



Topic: Cropping pattern and Groundwater: A study of Panipat District of Haryana

“Mahima” Department of Geography, M.D.U. University Rohtak

Abstract: Over the last 20 years, major changes have occurred in agricultural activities - cropping patterns, crop combination and land use in Panipat district. Due to expansion of ply board industries in the region the area under wheat and rice has been replaced by new crop named Poplar (tree). The crop combination of the village i.e. sugarcane-wheat-rice in 1990-1992 has been replaced by sugarcane-wheat-poplar in 2014-2016. Increasing cropping intensity has experienced a change in accordance with decline in waterlogged area. In fact, sugarcane is water demanding crop but the groundwater has not depleted due to the location of village along Yamuna River. In this village shallow water is not suitable for drinking purpose from last few years due to the excess use of chemical fertilizers and insecticides in the agricultural field and the leaching of contaminated water of Panipat city and industrial waste in Yamuna River. In shallow ground water conductivity and TDS is high and turbidity and DO is low from the normal values. The village has sandy and salty loam soil with low organic carbon, phosphorus, sulphur and medium potash contents.

ISSN 2454-308X



Key Words: Crop pattern, crop combination, crop intensity, soil, ground water.

Introduction: Agricultural development is an interlinked process of agro climatic condition, implementation of modern inputs in farming related to high yielding varieties of seeds, chemical fertilizers, insecticides, herbicides, pesticides and irrigation. The scope for expanding the net sown area having already reached a saturation level in study area and the potential for raising the yield nearly exhausted in many crops and regions, stepping up of the incidence of multiple cropping will be necessary to augment agricultural production (Hayami et al, 1971). Both human and environmental factors contributed to the intensification process and changing cropping patterns remain central to it (Ali, 1987). Expansion of new crops will change the existing cropping patterns and increase total agricultural output although productivity per agricultural worker may tend to decline as more and more family laborers would engage in farming (Brush and Turner, 1987; Grigg 1982).



Objectives: To examine the change in land use and cropping pattern in the Panipat District since 1990-1992 and 2014-2016.

Panipat district: Panipat district has five blocks namely, Panipat, Madlauda, &rana, Samalkha and Bapoli with an area of 1249.88 sq. km. In Panipat district Israna block recorded minimum and Panipat block recorded maximum fluctuation In pre-monsoon and post monsoon periods. The depth of water level in Israna block varies between 3.87 and 6.65 metres in June 1984 and 2017 respectively during pre-monsoon .whereas the depth of water level ranging between 3.01 and 5.30 metre in October 1984 and 2017 respectively during post monsoon period.

Changing Cropping pattern and crop combination during 1990 – 1992: Sugarcane-wheat-Rice was crop combination designated in the study area by Doi's techniques. Sugarcane was main crop in 1990-1992 and covered 41.54 percentage of the total cropped area in 1990-1992. Wheat was next highest crop in 1990-1992 and covered 28.12 percentage of total cropped area, and followed by rice in 1990-1992 (16.72 percent). Next it was fodder crop. Pulses, vegetable (methi), oilseeds, garlic and potatoes were the other minor crops and covered the 13.62 percentage of the total arable land.

Changing Cropping pattern and crop combination during 2014 – 2016 In 2014- 16 three crop combination i.e. sugarcane-wheat- poplar is designated in the study area. Rice crop is replaced by poplar trees. Sugarcane is major dominant crop and covered 48.63 percentage of the area .The area under Wheat crop decreased from 28.12 to 18.84 per cent in 1990-1992 to 2014-2016 respectively. In 2014-2016 the area under rice crop has decreased by 10.8 per cent and it is not included in crop combination. Therefore, in 2014-2016 poplar trees is considered as a dominant crop and covered 15.50 per cent of the total cropped area, it is also grown with the combination of wheat - poplar, halide-poplar and fodder- poplar. Pulses, garlic, oilseeds are the other minor crops. These crops cover 1.36 per cent of the area. An arable land increased by 9.41 per cent in 2014-2016 from 1990-1992.

Cropping Intensity: Cropping intensity of the study area has been increased by 185.40 to 194.42 per cent from 1990-1992 to 2014-2016 respectively. It is increased by 9.02 per cent. It is due to increasing in the cultivated land and declining in the waterlogged area in the study area.



Single cropped area was 34.97 in 1990-1992 and double cropped area is 64.83 per cent per cent in 2014 - 2016. There is decrease in single cropped area by 1.16 per cent in 2014-2016 and double cropped area is increased by 0.91 per cent in 2014-2016.

Results of soil and Ground water: In the study area pH and EC are (Normal), OC, Sulpher and Phosphorous are (Low) and Potash is medium in soil. The results of deep ground water have been recorded that is pH 7.89 pH (normal), conductivity 0.49 mS (0.8 mS normal), TDS (Total dissolved solvent) 0.31ppt (0.20ppt normal), turbidity zero ntu (0 -2 ntu normal) and DO (Dissolve oxygen) 5 ppm (5-8 ppm normal). In the ground wa ter TDS is high. The deep water is fine for drinking and agricultural purposes. The results of shallow ground water have been recorded i.e. pH 7.21 conductivity 1.16 mS, TDS 0.74 ppt, turbidity zero ntu and DO 4.8ppm. Only pH is normal in shallow water, conductivity and TDS are high, DO low and turbidity is normal. Thus the shallow water is not good for drinking. It is usable for irrigation and washing purpose.

Cropping pattern according to size of holding: In marginal size of holding, farmers have sown all type of crops rather than in small and medium size of holding. Pulses is absent in small and medium size of holding.

Conclusion: Over the last 20 years, major changes have occurred in agricultural activities - cropping patterns, crop combination and land use in Panipat district. Expansion of new crop (poplar tree) has changed the existing cropping pattern. Poplar trees are also grown with the combination of rabi crops. Due to its ecofriendly nature with other crops, they shelter their leaves in winter season as a result rabi crops (wheat etc.) will receive good sunshine for the growth of plants. The soil will also get enriched by the decomposition of the leaves. Poplar trees will help in storing the irrigated water due to the spreading of fallen leaves on the agricultural field. Moreover, poplar trees will mature within 4-5 years. The wood of poplar will be ready for plyboard industries in the region. Farmers attain more profit and feel comfort with the cultivation of poplar trees. Cropping intensity has increased. Single cropped area has decreased whereas double cropped area has increased therefore multiple cropping system is popular in the village. Net cropped area has increased steadily with the corresponding decline in waterlogged area.



Reference:

- Ali, Abu Muhammad Shajaat (2002): “An Ecological Explanation of Recent Changes in Cropping Patterns in Bangladesh”, National Geog.
- Carlyle, William J (2002): “Cropping patterns in the Canadian Prairies: thirty years of change”, The Geographical Journal, Vol. 168, No. 2, pp. 97 – 115.
- Sharma, T.C. (1997): “Trend in Cropping Intensity in Karnataka: A Regional Profile”, Transactions of the Institute of Indian Geographers, Vol.19, No. 1, pp.17 -30.
- Singh, Jasbir and Dhillon, S. S. (2004): “Agricultural Geography”, Tata McGraw – Hill Publishing Company Limited, New Delhi.
- Singh, Jasbir and Kaur, D. (1990) : “Fluctuations in ground water table and its impact on crop intensity/ cropping pattern in Jagadhri Tehsil (Ambala District)”, Unpublished M.Phil.. Dissertation
- Sharma, Vijay Kumar and Kaur, D. (2007): “Groundwater and Agricultural Development in North Eastern Haryana (1970 – 2003)”, Unpublished Ph.D. thesis.