

# Effect of green sowing practice on maize yield, production costs and profitability

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## Introduction

Cropping system is defined as the cropping pattern and management to derive benefits from a given resource based under a specific environmental condition. There is a large range of cropping systems, such as green sowing under Conservation Agriculture(CA) and conventional tillage. Green sowing is a direct sowing of a main cash or staple crops on living standing cover crops. This practice reduces the number of field operation and provide a larger flexibility of intervention for the farmers. As a CA management, green sowing aims at halting soil erosion, recycling nutrients and enhancing biological processes through the use of a diversity of cover crops

## Objective

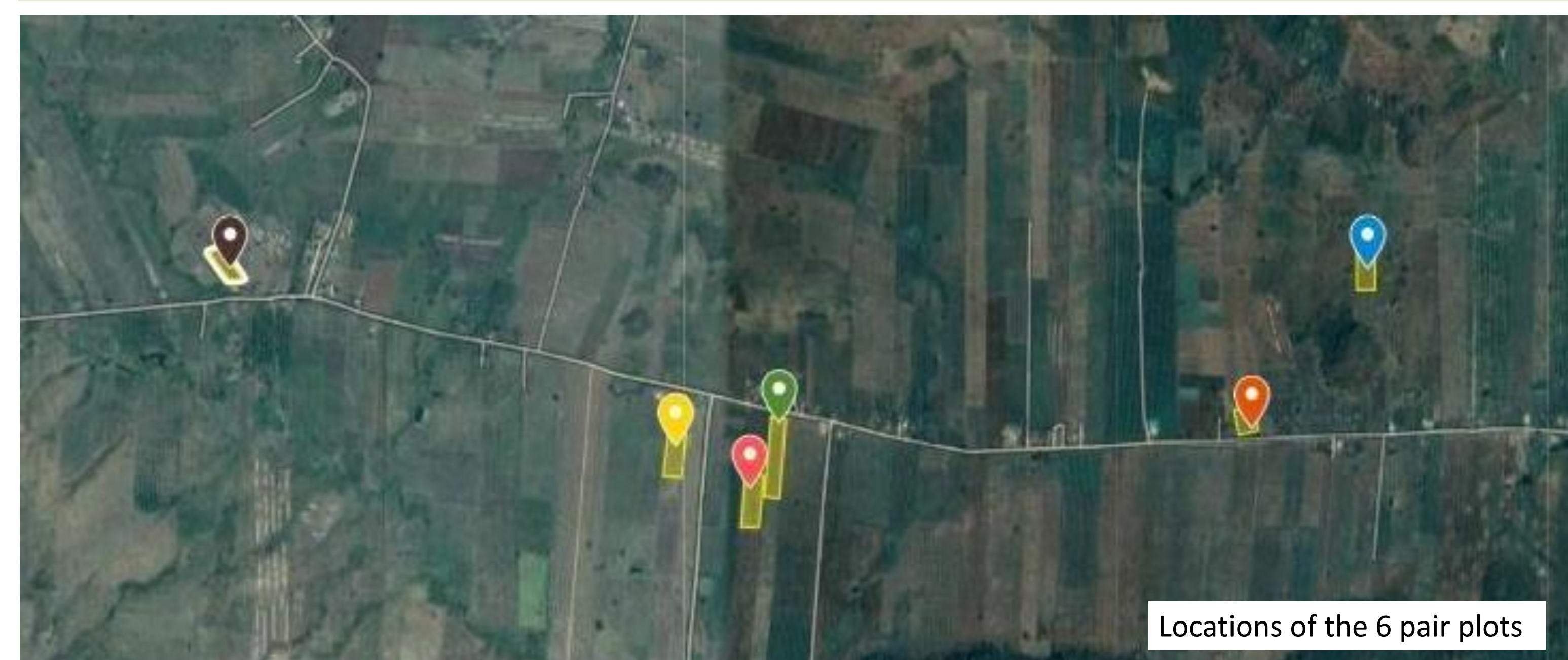
The on-farm demonstrations is aimed to see the difference maize cultivation systems (with CCs and CT management) which once is better in term of higher biomass inputs of CCs providing, lower production cost, higher yield and more profitability.

## Methodology

Aboveground biomass of cover crops (45 days after sowing), maize plant density and height, production costs, and yield of maize were assessed. Yield was assessed on 30 October 2021 (125 days after sowing) including number of plants, number of cobs per plant, aboveground biomass, fresh and dry weight of cobs and grains.

## Plan and cropping system

The on-farm demonstrations are located in Reaksmey Sangha village, Reaksmey Sangha commune, Rattanak Mondul district, Battambang province, there are 6 on-farm demonstrations with different cultivation systems with: (1) conventional plough-based management (CT) with two discs ploughing with the first plowing in April and the second in June, followed by maize sowing in July; (2) direct sowing of maize on green standing cover crop of sunnhemp (CAS, Crotalaria juncea). Sunnhemp was sown in 14 May with a rate of 30 kg per ha then maize was sown in 16 July by no-till planter with roller crimper attached in front of the tractor to terminate the sunnhemp; (3) direct sowing of maize on a green standing mix of cover crops (CAM: sunnhemp at 15 kg/ha + pearl millet at 10 kg/ha + cowpea at 20 kg/ha) then maize was sown by no-till planter.



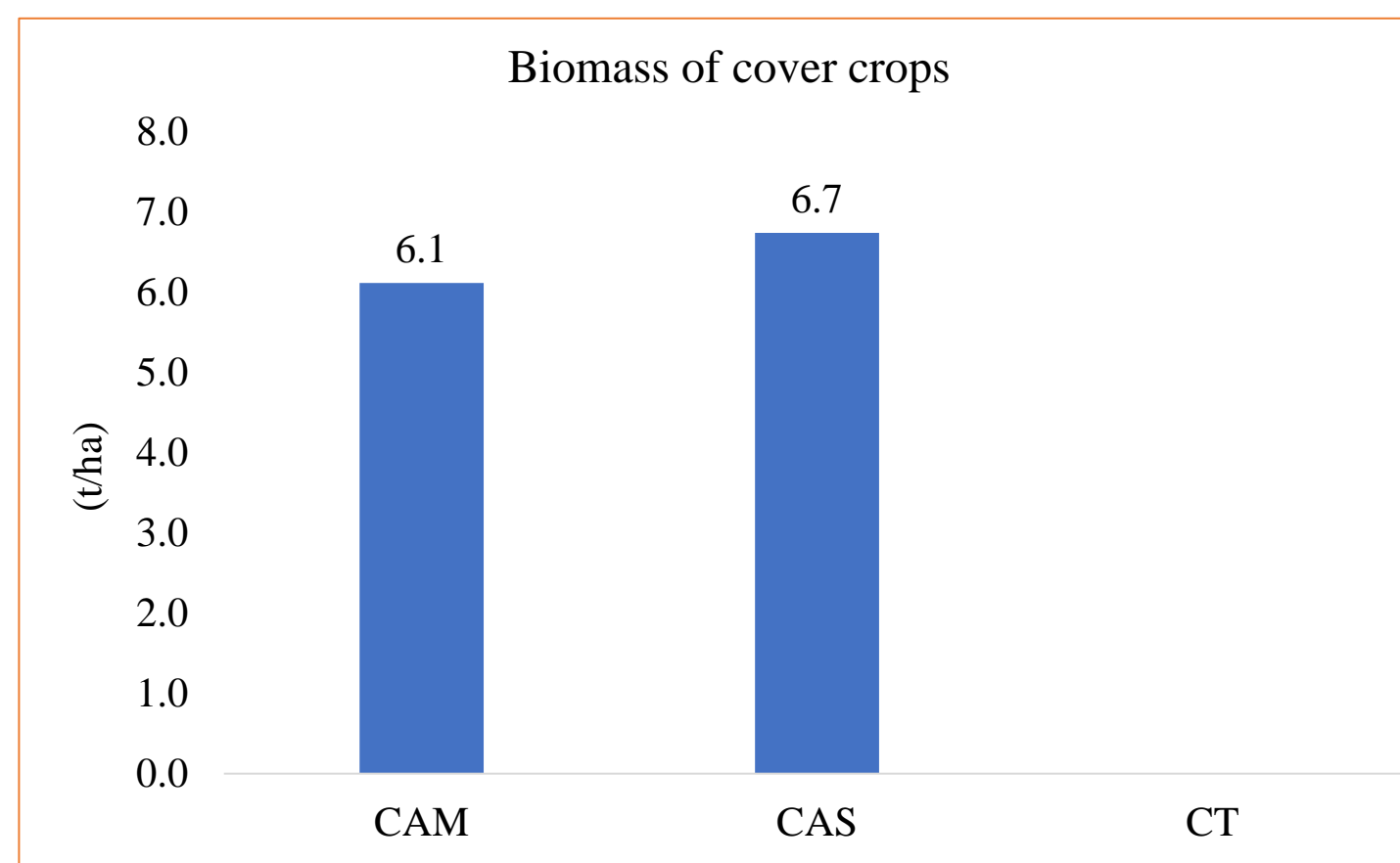
With the support of



Investing into Soil Organic Carbon management for resilient upland farming (ISOC)

## Result and Discussion

### ➤ Comparison of Biomass of cover crop

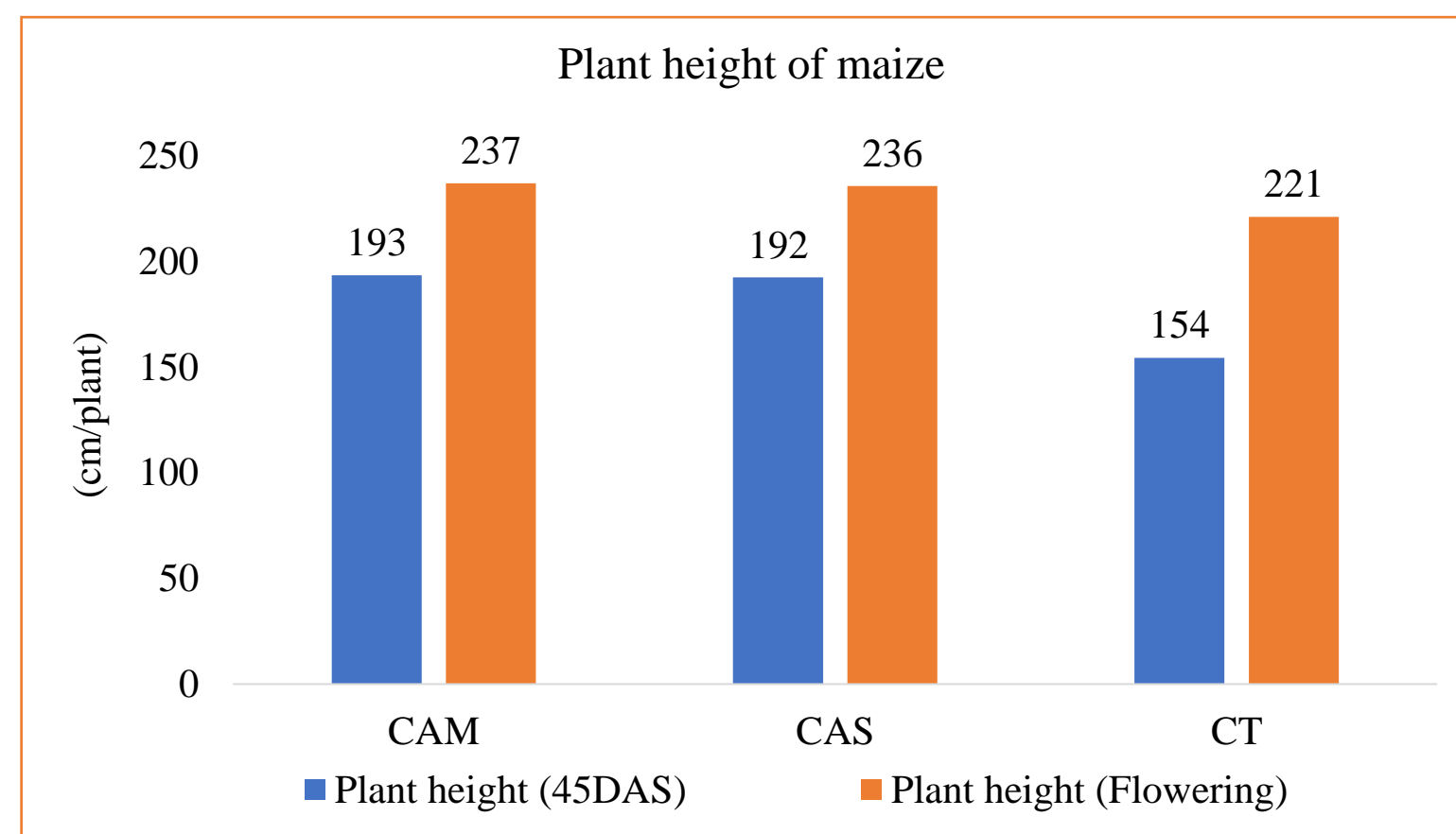


CT: Conventional tillage, CAS: Green sowing maize on single cover crop species (Cro. Juncea), CAM: Green sowing maize on mix cover crops (Cro. Juncea + Pearl millet +Cowpea).

### ❖ Biomass of Cover Crops

Highest aboveground biomass was recorded under CAS (6.7 t/ha) when compared with CAM (6.1 t/ha).

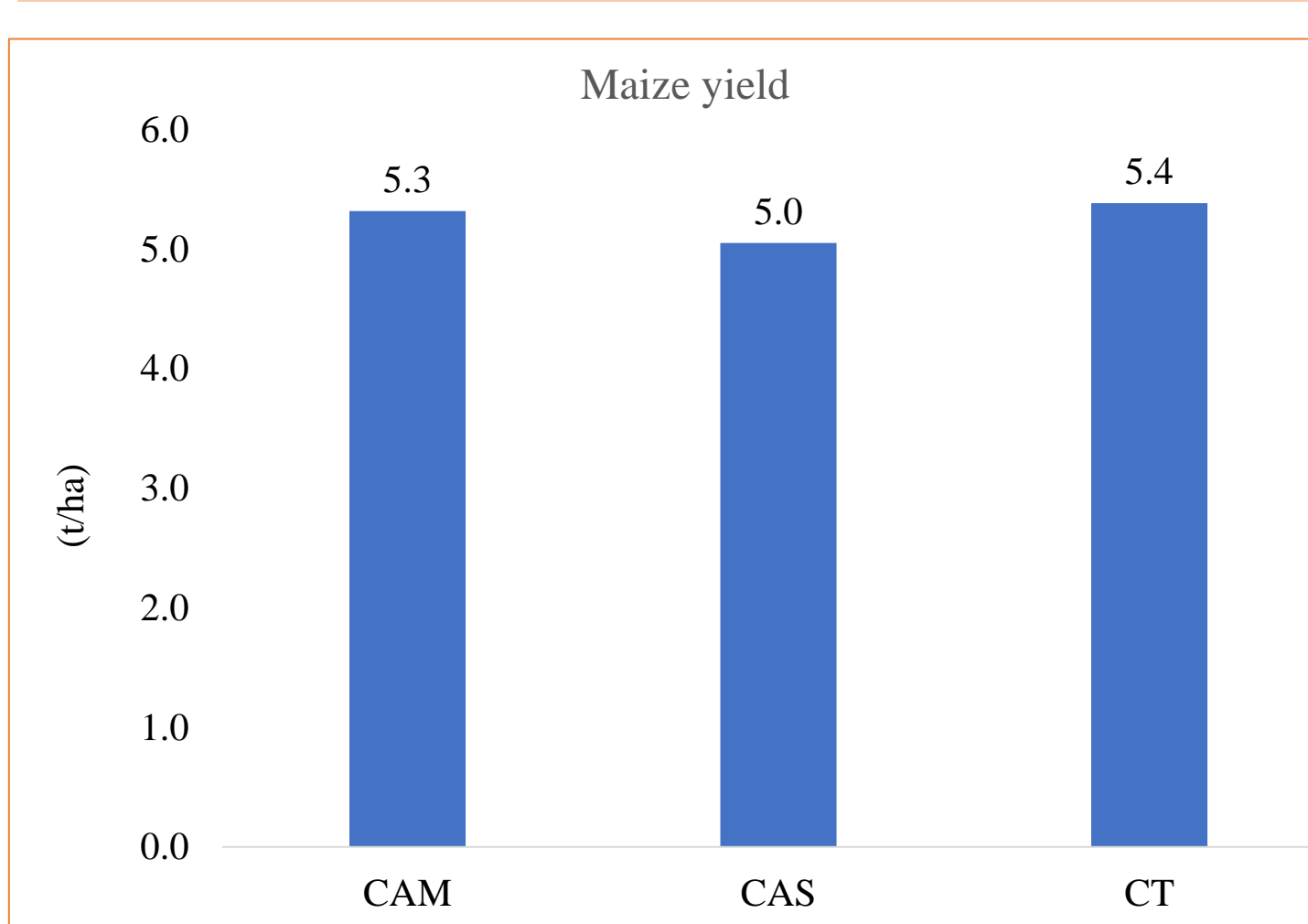
### ➤ Comparison of plant height of Maize



### ❖ Plant height of maize

CAS and CAM are higher than CT; it may due to CA treatments had more biomass inputs of cover crops which help maintaining the soil moisture, providing nutrients, rehabilitating the soil structure

### ➤ Comparison of maize yield

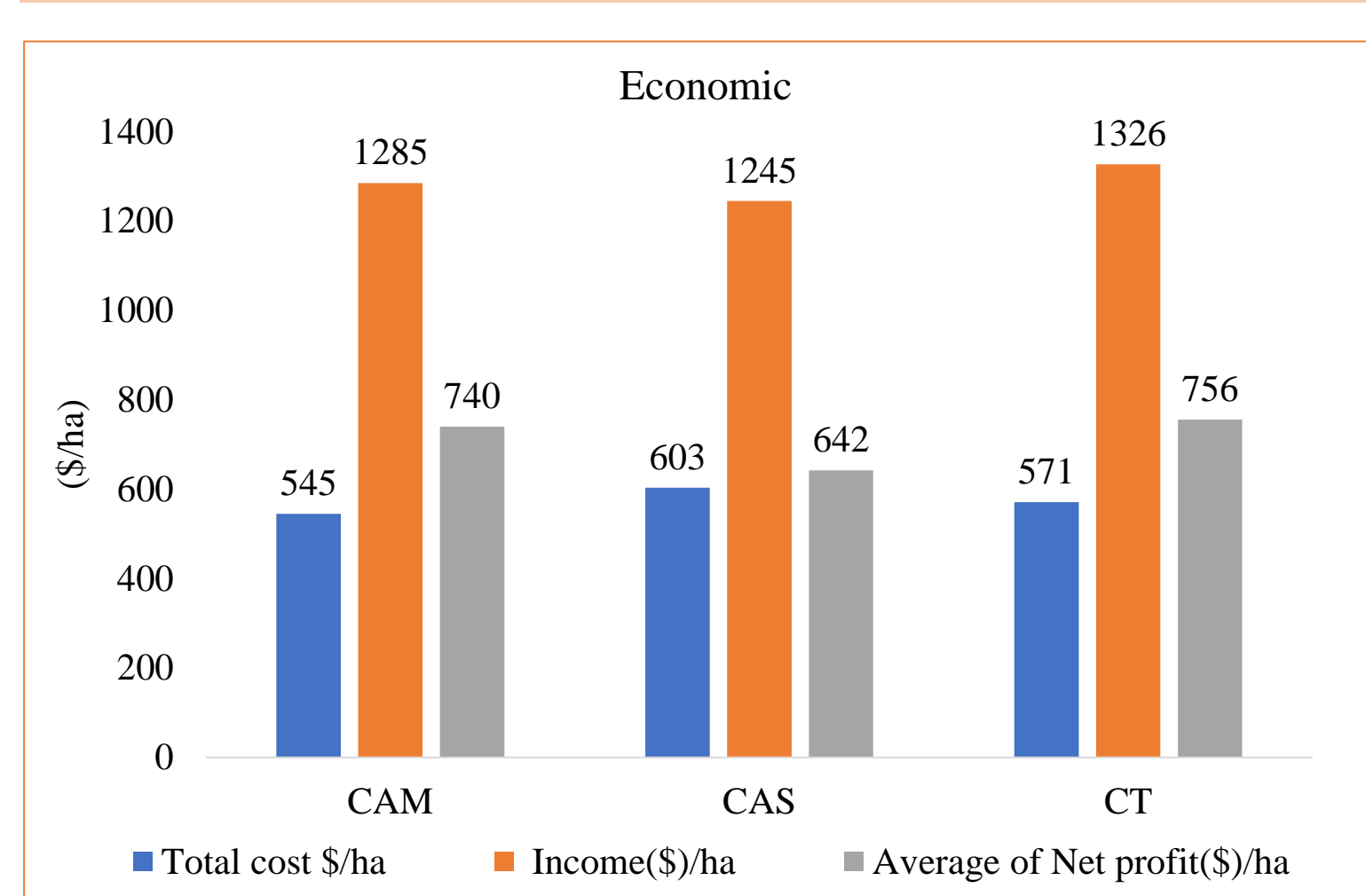


CT: Conventional tillage, CAS: Green sowing maize on single cover crop species (Cro. Juncea), CAM: Green sowing maize on mix cover crops (Cro. Juncea + Pearl millet +Cowpea).

### ❖ Yields of maize

The lower yield observed under CAS is mainly due to technical issue at sowing time with a lower coverage of soil on the maize sowing line and difficulty to terminate mechanically the Cro. juncea.

### ➤ Comparison of Economic



### ❖ Economic Assessment

The production cost of CAM was lower (545 USD/ha) than other treatments and the net profits were recorded under CAS and CAM with 642 USD/ha and 740 USD/ha, respectively. Production costs under CT (571 USD/ha) was higher than CAM while the net profit was similar

## Conclusion

In conclusion, green sowing of maize on mix of cover crops exhibited the most promising results when compared with other treatments according to the biomass inputs, lower production costs, higher yield and profit. The green sowing practice needs to be improved with a specific emphasis on the mechanical management of the cover crops and on the quality of the sowing under high and green inputs of biomass. This practice represents one of the most promising option to reduce the use of herbicide under CA management while minimizing production costs and increasing the flexibility of farm operations.