

EFFECT OF CHEMICAL FERTILIZERS ON AGRICULTURE LAND AND PRODUCTION OF CHARKHI DADRI DISTRICT.

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ABSTRACT:

Nutrient deficiency in soil of Charki Dadri District is met by various chemical fertilizers and pesticides. The demand for food products has increased due to the ever increasing population pressure in the district. The existence of human civilization is not possible without food. Without agricultural products, the maintenance of population cannot be imagined. New Modern technology techniques are being used in agriculture for the supply of food grains. Chemical fertilizers and pesticides have provided to be a panacea for farmers as production has increased rapidly due to their use but over time its negative effects are also visible which are important for researchers to analyze and evaluate. This research paper analyzes how increase the use of chemical fertilizers in Charkhi Dadri district from 2005 to 2017 and what is the effect on its soil health and production. A comparative format of table of chemical fertilizers use in agriculture in different years has been presented. So that in the present scenario, the use of chemical fertilizers can be analyzed and the fertility potential of the soil can be ascertained. Secondary data has been used to present this research paper.

I. INTRODUCTION:

More than 60% of rural households in India are mainly dependent on agricultural livelihoods. Therefore, emphasis was put on increasing production by using chemical fertilizers. Every year 32.4 million tones of fertilizer is made in India. India ranks fourth in the world in the use of agricultural chemical. In India 60% of pesticides, 18% of fungicides, 19% of weed pesticides and other Gap protection products are being used every year. After 2001, when the negative effects of Chemical fertilizers started coming out, the trend of organic manure and bio-products has been increasing continuously among farmers. Plants need 17 elements for their growth. Some of these main elements are phosphorus, nitrogen potash, hydrogen, carbon and oxygen etc. Plants make food for their growth by using photosynthesis method which uses carbon dioxide and in respiratory they use oxygen in the atmosphere and nutrients and water take from the land, so it is necessary to have proper nutrients in the land. In Charkhi Dadri district, nitrogen, potash and phosphorus is being, used to increase fertility of soil.

There is a high requirement of nitrogen and phosphorus in Indian soil, so fertilizer industries have developed rapidly in India. In 1980-81, 21.61 lakh metric ton nitrogen was produced which has increased to 121.75 lakh metric ton in 2010-11. Similarly, the production of phosphorus was 8.41 lakh metric ton in 1980-81 which increased to 45.32 lakh metric ton in 2010-11. Still, the country has to import chemical fertilizers and pesticides. Two-third of the total chemical fertilizers of the country are being used only in the Rabi crop.

STUDY REGION:

Charkhi Dadri is an inter-state district located in the southern part of Haryana. Whose border is with Bhiwani, Mahendergarh, Rohtak, Jhajjar and Rewari. It is 96 kilometers from the national Capital Delhi and 285 kilometers from Chandigarh, the capital of Haryana and connected to the capitals by road and railways. Charkhi Dadri district is located on National Highway 148B which goes from Kothputla to Bathinda. The latitudinal extension is located between 28°35' to 28° 59' northern latitude and the longitudinal extension 76°16' to 76°27' eastern longitude. Based on the data of year 2011 the area is 1370.59 km² and the total population is 5.02 lakhs. Which has 2.65 lakh males and 2.36 lakh females. The main crops of Charkhi Dadri district are wheat, mustard, millet, cotton and rice.

Here irrigation is done through canals and tubewells. It is a region of semi-arid climate. The average annual temperature here is 24.6° C and the average annual rainfall is 735 mm.

Objective:

Study of effects on soil health and production with increasing use of chemical fertilizers.

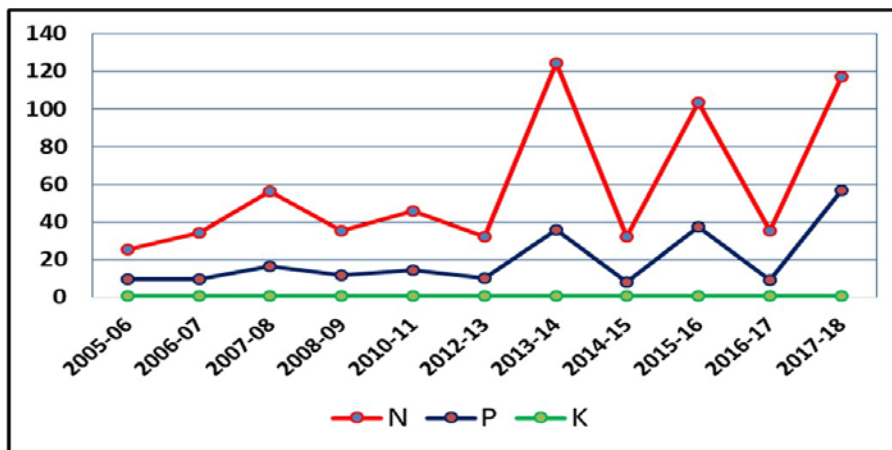
Database and Methodology:

The data is presented with the help of the table and table is prepared with the help of MS Excel. With the help of graphs increasing use of chemical fertilizers and crop production per hectare has been shows. On the basis of secondary data production per hectare of major crops of the district has been determined. The ratio of chemical fertilizers used in crops has been extracted.

II. RESULTS AND DISCUSSION:

A study of 14 years of data has shows that there is no balanced use of nitrogen phosphorus and potassium (i.e. N-P-K ratio) in the study region. Chemical fertilizers are being used in Charkhi Dadri district is more than balanced ratio 4.0 : 2.0 : 1.0. Graph shows that a very high proportion of chemical fertilizers are being used and this ratio is constantly increasing.

Diagram 1: Fertilizer Ratio in Charkhi Dadri District.

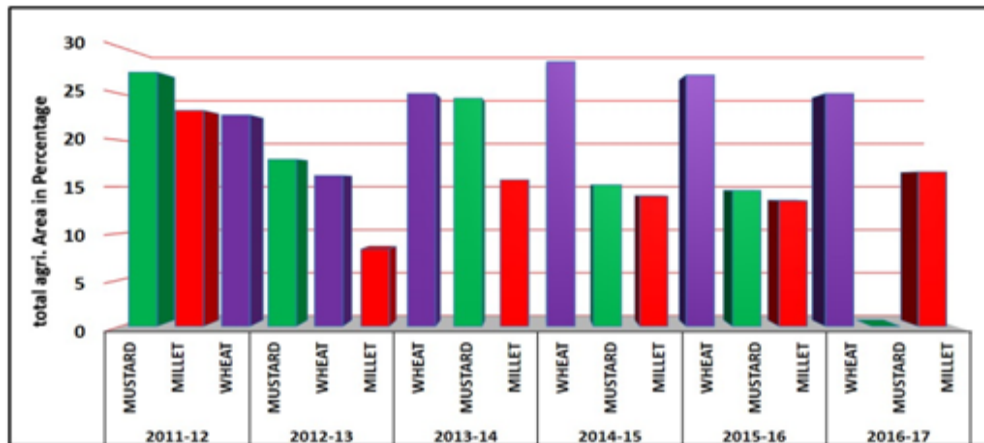


Graph shows that the use of chemical fertilizers in the year 2005-06 was in the ratio of 25.3 : 9.8 : 1.0 which has come to 117.0 : 56.7 : 1.0 by 2017-18. It means the consumption of chemical fertilizers has increased in the ratio of 91.7 : 46.8 : 1.0 in 14 years. Farmers are increasing the use of chemical fertilizers due to lack of information. While more production is dependent on fertility of the land and irrigation facilities. With the use of more chemical fertilizers, the land is becoming barren and the ground water level is going down. Where as Charkhi Dadri district comes under the low rainfall area of Haryana. Negative effects on the agricultural ecology of the district are evident due to the use of unbalanced N-P-K.

Various studies have shows that by consuming more chemical fertilizers, as the vegetables grow overnight, eating this poisonous grain can also speed up cancer cells in the body. The proportion of chemical fertilizers in the country is being the highest in the region of Punjab, Haryana, where the number of cancer patients is the highest. Farmers have inadvertently been poisoned in the cycle of over production, due to which they are suffering immense financial and physical losses. Appropriate data has not been found for the study of what effect chemical fertilizers have had on the soils of Charkhi Dadri district, but the proportion in which the uses of chemical fertilizers is large, the production has not increased in that proportion. It is clear that the fertility of soil is gradually decreasing.

Therefore, it is important that chemical fertilizers should be used in balanced quantities in future and emphasis should be placed on sustainable agricultural development.

Diagram₂ : Area of Major Crops in Charkhi Dadri district.



As per basis of diagram 2 in 2011-12 mustard production was 27.29% of total cultivated area which reduced to 13.23% in 2016 and in 2011-12 millet production is 23.19% which decreased by 9.69% in 2016 and wheat production 22.7% of total cultivated area in 2011-12 which increased by 4.3 in 2016. Basis on data analysis new irrigation techniques, chemical fertilizer, high insecticide and advanced seed were uses agriculture which lead to change in agriculture pattern. In Charkhi Dadri district in 2011 mustard production as per hectare was 1.2 tons and it was 2012-13, 1.6 tons and in 2016, 1.5 tons. Production per hectare is not increasing in the proportion to fertilizer.

Production of millet as per hectare was 1.8 tons and in the year of 2016 is 1.1 tons. A comparative study of the data shows that from 2011 to 2017, the production per hectare of millet declined on an average in Charkhi Dadri district. The major crop production of wheat was 4.3 tons per hectare in year 2011, which was 3.9 in the year 2012-13, 4 tons in the year 2013-14, 3.3 tone in the year 2014-15, 3.3 tons in the year 2015-16 and 4.3 tons in 2016-17. Seven years of data analytical study has shown that the production per hectare of wheat is either decreasing or remains the same. The above study has shows that due to excessive exploitation of land, the production capacity of agricultural land is decreasing and also the quality of land and food grain.

Table -1 : Yield variability of various crops for the two different phase in Charkhi Dadri district.

First phase 2004 to 2010				Seond phase 2011 to 2017			
Yield kg. ha ⁻¹	Maximum value	Minimum value	Mean	Yield kg ha ⁻¹	Minimum value	Maximum value	Mean
Wheat	2974.5	3684.9	3329.7	Wheat	2993.7	3900.8	3447
Mustard	960.9	1394.5	1177.7	Mustard	907.1	1723.6	1315.35
Millet	938	1298.3	1118.15	Millet	635.0	1632.9	1133.95

Source : Computed by Authors.

Table 1 shows the production changes in major crops of the study area. It is divided into two phases, the first one is from 2004 to 2010 and the second phase is from 2011 to 2017. The production of major crops is extracted in kg/ha⁻¹. In each phase the value of the lowest production year and the year of the highest production is written in kg ha⁻¹.

The mean was determined from both values. In the first phase, the yield of wheat has been increased 710.4 kg/ha⁻¹ and in the second phase 907.1 kg/ha⁻¹ has been increased. In the last 14 years, the yield of wheat has been increasing at a decreasing rate. It shows the poor health of the soil. Use of chemical fertilizers in the year 2005-06. N-P-K was 32.6, 12.7, 1.2 kg/ha⁻¹. While the use of N-P-K is 69.59, 17.59, 1.95 kg/ha⁻¹ in the year 2016-17 an increase of 36.9, 4.9, 0.6 kg/ha⁻¹ has been recorded in the use of N-P-K.

Consumption of nitrogen has increased enormously. Plants consume only 30% nitrogen in their uniforms, the rest of the nitrogen either goes into the ground or reaches the atmosphere by evaporation. Excessive use of nitrogen is causing land and air pollution. Contaminated ground water is being used in agriculture which is a danger to agricultural ecology. Drinking contaminated water reduces the red blood count in the body. For the safe future of agriculture, chemical fertilizers and pesticides will have to be used oppositely on basis of soil testing. The toxic cycle of demand for more chemical fertilizer and more water is enough to ruin the agricultural system of Charkhi Dadri district.

Table -2 : Gross cropped area (000 hectares) and percentage of gross cropped area under different crops in Charkhi Dadri district.

Crop	2004-05		2008-09		2014-15		2017-18	
	GCA	%	GCA	%	GCA	%	GCA	%
Wheat	44.6	20.83	51.5	22.85	63.4	28.43	47	13.5
Mustard	67.5	31.88	51	22.63	33.9	15.2	52	14.9
Millet	58	27.39	53.8	23.87	31.4	14	40	11.4
Cotton	18.8	8.88	6.1	2.7	21	9.4	27	7.75
Rice	4	1.8	4.6	2.04	6.5	2.9	9	2.58
Jau	.2	0.09	3.9	1.73	5.8	2.6	2	0.57
Jowar	3.2	1.51	4.2	1.86	2.2	0.9	-	-

Source : Computed by Authors.

As per table 2 the gross cropped area of wheat has been increased from 2004 to 2015 because the yield of wheat is high therefore farmers are encouraged to produce wheat. The GCA of wheat was 44.6 (ooo hect.) in 2004 which increased to 63.4 (ooo hec.) in 2015. Wheat was produced in 2004 on 20% of the total agricultural area which increased to 28.43% in 2015, wheat area increased by 7.6% and the cotton area has also increased. Whereas the area of millets and mustard has decreased. To increase production, farmers are using high chemical fertilizers in wheat crop and wheat is a food crop due to which the human body is getting more poison. The effect of poison is directly on the brain due to which the decision making capacity of the people is decreasing.

The demand for chemical fertilizers and pesticides is highest for wheat crop in the study area.

III. CONCLUSION:

Unbalanced N-P-K is being used in Charkhi Dadri district due to which the soil health is continuously deteriorating therefore production is increasing at a decreasing rate. When more chemical fertilizer is applied, more irrigation has to be done, hence the water sources are depleting. If the situation is not rectified in time, the entire district will soon be declared a dark zone.

REFERENCES:

1. Pal, S.P. (1984), contribution of irrigation to agricultural production and productivity, National Council of Applied economic Research, New Delhi.
2. Aldwell, CR, DJ Burden and A.M., Sherwood, (1983). "Impact of agriculture on round water in Ireland," Environmental Geology, 5:39-48.
3. Alfoldee, Al, 1983, "topic 2: "Movement of nitrate and pesticides in the vegetation cover- soil ground water and Rock system and interaction, "Environment of Geology, 5:19-25.
4. Alford, H.G. and M.P. Ferguson (1982), "Pesticides in soil and Ground water." Proceedings of a conference, Department of Agricultural Sciences. University of California (Berkeley).
5. Patra Suman. Mishra Pulak, Mahapatra. S.C., Mithun. S.K., "Modelling impacts of chemical fertilizer on agricultural production: a case study on Hooghly district, West Bengal, India," Dec. 2016: Modeling Earth systems and Environment 2(4).
6. FAO (1998) Guide to efficient plant nutrition management.
7. DSDB (2004-2017) District statistical Data book, Bhiwani and Charkhi Dadri, Development and planning department, Government of Haryana.