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"RESIDUAL EFFECT OF NON LEGUMINOUS WEED MANURES ON *LABLAB PURPUREUS*"

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ABSTRACT:
An application of Non Leguminous weeds (*Achyranthes aspera* and *Parthenium hysterophorus*) manure usually shows a favourable influence on crop yields for several years. These beneficial effects are distributed over a longer time than those of chemical fertilizers. *Parthenium hysterophorus* is a species of flowering plant in the aster family, Asteraceae. In India, it is locally known as carrot grass, congress grass or Gajar Ghas. It is an annual herb that aggressively colonizes disturbed sites. It grows on any type of soil and in a wide range of habitats and affects the production of crops, animals, human and animal health, and biodiversity. *Achyranthes aspera* is a species of plant in the family Amaranthaceae. It is distributed throughout the tropical world. It can be found in many places growing as an introduced species and a common weed.
Present investigation state that the residual effect of organic manures as comparative residual effect of Non leguminous weed compost manure, green manure and dry leaf manure on fodder crop *Lablab purpureus* plant yields. *Lablab purpureus* is a species of bean in the family Fabaceae. It is native to Africa and it is cultivated throughout the tropics for food and fodder crop. It is not only drought resistant but also able to grow in a diverse environmental condition around the world.

The experiment was conducted on the farm located at V-P High-tech Research farm, Dist. Beed. The experiment design was a randomized block design [RBD] with ten treatments and three replicates. Previous work in this laboratory and field shows that input, data for the organic manure in form of chemical fertilizers PK and NPK at the rate of 120N, 80P and 40K and compared with organic Non leguminous weed manures as green manure of *Achyranthes aspera* (AGM), green manure of *Parthenium hysterophorus* (PGM), mixed green manure of both.(A&PGM), Dry manure of *Achyranthes aspera* (ADM), Dry manure of *Parthenium hysterophorus* (PDM), compost of *Achyranthes aspera* (ACo) and compost of *Parthenium hysterophorus* (PCo). Result shows that green manure and compost manure of Non- leguminous weeds gives long term residual effect on crop *Lablab purpureus* plant and its improves the soil quality.

Keywords: Non-leguminous, organic, residual, weeds, manure.

INTRODUCTION:

The residual effects of organic matter in soil following manure or compost application on crop yield and soil properties can last for several years. Four years after application, residual effects of one-time application of beef feed lot manure at rates varying from 123 to 590 Mg dry weight ha^{-1} (1280–6140 kg N ha^{-1}) resulted in a quadratic increase in corn grain yield but also in increased leaching of NO_3–N and Na to a depth of at least 1 m [15]

The residual effects of organic materials on soil properties can contribute to improvement I soil quality for several years after application ceases [7].

Application of organic manures increases soil fertility and other properties [9, 11]. Ayoola O.T. and Makinde E. A. [3] Studied that

complementary Organic and Inorganic Fertilizer Application: Influence on Growth and Yield of Cassava/maize/melon Intercrop with a Relayed Cowpea and concluded that complementary application reduces the dependence of the farmer on inorganic fertilizer use. It also reduces the exposure of the soil to the consequences of inorganic fertilizer application.

Organic amendments play a residual role in their ongoing maintenance. Residual amendment effects on total nitrogen (N) and phosphorus (P) were apparent 11.5 yr after application [10]. Residual effects of organic fertilizers on chemical properties of soil was studied by Tabibian et al. [14] and found significant increase in organic matter, electrical conductivity.

Excessive and imbalanced use of chemical fertilizers has adversely affected the soil, causing decreasing the structure and water holding capacity, reduction in organic carbon and microbial flora of soil results as increasing acidity and alkalinity and harding of soil, to solve this organic manure plays an important role, they are complementary to the chemical fertilizers and many times they have the capacity to replace them [5,6].

An application of manure usually shows a favourable influence on crop yields for several years. These beneficial effects are distributed over a longer time than those of chemical fertilizers. Present investigation state that the residual effect of Non-leguminous (*Parthenium hysterophorus* and *Achyranthes aspera*) weeds organic manures as compost, green and dry leaf manure. Effect was studied on growth and yield of *Lablab purpureus*.

Lablab purpureus is a species of bean in the family Fabaceae. it is cultivated throughout the tropics for food. It is a very important fodder crop for tropical people, especially in the dry season and with its enhanced nutritional value. It is not only drought resistant but also able to grow in a diverse environmental condition around the world.

During the dry season *Lablab purpuras* dense green cover protects the soil from the action of sun rays and it can be advantageously used as a cover crop to reduce soil erosion due to wind or rain. *Parthenium hysterophorus* is a species of flowering plant in the aster family, Asteraceae. In India, it is locally known as carrot grass, congress grass or Gajar Ghas. It is an annual herb that aggressively colonizes disturbed sites. It grows on any type of soil and in a wide range of habitats. It affects the production of crops, animals, human and animal health, and biodiversity. *Achyranthes aspera* is a species of plant in the family Amaranthaceae. It is distributed throughout the tropical world. It can be found in many places growing as an introduced species and a common weed.

MATERIALS AND METHODS:

Field site and experimental design - The experiment was conducted on the farm located at V-P High-tech Research farm, Dist. Beed. The experiment design was a randomized block design [RBD] with ten treatments and three replicates [Table 1].

Treatments, Seeds variety and plot size - The present work related to treatments of plots dependes on the basis of the previous work of the field. First maize crop was harvested then on bed of previous residual effect of organic manure plots like comparative residual effect of compost, green manure and dry leaf manure. Previous work in this laboratory and field shows that input, data for the organic manure in form of chemical fertilizers PK and

NPK at the rate of 120N, 80P and 40K and Control (CON) compared with Non leguminous weeds organic manures as green manure of *Achyranthes aspera* (AGM), green manure of *Parthenium hysterophorus* (PGM), mixed green manure of both *A.aspera* & *P.hysterophorus* (A&PGM), Dry manure of *Achyranthes aspera* (ADM), Dry manure of *Parthenium hysterophorus* (PDM), compost of *Achyranthes aspera* (ACo) and compost of *Parthenium hysterophorus* (PCo). after 41 days of interval the Variety Lablab purpureus was sown. It was produced by a Patel Seeds Corporation, old Mandi P.O. Padra (Baroda, Gujrat*).* 36gm/plots of size 3m x 3m i.e. at the rate of 40 kg/ha each.

Plant sampling –

After 56 days of age the green foliage of *Lablab purpureus* was harvested during the early hours of the day, 3 kg vegetaion was cut in to small pieces and samples from each plot [100 gm plot $^{-1}$] were immediately collected.

Finally the total crop *Lablab purpureus* was harvested at the 56 DAS of age, plant fresh weight of the fodder yield obtained per plot was recorded on the field itself [100 gm plot $^{-1}$] samples of each treatment along with control they were oven dried at 90 ^{o} C for 2 Days till it gives constant weight for the determination of dry matter (DM), this dried sample was grinded to fine powder and stored in sealed polythene bags for further analysis as dry matter N, P, K and ash percentage from each sample [Table 2].

Analysis:

Chemical Analysis –

Samples of each treatment along with control were kept in oven for further chemical analysis. Ash values were obtained by burning the moisture-free samples in a muffle furnace at 600°C for 2 hours, Carbon (C) was then calculated by multiplying A value with 0.58 as factor and Calcium (Ca) content was analyzed by titrating the sample solution against 0.01 N $KMnO_4$ solution using methyl red as indicator [2]. Nitrogen (N) was measured by micro-Kjeldahl's method after digesting the sample with Conc. H_2SO_4 according to Bailey [4] and crude protein (CP) was expressed N x 6.25 equation as specified by AOAC, [2]. Total Reducing Sugar (RS) was determined by reacting the sample with phosphomolybdic acid at 420 nm using Folin-Wu-tubes and Phosphorus (P) was analyzed by reacting the sample with ammonium molybdate solution at 660 nm following Fiske and Subba Rau (1972) described by Oser [13]. Potassium (K) content was determined on a flame photometer model mediflame- 127 as suggested by Jackson [8]. The concentration of P and K was calculated on the basis of the standard graph prepared by using variable concentration of the standard solution.

Statistical Analysis –

All the results were statistically analyzed by using analysis of variance [ANOVA] test and treatments means were compared using the least significant difference [CD,P_0.05] which allowed determination of significance between different applications [12].

RESULTS AND DISCUSSION:

Fig.1. Show that residual effect of Non-leguminous weeds organic manures on *Lablab purpureus* the total plant analysis as fresh weight and Dry matter kg/ha produced highest amount of fresh weight observed in the treatment of *P. hysterophorus* Compost manure as 4889kg/ha followed by the treatment on *P. hysterophorus* Green manure as 4704kg/ha then in *P. hysterophorus* and *A. aspera* Green manure as 4574kg/ha. Lowest

Fresh Weight observed in the Control as 2963kg/ha followed by *P.hysterophorus* dry manure as 3407kg/ha then on chemical fertilizers PK treatment as 3481kg/ha.

Dry matter kg/ha was maximum on the *P.hysterophorus* and *A.aspera* Green Manure as 791kg/ha then *P.hysterophorus* Compost manure as 782kg/ha followed by *A.aspera* Green Manure as 711kg/ha and minimum in the treatment of Control as 523kg/ha then in chemical fertilizers NPK as 526kg/ha followed by *A.aspera* Dry manure as 535kg/ha then in chemical fertilizers PK as 540kg/ha.

Fig.2. Show that total plant Nitrogen kg/ha was maximum in the treatment of *P.hysterophorus* and *A.aspera* Green Manure as 19.77kg/ha followed by *A.aspera* Green Manure as 19.56kg/ha then on *P.hysterophorus* compost manure as 18.24kg/ha and minimum on the treatment of Control as 11.77kg/ha followed by chemical fertilizers PK treatment as 13.93kg/ha then chemical fertilizers NPK treatment as 14.03kg/ha.

The Total Reducing Sugar kg/ha was maximum in the treatment of *A.aspera* Green Manure as 19.79kg/ha then *P.hysterophorus* and *A.aspera* Green Manure as 18.99kg/ha then on *P.hysterophorus* compost manure as 17.62kg/ha and minimum on the treatment of Control as 11.00kg/ha followed by chemical fertilizers NPK treatment as 11.69kg/ha.

Fig.3. Carbon % was maximum in the treatment of *A.aspera* dry manure as 6.1% followed by *A.aspera* green manure as 5.94% then *P.hysterophorus* green manure as 5.65% and minimum observed on the treatment of Control as 4.06% then treatment of *A.aspera* compost manure as 4.79% then of chemical fertilizers NPK treatment as 5.37%

C/N Ratio was maximum in the treatment of *P.hysterophorus* green manure as 2.34 followed by *P.hysterophorus* compost manure as 2.31 then *A.aspera* dry manure as 2.22 and minimum observed in the treatment of Control as 1.81 then treatment of *A.aspera* compost manure as 1.86 then of chemical fertilizers NPK treatment as 2.02.

Table 3. This Table demonstrate the Percent increase over control Fresh weight, Dry matter, Nitrogen, Total Reducing Sugar kg/ha and also Ash, Carbon, Phosphorous, Potassium, Nitrogen as %.

Fresh vegetation percent increase over control kg/ha of *Lablab purpureus* was highest in the treatment of compost of *P.hysterophorus* as 65kg/ha followed by *P.hysterophorus* green manure as 59kg/ha then *P.hysterophorus* and *A.aspera* green manure as 54kg/ha and lowest value were recorded on dry manure of *P.hysterophorus* as 15kg/ha followed by PK then *A.aspera* dry manure as 19kg/ha then chemical fertilizers NPK as 23kg/ha followed by green manure of *A.aspera* as 41kg/ha.

The Total Reducing Sugar kg/ha Percent increase over control was highest in the *A.aspera* Green manure as 80kg/ha followed by green manure of *P.hysterophorus* and *A.aspera* as 73kg/ha then *P.hysterophorus* compost manure as 60kg/ha and lowest values were recorded on treatment of chemical fertilizers NPK as 06kg/ha followed by chemical fertilizers PK as 23kg/ha then *A.aspera* dry manure as 41kg/ha.

Nitrogen percent increase over control kg/ha of *Lablab purpureus* was highest in the treatment of *P.hysterophorus* and *A.aspera* green manure 68kg/ha then on green manure of *A.aspera* as 66kg/ha then followed by compost of *P.hysterophorus* as 55kg/ha and lowest value were recorded on chemical

fertilizers PK as 18kg/ha then on chemical fertilizers NPK as 19kg/ha treatment.

Phosphorous Percent increase over control maximum in the *A.aspera* Compost as 49% followed by *A.aspera* dry manure as 45% then *P.hysterophorus* dry manure as 44% and minimum observed on the treatment of chemical fertilizers PK as 05% then on *P.hysterophorus* and *A.aspera* green manure as 14% then on *P.hysterophorus* compost manure as 21% followed by chemical fertilizers NPK as 22% , *P.hysterophorus* green manure as 27%.

Potassium Percent increase over control highest in the treatment of *A.aspera* green manure as 33% followed by *P.hysterophorus* and *A.aspera* green manure as 22.48% then on *P.hysterophorus* green manure as 21.71% and Lowest found in the treatment of the chemical fertilizers PK as 04% then followed by *P.hysterophorus* compost manure as 08% and then *P.hysterophorus* dry manure as 12%.

The results show that residual effect of Non-leguminous weeds manure on the crop of *Lablab purpureus* the total plant analysis as fresh weight, Dry matter, Nitrogen, Total Reducing Sugar kg/ha and also Ash, Carbon, Phosphorous, Potassium, Nitrogen as % were calculated on the dry matter basis shows all significant over control.

CONCLUSION:

On the basis of result obtained, it can be concluded that residual effect of all Non-Leguminous weeds Manure plays an important role, Among the residual effect of all Composted manure and Green Manure on crop Lablab purpureus plant had the highest biological yield and land use efficiency.

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		East				
	1} P.&A.GM.	**2} PK**	**3} A.GM.**	**4} NPK**	**5} A.DM.**	
North	**6} P.GM.**	**7} A.Co.**	**8} P.Co.**	**9} CON.**	**10} P.DM.**	South
	11} A.Co.	**12} CON.**	**13} P.GM.**	**14} P.&A.GM.**	**15} A.DM.**	
	16} A.GM.	**17} P.Co.**	**18} PK**	**19} NPK**	**20} P.DM.**	
	21} P.GM.	**22} PK**	**23} P.&A.GM.**	**24} P.Co.**	**25} A.GM.**	
	26} A.DM.	**27} A.Co.**	**28} CON.**	**29} NPK**	**30} P.DM.**	
		West				

Table 1: Randomised Block Design Residual Effect of Non-leguminous weeds organic manure on crop Lablab purpureus.

Sr. No.	Field Activities	Period [DAS]		Sr. No.	Field Activities	Period [DAS]
1	Weed Collection: Achyranthes, Parthenium	00 DAS		7	Growth Analyses of Crop - I	27 DAS
2	Preparation of Dry Manure	15 DAS		8	Chlorophyll Analyses of Crop - I	28 DAS
3	Preparation of Compost Manure	30 DAS		9	Growth Analyses of Crop - II	43 DAS
4	Treatments given to R. B. D. plots	32 DAS		10	Chlorophyll Analyses of Crop - II	44 DAS
5	Sowing of Crop *Lablab purpuras*	145 DAS		11	Harvesting of Crop	56 DAS
6	**Field Activities (***Lablab purpuras)*	**[00 DAS]**		12	Chemical Analyses	74 DAS

Table 2: Field Activities of crop Lablab purpureus on Plots of Residual Effect of Non-leguminous weeds organic manure.

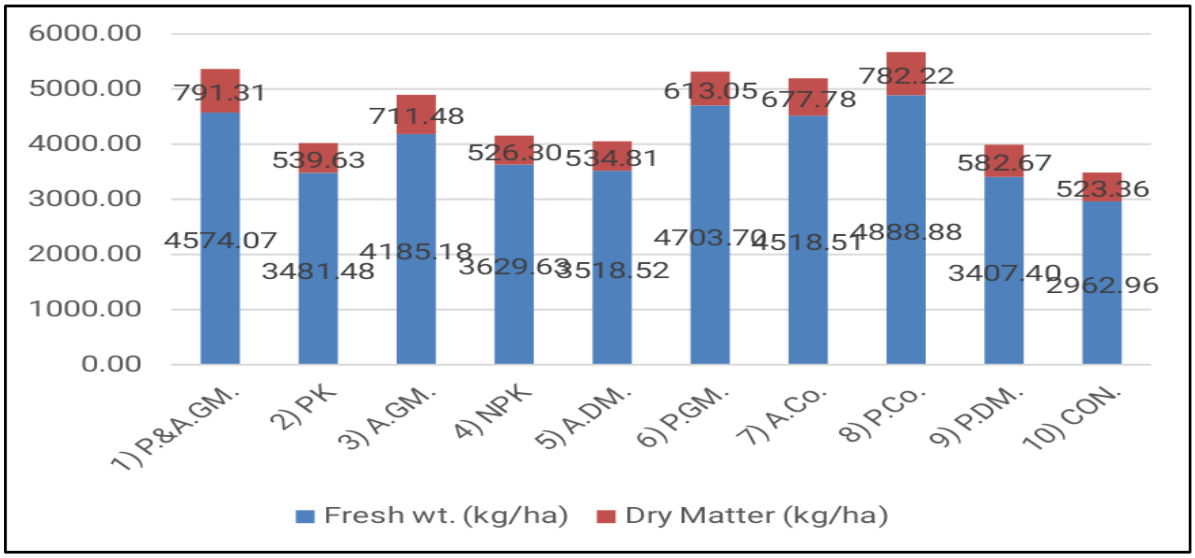

Fig. 1 : Graph of Residual Effect of Non-leguminous weeds organic manure on Lablab purpureus crop analyses of total plant Fresh wt. S.E.= 124, C.D.= 260 and Dry matter S.E.= 50.66, C.D.= 106 [kg/ha].

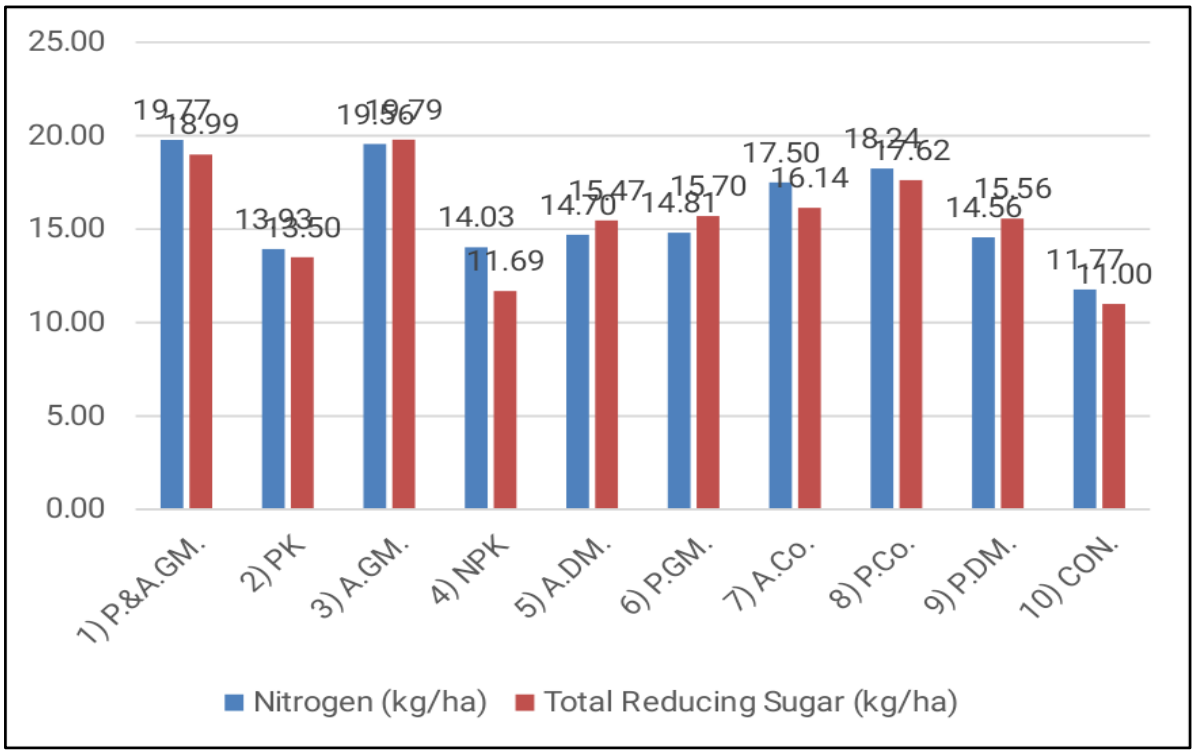

Fig. 2 : Graph of Residual Effect of Non-leguminous weeds organic manure on Lablab purpureus crop analyses of total plant Nitrogen kg/ha S.E.= 1.8, C.D.= 3.8 and Total Reducing Sugar kg/ha S.E.= 1.2, C.D.= 2.6 [kg/ha].

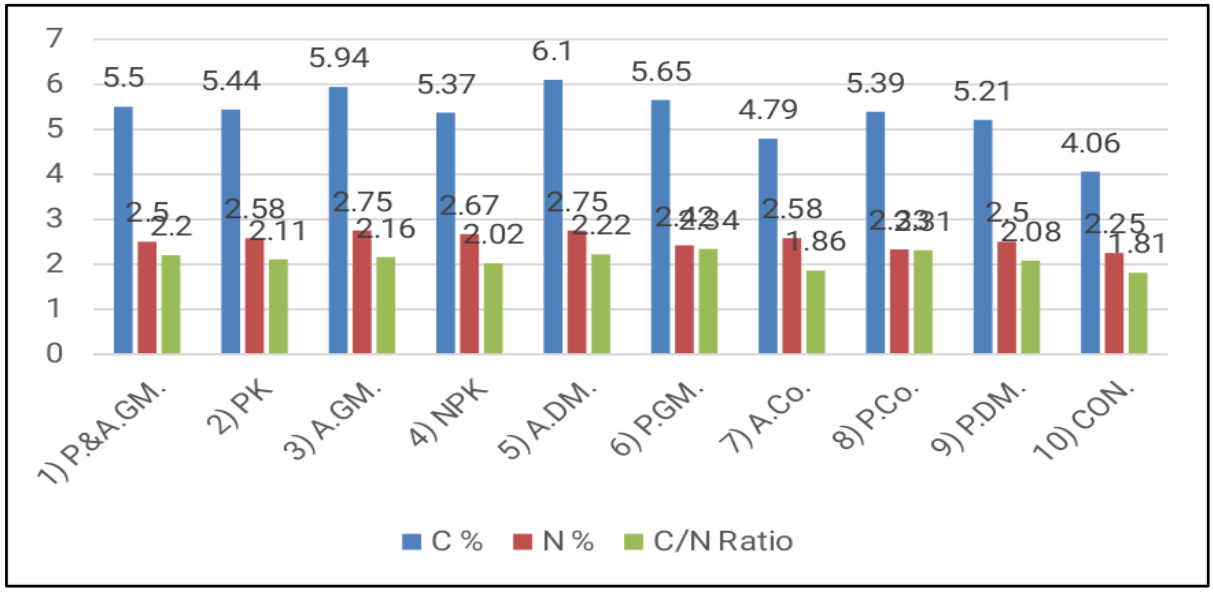

Fig. 3 : Graph of Residual Effect of Non-leguminous weeds organic manure on Lablab purpureus crop analyses of total plant Carbon% S.E.= 0.25, C.D.= 0.52 Nitrogen% S.E.= 0.19, C.D.= 0.39 and C/N Ratio S.E.= 0.19, C.D.= 0.39

Treatments	Kg./ha.					%					
	F.wt.	D.M.	N.	C.P.	R.S.	D.M.	P.	K.	A.	C.	N.
1} CON.	0	0	0	0	0	0	0	0	0	0	0
2} P.&A.GM.	54	51	68	68	73	33	14	22	35	35	11
3} PK	18	3	18	18	23	19	5	4	34	34	15
4} A.GM.	41	36	66	66	80	30	33	33	46	46	22
5} NPK	23	1	19	19	6	11	22	15	32	32	19
6} A.DM.	19	2	25	25	41	17	45	13	50	50	22
7} P.GM.	59	17	26	26	43	36	27	22	39	39	7
8} A.Co.	53	30	49	49	47	15	49	14	18	18	15
9} P.Co.	65	49	55	55	60	23	21	8	33	33	4
10} P.DM.	15	11	24	24	42	31	44	12	28	28	11

Table 3: % increase over control of crop *Lablab purpureus* on Plots of Residual Effect of Non-leguminous weeds organic manure.