



Integrating lemon trees in vegetable farms for slope protection, Philippines

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Sustainable Development Goals	No poverty and life on land

Summary

The integration of citrus in vegetable farms aims at increasing the forest cover and enhance slope stabilization, biological diversity and at the same time the protective and productive values of watershed in an intensive vegetable-based production system in the high elevation agro-ecological zone. The practice also aims to generate additional income.

Description

Planting of trees such as the calliandra in contour hedge-rows can reduce erosion on steep slopes and as windbreaks against strong winds or typhoon while integrating cash crops like vegetables. The tree can establish easily and grows quickly. It is adapted in areas with minimum temperature ranging from 18 to 22° C. Grows on different soil type and could be tolerant in acidic soils with pH of about 4.5. Lemons are well-adapted to virtually any soil in which they are likely to be planted if the soil has good drainage.

1. Implementation of the technology

The planting of the variety calliandra calothyrsus Meissner is recommended during the onset of rainy season, when irrigation is available. For this project the lemon

seedlings were propagated through budding. Scarify the seed before sowing to promote a rapid and uniform germination. Seed coat should be scraped or cut opposite the thin micropyle or hilum. For smaller quantities it is sufficient to soak them in cool water for 12 to 24 hours, higher quantities should be soaked for 24 hours before sowing.

Sow seeds at a depth equal to its width. The germination is expected to occur within 4 to 10 days. The transplantation of the seedlings can be started when they grow about 15 to 50 cm (usually reached after 6 to 12 weeks). The distance between trees and rows should minimum 2 m x 2 m, to avoid competition e.g. by integrating them in vegetable gardens, 4 m - 6 m are recommended. Apply 2 to 3 kg of organic or any compost materials and a handful of complete fertilizer on hole and thereafter 4 to 6 weeks from planting of trees.

In the establishment phase of the plant weeds should be removed to avoid competition. The calliandra trees should be pruned when necessary, generally recommended 3 to 4 times a year to a heights of 0.5 to 1 m. Eradicate infected or dead twigs and branches should

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be regularly removed and the trees should be shaped to evenly distribute main scaffold links around the trunk. The harvest can be started by determining the maturity of the crops or fruit and should be done with the use of pruning shear.

Lemon trees are generally tolerant and resistant to pest and diseases. Nevertheless, there are some known pests and diseases in the tested area like aphids, mites, scale insects, leafminer, stem borers, scab, canker, powdery mildew, etc.

1.1 Management of insect pests

Insect pest can be managed with the following methods:

1.1.1 Aphids

Spray with green label insecticides.

1.1.2 Fruit fly

Use insect traps such as methyl eugenol.

1.1.3 Scale insects

If you have small infestation, simply wipe them off the tree while chemical spray at large infestations.

1.1.4 Chewing insects

To eradicate, simply pull the chewing insects off the leaves with your fingers or tweezers.

1.1.5 Citrus leafminer

Remove infested leaves, and spray with insecticides on large infestations.

1.2 Management of disease

Diseases can be managed with the following methods:

1.2.1 Canker

Removal of infected leaves or stem and spray with fungicide.

1.2.2 Scab

Spray with fungicide / bactericide.

2. Results and finding

The rating / scoring of this practice is based on the evaluation of local experts / stakeholders and experiences from the field. The following paragraphs provide an overview of the evaluation of the practice covering technological, environmental and socio-cultural aspects.

2.1 Environmental services, social and cultural acceptability and farmers feedback

Good practices such as integrating lemon in the vegetable farm lands can prevent loss of income with a minimal payment for environmental services estimated at PHP 2 200 (2011).

In the pilot testing the tress started bearing fruits after 8 months. Lemon, which is gaining a market niche as an alternative healthy beverage and food complement can provide a stable stream of income of at least PHP 2 800 per annum (2011) for ten lemon trees.

According to the cooperators lemons are not new to them but it was only in recent years that it had gained popularity due to an increase in its demand. The cooperators welcome the opportunity to propagate lemons on a commercial scale, while at the same utilizing hedges that were previously planted with shrubs and other plants to improve the stability of terraces.

Cultural management is also very minimal and does not take much time from the farmer's usual farming routine. The practice is highly recommended for up-scaling with training and technical assistance from the Department of Agriculture and the Municipal Agricultural Office.

You manipulate and/or use pesticides (insecticides, fungicides, etc.). Make inquiries before! Pesticide can be harmful



to your health, the health of your family, of the consumers and of the environment. Use pesticides safely.

Figure 1. Map of project sites. Red areas are high elevation, white areas are middle elevation and green areas are low elevation



3. Validation of the practice

This good practice was tested in the project “Enhanced Climate Change Adaptation Capacity of Communities in Contiguous Fragile Ecosystems in the Cordilleras” (2009 to 2011) in August 2010.

Through active participation and involvement of local stakeholders and end-users in both training and field demonstration activities, the project identified the integration of lemon trees in vegetable garden as location-specific and appropriate option for climate change adaptation.

The selected representative site for pilot testing was the province in Ifugao in the municipality Banaue at a middle elevation on 1 000 to 2 000 m above sea level.

4. Further reading

- See also the Teca technology “Crop protection: Integrated management of fruit flies in India and Pakistan”
- Compendium Good Practice Climate Change Adaptation Options in Agriculture. Published by the Philippines Department of Agriculture and Food and Agriculture Organization of the United Nations through the MDG-F 1656 Outcome 3.1 Project. 2012.
- MDG-F 1656 Outcome 3.1 Project (Website: http://issuu.com/mdgf1656/docs/car_presentationfinal)
- Project Implementation Video on Youtube: https://www.youtube.com/watch?v=3R-eN48QB2A&feature=context&context=C4f10f33ADvjVQa1PpcFMN5IOF2D8eBOiymgxcjF5ne_aixO43HQ=
- Winrock International: http://factnet.winrock.org/fnrm/factnet/factpub/FACTSH/C_calothyrsus.htm

5. Agro-ecological zones

- Temperate, cool

6. Related/Associated Technologies

- 7701

6. Objectives fulfilled by the project

- Resource use efficiency