



Climate Resilient Agriculture Practices Investment Prioritization

Investment Prioritization for Region III: Central Luzon on Crop Rotation-Zero Tillage Combination

Overview

Region III has a total land area of 2,147,036 ha spread in seven provinces, 14 cities, and 116 municipalities^[1]. It contributes almost 10 percent to the National Gross Domestic Product. The agricultural sector gives 17 percent to the regional output, employing 22 percent of the labor force^[2].

The province of Tarlac has a total population of 1,366,000, composed of 280,382 households. Tarlac City is the most populous while Anao is the least populous^[1]. Out of the 305,345 ha of land in the province, 54.37 percent is utilized for agriculture. Rice, corn, and rootcrops are the main crops cultivated in the province^[3].

Typhoons and floods frequently visit the province. Likewise, limited access to water is a concern in areas without irrigation facilities^[4]. The effect of these calamities on agricultural lands is a major concern.

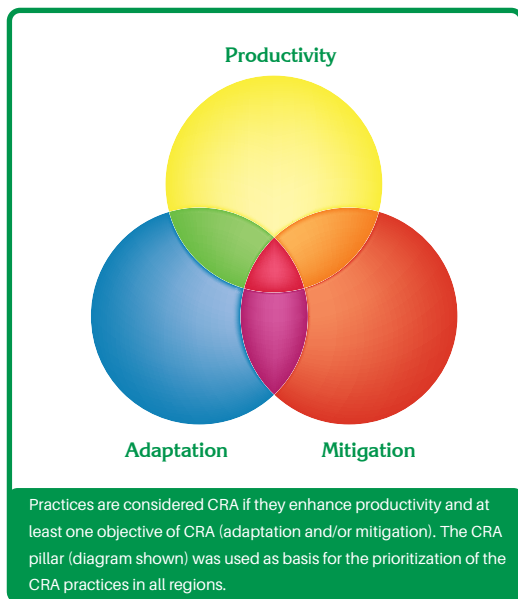
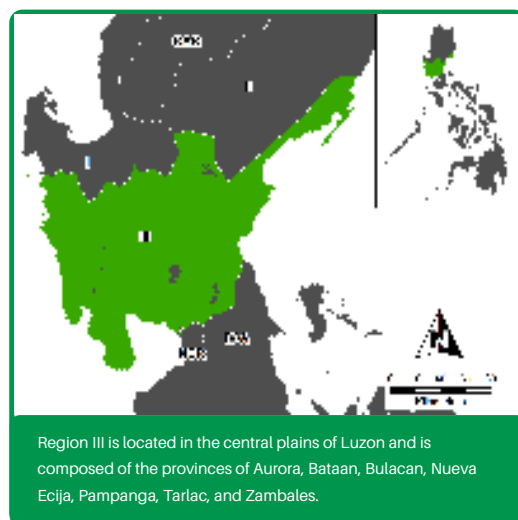
Prioritized Climate Resilient Agriculture (CRA) Practice

Some areas in the province suffer flooding during the rainy season and drought during the dry season. These extreme conditions greatly affect the practices of farmers. Under both conditions climate-smart varieties/lines for both rice and corn are favored because of their high yields and capacity to withstand adverse weather conditions. This practice was selected considering farmers' income and food security.

Crop rotation-zero tillage combination was prioritized among the CRA practices identified during a series of focus group discussions with farmer leaders, agricultural technologists and city/municipal agriculturists.

Improved varieties of corn, the BtGt (*Bacillus thuringiensis Gt*) is high in yield, resistant to corn borer, and tolerant to glyphosate/herbicide making it environment-friendly because of less pesticide usage.

To take advantage of the residual moisture after rice harvest, zero tillage is practiced in corn planting, this is a soil conservation technology that does not require conventional land preparation. It only requires a planting guide: plastic strings and a simple tool.



Data Gathering Methodology

Farmers in the municipalities of San Manuel, Moncada, and Paniqui and other municipalities of Tarlac plant either corn or sweet potato after rice. Corn production in the province supports feed mills located in the province while sweet potato provides the growing demand for food and feed. The Municipal Agricultural Officer of San Manuel, Tarlac recommends both conventional and climate smart practices for corn. The difference lies in the price of seed inputs, amount of organic fertilizer, application of micronutrients, the use of insecticide, and labor requirement.

Data gathered were then analyzed through the Cost-Benefit Analysis (CBA) Tool as prescribed by the International Center for Tropical Agriculture (CIAT).

Results

Farmers using the CRA practice requires an investment in the planting guide for the zero tillage. It also requires 20 man-days of planting to substitute the land preparation services in the conventional practice.

The high price of seeds of the CSA variety is compensated for by its positive impact on the environment by not applying pesticides. An additional 9kg input of micronutrients from the organic fertilizer helps in the development of the bushel making it bigger and heavier.

Based on current prices, results of field trials and past experiences of key informants, the use of climate-smart variety of corn in combination with zero tillage is privately profitable at 12 percent discount rate with a net present value (NPV) of Php222,775.53 (USD 4,571.63) and an internal rate of return (IRR) of 126 percent. With an initial investment of Php32,325.82 (USD 663.92), the payback period of investment is two years.

Improved quality of soil and social capital were considered beneficial to the society by four technical experts, the eventual use of climate-smart varieties seems to be more attractive with a social NPV of Php456,600.10 (USD 9,370).

Recommendations

Apart from the use of climate-smart varieties, rotating rice with either corn, sweet potato, or mungbean is also recommended. The application of organic fertilizer is likewise recommended in areas with Rice-Corn-Corn cropping pattern since corn absorbs large amounts of nutrients from the soil.

It is also recommended that Rice-Corn-Mungbean or Rice-Corn-Sweet Potato cropping pattern be used instead of Rice-Corn-Corn to lessen the use of inorganic fertilizers and maintain the productivity of the soil.

CBA Tool Summary Results

Farm-level Analysis	Net present value (NPV)	Social and Environmental NPV	Internal Rate of Return (IRR)	Social IRR	Payback Period	Initial Investment	Scenario in the Analysis	
	USD 4,571.63*	USD 9,370	32.76%	126%	2 years	USD 663.92	WITHOUT CRA: Bt Variety	WITH CRA: BtGt variety Zero Tillage
Aggregate analysis	Total area of coconut	Current adoption rate	Adoption rate	Aggregate NPV		Period		
	14,588 ha	2%	5%	USD 83,091.71		10 years		

*USD 1 = Php48.73

References

- ^[1] Philippine Statistics Authority. 2015.
- ^[2] Department of Agriculture Regional Field Office III. 2015.
- ^[3] Tarlac Agricultural Profile 2016. Provincial Agricultural Office.
- ^[4] Philippine Rural Development Project. Provincial Commodity Investment Plan. 2015.

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