

Report  
On  
Field visited to the trial implemented by CARDI and RUA



31 January to 1 February 2023

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## Introduction

The Cambodian Agricultural Research and Development Institute (CARDI) and the Royal University of Agriculture (RUA) are currently engaged in a series of replicated experiments investigating seasonal soil water availability for a perennial forage and rice/crop rotation in sand textured soils across a toposequence. Long term experiments were established in two locations: 1) Tramkak district, Takeo province and 2) Samrong Tong district, Kampong Speu province. The investigation is underway in districts in Takeo province that have a history of forage research and adoption, and from Kompong Speu province, without a background of forage intervention. The involvement of these two contrasting communities in the project provided the context for a farmer exchange visit in May 2018. The visit introduced farmers from Samrong Tong, who are newly exposed to forage growing through their participation in the above-mentioned experiments, to forage growers in Takeo who are established and successful, so that those from Samrong Tong could learn from their experience and better understand the potential for forage-growing. In 2019, new sites were added and a second forage variety was included to replace the upland cropping systems that were limited by the constraints of experimental management. Climate, crop and soil water data from the 2018 – 2019 reporting period has been provided by partners and is currently being analysed.

Separate to these activities, forage growers from Takeo have provided samples of soils, plant samples and forage-growing inputs, for an analysis of the nutrient dynamics of new forage plots on sandy soils. A nutrient omission experiment using four forage-producing soils sourced from these farmers was carried out at CARDI, revealing widespread and alarming deficiencies of potassium and sulfur. Nutrient balances for these sites were estimated and there are indications of significant nutrient removal from cut-and-carry systems in these soils and concern for both soil sustainability and crop and forage production.

## Objective

The objectives of this field visited and study are

- To determine if there is significant stored water in the sand textured soil profiles that perennial plants can use,
- To generate evidence for assessing the validity of toposequence-based recommendation for the positioning of forage plots within farms, which is essential for increasing the efficiency of nutrient and water use and selecting options for greater system productivity on sandy toposequences involving crops and forages.
- To see the progress of trial conducted by CARDI and RUA location in Takeo and Kampong Speu province
- To share the view of the trial to all the partners and students who are involve in the trial

## Timeframe

- 31 January 2023: Visited the trial in Takeo province
- 01 February 2023: Visited the trial in Kampong Speu province

## Location

The trial was conducted in two provinces under responsible of CARDI and RUA in which CARID was implemented in Tramkok district, Takeo province while the RUA was implemented in Samroung Tong district, Kampong Speu province.

## Participants in the field visited

A total of 12 participants in this field visited, those are coming from different institution such as

- Australian: 2 persons (Prof Matt and Dr Josh)
- CARDI: 3 persons (Dr Hin Sarit, Mr Veasna and colleague)
- RUA: 5 persons (Dr Chanthy and his 4 students)
- LDC: 1 person (Dr Chhay Ty)
- ACIAR: 1 person (Mr Leng Ratana- community specialist from ACIAR based in Australia embassy)

## The experiment

Three experiments were conducted (table 1-3) for RUA while CARDI is conducted only two experiments (table 1-2). The soil pH for the experiment was below 5.7 (pH<5.7) and above 6 (pH>6). The sizes of those plots are not suitable to subdivide for six treatments (Farmer practice, Farmer practice + K, Farmer practice + K + S, Farmer practice + Lime\*, Farmer practice + Lime + K\* and Farmer practice + Lime + K + S\*, and \*Treatments only included in soils where pH is <5.7).

Table 1: Effect of adding lime and K S on biomass of hybrid Molato II and Paspalum for the soil pH<6		
Experiment	Basal fertilizer	Fertilizer application in each harvest
Farmer practice	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha	Urea: 125kg/ha
Farmer practice + K + S	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha	Urea: 125kg/ha K (0-0-60): 51kg/ha S (0-0-17S): 59kg/ha
Farmer practice + Lime	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha - Lime: 3t/ha	Urea: 125kg/ha
Farmer practice + Lime + K + S	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha - Lime: 3t/ha	Urea: 125kg/ha K (0-0-60): 51kg/ha S (0-0-17S): 59kg/ha
Table 2: Effect of adding K and S to the farmer practice on the biomass of hybrid Molato II and Paspalum for the soil pH>6		
Experiment	Basal fertilizer	Fertilizer application in each harvest
Farmer practice	- Cow manure: 6.25t/ha	Urea: 125kg/ha

	- Chemical fertilizer: 15-15-15: 625kg/ha	
Farmer practice + S	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha	Urea: 125kg/ha K (0-0-60): 51kg/ha S (0-0-17S): 59kg/ha
Farmer practice +K + S	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha	Urea: 125kg/ha K (0-0-60): 51kg/ha S (0-0-17S): 59kg/ha

The recommended N is calculated based on fertilizer application rate in the previous toposeque. The application at cutting was urea 160 kg+18-18-13+8S 260 kg)/h that contains N 120 kg kg ha<sup>-1</sup>. The extra N, K, S treatment increases up to N 150 kg ha<sup>-1</sup>, while K (0-0-60: 51 kg ha<sup>-1</sup>) and (0-0-50 +17S: 59 kg ha<sup>-1</sup>) is used

Experiment	Basal fertilizer	Fertilizer application in each harvest
Optimum water (irrigation be done weekly) + recommended N	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha	N 120kg/ha or urea 261kg/ha
Optimum water + N, K, S (high input)	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha	N150kg/ha or urea 326kg/ha 0-0-60: 51kg/ha 0-0-50+17S: 59kg/ha
Reduce water + Recommended N (the irrigation be done fortnightly)	- Cow manure: 6.25t/ha - Chemical fertilizer: 15-15-15: 625kg/ha	N 120kg/ha or urea 261kg/ha



Photo 1: Six treatments



Photo 2: Three treatments

## Household participants in the trial

A total of 13 household participants in the trial for both provinces, in which 5 household from Takeo while other 8 household from Kampong Speu province.

Participant's farmer in Takeo province: 5 household

- ✓ Prey Tadok village, Samrong commune, Tramkok district, Takeo province: 1
- ✓ Pen Mease village, Samrong commune, Tramkok district, Takeo province: 1
- ✓ Po Dos village, Trampeng Thom Khang Cheung commune, Tramkok district, Takeo province: 2
- ✓ Toul Roka village, Cheng Ton commune, Tramkok district, Tekeo province: 1

Participant's farmer in Kampong Speu province: 8 household

- ✓ Samrit village, Tang Kroch commune, Samrong Tong district, Kampong Speu province: 8

## Result from field visit

The experimental in Takeo province which responsible by CARDI. Five household were selected to implement two experiments, in which two households were conducted in the rice field and other three households were conducted close to palm tree.





Photo 3: Activities of team visited site in Takeo province

The experimental in Kampong Speu province which responsible by RUA. Eight household were selected to implement three experiments, in which all plots are similar, in the meantime, the experiments plots are nice organized





Photo 4: Activities of team visited sited in Kampong Speu province

## Conclusion

The two days field visited in Takeo and Kampong Speu can concluded that the biomass of the forages can be variable among both location and management practice by both institutions. RUA is good management than CARDI as RUA has students involve in the experiments as they can collected the data for their thesis, however, the actual data and data analysis will tell us which treatments or farmers are good on biomass and conclusion which treatments can be appropriate for farmers/crop in both sides