Regeneration of Soil Contents Through Organic Farming in India

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ABSTRACT

Soil and water are the base resources of agriculture. The soil and water resource base for an average farm holding has declined considerably during the last five decades particularly from green revolution. Soil Degradation occurs when the soil is chemically or biologically altered by adding herbicides, pesticides, or toxic waste. Most of the reasons of soil degradation are man-made. Definitely the productivity of Indian agriculture has increased significantly and achieved the required development. But it is an unsustainable development of agriculture, which has led to the problem of soil degradation. Natural measures can prevent the pollution of natural resources. In this paper, researcher had considered only about the soil input and compares the soil contents from chemical farming method and organic method and trying to suggest remedial measures to regenerate the soil contents.

Keywords: Soil Degradation, Organic Farming Method, Vermi-fertilizers and Sustainable Development

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INTRODUCTION

Agriculture is playing a significance role in economy by giving its 14.4% contribution to India's GDP and by other significant contributions. Agricultural production and productivity are significantly influenced by man-made and natural inputs. Natural inputs include water, soil, and climate. Soil and water are the base resources of agriculture. The soil and water resource base for an average farm holding has declined considerably during the last five decades (Selvanrajan and Joshi, 2000), particularly from green revolution by intensive use of chemical inputs. Most of the reasons of soil degradation are man-made.

In this paper researchers had considered only about the soil input and compare the soil contents from chemical farming method and organic method and trying to suggest remedial measures to calm down the soil degradation.

Soil Degradation is when the soil is chemically or biologically altered by adding herbicides, pesticides, or toxic waste. Its causes are deforestation of land, poor farming practices (chemical farming), livestock overgrazing, inappropriate irrigation, urban sprawl and commercial development and Land pollution by industrial waste.

Objectives of the study are:

1. To study the reasons of the soil degradation.
2. To study the environment aspect of organic agriculture.
3. To compare the soil contents from Organic and Inorganic Farming on basis of standard range.
4. To suggest the remedial measures to come down the soil degradation.

MATERIALS AND METHODS

Researcher has used primary data for the study. For that purpose the researcher has submitted and referred to some testing reports of soil contents from Organic and Inorganic farming methods. In this research paper, researcher has considered 8 testing reports of soil and has analyzed average results of 8 in the same reports. Further, the researcher has also individually tested soil (contents) at District Soil Testing Laboratory, Sangli (Maharashtra State- Agricultural Department). To test the hypothesis of the study on basis values of soil contents, 't' test is used by researcher.

Hypothesis of the study

- Soil from Organic Farming Method is less degraded than soil from Inorganic Farming Methodology.

Soil Testing Analysis elicits:

Organic soil is less degraded because its pH value is 6.8 and it is ranged between the range of value of pH value of soil i.e. 6.5 to 7.5 pH. Whereas, pH value of inorganic soil is 8.9 mmho/cm, which is more than standard range of pH value of soil.(Table 1 and 2)

Organic soil is better for crops, because N-P-K of organic soil is higher than inorganic soil. Organic values of N-P-K (91.82, 61.33 and 688.05) are significantly more than Inorganic soil N-P-K contents (71.82, 54.33 and 588.05) (Table 2). The data reveals that there is significant difference in the values of N-P-K and pH value of soil. From the above data we can conclude that organic soil is more fertile and less degraded. Therefore, organic soil is favourable to environment than inorganic soil.

Table 1 and Table 2 show the results of soil contents of individual testing reports (i.e. organic and inorganic soil). Researcher has considered 8 testing reports of soil and has analyzed average results of each report. Table 3 shows the average results of various factors of soil of organic farming. From the view, Total Organic Matter was 0.717 percent mg/100g. Moreover, Phosphate and Potash was 63.70938 and 937.44 mg/100g respectively. Standard deviations of above factors were 0.238495 mmho/cm, 0.1688 mmho/cm, 0.1758 percent, 31.96 mg/100g, and 216.7916 mg/100g respectively. The data from the Table 1, 2 and 3 reveal that soil from the organic farming is not polluted and it is more fertile.

Hypothesis 1: Soil from Organic Farming Method is less degraded than soil from Inorganic Farming Method.

1.1 pH value (Range : 6.5 to 7.5)

$n = 8$

$\bar{X} = 6.675$ $s = 0.2385$

$H_0 : \mu = 7.0$ and $H_1 : \mu \neq 7.0$

Under H_0, the value of the test statistic is;

$$t_0 : \frac{(\bar{X} - \mu_0)\ (n-1)^{1/2}}{s} \sim t\,(n-1)$$

$t_0 = 1.94$

$t_{0.025}\,(7) = 2.365$

$|\,t_0\,| < 2.365$

∴ Accept H_o i.e. average level of pH is within the range of 6.5 to 7.5

1.2 Electrical Conductivity (Range : 0 to 1.0)

$n = 8$

$\bar{X} = 0.33125$ $s = 0.168775$

$H_0 : \mu = 0.5$ and $H_1 : \mu < 0.5$

At 5% level of significance $t_{0.05}\,(7) = 2.998$

∴ $t_0 > -2.998$

∴ Accept H_0, i.e. the Electrical Conductivity is about 0.5 mmho/cm.

1.3 Total Organic Matter (Nitrogen) (Range: 0.5 -1.0)

$\bar{X} = 0.717$ $s = 0.1758$

Average: 0.75

$H_0 : \mu = 0.75$ and $H_1 : \mu > 0.75$

Under Ho, $t_0 = -0.4966$

At 5% level of significance $t_{0.05}\,(7) = 2.998$

∴ $t_0 < 2.998$

∴ Accept Ho, i.e. average level of total organic matter is about 0.75.

1.4 Phosphate (Range : Above 15)

$\bar{X} = 63.7094$ $s = 31.9535$

$H_0 : \mu = 15$ and $H_1 : \mu > 15$

Under H_0, $t_0 = 4.0331$

At 5% level of significance the critical value is $t_{0.05}\,(7) = 2.998$.

∴ Reject H_0, i.e. average phosphate level is more than 15 kg per hector.

1.5 Potash (Range : Above 360)

$\bar{X} = 937.44$ $s = 216.7916$

$H_0 : \mu = 360$ and $H_1 : \mu > 360$

Under H_o, the value of test statistic is $t_{0.05} = 7.0471$

At 5% level of significance the critical value is $t_{0.05}(7) = 2.998$

$t_0 > 2.998$

∴ Reject H_0, i.e. the average amount of potash is more than 360 Kg/ha.

RESULTS

Table 1 and Table 2 show that organic soil is less degraded because its pH value is 6.8 and it is ranged between the range of value of pH value of soil i.e. 6.5 to 7.5 pH. Whereas, pH value of inorganic soil is 8.9 mmho/cm, which is more than standard range of pH value of soil.

Table 1 and Table 2 show organic soil is better for crops, because N-P-K of organic soil is higher than inorganic soil. Organic values of N-P-K (91.82, 61.33 and 688.05) are significantly more than inorganic soil N-P-K contents (71.82, 54.33 and 588.05).

From Table 3 and hypothesis testing researcher shows that the Electrical Conductivity organic soil is about 0.33125 mmho/cm which is within its range i.e.0 to 1.00. It concludes that soil from Organic Farming Method is less degraded and is favourable for crops.

Table 1: Soil Testing Analysis (Organic).

Sr. No.	Particulars	Unit	Standards	Result
1.	**pH Value**	mmho/cm	6.5 to 7.5	6.8
2.	**Electrical Conductivity**	mmho/cm	0 to 1.00	4.2
3.	**Total Organic Matter**	%	0.5 to 1.00	0.81
4.	**Nitrogen**	mg/100g	31 to 50	91.82
5.	**Phosphate**	mg/100g	15 <	61.33
6.	**Potash**	mg/100g	360 <	688.05

***Source**: Laboratory Test Report (2011).*

Table 2: Soil Testing Analysis (Inorganic).

Sr. No.	Particulars	Unit	Standards	Result
1.	**pH Value**	mmho/cm	6.5 to 7.5	8.9
2.	**Electrical Conductivity**	mmho/cm	0 to 1.00	6.4
3.	**Total Organic Matter**	%	0.5 to 1.00	0.61
4.	**Nitrogen**	mg/100g	31 to 50	71.82
5.	**Phosphate**	mg/100g	15 <	54.33
6.	**Potash**	mg/100g	360 <	588.05

***Source**: Laboratory Test Report (2011).*

Table 3: Soil Testing Analysis.

Sr. No.	Particulars	Unit	Standards	Average Result	Standard Deviation
1.	**pH Value**	mmho/cm	6.5 to 7.5	6.675	0.238485
2.	**Electrical Conductivity**	mmho/cm	0 to 1.00	0.33125	0.1688
3.	**Total Organic Matter**	%	0.5 to 1.00	0.717	0.1758
4.	**Nitrogen**	mg/100g	31 to 50	NA	NA
5.	**Phosphate**	mg/100g	15 <	63.70938	31.96
6.	**Potash**	mg/100g	360 <	937.44	216.7916

***Source**: Laboratory Test Report (2011).*
Note: NA = Not Available.

It can be deduced from Table 3 and hypothesis testing researcher shows that average level of Total Organic Matter is about 0.717, which is within its range i.e.0.5 to 1.00. It concludes that soil from Organic Farming Method is more fertile.

From Table 3 and hypothesis testing observes that the values of phosphate and potash are 63.71and 937.44, which are more than 15 and 360. It concludes that soil from Organic Farming Method is more fertile and less degraded. It is therefore suggested that:

- Farmers should avoid the use of chemical pesticides and insecticides and instead of this (they should make use of) vermi-culture and liquid of various leaves from various trees.

- Farmers should use appropriate method of irrigation and should give the proper proportion of water.
- Farmers should avoid the use of chemical fertilizers; instead of this they should use bio-fertilizer and vermi-fertilizer.
- Government should support by providing the bio-inputs to the farmers.

CONCLUSION

Soil is the most essential natural input among all natural inputs. Chemical farming practice is a significant responsible factor behind the soil degradation, which is being used by farmers to produce more food and non-food production. In this method, farmers do not take care of soil health. Definitely the productivity of Indian agriculture has increased significantly and achieved the required development. But it is unsustainable development of agriculture, which has led to the problem of soil degradation. To achieve the sustainable development of agriculture, farmers should cultivate their land by Organic and Natural farming methods, which can control the degradation of natural resources.

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