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Increasing agricultural production through green Manure of *Tithonia diversifolia*

Authors: Tessema, Segenet., Tolentiono, Nuno., Martins, Imaculada Mendonca.,Amaral Mascaranhas, Bendito., Pati Tpoi, Roni. and Bennett, Kahukura

World Vision Timor-Leste

Av. Dos Direitos Humanos, Estrada de Bidau, Bidau Mota Klaran, P.O Box 43, Dili Timor-Leste Tel: +670 331 28 30

Abstract

Between the months of October and February 64-70% of households in Timor-Leste are considered to be 'food insecure'. A leading cause of food insecurity within Timor-Leste is the lack of available food as a result of low yields. Low agricultural productivity is directly related to a lack of sustainable, reliable and affordable soil fertilizer. In response to this World Vision Timor-Leste (WVTL) began trials using the plant species *Tithonia diversifolia*. Tithonia contains large quantities of nitrogen, phosphorous and potassium, decomposes within two weeks and is found throughout Timor-Leste. WVTL compared yields of maize in trial plots fertilized with tithonia, animal manure and no soil treatment. Maize yields were on average one and a half times higher than the national average, while yields were similar between tithonia and those plots fertilized with animal manure. Tithonia is a highly viable option for national expansion and increasing yields.

Introduction

In Timor-Leste there is a need to address low agricultural productivity to improve food security. Low productivity is linked to soil fertility and a lack of suitable agronomic techniques.

Benefits of Tithonia diversifolia

- High macro and micro nutrients
- Decomposes within two weeks
- Abundant throughout a lot of Timor-Leste
- Sustainable and low cost
- Technically simple to implement

Methodology

<u>One week before planting</u>

i. Select the site for a demonstration plot. The land should be similar with the majority of the area in terms of soil fertility and other features
ii. Mark the plots with pegs
iii. Mark the spacing between rows and between plants

Plot A: Between rows 50cm/ between plants 25cm
Plot B: Between rows 70cm/ between plants 40cm

iv. Dig the planting spot
v. Apply two hands of chopped Tithonia in each planting spot
vi. Apply two hands of compost in each planting spot

<u>The day of planting</u>

i. Plant the seeds. Two seeds per spot

Results

Over all demonstration plots overseen by WVTL the expected maize yield was slightly higher in plots fertilized by *Tithonia diversifolia* (7.87 tons/ha) than in those fertilized by animal manure (7.85 tons/ha). This result is almost three times higher than the national average of 2.9 tons/ha and almost one and a half times that of the control demonstration plots which had no treatment.

Comparing expected maize yield in tons/ha at each demonstration plot location tithonia fertilized plots are consistently higher than plots with no treatment, with the exception of Biasale 2, with an average of a 135% increase in yield.

Conclusion

The use of *Tithonia diversifolia* has the opportunity to improve food security for Timorese farmers, particularly when coupled with appropriate agronomic practices such as decreasing spacing between seeds. In addition to improved yields tithonia's viability as an alternative fertilizer is increased due to its low cost, abundance and potential to be sustainable.

Challenges to the upscaling of tithonia use in Timor-Leste include its perception as an invasive weed species and consequently the undesirability for further introductions, initiating seedlings or stems around farms, developing nursery skills and combining tithonia green manuring with other agronomic practices.

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