

SUMMARY OF DATA: ZORO/EVON YIELDS TRIALS RESULTS DURING THE PROJECT PERIOD
JAN 2013 -- OCT 2015

Trial 5&6 were discarded because of crop failure

	Oct 2012-Jan 2013	Jan 2013- Mar 2013	Mar 2013- Sep 2013	Oct 2013- Jan 2014	Oct 2014- Mar 2015	Jun 2015- Aug 2015		
	Trial 1 Mizuna kg/bed	Trial 2 Potato Jiri local kg/bed	Trial 3 Maize Deuti kg/bed	Trial 4 Mizuna kg/bed	Trial 7 Garlic kg/bed	Trial 8 Kidney Beans kg/bed		
Sheet Composting or 4 inch biointensive	11.45	6.87	3.03	12.57	5.49	0.345		
1 ft. biointensive	7.78	6.72	2.46	8.73	4.1	0.307		
2 ft. biointensive	7.78	6.6	1.98	10.6	4.97	0.336		
Nepali traditional	5.76	6.03	2.08	6.96	4.28	0.307		
Nepali traditional + chemical fertilizer (DAP)	7.93	7.98	2.21	8.92	3.47	0.307		
Ratio SC to traditional	2.0	1.1	1.5	1.8	1.3	1.1	1.	AVERA 5 GE
Ratio SC to chemical	1.4	0.9	1.4	1.4	1.6	1.1	1.	AVERA 5 GE
% more than traditional	49.69%	12.23%	31.35%	44.63%	22.04%	11.01%		
% more than chemical	30.74%	-16.16%	27.06%	29.04%	36.79%	11.01%		

ZORO PROJECT, a project of dZi Foundation, implemented by Everything Organic Nursery Pvt. Ltd., Patlekhet 6, Kavre, Nepal from January 2013 through October 2015

Detailed report on **Yields trials** 2013-2015, submitted by Roshan Shrestha

The objective of ZORO project is to increase the production and productivity of Nepali organic farmers and to potentially raise their income level through the following outputs and activities:

Output 1: Yields Trials: Comparison of Nepali Biointensive with Other Bed Preparation Systems

Output 2: To conduct research and promote new varieties of vegetable, fruit and nut species that have commercial potential.

Output 3: To conduct research and promote organic pest control solutions utilizing local available resources.

Output 4: To test transferability of results through extension services to Associate Farmers who have been trained at EVON.

Output 5: To produce teaching materials based on outcomes of research.

Yields Trials: Comparison of Nepali Biointensive with Other Bed Preparation Systems

EVON.ZORO project main aim is to increase the production and productivity of crops to increase the production and productivity EVON is carrying research in different bed preparations (yield trials) since last three years. In those three years 8 trails were successful completed, which are as:

- I. October 2012- January 2013 – Mizuna -1st yield trial
- II. January 2013- March 2013 – Potato (Jiri Local) -2nd yield trial
- III. March 2013 – September 2013 – Maize (Deuti) -3rd yield trial
- IV. October 2013 – January 2014 – Mizuna – 4th yield trial
- V. February 2014- June 2014- Paprika – 5th yield trial
- VI. July 2014 – August – Aalas (flax) (due to uniformity in germination rejected) and again in September Mizuna was transplanted; this trial was also rejected due to attack by white grub.
- VII. October 2014 – March 2015 – Garlic -7th yield trial
- VIII. June 2015 – August 2015 – kidney beans -8th yield trial.

The bed size is 4 feet x 8 feet. There are five bed preparations:

- a. Nepali Biointensive 2 feet
- b. Nepali Biointensive 1 feet
- c. Sheet composting
- d. Nepali traditional and
- e. Nepali traditional + chemical fertilizer

Each bed preparation was replicated 3 times, so each trial involved 15 beds.

1. 1st Yield trial:

Mizuna is fastest growing leafy vegetables. As our objective is to promote new vegetables to the Nepali taste we tried to introduce that vegetable. By using same mizuna we conducted 1st yield trials on 5 different bed preparations. For that mizuna seedling were grown in green house and after 3 week those seedlings were transplanted in the yield trial beds. The seedlings were transplanted 60cm apart and 11plants were planted in individual bed. The weekly observation was implemented by research trial team for study and record of vegetative growth, canopy measurement of plant, infestation of pest and disease. Mizuna was harvest on January 2013 and data were maintained.

Findings:

C plot results are skewed because of probable soil difference. If we just account the data of plot A and B, the average yield of 5 bed preparations are as follow:

7.78Kg per bed - 2 ft. Nepali Biointensive

7.78kg bed - 1 ft. Nepali Biointensive

11.45 kg bed - Sheet Composting

7.93 kg bed - Chemical Fertilizer

5.76 kg bed - Nepali Traditional

The above results shows that sheet composted bed yield 44% more that of chemical bed. By this result we can convince those farmers who believe yield can't be enhanced without using chemical fertilizers; there are other alternatives of chemicals also.

This sort of bed preparations are cost economic and environmentally friendly also.

Yield trial 2 – Potato Jiri Local.

Potatoes occupy the fourth important position of the major crops of Nepal after rice, maize and wheat. Potato is the staple food crop in the remote hilly areas, and the main vegetable in other parts of the country. Potatoes are grown in all the three major agricultural zones (high hills, mid-hills, and plain area) of Nepal.

By using potato we conducted the second yield trial so that we can get ideas that which bed preparation would be best for potato. What would be the effect of Biointensive bed preparation system to other traditional system of bed preparations? Potato was planted in May at 45cm x 60cm using the variety Jiri local

Findings:

6.60 kg/ bed - 2 ft. Nepali Biointensive

6.72 kg/ bed - 1 ft. Nepali Biointensive

6.87 kg/ bed - Sheet Composting

7.98 kg/ bed - Chemical Fertilizer

6.03 kg/ bed - Nepali Traditional

If we compare the yield from sheet composted bed to chemical bed the yield difference between two beds is only 13% high in chemical bed.

Since potato is heavy feeder the use of chemical fertilizer fulfills the required nutrient and the variety we selected is also not suitable in this place.

The irrigation system of potato is furrow system so when irrigate, water leaches quickly in Biointensive bed preparations compared to other traditional and chemical bed.

Conclusion:

So we concluded that sheet composted bed is not suitable system for potato cultivation due to the obstacle in cultural practices and potato is commercial crops which are cultivated in hectares of land, for which bed preparation will be biggest challenge

More over potato is cultivated in field, after harvesting potato rice will be transplanted, which created difficulty in field preparations.

Yield Trial 3: March 2013 – September 2013 – Maize (Deuti)

Maize is the second largest crops after rice in Nepal. Maize is grown in three agricultural zones of Nepal. We did 3rd yield trial on Maize so that we can get idea about the impact of Nepali Biointensive bed preparation over chemical practice.

Findings

SN	3 Yield trials beds	Husk wt.kg	Bi-product (Khoya)	Grain kg
1	Sheet composting	3.034	3.430	10.734
2	Nepali Biointensive 1 ft	2.46	3.52	10.076
3	Nepali traditional	2.080	3.066	9.72
4	Chemical Fertilizer bed	2.210	3.929	9.733
5	Nepali Biointensive 2 ft bed	1.982	3.090	9.735

The grain yield from sheet composted bed is 10.734 kg per bed to 9.733kg per bed from chemical bed. This indicated that the yield increment is 9.23% more in sheet composted bed as compared to traditional bed. The sheet composted bed is more promising but same like potato farmers grows maize in large area so bed preparation system is challenging. More over the income from cereals crops is more negligible to vegetables so we decided to drop the idea of cultivation of maize in Biointensive bed and disseminate to farmers.

4th yield trial - October 2013 – January 2014 – Mizuna

Since Mizuna is easy to grow and can be grown commercially we tried to repeat for the yield trial. All the method and methodology applied were as previous year.

Findings:

2 ft. Nepali Biointensive - 10.60kg/bed

1 ft. Nepali Biointensive- 8.73 kg/bed

Sheet Composting -12.57 kg/bed

Chemical Fertilizer- 8.92 kg/bed

Nepali Traditional -6.96 kg/bed

The yield in sheet composted bed is 29.03% high compared to chemical bed.

Conclusion:

Mizuna is fast growing vegetables. Generally farmer do grow diverse type of vegetables so, mizuna cultivation is not mono-cropping like potato and maize so bed preparations for mizuna cultivation is promising and easy. More over the income from vegetables is high compared to cereals, income can be enhanced

5th yield trial - February 2014- June 2014- Paprika

Paprika is a specialty vegetable that is introduced to the Nepali farmers by EVON. Paprika have thick flesh than capsicum which weights more to capsicum so that the farmers growing capsicum can substitute capsicum with paprika. Paprika was planted 24 cm x 24cm apart and total of 8 planted were planted per bed.

Findings:

Unfortunately due to unforeseen reasons like excessive rains plants wilts and data couldn't maintain.

7th yield trial - October 2014 – March 2015 – Garlic

Garlic is the most important spice crop in Nepal. We did our 7th yield trial with garlic. On October garlic was seeds and water according to necessary. During harvesting, garlic was harvested from 1m² plot from each plot.

Findings:

4.10 kg/bed – 1 feet Biointensive

4.97 kg/bed - 2 feet Biointensive

3.47 kg/bed - chemical bed

4.28 kg/bed - Nepali traditional bed

5.49 kg/bed - sheet composting bed

Conclusion:

In comparison to chemical bed sheet composting bed gave 36% more increment in yield. This yield proves that sheet composting is far more effective than using chemical.

8th yield trial - June 2015 – August 2015 kidney beans

Crop rotation or incorporation of legume crops is the important aspect in any farming method, more over from June onward there would be excessive rain. In such rainy season we can't expect to grow any vegetables. To cope with that rainy season we selected 8th yield trail as Kidney beans.

Results:

345 gm/bed – Sheet composting bed

334.667 gm/bed - 2 feet Biointensive bed

307.333 gm/bed - 1 feet Biointensive bed

307 gm/bed - chemical bed

307 gm/bed - traditional bed

Conclusion

From this trial we got 11% more yield in sheet composted bed compared to chemical bed. The reason may be, in legume crops nodules are found in which rhizobium bacteria stays with symbiotic relation with nodules, if chemical fertilizer are used those bacteria can't function properly which in turn halts the yields.