# DETERMINATION OF A SUITABLE COMBINATIONS OF FARM YARD MANURE AND NPK 10:18:24 IN TOBACCO PRODUCTION

### Introduction

Maintaining and improving soil quality is crucial if agricultural productivity and environment quality are to be sustained for future generations (Reeves, 1997). Intensive agriculture has had negative effects on the soil environment over the past decades *e.g.* loss of soil organic matter, soil erosion, water pollution (Zhao *et al.*, 2009). Management methods that decrease requirements for agricultural chemicals are needed in order to avoid adverse environment impacts (Bilalis *et al.*, 2009). The use of manure and mulching are two of the basic cultivation techniques of Organic Agriculture (Effhimiadou *et al.*, 2009). Moreover, emerging evidence indicates that integrated soil fertility management involving the judicious use of combinations of organic and inorganic resources is a feasible approach to overcome soil fertility constraints (Abedi *et al.*, 2010; Kazemeini *et al.*, 2010; Mugwe *et al.*, 2009).

Combined organic/inorganic fertilization both enhanced C storage in soils, and reduced emissions from N fertilizer use, at the same time contributing to high crop productivity in agriculture (Pan *et al.*, 2009). Tiwari *et al.*, (2002) have also reported that the inclusion of manure in the fertilization schedule improved the organic carbon status and available N, P, K and S in soil, sustaining soil health. Addition of organic materials of various origins to soil has been one of the most common practices to improve soil physical properties (Celik *et al.*, 2004). Combined use of NPK and farmyard manure increased soil organic matter, total N, Olsen P and ammonium acetate exchangeable K by 47%, 31%, 13% and 73%, respectively compared to application of NPK through inorganic fertilizers.

#### **Objective of the research**

#### **General objective**

> To improve tobacco yield and quality

### Specific objective

To determine a suitable combination of Farmyard manure and NPK 10:18:24 for tobacco production

### Materials and methods

# Plot size and experimental design

The experimental design was Complete Randomized Block Design

\Design (CRBD) with 3 replications. 7 rows at 1.2m\*10m gross with net area of 3 centre rows (1.2m\*3) leaving three plants on each end (0.5\*3) giving a net area of 3.6\*7m2.1.2m alley was left between plots and 1metre between blocks.

Treatments were

1) Control (0kg NPK)

2) 20 kgN/ha (12g per plant)

3) 40 kgN/ha (24g per plant)

4) 60 kgN/ha (36g per plant)

5) 80 kgN (48g per plant)

FYM: Block I=0 kg, Block II=250 kg, Block III=500kg

# Plant management

Transplanting was done on 4/11/2011 and spacing was 100cm ridge to ridge and 60cm plant to plant. Fertilizer was applied on 18/11/2011. Topping was done accordingly to prevent flowering and suckers were controlled by the sucker killer called Yamaotea super.

# Data collected

- (i) Date of sowing in the nursery, transplanting and fertilizer application.
- (ii) Green weight of tobacco leaves
- (iii)Dry weight of tobacco leaves

# Data analysis

Data were managed by Microsoft excel and analyzed by Costat computer program.

# **Results and Discussion**

# Leaf length and width

In this particular trial leaf length and width were measured and representative average leaf length and width were calculated

### Middle leaves

The highest average value of leaf length for middle leaves was of treatment number 10 which gave 64.21 cm followed by treatment number 15 which gave 60.83 cm (table 1). Treatments 1, 2, 6, 7, 11, and 13 differed significantly with the rest of the treatments at p<0.05 The shorted leaves in average came from treatment number 6 which gave 32.25cm The highest average value of leaf width for middle leaves was from treatment number 10 which gave 33.02 cm followed by treatment number 4 which gave 31.21 cm. Treatments 1, 6, 7, and 11 differed significantly with treatments 3, 4, 5, 8, 9, 12 and 14 at p<0.05

Table 1: The average leaf length and width for 15 treatments of combination of FYM andNPK

T/n	Treatment	Middle leaf (cm)		<u>Top lea</u>	<u>f (cm)</u>
		Length	Width	Length	Width
1	0gm NPK	40.87 efg	20.82 efg	37.48 bc	16.98 de
2	12gm NPK	46.80 cdefg	22.18 defg	39.68 bc	19.65 de
3	24gm NPK	55.31 abcd	29.04 abc	51.91 ab	27.52 abc
4	36gm NPK	59.68 abc	31.21 ab	57.83 a	31.28 a
5	48gm NPK	55.34 abcd	28.04 abcd	51.10 ab	23.81 cd
6	250kg FYM	32.25 g	16.09 g	29.70 c	12.95 e
7	250kg FYM&12gm NPK	42 defg	19.54 efg	40.17 bc	17.55 de
8	250kg FYM&24gm NPK	51.63 abcde	25.52 bcde	50.26 ab	22.87 cd
9	250kg FYM&36gm NPK	52.23 abcde	25.19 bcde	51.59 ab	24.20 bcd
10	250kg FYM&48gm NPK	64.21 a	33.02 a	64.14 a	30.90 ab
11	500kg FYM	36.95 fg	17.37 fg	35.36 bc	14.88 e
12	500kg FYM& 12gm NPK	47.48 bcdefg	23.05 cdefg	49.02 ab	23.21 cd
13	500kg FYM& 24gm NPK	46.49 efg	22.40 cdefg	39.84 bc	19.59 de
14	500kg FYM& 36gm NPK	50.61 abcde	24.68 cde	48.54 ab	23.09 cd
15	500kg FYM& 48gm NPK	60.83 ab	31.01 ab	60.92 a	31.02 ab
	Mean	49.51	24.61	47.17	22.63
	Lsd	11.93	5.94	14.26	6.33
	CV (%)	14.40	14.42	18.08	16.72

Means followed by different letters are significantly different by Duncan New Multiple range P<0.05

# **Top leaves**

The highest average value of leaf length for top leaves was of treatment number 10 which gave 64.14 cm followed by treatment number 15 which gave 60.92 cm (table 1). Treatment 6 differed significantly with treatments 3, 4, 5, 8, 9, 12, 14 and 15 at p<0.05

The shorted leaves in average came from treatment number 6 which gave 29.70 cm

The highest average value of leaf width for middle leaves was from treatment number 4 which gave 31.28 cm followed by treatment number 15 which gave 31.02 cm. Treatments 6 and 11 differed significantly with treatments 3, 4, 5, 8, 9, 10, 12, 14 and 15 at p<0.05.

### **Green Leaf yield**

Table 2 shows the results of green leaf yield. Results show that the highest green leaf yield was from treatment 15 which applied 500kg Farmyard manure and 48gm NPK which gave (9566.96 kg/ha) followed by treatment 10 with the rate of 250kg Farmyard manure which gave (9221.57 kg/ha). Treatments 1, 6 and 11 differed significantly with the rest of the treatments except for the treatments 7 and 8.

### Dry leaf yield

Results show that the highest leaf dry weight was obtained from treatment 1 (500kg Farmyard manure and 48 gm NPK) which gave 1519.29 kg/ha, followed by treatment four (36gm NPK) which gave 1440.70 kg/ha. Treatment 15 differed significantly with the rest of the treatments except for treatments 4 and 8.

#### Grade index

The average highest grade index was obtained from treatment seven (250kg FYM and 12gm NPK) which was 2.25, followed by treatment five (48gm NPK) which was 1.20. Treatment seven differed significantly with treatments 1, 3, 4, 10, 11, 12, 14 and 15 at P<0.05

T/n	Treatment	Green weight	Dry weight	Grade index
		(Kg/ha)	(Kg/ha)	
1	0gm NPK	2179.16 e	140.96 e	0.21 b
2	12gm NPK	5939.91 bcd	701.65 cde	0.86 ab
3	24gm NPK	8210.49 abc	876.69 bcd	0.51 b
4	36gm NPK	8466.63 ab	1440.70 ab	0.36 b
5	48gm NPK	6414.61 abcd	667.75 cde	1.23 ab
6	25kg FYM	2359.57 e	518.81 cde	1.20 ab
7	250kg FYM & 12gm NPK	3516.86 de	522.10 cde	2.25 a
8	250kg FYM & 24gm NPK	5090.27 cde	1053.82 abc	0.78 ab

Table 2:	Green,	dry	leaf	' yield	and	l grade	ind	ex
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9	250kg FYM & 36gm NPK	7891.13 abc	728.47 cde	0.93 ab
10	250kg FYM & 48gm NPK	9221.57 a	759.67 cde	0.61 b
11	500kg FYM	2497.23 e	314.85 de	0.56 b
12	500kg FYM& 12gm NPK	5915.76 bcd	922.18 bcd	0.54 b
13	500kg FYM & 24gm NPK	5615.96 bcd	872.26 bcd	1.01 ab
14	500kg FYM & 36gm NPK	6661.72 abcd	860.58 bcd	0.67 b
15	500kg FYM & 48gm NPK	9566.96 a	1519.29 a	0.59 b
	Mean	5969.85	793.32	0.824
	L.s.d	2830.88	543.09	1.36
	CV (%)	28.35	40.93	98.87

Means followed by different letters are significantly different by Duncan New Multiple range P<0.05

The highest coefficient of variation could be caused by big difference in leaf quality grade. Some grade had very high price and some were given very low grades

### Conclusion

From tobacco leaf yield results it indicate that plot treated with 500kg Farmyard manure and 48gm NPK gave the highest yield for both green and dry leaf yield. Hence the best combination of Farmyard manure and NPK is between 500kg of Farmyard manure and 48gm of NPK in sandy loam soil of Tumbi, Tabora.