



Fallow cropping: garlic after rice in the Philippines

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Country of first practice	Philippines
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Sustainable Development Goals	No poverty and life on land

Summary

This practice describes how garlic can be planted instead of rice in terraces where irrigation was limited. Planting garlic thus serves as an adequate option for climate change adaptation.

Description

This good practice was tested in the project “Enhanced climate change adaptation capacity of communities in contiguous fragile ecosystems in the Cordilleras” (2009 – 2011) from December 9, 2010 (planting) to April 5, 2011 (harvest). Through active participation and involvement of local stakeholders and end-users in both training and field demonstration activities, the project identified fallow cropping of garlic as a location-specific and appropriate option for climate change adaptation in the selected representative sites in Ifugao in the municipality Banaue.

In Ifugao, agriculture is the primary source of livelihood of its people despite its topography and physiographic constraints. However, some of the rice terraces have been abandoned due to lack of irrigation systems, low yields, and migration of farmers to other places. The series of workshops conducted during the project helped farmers realize that these terraces can be utilized to generate additional income. Garlic is an important seasoning for Filipinos. Ilocos

White is the most common variety of garlic planted for commercial production in the Philippines. It is moderately resistant to insect pests and diseases.

1. Objective

The objective of this GPO is to encourage farmer cooperators to utilize abandoned terraces for crop production, which will provide produce and fulfill climate change adaptation functions.

2. Land preparation

It is recommended to use the minimum tillage method. For this,

1. Cut the rice stubbles in a 1 000 m² area one week before transplanting.
2. Broadcast 20 kg complete fertilizer and 100 kg compost then immediately mulch the area.
3. Construct trenches along the perimeter and centre of the paddy. Since the soil is compact and not cultivated, irrigate the paddy 1 to 2 days before transplanting.

2.1 Clove / seed preparation

Fully-matured and well-developed bulbs of medium to-large cloves should be selected as planting materials. The outer cloves of the bulb are the best for planting. A hectare of land will require about 400 to 700 cloves depending on the size of the bulbs and the distance of planting.



Crop Production

The planting material is prepared first by separating the clove from one another. The planting materials are then soaked in an insecticide-fungicide solution for at least two hours to get rid of seed-borne pests and diseases. The cloves should be air-dried before planting.

2.2 Time, distance of planting and weeding

In general, the planting of garlic is done between October and December (location specific). In rain fed upland areas, planting can be done during the early part of September. Thrust a dibble to the soil at a depth of 2 to 3 cm and 1 cm wide then plant by inserting one clove per hill with a spacing of 20 cm x 20 cm. Start weeding at 30 days after planting and repeat if weeds are still present. Stop weeding when the bulbs start to form.

2.3 Mulching and fertilization

Mulch can be applied before or after planting. Mulch is evenly laid on the field with a thickness of 3 to 5 cm. Rice straw is commonly used as mulching material. Before planting, the soil should be analysed to determine the type and amount of fertilizer needed to be applied. Application of organic fertilizer is found to be more effective in garlic production. The recommended fertilizer management for garlic is presented in the following table. For minimum tillage, broadcast the organic fertilizer and complete fertilizer before

mulching the area (Table 1).

2.4 Irrigation

In preparation for planting, if soil moisture is not sufficient, it is necessary to irrigate the field a day or two days earlier. Enough moisture is essential within the root zone (up to 59 cm deep) during the vegetative growth. The frequency of irrigation depends on the soil type and occurrence of rainfall during the growing period. Irrigate the crop at various growth stages as follows (note that water should never be allowed to stay in the field beyond six hours)

- first: 3 to 5 days after planting or right after mulching;
- second: 14 days after planting or after first application of fertilizer;
- third: at early bulbing stage (50 days after planting);
- fourth: at bulbing stage (60 days after planting);
- fifth: optional, depending on the plant condition and/or soil moisture status.

2.5 Crop protection

Early planting of garlic, which starts in October, minimizes the risk of insect pest infestation. However, the possible occurrence of tropical depressions and typhoons predisposes the crop to fungal infection, because of water logging in low lying areas. Late planting, which starts in December, will expose the crop to insect pests and diseases since the vegetative

Table 1. Recommended amount of fertilizer per hectare

Fertilizer	Rate of Application (Kg/ha)	Time of Application	Method of Application
Organic Fertilizer	1 000	Before mulching	Basal
14-14-14	200	Before mulching	Broadcast
Urea	100	Basal	Broadcast
14-14-14	200	14 DAP	Broadcast

Source: FAO 2013



growth coincides with the dry and warm months of February and March. Use chemical pesticides only if necessary.

2.6 Harvesting, postharvest operations and storage

Garlic matures 90 to 120 days after planting. Generally, early planting has a longer period of maturity than the late planting. Indicators are the softening of the main stem above the bulb and the yellowing of 75 percent of the leaves. For the harvest pull the individual plants by hand. The harvested bulb can be sun or air-dried. Sun drying ranges from 3 to 4 days. Bundle the harvest by tying together 50 to 100 pieces of bulbs

3. Results and findings

The good practice option had very high ratings because different local stakeholders evaluated that given the best possible quality of planting materials and cultural management, this GPO can contribute greatly to the different aspects of farm-level resilience. The following section provides some details on the expected positive contributions of this good practice to CCA and DRR.

Fallow cropping: garlic after rice has high technological suitability (rating of 4). Garlic requires less water and has the ability to tolerate dry conditions which allows farmers to grow it during drought and / or when production of other crops is not possible. Garlic is known for its insecticidal properties and its ability to deter plant pathogens, which can help reduce pesticide use. Straws, stalks and other crop residues will provide soil cover, suppress weed growth, help retain soil moisture, and serve as a source of organic matter upon decomposition. This can then later reduce chemical fertilizer use during the

next rice planting season and even make nutrients available for future use through accumulated humidified organic matter in the soil.

3.1 Environmental services and benefits

One of the benefits from the GPO is reduced fertilizer use. According to farmer-cooperators, the amount of fertilizer used in the GPO is below the standard, i.e. less than 4.5 tablespoons per 10 square feet.

The shallow and minimal tillage employed in the GPO also helps preserve soil moisture and soil structure. Moreover, this good practice option is also not seen to increase soil acidity because the crop residues (which are organic) left on the plot contributes to maintaining optimum soil pH levels.

3.2 Economic benefits, social and cultural acceptability, and farmers feedback

Garlic is a cash crop with a quick return on investment. On the second cycle, cooperators usually stock at least five kilos of garlic cloves for the next cropping. It requires minimal labour input. Cultural management is also very minimal from planting until harvest.

In a 350 square meter demonstration site, a yield of 1.5 kg per square meter was obtained resulting in a profit of approximately USD 140 (2011) for the entire demonstration plot, for one cropping season.

The shift of technique from fallow cropping to Garlic after rice is new in the demonstration site, but the potential of addressing dwindling and uncertain farm incomes, attracted the interest of farmers. Farmer-cooperators distributed garlic gloves to other farmers who showed interest in following the same farming technique.



The above good practice option is recommended for up-scaling with training and technical assistance from the Department of Agriculture and the Municipal Agricultural Office.

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



4. 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 – 2011) from December 9, 2010 (planting) to April 5, 2011 (harvest). Through active participation and involvement of local stakeholders and end-users in both training and field demonstration activities, the project identified fallow cropping of garlic as a location-specific and appropriate option for climate change adaptation in the selected representative sites in Ifugao in the municipality Banaue.

5. Further reading

- Compendium of 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. June 2012;
- MDG-F 1656 Outcome 3.1 Project Website: <http://climatechange.da.gov.ph/>;
- See implementation documentation on Youtube: https://www.youtube.com/watch?v=x2lqJ6kGJ-I&feature=context&context=C4f10f33ADvjvQa1PpcFMN5IOF2D8eBOiymgxcpjF5ne_aixO43HQ=; and
- Department of Agriculture, Philippines: <http://www.da.gov.ph/>.

6. Agro-ecological zones

- Tropics, warm

7. Objectives fulfilled by the project

7.1 Labor-saving technology (LST)

- This practice requires minimal labor input.

7.2 Pro-poor efficiency

- Garlic is a cash crop with a quick return on investment.