



# Controlled Released Fertilizer

## Challenge

Cassava farmers use conventional types of non-coated fertilizer twice in a crop season, during months 1 and 3 after planting. These conventional and widely available fertilizers lead to nitrogen loss in the soil and only last for a very short time. These inefficiencies result in economic loss for farmers, and nutrient loss for cassava plants and farmer’s soil during the gap of applications.

## Solution

Precision fertilizer application using a 4-R approach focuses on applying the *right* source of fertilizer, at the *right* rate, at the *right* time, and in the *right* place. Controlled-release fertilizer (CRF) requires only one application per season. Polymer coatings on the fertilizer, designed specifically for cassava, release the right amount of nutrients that match the need for plants at various growth stages. CRF reduces the risk of soil nutrient loss and negative environmental impacts, offering long-term sustainability benefits for climate-smart agriculture.

## Adaptation and Mitigation

Resin-coated urea, the main technology in CRF, improves nitrogen use efficiency and reduces greenhouse gas emissions associated with conventional nitrogen fertilizer application.

## Business Model

Controlled-release fertilizer is relatively new in the agriculture market. Mitrphol Group, one of Thailand’s major producers of sugar products, released resin-coated urea to local cassava market at the beginning of 2024. The initial target groups of users are likely to be smart cassava farmers. Mitrphol is interested to expand to other crops in the future. Controlled and slow release fertilizer products are also available from a few other companies.

Expected Income Gain for Smallholder Farmers				Notes	
per rai	Traditional	CRF			
Yield (kg)	4,653	5,558		Estimated yield increase of 19% Slight increase in starch content	
Price (THB)	3.67	3.79			
Revenue (THB)	17,071	20,982	3,911		
Fertilizer (THB)	1,500	1,926	(426)	Only one application needed for CRF	
Labor (THB)	200	0	200		
			Income Gain		
			3,685		
			per rai		

USDA Thailand Regional Agriculture Innovation Network (RAIN) project, funded by United States Department of Agriculture Food for Progress and implemented by Winrock International, strives to facilitate adoption of 30 climate smart innovations by 30,000 farmers. For more information, visit <https://winrock.org/project/using-tech-to-support-thailands-transition-to-climate-smart-agriculture>.