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Chemicalization of Agriculture Plants: A Major Factor of high yield of Bio-Gas

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ABSTRACT

The importance of fertilizers was expressed as far back in 1563 by the french naturalist Pallissy that salts form on the basis of life and growth of all crops. German chemist Glouber (1656) proved that addition of salt petre to soil markedly increases the yield of crop. Role of N_2 in the life of plants was elucidated even much latter. Original Ideas concerning aerial nutrition of plants was set forth by M.V. Lomonosov in 1753. The roots of Luxuriant trees in barren sand is manifestation that their succulent leaves receive copious nourishment from air. Lavoisier in 1775 discovered that plants take up substances from surrounding air water and mineral kingdom. Necessity to fertilize "bad" soils where fertilizers act as agent enabling conservation of moisture in the soil and improving its structure and to neutralize it's acidity or promote decomposition of the organic matter present there.

Nitrogen accumulated in the soil by Leguminous crops. Introduction of clover (or other legumes) into crop rotation improves the N_2 balance and leads to substantial increase in crop yields by taking N_2 from air. The amount of 'C' in the crop has nothing to do with its content in manure the source of 'C' for plants being atmospheric CO_2 Liebig formulated the law of minimum That the crop size depends on the amount of minimum (i.e. the most deficient) factor.

If N_2 or Zn is deficient in cultivation of a crop, no matter how much P, K and other nutrients are added they will not increase the crop yield. In 1858 Knop and Sachs succeeded in bringing plants grown on artificial nutrient media with supply of mineral salts to full maturity.

KEY WORDS:

Nutrients, Nitrogen, macronutrients, fertilizers, green manure, Crop, Yield, green house deficient, mineral.

INTRODUCTION:

Pryamishnikov studied role of biological N_2 in agriculture and emphasized the need of organic fertilizers. Ammonium salts are equivalent to nitrates as source of N_2 nutrients of plants and does not bring about undesirable after affect. Degradation of proteins form amino acids from which NH_3 is eliminated, which bound as asparagine. Asparagine may be neutralized in plants in biosynthetic processes and referred as "neutralized ammonia" the fertilizer of future. All soils are capable of exchanging the absorbed cations (both M and N), the number of cations absorbed by the soil being equal to that of cations displaced from the soil solution as instantaneous reactions."Turchin" (1902-1969) pioneered the use of compound Labelled with stable N_2 isotope N^{15} and pathway of NO_3^- NH_4^+ and amides entering plants and utilized in the synthesis of amino acids and proteins.

The difference between the intake of nutrients into the soil and their removal from the letter constitutes the nutrient balance. The removal of nutrients from soil is determined by their amount taken up by primary and secondary crops from unit arable area. The return of nutrients into the soil is determined by their compensating amount brought back with fertilizers, seeds, and root residues, by the process of molecular N_2 fixation. The world wide experience provides evidence to the effect that crop yields are directly dependent on the amounts of applied fertilizers. As predicted by food and agriculture organization (FAO) of the united Nations the demand of fertilizers by the year 2020 will amount of 348.7 million tones of nutrients, including 210 million tons of N_2, 110 million tons of P_2O_5 and 100 million tons of K_2O. The application of fertilizers per capita will increase from 95 to 185 kg of nutrients in developed Countries and from 47 to 63 kg in developing Countries. Half of the estimated yield increases due to fertilizers, while the other half is ensured by other means, such as farming practice, breeding, land reclamation and by application of herbicides and other plant protection chemicals.

EXPERIMENTAL PRACTICES:

Sample 1:- Wheat crop with area of 1000 sq feet applied with 1.10 kg N, 0.4 kg of P_2O_5 and 0.7 kg of K_2O.

Sample 2:- Potato field with area of 1000 sq feet exposed to light, heat, moisture and by nutrition in the form of 1.5 kg of N, 0.6 kg P_2O_5 and 2.7 kg of K_2O.

Sample 3:- Maize field of the area 1000 sq feet charged with 0.8 kg N, 0.5 kg of P_2O_5 and 0.9 kg of K_2O.

Sample 4:- Barley Crop in 1000 sq feet area charged with 1.4 Kg N, 0.8 Kg P_2O_5 and 0.6 Kg of K_2O.

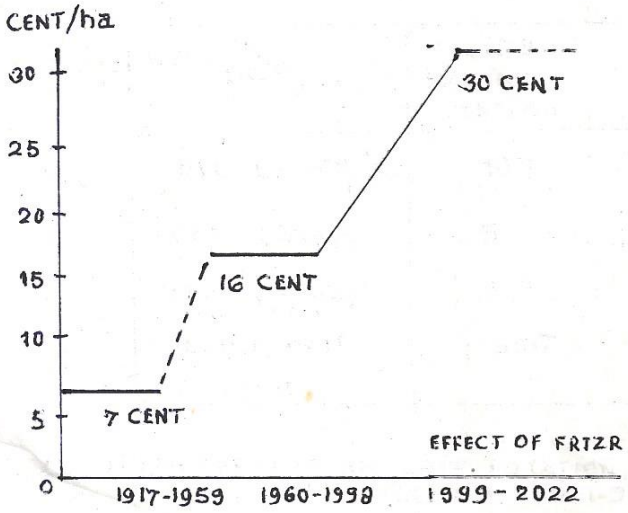
Sample 5:- Clover field of 1000 sq feet area, no addition of any additional nutrients.

OBSERVATION AND INFERENCES:

Study of table 1.1, 1.2, 1.3, 1.4, indicate the following Results.

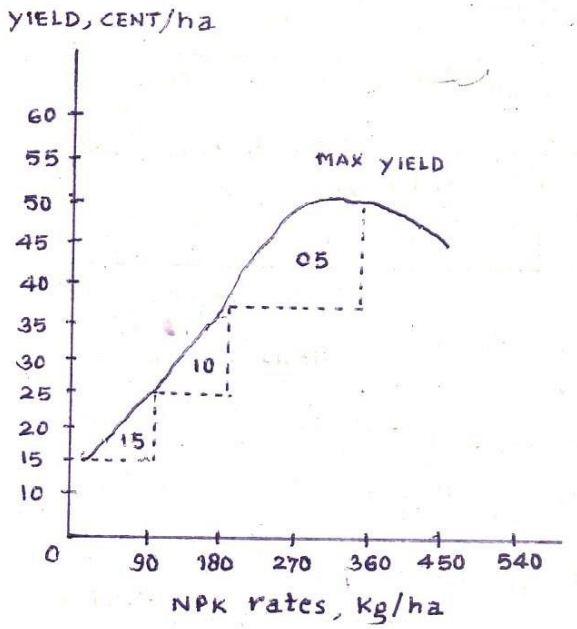
1. Application of fertilizers to its threshold amount improves the crop quality even in adverse climatic conditions.
2. The grain quality particularly the protein content in winter season.
3. Use of 20 to 30 tons of manure applied per hectare are of land increases the grain crop yield by 6 to 7 centers, the corresponding increments for potatoes, root crops and ensilage crop been 60 to 70, up to 150 and 150 to 200 centers per hectare respectively
4. Table 1.4 indicates 36 tones of manure increased the yield of four rotating crops by a total of 34 centers in term of grain.
5. Calculation shows that money spent on inorganic fertilizers returns double or triple cost of a crop and 1 kg of the active ingredient returns 5 to 10 kg of grain.
6. Return from fertilizers depends on natural fertility of the soil and on its moisture content. It account for 70 to 80% increase in yield amounting to 30 and more centers.
7. Bio-gas production increased with respect to the nutrients added and drought resistance varieties of the crop table 1.5

8. Advanced farming practices, timely planting increase the crop yield even in absence of additional nutrients (table 1.2). Over fertilization or application of fertilizers with upset nutrient balance lead to poor crop quality and pollution of environment.



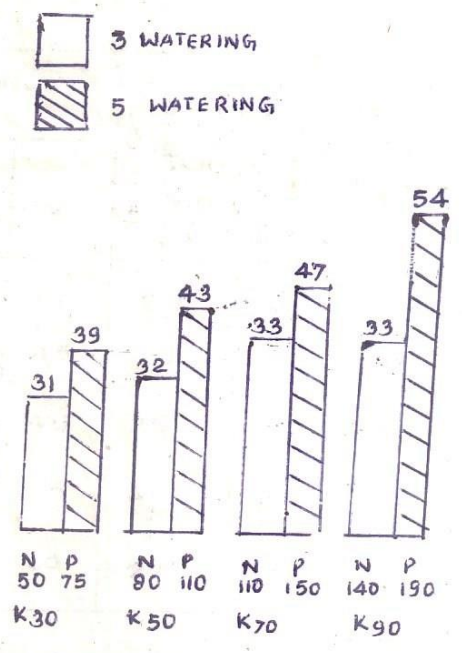
CHANGES IN WHEAT YIELD IN WEST U.P (100 YRS Pd

FIG-1-1



YIELD VERSUS FERTILIZER RATE

FIG 1-2



EFFECT OF FERTILIZER RATES ON SPRING WHEAT YIELD (WATERING)

FIG 1-3

	AGRO-PRACTICES	YIELD, CENT/ha				INCREMENT, CENT/ha			
		POTATO	WHEAT	BARLEY	MAIZE	POTAO	WHEAT	BARLEY	MAIZE
1	NO FERTILIZERS LATE PLANTING	90	75	71	80	-	40	45	51
2	APPLICATION OF FERTILIZERS	160	145	140	150	70	67	74	80
3	NO FERTILIZERS ADVANCE TECHNOLOGY	154	140	135	151	65	60	58	67
4	ADVANCE TECHNOLOGY FERTILIZER ADDITION	276	255	270	265	185	180	190	200

Effect of Various agro-practices/Technologies on yield of crops

CROP	ABSOLUTE INCREMENT CENT/ha	IN TERM OF GRAIN CENTNERS
RYE (GRAIN)	10.7	10.9
OAT (GRAIN)	5.3	5.4
CLOVER (HAY)	6.5	3.0
FODDER BEET	155.7	15.6
TOTAL		34.7

YIELD INCREMENTS IN CROP ROTATION BY APPLICATION OF MANURE PER YEAR FIG 1.5

S. NO.	TYPE OF CROP	APPLIED PER HACTARE K_5			YIELD FROM FERTILISED SOILS, CENT/HA	INCREMENT DUE TO FERTILIZER, CENT/HA	CROP TO ACTIVE INGREDIENT RATIO
		N	P_2O_5	K_2O			
1	WINTER RYE	60	65	50	19.7	6.0	3.6
2	WINTER WHEAT	55	57	45	33	7.0	4.7
3	SPRING WHEAT	45	55	45	25	5.0	4.0
4	OAT	47	45	55	24	3.0	4.5
5	BARLEY	56	55	60	27	7.0	4.2

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