



Maize Vegetable Intercropping, A Combating Mechanism Against Food Insecurity In Rain Fed Sloppy Land In The Western Hills Of Nepal.



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Introduction

Maize is the main staple food for the people of the western hills of Nepal.

About 69.33% and 69.07% of total area and production respectively occupies in the mid-hills.

The productivity of the maize in the mid-hill is only 2.1 Mt./ha (SIN A 2008/2009), where production potential is about 10 Mt./ha. (Man-3).

Concerned agencies and personnel should think over the possibility of increasing the income per unit area of upland (Bariland) either by introducing high yielding maize variety suitable for the marginal farmers or by integrating the suitable crop that would give additional income from the same unit of land.

To address the above scenario simple work on possibility of vegetable integration with maize was initiated in Palpa district of Nepal



Materials and methods:

Vegetables like cauliflower (Silvercup-60), tomato (Srijana) and bean (four-season) were taken for study.

Manakamana-3 variety of maize was used for the study purpose.

Four farmers for mother sets and 16 farmers for baby sets were volunteered among the group. One farmer was assumed as a replication.

Detail plan was as following.



Mother trial sets:

Crop Combination	Plot size Meter	Spacing cm.	Fertilizer N: P: K Kg/Ha. And FYM ton per Ha.
Maize+ Cauliflower	7.8x3	60x30 Maize 60x45 cauli	60:30:30+6T.FYM for Maize and 35:25:20+4T(half dose) for cauli
Maize+ Bean	"	120x30 Bean	60:30:30+6T.FYM for Maize and 10:20:15+4T FYM for bean
Maize+ Tomato	"	60x30 Maize Tomato 60x45	60:30:30+6T.FYM for Maize and 35:25:20+5T FYM For tomato
Maize sole	"	60x30	60:30:30+6 tom FYM

Baby sets

Crop combinations	Replications
Maize+ cauliflower	Four replications/ Farmers
Maize+ Bean	"
Maize+ Tomato	"
Maize sole	"



our-season bean was sown and vegetable seedlings were transplanted at about 20-25 days of silking or 120 days old maize plant.

Nursery Preparation:

Hot bed semi-gumbos nursery preparation method was carried out to grow the seedlings of cauliflower and tomato.

Nursery of 1 m⁴ m size was prepared by mixing the chemical fertilizer and well rotten compost.

The bed was treated with formaldehyde at the rate of 1: 10 and covered with transparent plastic sheet for 15 days.

On 16th day plastic sheet was

Fremoved and slightly dug and pulverized the soil. Seeds of tomato (Srijana) and Cauliflower

(Silvercup-60) were sown in the nursery.

After seed sown chloropyrophus @ 1 ml/liter of water was sprayed to protect the seed from red ant.

The nursery was covered with semi-gumbos to protect the bed especially from raindrops.

Seedlings of 4 leaves were again transplanted to another nursery for hardening purpose.

25 days old seedlings were transplanted in maize field.

Result and discussion:

The result of the vegetable integration was encouraging.

The total yield from maize tomato integration was 20753 kg./ha. (table 1 and 2)

The net return from maize + tomato was highest NRS 287189.3/ha (US\$4045/ha) Whereas net return was

Rs.13189.5/ha(US\$186/Ha) obtained from sole maize crop.

- Similar study was conducted by Gautam IP-2007, and found the gross return per ha, was Rs.150000(US\$ 2112/ha) and 302400(US \$4259 / ha) from maize bean and maize tomato respectively.

- In addition, Upreti et al (2001) in research station condition found highest gross income (NRS. 90977/ha. or US\$ 1295.04/ha) from intercropping of two rows of groundnut between maize rows.

This was happened due to the use of maize plants as a support material to the tomato and bean vine. The cost of support material for tomato and bean was calculated as 30 percent of the total production cost.



Conclusion

- This was an innovative intervention in the area where maize is the predominant crop.

- Women farmers were very much excited with the result obtained from the study plots and created a state of self-reliance and empowerment, increased access to and control over the monetary resources.

- It was observed that most important factor of motivation and power at household level was income.

- Maize+ tomato integration would be the high priority inter crop for the farmers to start with commercial farming followed by cauliflower.

- However this is for one-year result, its verification is required to make a wide and conclusive result.



Table-1. Summary of the result under vegetable integration with maize

S. N.	Treatments	Replications	Mean prod.Kg/ha		Market price Rs/Kg		Gross income Rs/ha		Total Income Rs./ha	Additional gross income Rs./ha
			Maize	Vegetable	Maize	Veg	Maize	Veg		
1.	Maize-Cauliflower	8	3886	5553	10.5	27	40803	149931	190734	149931
2.	Maize+Tomato	8	3713	17040	10.5	20	38986.5	340800	379786.5	340800
3.	Maize+Bean	8	4246	13860	10.5	12	44583	166560	211143	166560
4.	Maize sole	8	3967	0	10.5	0	41653.5	0	41653.5	0

Table -2.Cost benefit summary of vegetable integration with maize as reported by the farmers

S. N.	Treatments	Replications	Gross income Rs/ha		Prodn. Cost Rs. Per Ha.		Net Income Rs. Per Ha.		Total net incomes/ha	Additional net income Rs./Ha
			Maize	Vegetable	Maize	Veg	Maize	Veg		
1.	Maize-Cauliflower	8	40803	149931	28464	56239	12339	93691.8	106031	93691
2.	Maize+Tomato	8	38987	340800	28464	64133	10522.5	276667	287189	276666
3.	Maize+Bean	8	44583	166560	28464	15440	16119	151120	167239	151120
4.	Maize sole	8	41854	0	28464	0	13189.5	0	13189.5	0

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