Cassava (Manihot esculenta) is a multipurpose crop. The plant produces a tuber that is edible with proper preparation and is a staple carbohydrate, and the cassava starch is also used to make the tapioca pearls in your pudding cup. In addition to its use as food and animal feed, there has been an increasing interest in using cassava as a biofuel.

In Thailand, a major producer and exporter of cassava, the crop can be grown year-round. Typically, cassava is grown in upland areas under rainfed conditions and harvested 12 to 18 months after planting. However, research has shown that farmers can use rice paddy fields in the off-season to produce a cassava crop. This is because rice paddy fields are left fallow from roughly December through August. This is a notably shorter growing season and does result in cassava with lower starch yields. Nevertheless, using rice paddy fields to increase cassava production could increase production and income for farmers on land that would not otherwise be used for production.

Poramate Banterng, a crop breeder who works with the cassava breeding program in Khon Kaen University, and colleagues recently conducted a study in Thailand evaluating the performance of four cassava genotypes grown in rice paddy fields during the off-season. The results of this research were recently published in Crop Science (http://doi.org/10.2135/cropsci2018.07.0435). Four cassava genotypes were grown at five sites in Thailand. The four genotypes were selected based on maturity and aboveground structure (i.e., branching), including medium maturity and branching (Kasetart 50), late maturity and nonbranching (Rayong 9), late maturity and branching (Rayong 11), and early maturity and branching (CMR38-125-77). Cassava was planted in December and harvested in June. During the study, weather conditions were monitored at each site, and crop data were collected at 30-day intervals including the final harvest at 180 days after planting. Crop data included leaf area, growth rates (leaf, stem, and root), and root starch content.

The main finding of this study was that the genotype selected for early maturity and branching characteristics (CMR38-125-77) had the best performance. This genotype had a higher mean performance and stability for storage root fresh weight, storage root dry weight, and total dry weight when compared with the other genotypes. Banterng points out that collecting data throughout the growing season helped in identifying physiological determinants of both storage root yield and total biomass.
for example, the change in net assimilation rate from 120 to 180 days after planting and the change in storage root growth rate from 90 to 180 days after planting. Understanding how these traits relate to cassava biomass could aid in selecting and developing cassava that can be grown in rice paddy fields during the off-season.

“The results from this study indicate that cassava may be a viable alternative crop in upper paddy fields during the off-season of rice,” Banterng says, “and this could help to increase food, feed, and bioenergy production in Thailand.” Banterng also recognizes that growing cassava in rice paddy fields rather than leaving them fallow could affect the nutrient balance, resulting in a need for monitoring soil fertility and possibly the addition of fertilizers.

“Presently, some of the farmers in Thailand are interested in this growing system because they can earn more money from their own land areas during the dry season. Therefore, breeding for early bulking and drought tolerances and [studying] nutrient balance and fertilizer management for this growing system are also necessary.” If a large number of farmers were to implement this practice, there will be a need for research to determine the best management practices to sustain both cassava and rice production in this region.

Dig Deeper
Check out the original full-length article, “Cassava Growth Analysis of Production during the Off-Season of Paddy Rice,” in Crop Science: http://doi.org/10.2135/cropsci2018.07.0435.