

## PERFORMANCE OF INTERCROPPING GROUNDNUT WITH GARLIC AND ONION

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### ABSTRACT

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An experiment was conducted at Multilocation testing (MLT) Site, Gabtali, Bogra under On Farm Research Division, Bangladesh Agricultural Research Institute, Agricultural Research Station, Seujgari, Bogra during the Rabi season of 2005-06 and 2006-07 to verify the performance of groundnut + garlic and groundnut+ onion intercropping in the farmers field. The experimental designed was used RCB with 3 replication. Average of two years results, two rows of onion and garlic in between 40 cm apart rows of groundnut produced the higher groundnut equivalent yields (2.67 and 2.94 t/ha, respectively) with higher gross margin (Tk. 21381.00 and Tk. 26788.00 per hectare, respectively) . The lowest groundnut equivalent yield (1.80 t/ha) with lower gross margin (Tk.12238.00 /ha) were obtained from sole groundnut .Yield of groundnut with one row of onion and garlic was higher than that of two rows of onion and garlic.

**Key Words:** Performance, Intercropping, Groundnut, Garlic and Onion.

### INTRODUCTION

Intercropping is very common practice throughout the country. It is the practice of growing two or more crops simultaneously in same land. It paves the way for increasing crop production per unit area. This has been reported from many countries viz. Bangladesh, India, China, Srilanka and Taiwan (Anonymous. 2006). In Bangladesh continued population expansion has been facing serious food deficit and they are trying to utilize the available crop land more intensively to produce more food. Groundnut (*Arachis hypogaea*) is an oil seed crop having high energy index. On the other hand, leguminous crops are highly nutritious and improve soil fertility by fixing atmospheric nitrogen. Another point of view groundnut is a long duration slow growing crop especially in rabi season. It is grown with wide row spacing which allows long term fallowing of interspaced. Garlic and onion are two most popular and economic spices crops which need much shorter duration for their maturity. Double rows of onion and garlic in between two rows of groundnut gave higher LER than single row system. Two rows of onion and two rows of garlic gave the higher yield of onion and garlic than one rows of every crop. Yield of groundnut with two rows of onion or garlic was higher than one rows of onion or garlic due to higher plant population of groundnut (Anonymous, 2004). All the inter cropped system earned higher return and LER than that of sole crop (Anonymous, 2004). The inter row spaces of groundnut could be utilized for growing these crops as short duration crops. Intercrops are also risk averse and met the diversified farmers' needs. Oil Seed Research Centre, BARI has developed two intercropping technologies such as groundnut + garlic and groundnut +onion was suitable row arrangement. These two technologies are found agronomically feasible and economically profitable. Thus an experiment was designed with the objectives to find out the performance of garlic and onion as intercrops with groundnut in the farmers field.

### MATERIALS AND METHODS

The experiment was conducted at MLT Site, Gabtali, Bogra during the rabi season of 2005-06 and 2006-07. The experiment was laid out following RCB design with 3 replications. The unit plot size was 3.6m×4.cm. There were 5 treatments viz. T<sub>1</sub> = Monoculture groundnut (324 plants of groundnut), T<sub>2</sub> = One row of onion in between 30 cm apart rows of groundnut (324 plants of Groundnut +440 plants of onion), T<sub>3</sub> = Two rows of onion in between 40 cm apart rows of groundnut (360 plants of groundnut + 640 plants of onion), T<sub>4</sub> = One row of garlic in between 30 cm apart rows of groundnut (324 plants of groundnut + 440 plants of garlic ) and T<sub>5</sub> = Two rows of garlic in between 40 cm apart of groundnut (360 plants of groundnut + 640 plants of garlic ). Spacing of groundnut was maintained 30 cm× 15 cm in T<sub>1</sub>, T<sub>2</sub> and T<sub>4</sub> where as 40 cm×10 cm in T<sub>3</sub> and T<sub>5</sub>. Onion and garlic spacing was single row in T<sub>2</sub> and T<sub>4</sub>. Spacing between two rows of groundnut, two rows of onion and two rows of garlic was maintained 40 cm×10 cm in T<sub>3</sub> and T<sub>5</sub> respectively. The plot was fertilized with 30-44-83-30-4-1 kg of N-P-K-S-Zn-B per hectare. Additional 60 kg N/ha was applied in intercropping plots ( onion and garlic ) as side dressing at 25 and 50 days after emergence of groundnut. The variety of groundnut was BARI Badam -6.

Seeds of groundnut, garlic and seedling of onion were sown/planted on 14 - 17 December during two years. The garlic and onion were harvested on 25-28 March and groundnuts were harvested on 10-14 May during two years. The crop sprayed with Diazinon for caterpillar and Rovral against fungal infection. Yield and yield attributes were

recorded and analyzed statistically following Duncan's New Multiple Range Test (DMRT). Economic analysis was also done.

## RESULTS AND DISCUSSION

The yield and yield component of groundnut affected by intercropping with garlic and onion are presented in Table 1. It revealed that the yield and all yield components except plant height and seeds per pod differed significantly due to the treatments. Branch per plant (8.10) of T<sub>1</sub> (Sole groundnut) was significantly higher than the other treatments. The highest number of pod per plant (14.67) was obtained from T<sub>1</sub> among the other treatments. Similarly the highest weight (9.65 g) of seed per plant was obtained from T<sub>1</sub> which was significantly different with all other treatment. The highest 100 kernel weight (33.40 g) was also obtained from T<sub>1</sub> (Sole groundnut). Significantly the highest nut yield (2.02 t/ha) was obtained from T<sub>1</sub> and the lowest nut yield (1.29 t/ha) was recorded from T<sub>5</sub>.

Table1. Yield and yield component of groundnut affected by inter Cropping with garlic and onion at MLT site Gabtali, Bogra during Rabi 2005-06 to 2006-07

Treatment	Plant height (cm)	Branch/Plant(no)	Pod/Plant(no)	Seed/pod (no)	Seed wt/ plant (g)	100 kernel wt (g)	Yield(t/ha)	
							2006-07	2005-06
Sole ground	35.70	8.10a	14.67a	2.37	9.65a	33.40a	2.02a	1.58a
Groundnut + Onion	35.90	7.67ab	11.67b	1.80	6.68b	32.27b	1.40b	0.62b
Groundnut + Onion	35.63	7.53b	11.57b	1.70	6.38b	32.23b	1.33bc	0.57b
Groundnut + Garlic	35.67	7.57b	11.60b	1.73	6.44b	32.13b	1.34bc	0.66b
Groundnut + Garlic	35.60	7.50b	11.57b	1.67	6.24b	32.20b	1.29c	0.57b
F-test	NS	*	**	NS	**	**	**	**
CV (%)	0.50	2.34	0.99	15.10	2.38	0.26	2.12	7.67

NS= Not significant, In a column, similar letter do not differ significantly at 5% (\*) and 1% (\*\*) level of significance

Results of intercropping on the yield of groundnut, onion and garlic are presented in Table 2. Due to the introduction of onion and garlic, the yield of groundnut was decreased. The higher groundnut equivalent yields were recorded from all intercrop treatments as compared to sole crop of groundnut. The highest groundnut equivalent yield (2.94 t/ha) was obtained from T<sub>5</sub>.

Table 2. Yield of groundnut, onion, garlic and groundnut equivalent yield of groundnut inter cropping with garlic and onion at MLT site Gabtali, Bogra during 2005-06 to 2006-07.

Treat	Yield of groundnut(t/ha)			Yield of onion(t/ha)			Yield of Garlic(t/ha)			G. nut equivalent yield(t/ha)
	2005-06	2006-07	Mean	2005-06	2006-07	Mean	2005-06	2006-07	Mean	
Sole ground	1.58	2.02	1.80							1.80
Groundnut + Onion	0.62	1.40	1.01	2.09	2.60	2.35				2.57
Groundnut + Onion	0.57	1.33	0.95	2.46	2.70	2.58				2.67
Groundnut + Garlic	0.66	1.34	1.00				1.41	1.67	1.54	2.72
Groundnut + Garlic	0.57	1.29	0.93				1.67	1.80	1.74	2.94

The economic analysis of groundnut intercropping with onion and garlic are presented in Table 3. The higher gross margin (Tk. 26788/ha.) and BCR (2.41) were recorded from T<sub>5</sub>. The lowest gross margin (Tk.12238.00/ha) and BCR (1.83) were obtained from T<sub>1</sub> (Sole groundnut).

It was found that two rows of onion in between 40 cm apart rows of groundnut were better than one row of onion in between 30 cm apart of rows of groundnut. Similarly two row of garlic in between 40 cm apart rows of groundnut was better than one rows of garlic in between 30 cm apart rows of groundnut. Yield of groundnut with one row of onion and garlic was higher than two rows of onion and garlic and this might be due to higher plant population of groundnut. Mondol *et al.* (2004) reported that monoculture produced the highest yields of individual crops. The

highest groundnut equivalent yield (4.78 t/ha), net return (Tk.84086.00/ha) and benefit cost ratio (8.33) were obtained from the treatment with two rows of onion in between two rows groundnut. Singh *et al.* (2003) reported that intercropping with potato, garlic and pea with autumn planted cane produced higher cane yield than sugarcane mono-cropping. Maitra *et al.* (2001) reported that all intercropping systems generated higher returns than sole crop.

Table-3. Economic analysis of Groundnut inter cropping with garlic and onion at MLT site Gabtali, Bogra during 2005-06 to 2006-07 (Average of 2 Years).

Treatment	Gross return (Tk/ha)	TVC (Tk/ha)	Gross margin (Tk/ha)	BCR
Sole ground	27000	14762	12238	1.83
Groundnut + Onion	38550	18325	20225	2.10
Groundnut + Onion	40050	18669	21381	2.15
Groundnut + Garlic	40800	17712	23088	2.30
Groundnut + Garlic	44100	18312	26788	2.41

Price:

G. Nut = @ Tk-15/kg

Onion = @ Tk-10/kg

Garlic = @ Tk-20/kg.

TVC= Total Variable Cost

BCR= Benefit Cost Ratio

From the above discussion it was revealed that the highest groundnut equivalent yield and benefit cost ratio from two rows of onion or garlic in between 40 cm apart rows of groundnut. The lowest groundnut equivalent yield and benefit cost ratio were obtained from sole groundnut.

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