Evaluating Zero-tillage Garlic as a Climate Smart and Food Secure Agriculture Practice for Nepal

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Abstract (300 word limit)

Statement of the Problem: Nepalese agriculture has been identified as highly vulnerable to climate change effects, there is strong need to identify, pilot and promote climate smart agriculture practices even to produce daily required food or cash crop to meet food requirement of vulnerable Nepalese people. Agriculture in Nepal (lies in Northern part of Indo-gigantic plain), so-called 'store-house of grain', is also affected by increased water scarcity and water stresses during critical period of crop growth mainly caused by abnormal rainfall, increased numbers of dry-spells and reduction of winter rainfall. Since agriculture is main source of livelihood for majority of people, consequences of these changes are more than bad harvest and poor production since it affects every aspects of economy and society.

Purpose of this study is to evaluate zero-tillage garlic as a climate smart agriculture practice to produce food during even in adverse climatic condition.

Findings: Soil moisture under zero-tillage practice has higher than the farmers' practice. Soil moisture under zero-tillage condition was 23.5% compared to 19% under farmers' practice. Comparison of the garlic bulb yield between zero-tillage and farmers' practice shows that yield under zero-tillage condition is no lesser than farmers' practice. In fact, the average yield under zero-tillage condition (1.62 tons ha^{-1}) is 13.9% higher than average yield under farmers' practice (1.42 $tonha^{-1}$). Comparable yield is boon for farmers considering big input saving and reduction in cost of production. Cost saving for bulbils is due to lower planting density, whereas cost saving for labor is due to low labor requirement. Although there is $4673 additional cost for mulching, the zero tillage practice significantly reduced the cost of production compare to farmers' practice. As well as average net return from the zero-tillage garlic cultivation is $3021 ha^{-1} which is 46.6% higher than the net return from farmers' practice which is $2060 ha^{-1}.

Conclusion: Zero-tillage garlic cultivation is Climate Smart Agriculture practice due to its time and water saving nature and its potential to increase crop yields and profits, saving soil moisture. Study verified that zero-tillage practice reduce winter fallow, ultimately leading to higher economic return and food security of farmer.

Image

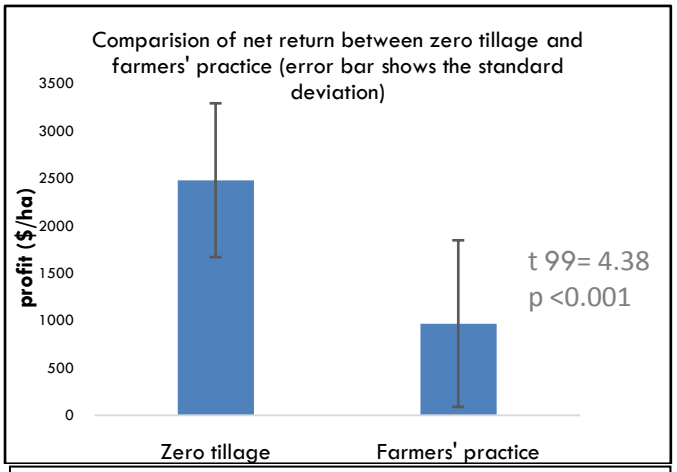


Figure 1: Comparison of net economic return from garlic production in between zero-tillage condition and farmer's practice

Recent Publications (minimum 5)

1. **Bhattarai Bhawana** , B.K. Amrit, Dhakal Krishna Hari, Phd, "Screening of salt tolerance of maize *(Zea mays)* genotypes at germination and early seedling growth stages" (2014) (Proceeding)
2. B.K. Amrit , **Bhattarai Bhawana** , Dhakal Krishna Hari, PhD, "Dry matter production of maize genotypes treated for salt tolerance at early seedling growth" (2014) (Proceeding)
3. Mr. Bhandari Thaneswor, **Bhattarai Bhawana**, et.al. "value chain analysis of dairy sector in Lamjung"(2013)



Biography (150 word limit)

Bhawana Bhattarai has her own expertise on sustainable Agriculture development, Food security and Climate Smart Agriculture in Nepal and passion in improving the Nepalese agriculture, food security and wellbeing of Nepalese vulnerable. Poor food secured situation of Nawalparasi District of Nepal has catalyzed her to work on the sustainable model of food production in Climate change affected area. Her passion lead to find an opportunity to work with Local Initiative for Biodiversity Research Na Development (LI-BIRD), a non-profit making Non Government Organization of Nepal. In her work tenure she has identified zero-tillage model of farming and studied for a year to verify this model. This approach is responsive to all stakeholders. Foundation of her study is based on local and traditional method of dibbling garlic on rice stub and finally leads to develop as a new model of farming. Now she is working with sustainable agriculture development in some non government organizations aiming to improve food and nutrition security of Nepalese people.

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