



ultimately the production in long run is reduced [3]. It has resulted in leaching of chemical into the surface and ground water around study area is although most of the population depends upon agriculture produce such as wheat and Jowar, maize since long back. However, generation after generation the soil supporting to wheat and Jowar, maize is utilized for production with no any scientific analysis. So, this research will add scientific knowledge about soil supporting to wheat and jowar and maize.

## Materials and Methods

**Study area:** Baramati tehsil, belong to western part of Maharashtra. It is belonged to Pune division. Baramati tehsil is the fourth largest city in Pune district. Baramati tehsil lies between 18°04' to 18°32' north latitude and 74°26' to 74°69' east longitude. It is located at altitude of 550 meter above the sea level [4].

**Collections of soil samples:** Soil samples are collected December 2020 to February 2021. Each site 2 crop plants soil samples were collected representatively in the depth of soil from different places of the tehsil. During survey Nira and Karha river basin area, water resources like lakes reservoirs, Nira left canal, dry area with less water resources selected. While collecting soil samples the upper layer of vegetation, surface litter, stones stubble if any were cleared away and then layer of soil immediately below (0-20 cm) was collected in sterile polythene bag, noted location site, date of collection, agriculture crop plants (Figure 1). All soil samples bring in laboratory removed debris, stones, grass and making soil samples ready for soil analysis like various parameter [5].

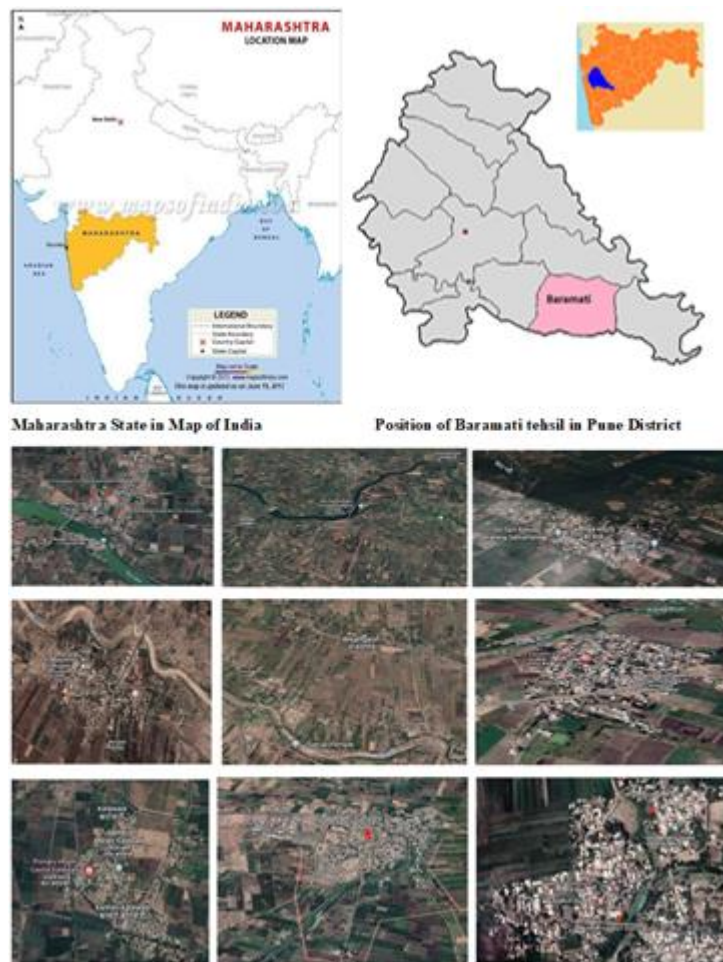


FIG. 1. Baramati Tehsil study area various sites satellite view.

## Physicochemical properties of soil

**pH:** The most significant property of soil is its pH level, its effects on all other parameters of soil. Therefore, pH is considered while analyzing any kind of soil [6]. If the pH is less than 6 then it is said to be an acidic soil, the pH ranges from 6-8.5 it's a

normal soil and greater than 8.5 then it is said to be alkaline soil.

**Electrical Conductivity (EC):** Electrical conductivity is also a very important property of the soil; it is used to check the quality of the soil. It is a measure of ions present in solution [7].

**Organic Carbon (OC):** Organic matter estimation in the soil can be done by different methods. Loss of weight on ignition can be used as a direct measure of the organic matter contained in the soil. It can also be expressed as the content of organic carbon in the soil. Organic matter/organic carbon can also be estimated by Walkely and Black, 1934.

**Nitrogen (N):** Total N includes all forms of inorganic N, like  $\text{NH}_4\text{-N}$ ,  $\text{NO}_3\text{-N}$  and also  $\text{NH}_2$  (Urea) N and the organic N compounds like proteins, amino acids and other derivatives. Depending upon the form of N present in a particular sample, specific method is to be adopted for getting the total nitrogen value. About 80% of the atmosphere is nitrogen gas. Nitrogen gas diffuses into water where it can be “fixed” (converted) by blue green algae to ammonia for algal use [8].

**Phosphorus (P):** It is one of the most important micronutrients essential for plant growth. Phosphorus most often limits nutrients remains present in plant nuclei and act as energy storage. In these methods, specific colour compounds are formed with the addition of appropriate reagents in the solution, the intensity of which is proportionate to the concentration of the element being estimated [9]. The colour intensity is measured spectrophotometrically.

**Sodium and Potassium:** Flame photometric method potassium present in the soil is extracted with neutral ammonium acetate of 1 molarity. This is considered as plant available K in the soils. It is estimated with the help of flame photometer. This is a well-accepted method (Table 1).

**Micronutrients (Fe, Zn, Cu and Mn):** The mean values of the micronutrients determined in the soils followed a decreasing order as  $\text{Fe} > \text{Mn} > \text{Zn} > \text{Cu}$ . Table 2 micronutrients estimated by using atomic absorption spectroscopy method (Figures 2-9).

TABLE 1: Physicochemical analysis of soil samples crop plants in study area.

Nira river sites soil analysis									
Sites	Crop plants	pH	E.C. $\text{ds.m}^{-1}$	O. C %	N $\text{Kg/ha}$	P $\text{Kg/ha}$	$\text{K}^+$ $\text{Kg/ha}$	$\text{Na}^{++}$ $\text{Meq/lit}$	$\text{CaCO}_3$ %
Kambleshwar	Wheat	8.61	0.96	0.69	166.00	6.30	848.00	16.86	16.32
	Jowar	8.36	0.77	0.66	159.00	5.40	365.00	11.04	6.12
Songaon	Wheat	8.36	1.50	0.54	130.00	8.20	499.00	12.71	13.77
	Jowar	8.49	1.16	0.54	130.00	5.19	426.00	14.90	12.24
Korhale (KH)	Wheat	8.41	0.52	0.81	195.00	5.30	1070.00	8.17	15.81
	Maize	8.33	0.45	0.99	238.00	6.19	976.00	8.02	19.89
Karha river sites soil analysis									
Sites	Crop plants	pH	E.C. $\text{ds.m}^{-1}$	O. C %	N $\text{Kg/ha}$	P $\text{Kg/ha}$	$\text{K}^+$ $\text{Kg/ha}$	$\text{Na}^{++}$ $\text{Meq/lit}$	$\text{CaCO}_3$ %
Morgaon	Wheat	8.05	0.97	0.48	115.00	4.10	613.00	5.68	15.30
	Jowar	8.15	0.89	0.63	151.00	4.40	452.00	6.76	13.77
Anjangaon	Wheat	7.91	0.74	1.02	245.00	8.20	2492.00	3.94	15.81
	Jowar	8.34	0.34	0.33	79.53	5.30	874.00	4.94	17.34
Gunawadi	Wheat	8.69	0.85	0.48	115.00	6.20	409.00	8.46	31.95
	Jowar	8.73	0.71	0.49	118.00	4.40	875.00	9.81	29.25
Nira left canal sites soil analysis									
Sites	Crop plants	pH	E.C. $\text{ds.m}^{-1}$	O.C %	N $\text{Kg/ha}$	P $\text{Kg/ha}$	$\text{K}^+$ $\text{Kg/ha}$	$\text{Na}^{++}$ $\text{Meq/lit}$	$\text{CaCO}_3$ %
Katewadi	Wheat	8.27	0.35	0.78	187.00	8.80	513.00	4.74	19.89
	Jowar	7.82	0.60	0.66	159.00	4.40	455.00	2.60	12.24

Pandare	Wheat	7.63	0.22	0.69	166.00	7.77	460.00	3.26	5.10
	Jowar	8.12	0.42	0.78	187.00	4.44	728.00	3.76	10.20
Vadgaon Nimbalkar	Wheat	8.4	0.97	0.6	144.00	4.20	449.00	6.69	12.75
	Maize	8.73	0.62	0.93	224	4.4	311	9.25	12.75
<b>Less water reservoir sites soil analysis</b>									
<b>Sites</b>	<b>Crop plants</b>	<b>pH</b>	<b>E.C. ds.m<sup>-1</sup></b>	<b>O. C. %</b>	<b>N Kg/ha</b>	<b>P Kg/ha</b>	<b>K<sup>+</sup> Kg/ha</b>	<b>Na<sup>++</sup> Meq/lit</b>	<b>CaCO<sub>3</sub> %</b>
Sawal	Wheat	8.12	0.47	0.72	173.00	8.19	750.00	4.54	14.79
	Jowar	8.25	1.26	0.36	86.76	6.41	470.00	7.19	16.83
Parawadi	Wheat	8.83	0.56	0.54	130.00	5.11	464.00	9.99	19.38
	Jowar	7.97	1.05	0.63	151.00	5.19	1253.00	10.17	13.77
Supa	Wheat	8.14	0.50	0.36	86.76	6.20	1260.00	4.35	9.18
	Jowar	8.31	0.24	0.27	65.07	7.19	381.00	2.51	8.67
Murti	Wheat	8.05	0.75	0.84	202.00	6.19	1587.00	4.16	6.12
	Jowar	7.96	0.94	0.69	166.00	6.30	1864.00	2.79	3.57
Lonibhapkar	Wheat	7.99	0.49	0.84	202.00	5.30	660.00	4.52	4.08
	Jowar	8.16	0.59	0.96	231.00	6.30	669.00	4.23	9.69
Waki	Wheat	8.20	0.87	0.63	151.00	4.40	517.00	6.86	22.44
	Jowar	8.02	0.91	0.72	173.00	4.40	398.00	5.03	19.38

TABLE 2: Micro nutrient analysis.

<b>Nira river sites soil analysis</b>						
<b>Sites</b>	<b>Crop plants</b>	<b>Micro elements</b>				
		<b>Fe (PPM)</b>	<b>Mn (PPM)</b>	<b>Zn (PPM)</b>	<b>Cu (PPM)</b>	
Kambleshwar	Wheat	0.45	0.09	0.01	0.09	
	Jowar	0.58	0.21	0.03	0.07	
Songaon	Wheat	0.94	0.17	0.03	0.16	
	Jowar	0.56	0.13	0.02	0.11	
Korhale (KH)	Wheat	0.86	0.22	0.06	0.18	
	Maize	0.29	0.21	0.02	0.16	
<b>karha river sites soil analysis</b>						
<b>Sites</b>	<b>Crop plants</b>	<b>Microelements</b>				
		<b>Fe (PPM)</b>	<b>Mn (PPM)</b>	<b>Zn (PPM)</b>	<b>Cu (PPM)</b>	
Morgaon	Wheat	0.41	0.12	0.01	0.06	
	Jowar	0.28	0.14	0.02	0.06	
Anjangaon	Wheat	0.13	0.08	0.09	0.14	
	Jowar	0.36	0.16	0.01	0.07	
Gunawadi	Wheat	0.33	0.41	0.02	0.08	
	Jowar	0.27	0.04	0.02	0.03	
<b>Nira left canal soil analysis</b>						
<b>Sites</b>	<b>Crop</b>	<b>Micro elements</b>				

	plants	Fe (PPM)	Mn (PPM)	Zn (PPM)	Cu (PPM)
Katewadi	Wheat	0.76	0.13	0.02	0.19
	Jowar	0.57	0.38	0.04	0.09
Pandare	Wheat	0.67	0.13	0.03	0.12
	Jowar	0.56	0.21	0.01	0.12
Vadgaon-Nimbalkar	Wheat	0.72	0.22	0.03	0.15
	Maize	0.85	0.26	0.05	0.16
<b>Less water reservoir soil analysis</b>					
Sites	Crop plants	Micro elements			
		Fe (PPM)	Mn (PPM)	Zn (PPM)	Cu (PPM)
Sawal	Wheat	0.47	0.10	0.02	0.06
	Jowar	0.61	0.22	0.09	0.10
Parawadi	Wheat	0.31	0.18	0.08	0.05
	Jowar	0.52	0.60	0.03	0.06
Supa	Wheat	0.30	0.15	0.02	0.07
	Jowar	0.37	0.07	0.02	0.02
Murti	Wheat	0.70	0.23	0.02	0.17
	Jowar	0.47	0.23	0.03	0.10
Loni-bhapkar	Wheat	0.27	0.09	0.02	0.08
	Jowar	0.28	0.18	0.01	0.07
Waki	Wheat	0.52	0.36	0.02	0.08
	Jowar	0.34	0.10	0.01	0.07

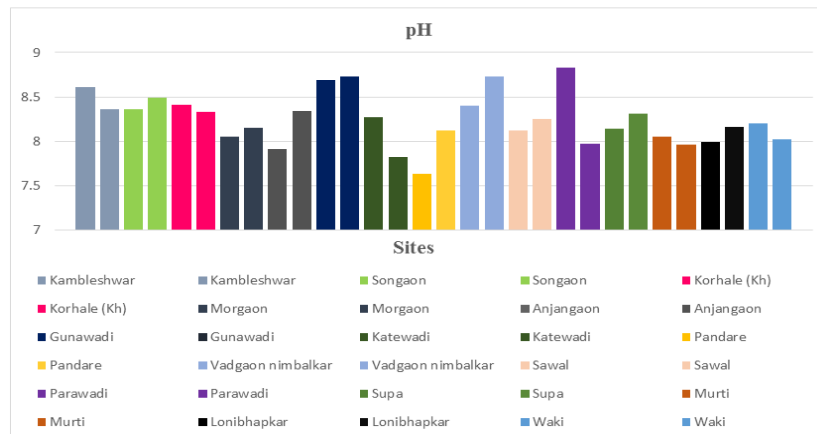


FIG. 2. pH in different sites.

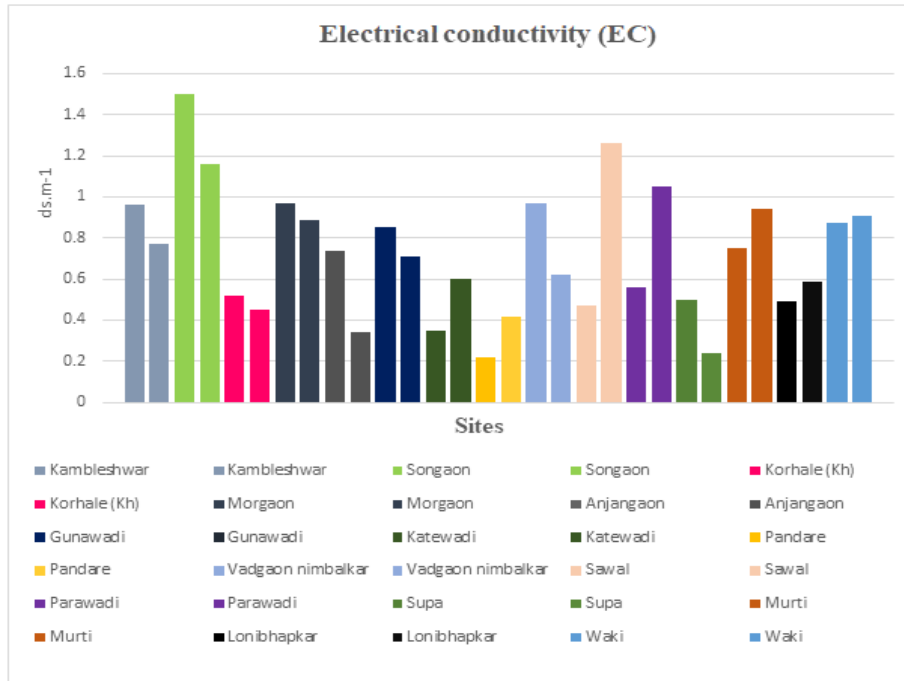


FIG. 3. Electrical conductivity.

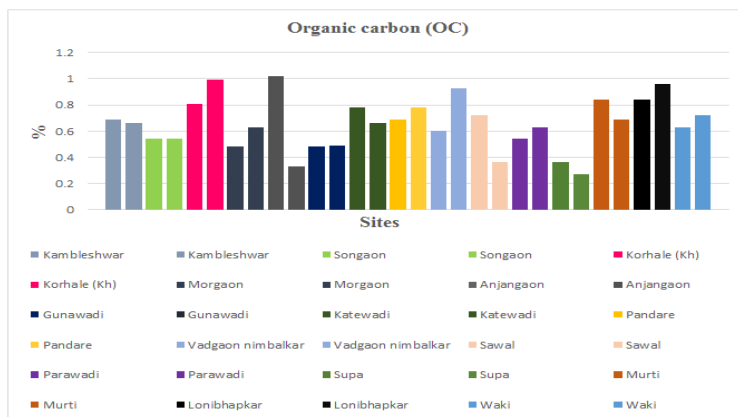


FIG. 4. Organic carbon.

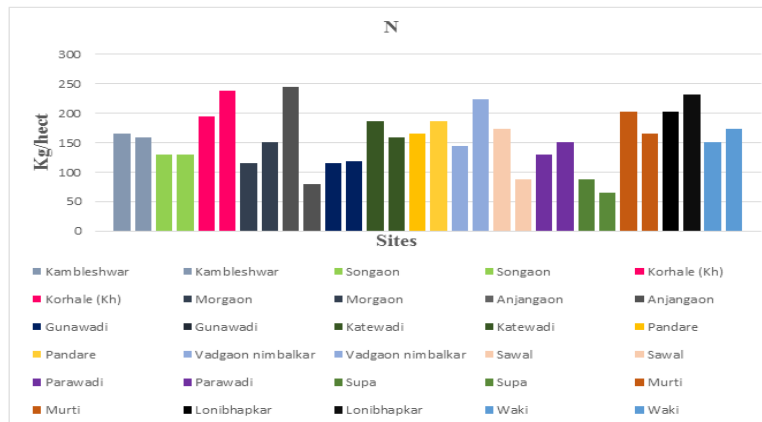


FIG. 5. Nitrogen analysis.

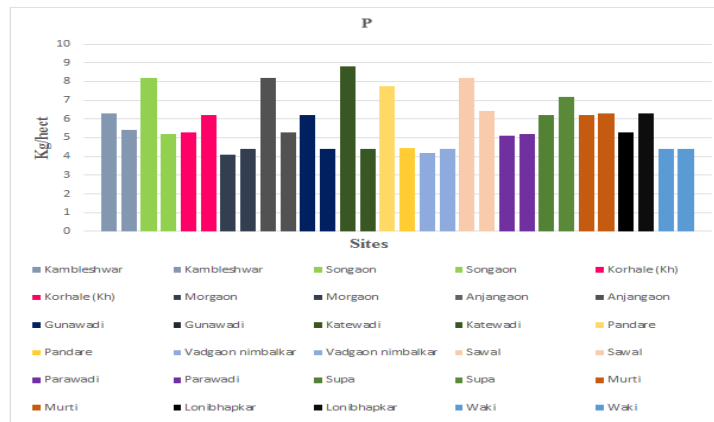


FIG. 6. Phosphorus analysis.

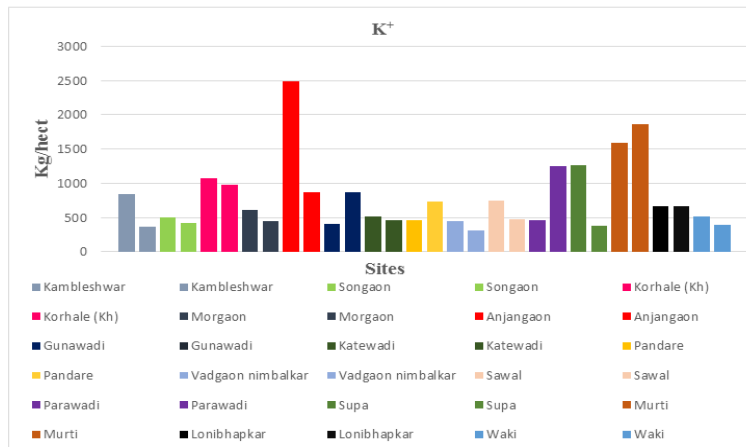


FIG. 7. Potassium analysis.

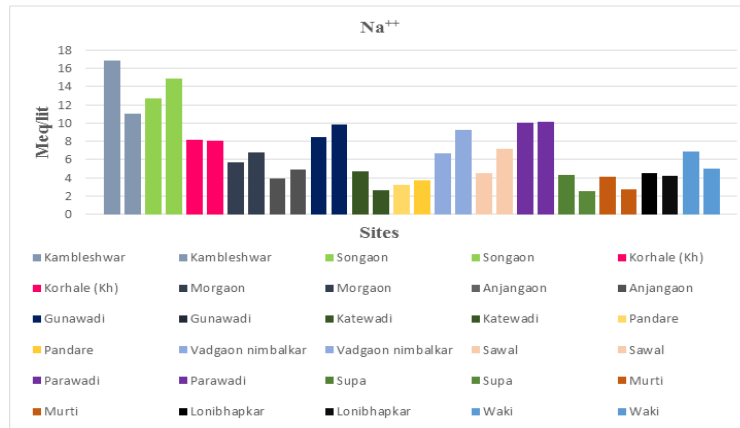


FIG. 8. Sodium analysis.

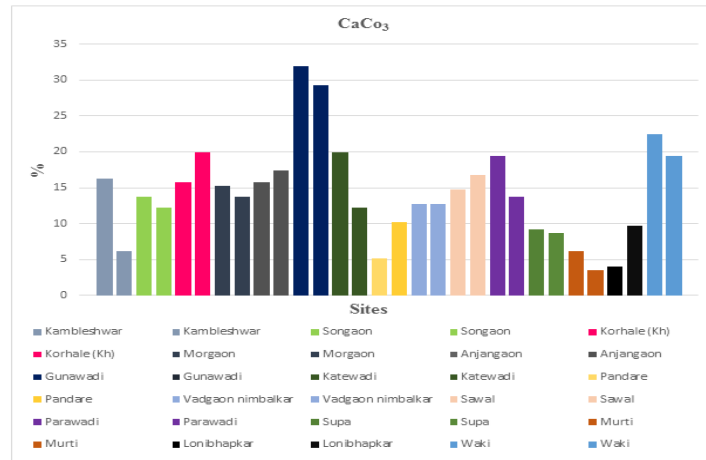


FIG. 9. Calcium chloride of analysis.

## Results and Discussion

In the present investigation study focus on the physicochemical analysis of a soil from crop fields in Baramati Tehsil region. During study preferred to investigate the soil samples for its physicochemical analysis of some parameters [10]. Total 30 soil samples collected from 15 sites during December 2020 to February 2021. Physicochemical characteristics of soil were assessed by laboratory analysis. A physicochemical study of soil is based on various parameters like soil pH, Electrical Conductivity (EC), Organic Carbon (OC), available Nitrogen (N), Phosphorus (P), Potassium (K), Sodium (Na), Calcium Carbonate (CaCO<sub>3</sub>) and micronutrients (Fe, Mn, Cu and Zn). Soil samples were analyzed for their physicochemical properties and their results were represented in Table 1, however, micronutrient analysis results represented in Table 2. All site soil samples in crop fields pH shows moderately alkaline to strong alkaline [11]. Organic carbon fluctuate ranges from  $\geq 1.00 \leq 0.81-1.00 \leq 0.51-0.80 \leq 0.41-0.50 \leq 0.21$  to 0.40. Nitrogen content shows  $\geq 140-280 \geq 140$ , phosphorus content shows  $\leq 8-14, \leq 7.00$ , kg/hector, potassium content  $\geq 300$  kg/hector shows all sites abundance in amount. All sites crop field's soils shows luxuriant amount of sodium content. CaCO<sub>3</sub> content shows medium to abundance in quantity in all sites. In case of micronutrients analysis shows as low ranges of  $Fe \geq Mn \geq Zn \geq Cu$  in ppm all sites crop fields soil samples.

## Conclusion

In this study soil physicochemical characteristics were assessed by laboratory analysis. Different locality maximum site crop field's soil samples show average electrical conductivity some sites soil samples show more than average electrical conductivity. In modern agriculture excess use of chemical fertilizers affects the pH, EC, Organic carbon, N, P, K, Na and CaCO<sub>3</sub>. More than average 1.00 Electrical conductivity which are harmful for germination. Due to overdose of chemical fertilizers its affects soil fertility resulted to decreases crop yields production.

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