is a county, which is facing a fast-growing population, which creates the issues of food security. 220.9 million Population of the country depends on 49.09 percent area of Pakistan, which is under cultivation. This agricultural area is under the threat of Housing Societies. Fast urbanization in Khairpur may issue food security problems, which may cause social imbalance. If measures are not taken to secure the future of agriculture sector.

Suggestions

The economy of the district is based on agri-business, the district government and stockholders are suggested the following suggestions:

1: 26.6 percent area of the district is under cultivation, 16.7 percent area of the district is barren owing to water scarcity, and remained 43.3 percent area is under the dunes.

2: Irrigation, Agriculture departments, Government of Sindh, and district government have suggested irrigating the 16.7 percent area to manage and assure the availability of water to increase the agricultural land.

3: Government assure the stop the migration from rural towards to main cities of District Khairpur and provide the Basic-Human-Facilities like drinking water, health, education, entertainment facilities, electric availability, and utility stores may introduce in rural areas.

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