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Production Criteria of Heat-Treated Chicken Fertilizers in Iraqi Agriculture

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Abstract

This research paper compares the efficacy of several kinds and standards of organic fertilizers (OrgFrtz) in enhancing soil quality (SolQty), yield, and agricultural production quality, and also crop rotation (CrpRtn) efficiency, to the projected standards of mineral fertilizers (MinFrtz)for achieving the desired output. Numerous thermodynamically dehydrated granular chicken fertilizer normal conditions were investigated, including its appropriateness as an ecologically sound complex OrgFrtz and its efficiency in increasing production, quality traits, SolQty and CrpRtn efficiency when compared to conventional fertilizer, buckwheat (BckWet) plants using green manure (GrnMnr), MinFrtz and natural nutritional background. CrpRtn's commercial efficacy is examined, and its increase to a profit margin of 60–95 percent is calculated based on the kind and quality of fertilizer utilized.

Keywords: Organic Fertilizers (OrgFrtz); Green Manure (GrnMnr); Mineral Fertilizers (MinFrtz); Buckwheat (BckWet); Soil Fertility (SolFrtly); Soil Quality (SolQty); Green Mass (GrnMas).

1. Introduction

The contemporary agricultural system must be founded on the regeneration of SolQty, the preservation of energy resources, as well as the maintenance of ecological equilibrium. This necessitates the judicious usage of local materials, as well as the creation of analytical methodologies for optimizing destabilizing and stabilizing performance components. Soil deterioration and soil's humus loss are two of the destabilizing causes. The increase in agricultural yields is followed by mechanisms of rapid deterioration of the topsoil not just in a particular part of Iraq, but throughout the country as revealed in analyses. Hence, the yearly erosion of soil's humus in the Republic of Iraq is 1100–1800 kg/ hectare, and to restore this deficit, at least 10.6 ton/hectare of OrgFrtz must be added yearly, for increased regeneration of soil fertility (SolFrtly)–and over 12ton/hectare of arable-land each year. Regrettably, OrgFrtz application in Iraq is only 1.5–2.5 ton/hectare of plants. As a consequence, the crop's unfavorable soil's humus equilibrium is 0.3 ton/hectare[1]. Hence, it is critical to properly employ all forms of OrgFrtz (plant-based fertilizer, normal fertilizer, straw, bird dung, and so on), which are the most significant components in resource preservation and upkeeping of good fertile reproduction, particularly given the high pricing of MinFrtz [2].

Nevertheless, there is a lack of well-executed research on most local OrgFrtz s. Bird droppings, for example, have received scant attention. This is because tiny farms were formerly involved in chicken farming, and the production of bird droppings (BirDrpg) was negligible[3]. Industrial PoryFarg is presently in operation in accordance with the

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development of contemporary PoryFarg, and the amounts of BirDrpg have become extremely huge, posing a serious threat to the environment's ecology. As a result, research into successful approaches of handling and utilizing BirDrpg as an organic form of fertilizer in farming has become important and coveted[4]. The utilize of BirDrpg as a useful OrgFrtz is an old topic. Several studies have noted that BirDrpg are an excellent resource as OrgFrtz for agricultural utilize [5]. BirDrpg are high in nutritional value that is readily available to vegetations, swiftly soluble in water, and are readily absorbed. BirDrpg are comparable to MinFrtz in terms of crop impact in the first year of utilization. BirDrpg have an after effect on productivity in the next two to three years as the result of the substantial amounts of organic constituents and their slow release [6][7]. Simultaneously, the efficacy of utilizing thermally treated chicken droppings (ChkDrpg) in enhancing SolFrtly and CrpRtn yield has not been well researched, and the circumstances of numerous jungles in various locations throughout Iraq have not been comprehensively researched [8][9].In the regeneration of SolFrtly and the increase of agricultural output, GrnMnr crops have turned out to be critical. “In conjunction with fertilizer and additional OrgFrtz s, and also MinFrtz, the utilize of GrnMnr as one of the parts of the fertilizer system should become a highly strong scheme of producing crops and improving SolFrtly,” as noted by D.N. Prianishnikov [10] . The utilize of plants for GrnMnr has been carefully and comprehensively researched on several occasions.

However, as agricultural procedures, particularly biological ones, become more intensive and the issue of conserving and boosting SolFrtly has turned out to be more pressing, the concerns of the purpose force us to return to this readily available, extremely efficient type of OrgFrtz , choosing efficient fertilizer crops and disclosing their new qualities, characteristics, and processes of efficacy and effect on the soil. Generally, it is important to investigate the fertilizing properties of different kinds of fertilizers, as well as their influence on soil agrochemical and agrophysical parameters, as well as arable-land yield. Furthermore, D.N. Prianishnikov stated, “For the purpose of assessing the fertilizing worth of a material, to be capable of regulating growing conditions in the field, there is a requirement to have the knowledge of the needs of crops at all phases of development, and also to know a number of soil parameters and structural, chemical, and biological activities that occur in it” [11][12].

Considering the significance of these guidelines, we attached great importance in our experimentations on the efficiency of different kinds and standards of fertilizers to illuminate the impact of the researched fertilizers on water-food practices, bioactivity, and soil contamination, which largely dictated the efficient strategies of their utilization[13][14].

2. Research Program and Methodology

Between 2016 and 2018, a group of expert researchers carried out an experimental field study in Iraq. The soil involved falls into three types, firstly consisting of grey soil, with a fine-grained excessive loam structure. Secondly, involving grey soil which has a granular constituent of heavy loam. Thirdly, the research involved grey forest soil, with heavy loam grain-size constituents. The experimental field's initial agrochemical variables comprise soil's

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humus content – 3.2 percent, alkaline hydrolysable nitrogen – with “70-95” mg/kg, “P_2O_5-125-175, K_2O-110-120” mg/kg, pH of arable-land layer salts of 4.6.

The following tillage system involving nine farmlands was investigated:1. yearly grasses (combination of feed); 2. spring wheat; 3. corn; 4. peas; 5. corn; The studies were conducted on a three-dimensional surface with plots sequentially placed in the tillage order of the stated CrpRtn. The plots were 10*25 m in size, with a total area of 250 square meters.

The subjects of the investigation were “Spring-wheat” and corn (“cultivar ROSS 199”). We evaluated the efficacy and after effects of conventional fertilizer, GrnMnr, and different thermally-treated chicken fertilizer standards in comparison to the predicted mineral fertilizer normative for accepting 2, 3, 4 ton/hectare of “Spring-wheat” and 25, 35, 45 ton/hectare of green corn.

The following tables provide a detailed overview of the research. Meteorological conditions varied during the trial, with 2016 and 2017 being particularly unfavorable.

“Spring-wheat” planting was hampered in 2016 by 50% below-average rainfall in May and 16.3°C above-average daily air temperature (AirTmp). During the first 10 days of June, the AirTmp's normal daily average temperature of 14.6 degrees supported the passing of the plowing and cultivating phases since rainfall was on the order of 160 percent of normal.

Consequently, rainfall was down to 13 millimeters per day, with a 21.9 degree daily average air temperature (2.4 degrees higher than normal), causing the wheat to ripen quicker than expected (normal rainfall is 59 millimeters per day). August's mild and sunny weather aided the harvest's growth.

At the beginning of May 2017 of the planting season, the daily average AirTmp was 2.8 degrees lower than normal, and rainfall was 74 percent of the normal rainfall. The decreased AirTmp hampered corn seed germination as well as the development of even shoots. Cool climate remained in June (average monthly temperature was 2 degrees lower than normal), delaying maize growth and maturation Ample monthly rainfall (163 percent of the normal) and an increase in average daily AirTmp of 21–22 degrees during “second ten” days besides “third ten” days of “July” helped matters and enhanced corn growth rate. In August and early September, favorable circumstances are produced, causing maize to form ears and accumulate green weight on the top. Throughout the 2018 agricultural season, environmental factors were favorable. However, spring was chilly and wet. The first ten days of May were cold and rainy, and the soil temperature in the top 10 centimeters of the strata was only 8 degrees, so planting wheat had to be postponed.

The daily average ambient temperature climbed to 16.3 degrees (3.3 levels hotter than usual) in the “second ten” days of May, with minimal rainfall, allowing for elevated planting. Rainfall (125 percent of the normal) in the first ten days of June and an average daily ambient temperature near to a lengthy standard (13.01degrees) aided plant tillering; rainfall in the

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"second ten" and "third ten" days also added to strong wheat growth and progress. Weather patterns were good for grain swelling and maturation in July and August. Rainfall was below normal in the first and second 10-days of August, however, the average daily temperature is over normal, resulting in complete maturity of grain and quality gathering.

3. SoilHumus Overview

Soil organic matter (SoOrMr) (plant and animal waste) decomposition results in soil-humus , which is a valuable soil amendment Because it increases the biological, chemical and physical properties of the soil, making it more fertile and useful for agriculture. soil's humus is regarded as a (reservoir for storing plant food) that gradually releases nutrients in a manner that is most beneficial to crops. In addition, it provides a source of carbon for plants, since it enhances the capacity of ground water to dissolve various plant meals such as phosphorus, potassium, iron, calcium, manganese, zinc, and magnesium in the soil. The colloidal complex is made up of silica and clay, which are the two most significant mineral colloid components in soil. It ((absorbs 25 times its weight in water)) whereas clay absorbs more than two-thirds of its weight in water and this feature is very important in the retention of water on the ground during drought.

4. Results

Cultivation, including the growing of cereals and poultry (PoryFarg), is practiced in the forest-steppe zone, while sheep and cattle ranching are the most prominent forms of animal husbandry in the region. There are a vast number of horses in all. Based on the most recent official census in 2010, the number of cows in Iraq achieved 2.552 million heads, with buffaloes accounting for 285.5 thousand heads, sheep accounting for 7.722 million heads, goats accounting for 1.474 million heads, and camels accounting for 58.3 thousand heads. Simultaneously, approximately 10–114 million tonnes of fertilizer are accrued each year. It includes around 55–70 thousand tonnes of nitrogen, 35–40 thousand tonnes of P_2O_5, 65–85 thousand tonnes of K_2O, 55–65 thousand tonnes of CaO, and a huge variety of trace elements. More than 40–50 kg of NPK is applied per hectare of arable-land.

Iraq has two species, which included the Great Houbara, which is extinct in Iraq but found elsewhere, two species promoted by humans, 52 uncommon species, and 18 species the internationally on the edge of extinction.

In Iraq, there are many types of marine creatures in the Shatt al-Arab, there are only two types promoted by humans and the rest are considered extinct species due to the great pollution due to oil waste that occurred in many years.

The yearly generation of BirDrpg exceeds 1.5 million tonnes. In terms of speed of impact, the fertilizing characteristics of bird droppings, particularly ChkDrpg, are outstanding than fertilizer and not inferior to MinFrtz. Nevertheless, as the result of a poor understanding of effective application techniques, this precious fertilizer is rarely utilized rationally in

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agriculture, and its amassed huge masses contaminate the soil. GrnMnr plants, without a doubt, serve an essential function in restoring the soil's organic matter and increasing its soil's humus constituents. They are regarded as a low-cost, commonly accessible source of replacing SoOrMr, as well as an ecologically sound and cost-effective OrgFrtz . Based on our most recent statistics, the growth of GrnMnr and its absorption into the soil is two times less expensive than the manufacture, transfer, and implementation of an identical quantity of fertilizer and six times less expensive than industrial fertilizers. They are comparable to straw-based fertilizer in respect of agricultural productivity (6).

GrnMnr plants have lately been utilized with chicken waste in several Asian nations to increase SolFrtly, with impressive outcomes in raising soil carbon and nitrogen concentration and enhancing the C: N ratio (3). The most common GrnMnr crops are legumes (lupine, melilot, peas, vetch, and so on). Non-leguminous plants are also utilized (mustard, rape, winter cress, and BckWet). Nevertheless, the majority of these plants are mainly applied for food production on farmland. Hence, in the Republic of Iraq, green-manured fallow fills just 1.1 percent of arable-land. As a result, the specific constituents of the farmed GrnMnr crops must be carefully chosen. We conducted extensive research on the efficacy of a broad range of GrnMnr species. Legumes and BckWet types "Batyr" and "Cheremshanka" produce good results for side rationing, with strong energy of early development. They control weeds and rid the soil of pathogens. BckWet root system produces phytoncides, which kill harmful bacteria in the soil that cause rot disease and other illnesses. The seedlings of the second portion can be planted at a seeding rate of 65–75 kg/ hectare. Peas and BckWet offer large harvests of dry matter at the top and root, as well as agricultural wastes, in our studies. BckWet took the top position among the investigated GrnMnr crops with regards to nutrients (total NPK) penetration into the soil with the highest output. Furthermore, it is worth noting that the green volume of BckWet is not utilized for cattle feed on farms, but rather for side rationing.

BckWet was utilized for comparative vetting in studies to evaluate the efficiency of different kinds and standards of fertilizers based on these characteristics. Various soil and plant analyses were conducted in conjunction with the work on this subject.

One of the obstacles to obtaining continuously high production is a lack of hydration, which depends on the soil's structural aggregate components, agricultural techniques, and other factors, such as fertilizers, to build up, preserve, and be used by flora. OrgFrtz and ChkDrpg improve the land's structural-aggregate components, loosening it, and reducing the loose soil's unproductive moisture dissipation (UnPrdMostr). The results of our research confirm this.

It is clear from Table 1 that fertilizers, particularly OrgFrtz s, have a favorable influence on arable-land, subsurface and meter soil layers (SoLr). This confirms previous findings and indicates the value of fertilizers. An OrgFrtz context has much greater weighted average AvgChcal indicators of productive wetness than a natural control context (PrdMostr).

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During the first crop (impact), the amount of these predictors varied and depended on the type of OrgFrtz found in soil meter layers; during the second crop (the first year after impact), the range was 139.92–168.87 mm; and during the third crop (the second year after impact), the range was 169.9 - 175.9 mm; and during the fourth crop (the fifth year after impact), the range was 130.1 mm; and. The addition of OrgFrtz in the variants decreased moisture loss from the topsoil, and as a consequence, its development was optimum and adequate throughout the growth season. We discovered that PrdMostr dynamically increased in size when examining all soil layers from the first year of the effect to the second year. This finding may be related to the ongoing improvement in the aggregative structural traits of the affected soil OrgFrtz. In other words, based on the second year of the after effect-, 1–2–3 ton/hectare of GCM (GrchckManr), the concentration of PrdMostr in the 0–40 cm SoLr was 65.8, 66.54 , and 75.9 mm, respectively, compared to 52 mm based on MinFrtz applied yearly.

As a result of the improved water resistance of soil aggregates following prolonged exposure to GrchckManr, the variations in support for the second year of GrchckManr after impact are 13.8; 15.9; and 23.9 mm, enabling an additional production of 5.52; 6.36; and 10.02 g/ha without fertilizer application. In response to 42 tons/ha of straw fertilizer used in the second year's components of 3 tons/ha of GrchckManr and 26 tons/ha of BckWet GrnMnr, this pattern was seen. To retain and expand SolFrtly while attaining anticipated yields of excellent quality, CrpRtn that employs fertilizers should be used in combination with complexes of agro-technical interventions. The findings (Table 2) show that the background indices of the control with no fertilizers employed significantly exceed the weighted average chronological (AvgChcal) indices of hydrolysable nitrogen, mobile phosphorus, and potassium within the context of the impact and aftereffect of OrgFrtz.

Table 1. The amount of PrdMostr in the soil during a grain tillage CrpRtn cycle, related to the impact and after effect of diverse types and standards of OrgFrtz compared to the impact of MinFrtz and the natural backdrop (weighted AvgChcal indicators for the growth and development of crops, mm)

Fertilizer kinds and standards	*The bloom wheat in the early spring (after effect, 2016)*			*First-year of Corn, after effect, 2017*			*The bloom wheat in the early spring (Second-year of after effect, 2018)*		
	SoLr, cm								
	Between Zero to Twenty	Between Zero to Forty	Between Zero to One hundred	Between Zero to Twenty	Between Zero to Forty	Between Zero to One hundred	Between Zero to Twenty	Between Zero to Forty	Between Zero to One hundred
Control without fertilizers (natural background)	19.99	33.9	105	24.77	51.88	140.0	31.2	50.9	129.66
MinFrtz NPK for 4 tons per hectare grain yield and 40 ton/hectare corn GrnMas	24.1	40.12	118.9	23.98	51.88	134.98	25.99	54.01	139.89
GrchckManr 1,0 tons per hectare	25.6	39.99	131.97	30.01	56.8	139.92	36.44	65.8	156.9

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GrchckManr 2,0 tons per hectare	23.9	44.0	137	31.2	58.3	161.6	36.44	66.54	170.21
GrchckManr 3,0 tons per hectare	27	42.91	140	33.87	66.01	169.52	37.6	74.78	175.56
42 ton/hectare straw-based fertilizer (composed of 3 ton/hectare GrchckManr)	21.4	40.12	116	30.68	63.23	144.3	35.6	65.46	175.9
BckWet GrnMnr 26 tons per hectare	20.31	36.44	119.72	129.66	54.65	142.8	33.22	69.02	170.99

Note. MinFrtz were put directly under each crop annually based on the calculated and balanced production.

Table 2. OrgFrtz kinds and standards, compared to MinFrtz effects and the natural background, mg/kg soil, have an impact and aftereffect on nutritional value (AvgChcal-Weighted Indicators of Crop Growth and Development Stages at 0-20 cm SoLr)

Fertilizers Types and Norms	*The bloom wheat in the early spring (after effect, 2016)*			*First-year of Corn, after effect, 2017*			*The bloom wheat in the early spring (Second-year of after effect, 2018)*		
	“N_g”	“P_2O_5”	“K_2O”	“N_g”	“P_2O_5”	“K_2O”	“N_g”	“P_2O_5”	“K_2O”
Keeping everything under control without using any fertilizers (natural background)	80.01	189.9	95.9	60.0	211.88	80	85.4	174	82.77
MinFrtz NPK for 4 tons per hectare grain yield and 40 ton/hectare corn GrnMas	95	277	171.01	75	256.02	180.53	89	245.78	160.01
GrchckManr 1,0 tons per hectare	140.02	320	195.01	82	280.03	130	95.89	240.77	137.05
GrchckManr 2,0 tons per hectare	145.07	345	235	84.98	305	150	104.0	260	186.0
GrchckManr 3,0 tons per hectare	169	365.0	280.8	90.3	330.0	222	123.0	330	293.5
42 ton/hectare straw-based fertilizer (composed of 3 ton/hectare GrchckManr)	95.7	295.8	162.3	75.3	257.0	115	127.0	390	190.0
BckWet GrnMnr 26 tons per hectare	94.9	300.4	198.7	71.5	263.0	150	92.8	270.6	180.1

Their composition is significantly greater than in the alternatives with yearly mineral fertilizer applications and the anticipation of getting 4 ton/hectare of grain. The same pattern was seen in the context of year one and year two of OrgFrtz after effect. The 3 ton/hectare GrchckManr was equivalent to 42 ton/hectare straw-based fertilizer in year two of the after effect. BckWet GrnMnr was found to be similar to straw-based fertilizer in this aspect. The degree of performance was decided by the action and after effect of several types of fertilizers. The greatest average yield during 2016–2018 was attained with the addition of 3 ton/hectare of GrchckManr and equaled to 6.21 ton/hectare of grain-unsaturated. With the impact, the output of “Spring-wheat” was 5.31 ton/hectare of grain-units (GrUnit), the output of GrnMas of corn was 48.00 ton/hectare (concerning the GrUnit of 8.12 ton/hectare of

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GrUnits) in year one of after effect, and the output of "Spring-wheat" was 4.2 ton/hectare of GrUnit in year two of the after effect.
The substantial fall in the output of the crops occurred when the requirements for applying GrchckManr to 1–2 ton/hectare reduced, however, it remained at the degree of the outcome attained within the context of the backdrop of the yearly administration of MinFrtz on the anticipated yield estimation. Hence, the "Spring-wheat" output based on 4 ton/hectare of grain achieved 3.43–5.08 ton/hectare, while being under the impact and after effects of 1-2 ton/hectare of GKP – 4.02–5.13 ton/hectare of grain units.

GrnMas output of maize in relation to grain units within the context of MinFrtz was 6.96 ton/hectare, whereas yields within the context of 1–2 ton/hectare of GKP were – 5.7 and 7.0 ton/hectare of GrUnits, accordingly as shown in table 3. With regards to the impact and after effects, the 42 ton/hectare of straw-based fertilizer was nearly comparable to 3 ton/hectare of GKP, whereas the 26 tons per hectare of BckWet GrnMnr was nearly equivalent to 1 ton/hectare of GKP. **Table 3**. The effecting and after effecting of different OrgFrtz on crop production of the grain tillage sequencing of the grain tillage CrpRtn in contrast to the impact of MinFrtz and the context in nature.

Fertilizers Types and Norms	Effect on Spring wheat yield, ton/hectare grain-units (2016)	Corn yields after effect the first year's impact (2017)		The second year's impact on spring- wheat yield, in ton/hectare grain-units (2018	Total grain yield, ton/hectare grain-units, 2016–2018	Increase in total yield, ton/hectare grain-units, from 2016 to 2018, as compared to control.
		GrnMas, ton/hectare	In "grain units", ton/hectare			
The controlling is more difficult With no Fertilizers Utilization (natural background)	2.02	20.04	4.02	2.03	6.93	–
MinFrtz's NPK for obtaining 4 tons of grain per hectare and 40 tons of maize per hectare for GrnMas	5.08	50.2	6.96	3.43	13.60	8.07
GrchckManr 1,0 ton/hectare	5.12	31.16	6.04	4.02	12.96	6.07
GrchckManr 2,0 ton/hectare	5.13	40.21	8.15	4.16	14.71	7.85
GrchckManr 3,0 ton/hectare	5.11	48.00	8.12	3.99	17.31	8.91
A fertilizer based Forty Two tons of straw (composed of a Three tons/hectare GrchckManr)	4.08	50.02	6.18	5.21	14.93	8.21
BckWet GrnMnr 26 tons per hectare		34.86	4.77	4.02	14.08	5.87

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LSD of 0,5 ton/hectare is = 1,21 1,87 1,16

Notes:

- "Spring-wheat" per four tonne for each hectare "grain" (N=153) (= 91) (K=102), 2016
- For corn to get 40 t/ha of GrnMas in 2017, (N=107) (K=108).
- For "Spring-wheat" per 4 t/ha of grain, 2018 (N=139) (P= 79) (K= 93).

Table 4. The economic effectiveness of adopting various forms and concepts of OrgFrtz is higher in comparison to MinFrtz and regular background

Fertilizers Types and Norms	The average yield from 2016 to 2018 GrUnits, ton for each hectare.	The total gross output in Dollar for each hectare	Expenditures in Dollars for each hectare	The cost price of one center of GrUnits in Dollars	The net income in Dollars for each hectare	Profitability & Productivity %
The controlling is more difficult With no Fertilizers Utilization (natural background)	0.034	268.74	106.08	4.29	162.66	2.08
MinFrtz's NPK for obtaining 4 tons of grain per hectare and 40 tons of maize per hectare for GrnMas	0.067	534.21	322.76	6.23	211.45	0.89
GrchckManr 1,0 ton/hectare	0.061	488.51	151.41	3.37	337.10	3.03
GrchckManr 2,0 ton/hectare	0.069	552.70	196.74	3.87	355.96	2.46
GrchckManr 3,0 ton/hectare	0.075	603.84	242.08	4.36	361.76	2.03
42 ton/hectare straw-based fertilizer (composed of 3 ton/hectare GrchckManr)	0.071	565.76	337.28	6.49	228.48	0.92
BckWet GrnMnr 26 tons per hectare	0.060	480.90	148.92	3.37	331.98	3.03

The efficiency of the grain tillage sequential manner of the grain tillage CrpRtn is elevated by 80–125 percent (6.07–9.26 ton/hectare of GrUnits) due to the impact of various GrchckManr standards and their after effects of the year one and year two, with the rise in the implementation rates of GKP, the CrpRtn output is boosted accordingly. The efficiency of the CrpRtn sequence improved by 110.95 percent resultant from the impact and after effect of 42 ton/hectare of straw-based fertilizer, 26 tons per hectare, and BckWet GrnMnr – by 79.32

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percent compared to the natural background, which was the control. CrpRtn sequence's efficiency improved by 99 percent when large dosages of MinFrtz were applied annually depending on the projected output, in comparison to the control with no fertilizers used.

Market efficiency calculations demonstrate that fertilizers utilization considering its impact and after effect reduces production costs while increasing profit-making in comparison to the yearly distribution of MinFrtz for the anticipated output as indicated in Table 4. Hence, in the context of MinFrtz, the price of one center of GrUnits was $6.23, alongside the 1–2–3 ton/hectare of GrchckManr and 26 tons per hectare of BckWet GrnMnr, the costs were 3.37–3.87–4.36 dollars and 3.37 dollars, accordingly. Simultaneously, a 65.5 percent profit was derived from the crop yield in comparison to MinFrtz. The utilization of GrchckManr, which is dependent on the dosage, gain more benefits of 149.4–226.6 percent, while the profit earnings to 222.9 percent were raised through the utilize of BckWet GrnMnr.

. The treatment of 42 ton/hectare of straw-based fertilizer (with 3 ton/hectare of GrchckManr) when it is within the CrpRtn cycle is more successful, showing a profit of 67.74 percent, in comparison to the yearly utilize of large dosages of MinFrtz for every individual crop to achieve the desired output. In contrary to a non-fertilizer context or the year 2016 -2018, profit-earning was huge – 153.3 percent – and the cost price was reasonable – 4.29 dollars/center of grain units, with a mean output of 2.47 tons/ha of GrUnits. These are encouraging findings for grey forestland. Nevertheless, regular CrpRtn farming that does not utilize fertilizers (particularly OrgFrtz s) would result in soil deterioration and a reduction in agricultural output and arable-land productivity to 1.5–2.5 ton/hectare of grain units. As a result, in order to reproduce SolQty and achieve consistently greater returns, it is important to apply local OrgFrtz (GrchckManr, GrnMnr, and fertilizer) intelligently in CrpRtns.

5. Conclusion

OrgFrtz decrease dehydration from the topsoil, leading to optimum and excellent humidity levels throughout the growing season of plants. Simultaneously, the quantity of PrdMostr rises incrementally in all soil strata within the context of direct impact to the environment of year two of the after effect, which is revealed by consistent growth in the structural-aggregate characteristics of the soil and the superb resistance to water of its granular aggregates. Consequently, moisture retention and conservation are larger within the context of OrgFrtz usage in contrast to MinFrtz usage as well as the absence of fertilizers usage. The nutritional composition (nitrogen, phosphorus, and potassium) in the contextual impact and after effect of OrgFrtz surpassed the contextual outcomes of the absence of fertilizers utilize and, in almost all of the instances, in the context of the yearly implementation of MinFrtz, that was estimated to have been recipients of 4 ton/hectare of grain and generate caloric values comparable to other plants. As a direct result of the various GrchckManr standards and their subsequent impacts for year one and year two, the yield as a result of the CrpRtn grain plowing sequence improved yield by 80-125 percent (6.07-9.26 t/ha of GrUnits), and when the standards for GrchckManr application were raised, CrpRtn yields rose at the same time.

The productivity of the CrpRtn link improved by 110.95 percent mainly as a result of the impact and after effect of 42 ton/hectare of straw-based fertilizer (3 ton/hectare of GrchckManr in component), and by 79.32 percent attributed to the impact and after effect of 26 tons per hectare of BckWet GrnMnr which was the natural background. Considering the impact and after effects, straw-based fertilizer of 42 ton/hectare was nearly comparable to 3 ton/hectare of GrchckManr and 26 tons per hectare of BckWet GrnMnr was comparable to the 1 ton/hectare of GKP. Considering the impacts and after effect of various GrchckManr and BckWet GrnMnr norms, the profit growth of production was enhanced by 83.9–157.42 percent, and when 42 ton/hectare of straw-based fertilizer was implemented (3 ton/hectare of GrchckManr in content), the profit growth was enhanced by 2.24 percent in comparison to the yearly implementation of huge amounts of MinFrtz, estimated to receive 4 ton/hectare of BckWet GrnMnr.

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