

Review Article

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Organic Manures' Impact on the Development and Production of Pulses - A Review

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ABSTRACT

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Nutritionists view pulses as a crucial component of a balanced diet. However, the supply of pulses per person is decreasing as the world's population grows. To meet the growing population's need for protein, the output of pulses must be expanded. Pulses were raised in soils with inadequate nutrient management and low fertility. Research demonstrates that adding organic manure to the soil enhances the soil's physical characteristics as well as its fertility condition. The production and financial returns will undoubtedly rise with careful nutrient management that includes both organic manure and inorganic fertilizers. As a consequence, the cost of nutrient consumption will be significantly reduced, and nutrient utilization efficiency will increase.

Introduction

Due to their low cost as a source of vegetable protein for the human diet, pulses are gaining relevance on a worldwide scale. In order to adequately provide the growing population with protein, it is therefore necessary to increase global pulse production.

There are several causes of pulses' poor production. Pulses are plants full of vitality, But since they are grown in energy-poor environments and with insufficient amounts of organic and inorganic fertilizers, they develop at a slow rate. It is crucial to employ organic manures in conjunction with fertilisers to maintain the fertility, health, and

biological activity of the soil. (Patel *et al.*, 2009). Recently, there has been a rise in use organic manure, such as FYM, chicken compost, goat manure, and pressmud. The soil's nutritional status and water holding capacity are improved by the addition of organic manure. (Kale *et al.*, 1991).

Vermicompost

Vermicompost is a method of composting that uses earthworms. Earthworms eat biodegradable wastes (such as vegetable and fruit peels) and break these natural materials down into organic fertilizer. Vermicompost is commonly used in organic farming and helps to keep the soil healthy. Nitrogen is more abundant in vermicompost than Phosphorus and

Potash. Vermicompost is not harmful to the soil and helps to increase its nutrient content in soil. Aman *et al.*, (2022).

Vermicompost's impact on pulse crop productivity and growth

Khan *et al.*, (2017) found that applying vermicompost increased the amount of cowpea seed and straw ingested quantity of pods per plant, how many seeds are in each pod, and the NPK content.

It improved the availability of these nutrients by being added to the soil. Harireddy and Joy Dawson (2021) indicated that the application of Vermicompost (5t/ha) + Rhizobium + Azospirillum components of cowpea led to the highest output (amount of pods per plant 33.68, how many seeds are in each pod 9.47, and seed test weight 28.78 g) and growth (plant girth 39.25 cm, several branches 8.83).

The usage of organic manures and vermicompost (5t/ha) biofertilizer might be the cause of the rise in yield characteristics. Rajkhowa *et al.*, (2003). Boosted nutrient supply from use of biofertilizers and organic manures together, which increased nutrient availability, greatly augmented the variables influencing plant height development (Singh *et al.*, 2014). According to Patil *et al.*, (2014), Vermicompost 1.2 t/ha + PM 4 t/ha treatment had the largest stem diameter, then comes 8 t FYM + 1.5 t PM/ha.

Poultry Manure

Organic manures are renowned for having rich in nutrients for crops, both macro and micro. They also aid in enhancing the soil's structural integrity. The impacts of chicken manure on the soil's chemical characteristics, including pH, organic C, accessible P, replaceable Ca Mg, K, and Na as well as ECEC, as well as soybean plants' yields of dry matter and plant heights, and N, P, and K concentrations the tissues of plants, were studied in pot tests. Soremi *et al.*, (2017)

The impact of chicken compost on pulse production and growth

The largest quantity of pods per plant, the highest amount of grains in each pod, the highest 1000-seed test weight, the highest yield per hectare of grain, and the highest per-hectare straw yield were obtained with a downloadable of 10-40-20NPK kg/ha+10 kg/ha N via chicken manure+GA375+75 ppm (Srivastava and Verma, 1981). According to Roba (2018), For increasing the development and productivity of Chinese cultivars in the agro-climatic conditions of Peshawar Valley, chicken manure application at a rate of 10t.ha⁻¹ is advised.

Goat Manure

According to agri farming, animal manure high in nutrients has been added to pastures and fields decades to enhance agricultural yields and improve the soil. Goat manure is among the best animal manures, providing a consistent source of fertiliser for the garden in addition to the creamy milk needed to make cheese. Compost is rich in the plant nutrients potassium (K), phosphorus (P), and nitrogen (N), all of which are necessary for plant growth. Compost also replaces organic matter and essential minerals like calcium, magnesium, and sulphur, improving the soil's fertility and quality.

Effect of goat manure on pulse crop productivity and growth

Suyapradha *et al.*, (2020) observed that adding organic manure considerably lowers pH and EC values; application of goat manure @ 8t ha⁻¹ increases the nitrogen content in soil; application of goat manure @ 17t ha⁻¹ increases the phosphorus content; and the value of potassium was found to be higher in 12.5t ha⁻¹ of goat manure of black gram.

Farm yard manure

Cattle excrement, urine, bedding components like straw and litter, and leftover feed for the animals are all components of farmyard manure, which is a

degraded combination. Dung and urine-soaked waste from the cattle shed are collected daily and dumped into trenches 6-7 metres long, 1 metre deep, 1.5 to 2 metres broad.

An elevation of around 0.5 m above ground level, each trench is filled. The heap's top must be shaped like a dome and earth slurry-plastered with cow manure. After three to four months, it is prepared for usage. This method can produce 7 to 8.5 cubic metres of manure per cow per year (Negagrover, 2022).

Effect of farmyard manure on pulse production and growth

Due to their value as a source of nutrients for plants, FYM and vermicompost have a positive impact on crop yields and soil productivity. These organic nitrogen sources promoted root growth, increased microbial and biological activity in the rhizosphere, and increased aeration from the earth. Gandhi *et al.*, (1991); Shukla *et al.*, (2013); Gupta, and Sharma (2006). According to Parvatigadi *et al.*, (2017), applying FYM at a rate of 5t/ha increased chickpea grain yield considerably compared to not applying FYM.

Vermiwash

The organic fertiliser known as vermiwash is made from vermiculture units and vermicompost used as drainage. It is applied to the plant's roots as well as a foliar spray.

That study investigates how vermiwash affects development and growth. When blended with a specific proportion of vermicompost or sprayed directly on plants, vermiwash proved to be an efficient fertiliser that helps in plant growth.

It has also been demonstrated that plants treated with vermiwash are resistant to disease and do not have worms like leaf eaters on their leaves or other plant components.

Vermiwash's impact on the development and production of pulses

It has been claimed that the higher growth characteristics in the application of Vermiwash includes a greater level of organic carbon, N, P, K, Ca & Mg minerals and hormones that promote plant growth that are in charge of promoting rapid growth and development. Jeevamruth at the time of planting, 500 liters/ha, and 30 DAS + Panchagavya@ 2% squirts at 25 and 40DAS + Vermiwash @ 8% sprays at 30 and 45 DAS can be explained by this Deepa Joshi *et al.*, (2013).

Impact of Pressmud on the production and development of pulses

For every 100 tonnes of crushed sugarcane, there are 3 tons of pressmud cake leftover, which is a byproduct of the sugar business. When this residue was composted, it became extremely nutritious organic manure. Composting is a waste disposal method that has a lot of potential because it allows for the solid treatment and recycling of organic waste. Thus, organic solid waste may be biodegraded to the point where it can be composted, and the finished compost materials can be spread on agricultural areas. Due to its high sugar content, substantial levels of the vital plant elements organic carbon, nitrogen, phosphorus, potassium, calcium, and magnesium, as well as traces of the micronutrients Zn, Fe, and Mn, pressmud is a bio compost that is used to increase crop productivity and maintain soil fertility. Because of this, the advantages of using this bio compost to improve soil fertility and raise crop yield are well known. (Sunil, 2017).

According to Paramasivam *et al.*, (2006), adding pressmud cake at a rate of 1.5 t/ha improved the intake of phosphorus and sulphur, two components together related to the production of oil. According to Kausale *et al.*, (2007), applying pressmud cake at a rate of 5 kg per hectare considerably boosted groundnut oil yield and protein content compared to the control.

Table.1

Vermicompost's nutrient makeup.		
S. No	Nutrient	Content
1	Biological Carbon	8.10 to 16.78 %
2	Nitrogen in total (N)	1.5 to 2.10 %
3	Nitrogen in Phosphorus (P)	0.5 to 1.0 %
4	Nitrogen in Potassium (K)	0.50 %
5	Calcium (Ca) and Magnesium (Mg)	21.00 to 71.00 m.e / 100 g
6	Accessible Sulphur (S)	124 to 544 ppm
7	Copper (Cu)	100 ppm
8	Iron (Fe)	1800 ppm
9	Zinc (Zn)	50 ppm

Table.2 Chemical characteristics of the animal waste

Parameter	Value
Nitrogen	22.5 g/kg
Phosphorus	14.9 g/kgs
Potassium	12.2 g/kg
Calcium	3.3 g/kg
Iron	7.0 g/kg
Sulphur	4.7 g/kg
Zinc	53.50 mg/ kg
Organic molecule	126.4 g/kg
Magnesium	1.6 g/kg
C : N	5.42

Table.3 Composition of nutrients in goat dung

Manure	Nitrogen (N)%	Phosphorus (P)%	Potassium (K)%
Goat dung from a farm	1.30	0.50	1.52
Goat manure composted	2.20	1.21	3.66
Goat faeces	1.10	0.03	7.9

Table.4

Organic Sources	Nutrients composition (%)		
	Nitrogen	Phosphorus	Potassium
Farmyard manure(FYM)	0.52	0.25	0.49

Table.5

Parameters Analyzed				
Sample analyzed	Total Nitrogen	Total Phosphorous	Total Potassium	PH
Vermiwash	3.1	1.4	2.55	7.4
Dung	0.80	0.74	0.62	7.8

Table.6 Press mud compost's nutrients include

No.	Nutrients	Avg quantity/Press mud 100g (%)
1	Organic substance	45
2	Calcium	06
3	Phosphorus	1-2
4	Potassium	2-3
5	Nitrogen	1.3-2.3
6	Magnesium	1
7	Sulphur	0.3
8	Cellulose	10.4
9	Hemi cellulose	09.0
10	Lignin	8.9
11	Protein	15.1
12	Wax	8.1

According to Singaravel (2007), In a sandy soil, increasing the existence of the three primary nutrients (N, P, and K) while decreasing the pH and EC was achieved by adding varying amounts of N, P, and K to pressmud cake @ 12.5 t ha⁻¹. Pagaria and Totawat (2007) discovered that adding pressmud cake @ 15 t/ha dramatically raised the quantity of readily compared to the control, the soil had less Fe, Zn, Mn, and Cu accessible as micronutrients. According to Sushma *et al.*, (2007), applying pressmud cake at a rate of 5 t/ha resulted in large part greater levels of soil nitrogen, phosphorus, & sulphur that were readily available. According to Pritpal *et al.*, (2010), the quantity of native soil nutrients increased when pressmud cake was added to the ground (N, P and K).

The research suggests that utilizing organic manures as part of an efficient nutrient management plan might increase pulse production and improve soil physio-chemical properties. Protein is abundant in pulses. Pulses are an essential source of nutrients

that not only ensure nutritional security but also increase the soil's fertility. Comparing area production and yield to output value reveals that most pulses are more productive. With each pulse, the production of organic manures significantly improved.

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