



Effect of Intercropping of the Cover Crop and Peanut on the Growth and Yield of Cassava that Grown by No-Ridging in the Highlands of Rattanak Mondul District, Battambang Province

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ABSTRACT

This article focuses on the practice of conservation agriculture, mainly on soil fertility, soil erosion reduction, soil erosion, and cover crop studies. The study highlights the need for additional support to encourage conservation agriculture adoption, particularly for small-scale farmers. Support measures should include financial assistance to cover initial costs and secure land tenure to promote long-term investments. Despite these advantages, several challenges hindered conservation agriculture adoption. Especially after eliminating tillage and banning herbicides, farmers faced challenges with weed management in the first two years. But conservation agriculture practices improved soil structure by eliminating tillage, which enhanced water retention and drainage, helping crops withstand extreme climate events such as the 2013 flash floods and the 2012 and 2014 droughts. Limited access to affordable conservation agriculture equipment, such as no-till planters, further complicates adoption. Since most farmers prefer to grow cassava, it is easy to grow, but it was too long, so it may take a long time for farmers to plant the next crop, so in this study we conducted a study with planting by adding or inter-kind of crop such as cover crop and peanuts in cassava that no-ridging to find out the benefits of peanuts and cover crop, peanuts acting as a secondary crop after cassava. For data collection research, data analysis methods were taken from the collection of biomass samples of crops that interacted in cassava and samples of yield, then evaluated and analyzed.

Keywords: *Conservation Agriculture, Cover Crop, No-Ridging*

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INTRODUCTION

In the highlands of Battambang province, especially in Rattanak Mondul district, most farmers are engaged in farming with the cultivation of corn, beans, fruit trees and cassava. From year to year, farmers continue to cultivate crops with regular crop rotation, which can be corn with corn, corn with soybeans, corn with cassava or cassava with other

crops, including cassava. A crop that is popular because it is a marketable crop with good prices and easy to grow, farmers often grow it with a lift. But for sub-cassava cultivation, there are also some negative factors that cause erosion and soil erosion that can take away fertile soil from year to year through repeated practices. Of farmers. On the other hand, according to the above description, most farmers grow crops alternately, while cassava is an easy crop to grow, but it has a long life, so it may take a long time for farmers to reach the next crop. For this study, we conducted additional studies on peanuts and ground cover crops between sub-cultivars of cassava planted without sub-cultivation to understand the benefits of peanuts and ground cover with peanuts acting as the next secondary crop.

Currently, farmers planting cassava on ridging bed for the following purposes: (1) Easy to control weeds (2) Easy to harvest (3) Reduce waterlogging, but this practice promotes soil erosion, which is the main cause of soil erosion that can loss of nutrients and reduced yields. Changing practices to planting without ridging may be lead of mitigating the above effects, but it also has consequences for weed control through the use of herbicides and waterlogging. More are included, such as planting cover crops / pearnut inter cropping in cassava for the following purposes: (1) weed control, (2) reduce weeds, (3) increase water infiltration, and (4) provide more nutrients (5) increase income from harvesting peanuts. These practices can make cassava production more sustainable, both economically and environmentally.

RESEARCH METHODOLOGY

In order to gather data for this review, a qualitative approach was taken to other published journal documents, websites, books, and reports on the state of the intercropping in cassava and benefit, biomass kind of the the crop. The data was taken from collect the sample of biomass of crop that was inter in cassava then evaluated utilizing additional data.

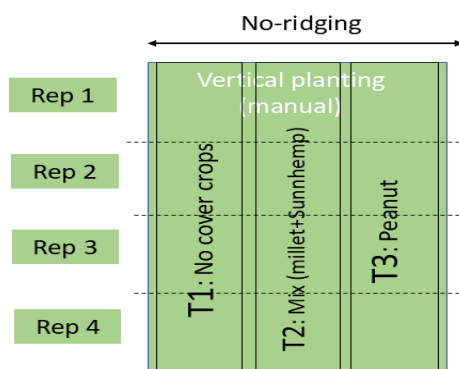
1. Experimental

Experiments with 3 different experiments in cassava that no-ridging:

T1: No ridging vertical planting

T2: No ridging vertical planting + Mix cover crops (Millet + Sunnhemp) in cassava

T3: No ridging vertical planting + Peanut



Finger 1: Experiment of preparation and method of planting + inter-cropping

2. Study Area

The study was conducted in Pichangva village, Raksmei Sangha commune, Rattanak Mondul district, Battambang province.



Finger 2: Map of study area of experiment

3. Data collection

The method in data collection is to take biomass of cover crop samples, peanut samples directly, then record the data, and finally, to collect cassava samples at harvest, which is the last sample, then to record the data and analyze.

4. Data Analysis

How to analyze data:

- Enter data in Excel: Prepare as general data for analyze
- Analyze data by Pivot: Find average of data

RESULT AND DISCUSSION

3.1 Conservation agriculture as an alternative to plough-based cassava cropping in the upland borders of Kampong Cham, Cambodia: preliminary results of extension

In 2004, the implementation of conservation agriculture, including direct-sowing mulch-based cropping (DMC) systems, began in Kampong Cham province, Cambodia. While the region boasts fertile soils and extensive rubber plantations, smallholder farmers in upland areas have faced difficulties due to reliance on cassava monocropping, especially after declines in maize and soybean yields. This situation has contributed to economic hardship and increased poverty.

To tackle these issues, the Cambodian Ministry of Agriculture initiated the PADAC project in 2008, with technical backing from CIRAD and financial support from AFD. The project's goal was to develop and advocate for DMC technologies that would enhance

sustainable crop production, promoting a biannual rotation of cassava and maize alongside *Stylosanthes guianensis* as cover.

A comprehensive network was set up to evaluate the effectiveness of these practices, including demonstration plots and farmer feedback mechanisms, along with training initiatives. By the end of 2011-12, 297 farmers had adopted DMC techniques across 234 hectares in nine villages, focusing particularly on five 'pioneer villages' for an in-depth study.

Economic comparisons indicated that DMC practices led to increased yields: cassava production rose from 7.6 Mg/ha to 11.1 Mg/ha, while traditional methods declined from 6.4 Mg/ha to 5.5 Mg/ha. The gross profit margin for DMC-based cassava was about 930 USD/ha, compared to 410 USD/ha for conventional practices. DMC-based maize also showed potential, yielding 400 USD/ha in its second year.

However, challenges persisted. Farmers often made decisions based on short-term economic gains, with over 40% reverting to traditional methods due to perceived risks and higher investment costs associated with DMC. Ongoing training and the establishment of partnerships are essential for improving seed production and enhancing community services.

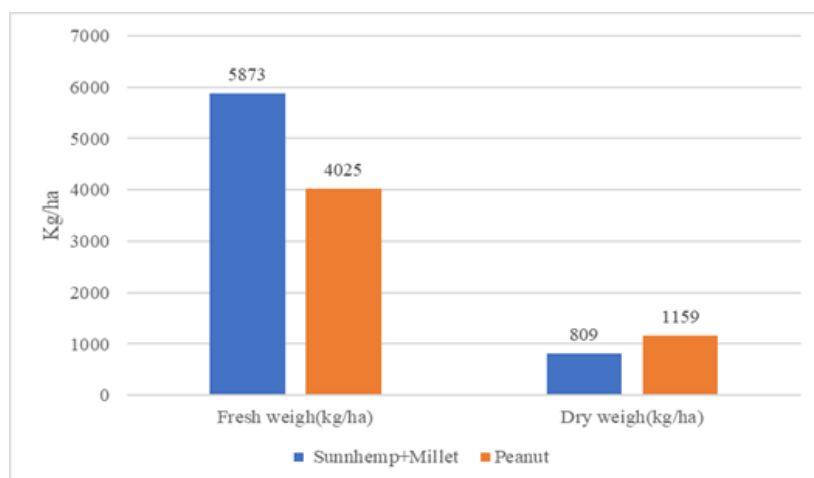
To fully understand and promote the sustainability of DMC practices, further investigation into dropout rates and the adoption process will be necessary.

According to a study in southern Nigeria. In Sub-Saharan Africa, who have studied growing corn intercropping with cassava, it has been shown that it is a popular technique for those in that area. Farmers can harvest corn early in four months before harvest cassava, so they can get two profits on the same land, but as result of studies was show that the yield of these two crops is lower than that of solitary crops (Charles, N. & Jeanne, T., 2022).

In another study, soil and fertilizer management was studied, focusing on soil and fertilizer management in the soil, fertilizer application, mostly on the amount of fertilizer application and application to increase yields of cassava (TICA & PD AFF, 2017-2019).

For the study of this topic is not different from the study of the above case, this study is to study the intercropping of cover crops and peanut by planting in the cassava. By planting cover crop mulch in order to increase soil fertility, reduce soil erosion, prevent weeds during the growing stage of cassava, and peanuts are also a staple crop to provide yields to farmers. Peanuts can also be harvested within 3 months after planting, and plant residues can also be used as manuar or as cattle feed.

3.2 Weight Biomass of intercropping in Cassava



Graphic 1: Weight biomass of intercropping

Results showed that biomass intercropping crops in cassava have two result (1) Fresh weigh biomass, (2) Dry weigh biomass. For fresh weigh biomass Sunnhemp+Millet was higher than Peanut, but for dry biomass Peanut was higher than Sunnhemp+Millet. On average, for these two kinds of crops it a bit different for biomass, so it still can improve crop yields and good biomass for soil.

CONCLUSION

This study concludes that the incorporation of cassava into crops significantly enhances its growth and yield. Furthermore, the inclusion of cover crops or peanut intercropping in cassava serves various purposes, including (1) weed control, (2) weed reduction, (3) water infiltration, and (4) nutrition provision. (5) increase income from harvesting peanuts. These practices can make cassava production more sustainable, both economically and environmentally, while peanuts also have an effect on cassava growth. Farmers can also get income while waiting for the cassava harvest. Compared to growing cassava as a single crop, planting additional crops is a new practice. However, it is highly effective in helping farmers acquire new techniques, reduce the cost of using certain fertilizers, and increase their income.

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