

Objectives

The main objective of this experiment was to examine the effect of bio-slurry (effluent produced from biogas plant) on cereal and vegetable crops namely maize and cabbage. Specific objectives were directed towards:

- Generating reliable data information on the effect of bio-slurry (both in liquid and composted forms) on crops and soil;
- Comparing the effect of different forms of the bio-slurry singly or in conjunction with the chemical fertiliser on maize and cabbage; and
- Assessing the quality of organic fertiliser (chemically and biologically) produced by the biogas users.

Approach and Methodology

It is worth mentioning that until now no authentic data exist in Nepal regarding the influence of bio-slurry on the yield of crops and vegetables. In the absence of reliable and conclusive data, the extension workers are facing difficulty to convince the farmers about the usefulness of slurry as fertiliser. Thus to fulfill this gap, Alternative Energy Promotion Centre (AEPC) of the Ministry of Science and Technology (MOST) initiated this research programme for implementation with effect from 14th April 2001 to 31st August 2001.

With the help of the researchers of Outreach Division of Nepal Agricultural Research Council (NARC), the Consultant's Team identified appropriate location at Ward no. 8, Chapagaon VDC of Lalitpur District. Two innovative farmers, who have been participating since long time in the Outreach Programme covered by NARC, were selected to participate in the bio-slurry experiment on maize and cabbage.

Both the bio-slurry experiment on maize and cabbage consisted of Complete Block Design (CBD). The plot size for maize trial was 5 m x 4 m and that of cabbage was 4 m x 3 m. Maize trial comprised of nine treatments with different doses of bio-slurry, slurry compost, FYM and mineral fertiliser, while seven treatments were kept for cabbage trial. All the treatments were replicated three times.

Main Findings

Experimentation on Maize

In this study various treatments, as presented in Table 1 of the report, were used for maize crop in combination with or without chemical fertiliser, Farm Yard Manure (FYM), Slurry Compost and liquid slurry.

There is a general trend in the increase of maize grain yield in all treatments over the control. Application of slurry compost at 10 t/ha has resulted in highest yield increment of 23 percent compared to the control. Similarly, the second highest yield increment (16.5%) was brought about with the half dose of mineral fertiliser in conjunction with 5 t/ha of slurry compost. On the other hand, addition of FYM and full dose of chemical fertiliser with full dose of slurry compost gave almost the same yield difference of 13.9 percent and 13.0 percent, respectively. Ten percent increment in yield of maize was observed due to bio-slurry application in liquid form, while there was only 8 percent increase in the yield of maize over the control due to application of recommended dose of chemical fertiliser. These findings clearly demonstrate the superiority of organic manure over the mineral fertiliser.

Experimental trials on Cabbage

In case of cabbage, the experimentation consisted of only seven treatments as shown in Table 2 of the Report. The highest yield of 69.6 ton per hectare has been produced by the application of a full dose of recommended fertiliser along with 20t/ha of slurry compost. The yield is 36.2

percent higher over the control. The second highest yield is recorded as a result of slurry compost treatment applied at 20t/ha. It is 28.4 percent higher than the control. Likewise, there is not much difference in the yield of cabbage due to application of liquid slurry (18.4% increment) and full dose of chemical fertiliser (19.6% increment). FYM application gave 14 percent more yield of cabbage than the control. Even the control produced notable yield, which is due to the presence of favourable inherent soil fertility as vegetable is cultivated every year on this plot and the farmers generally use high dose of mineral fertiliser as well as organic manure for the vegetable production.

Comparatively biogas slurry in liquid form yielded 6.6 percent higher yields than the FYM treatment. Similarly, slurry compost produced 11.06 percent higher yields than the liquid slurry whereas mineral fertiliser produced 6.0 percent lower yields than the slurry compost. The combination of slurry compost and full dose of fertiliser produced 15.3 percent higher yields than the mineral fertiliser. Similarly, the half dose of fertiliser with half of the slurry compost was 18.25 percent inferior to the full dose of fertiliser with 20t/ha of slurry compost.