



TATA TRUSTS-TEL AVIV UNIVERSITY INDO-ISRAELI INNOVATION VILLAGES

TAL-YA PILOTS

INTRODUCTION

In 2017, Tata Trusts and Tel Aviv University (TAU) joined forces to increase India's smallholder farmers' net income through the diffusion of Israeli technologies and innovations in agriculture.

Through a network of local innovation hubs - the "Indo-Israeli Innovation Villages"(IIVs) - initially in Andhra Pradesh and in the future throughout India, Tata Trusts and TAU aim to provide a platform for innovative Israeli agricultural technologies to pilot in real field conditions and adapt to the local needs and context, until ripe for large-scale roll-out.

In 2018, Tal-Ya was among the first Israeli companies to be selected to take part in the Tata Trusts-TAU IIV Pilot Program in India. Since September 2018, close to 10,300 Tal-Ya trays have been installed over 23 smallholder farms with trees (mango, custard apple, sweet lime, apple ber, moringa, muskmelon) and vegetables (tomatoes ,bitter gourd).

THE TECHNOLOGY

The tray facilitates an ideal microclimate around the plant's foundation, the roots. This focus creates stimulation of productive and healthy plant-growth by reducing evaporation, enhancing photosynthesis and enhancing insulation while protecting the environment and some of its most valuable elements; water & soil.

Tal-Ya's simple patent-based recyclable platform (EP1866101). It is easy to install, use, and maintain. Also- applicable on various crops with different climate characteristics.



METHODOLOGY

The of the NITSAN lab is to initially test potential technologies at a small scale and then gradually scale up depending on the performance of the technology in field trials. A special emphasis is placed on conducting field trials in actual farms and by actual smallholder farmers, rather than in a controlled experimental station. It is only in this way that the real performance of the technology, when operated by local farmers, can be verified. Once a technology has proven itself at a scale sufficient to draw robust statistical conclusions, and has been demonstrated to local farmers.

Even though Tal-Ya was originally designed for fruit tree cultivation, it was tested for both fruit trees and various types of vegetables in Andhra Pradesh. By today, Tal-Ya trays have gone through three rounds of field trials for various crops but all trials were interrupted by the Covid-19 pandemic and the severe lockdown which paralysed agriculture in rural India. Testing and scaling up will be resumed when conditions return to normalcy.

- First experiment - September 2018, 405 Tal-Ya trays have been installed over 7 smallholder farms in Anantapur district. it's being piloted with trees (mango, custard apple, sweet lime, apple ber, moringa) and vegetables (tomatoes).
- Second experiment - September 2019, 380 Tal-Ya trays have been installed at one bitter gourd plot in Piler
- Third experiment begins December 2019 and details are presented in this paper

2019/2020 TOMATO EXPERIMENT

Since December 2019 to mid-January 2020 a 9,480 Tal-Ya trays have been installed over 17 smallholder farms in Chitoor district at the state of Andhra Pradesh. The experiment is done with 14 tomato farmers, 2 muskmelon farmers and 1 Bitter guard farmer. An average cultivated area is about 0.17 acres. The first farmer to start harvesting was in late February, the 13th week of the experiment. Because of the COVID-19 pandemic and the lockdown in India from March 24 -

10 farmers have reached the harvest stage.

4 farmers did not reach the harvest stage.

1 farmer's trays were installed just before lockdown so he did not manage to sow.

1 farmer's trays were installed in mid-July so the data on his plot does not appear in this report.

Farmers who harvest - skipped several weeks of harvesting due to lockdown inactivity in the market. But even when market activity returns after two weeks, most of them did not harvest because of the drastic drop in the prices of agricultural commodities. Because of this - farmer is not in a situation

where he has spent money to invest in crops for fertilizers and pesticides. so they waited for a week after- seeing if there might be a price increase.

Some went back to harvest and some did not.

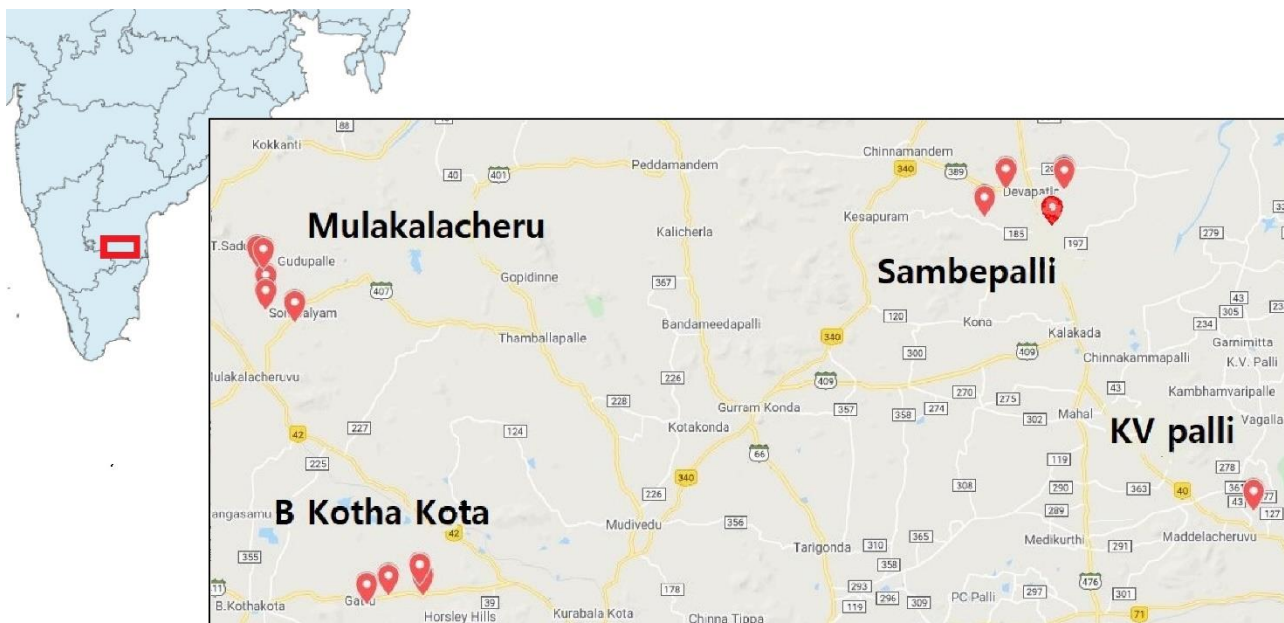
Farmers who do not - leave the fruit in the field without harvest- for feeding goats.

And those who harvest- faced difficulties of low prices, no buyers to purchase and a decrease in yields

THE FARMERS :

Farmers are located in four AP mandals :

KV palli, Sambepalli, B Kotha Kota and Mulakalacheru



District	Village	Full Name	Crop	Trays installed	Date of installation
B Kotha Kota	Guttapalem	Thimmireddy	Tomato	795	22.11.19
Sambepalli	Kattaguttapalli	T. Narasimha reddy	Tomato	625	25.11.19
Sambepalli	Nadimraajulapalli	Venkateswara	Tomato	663	29.11.19
B Kotha Kota	Gattu	Jakir Hussen	Tomato	550	3.12.19
Mulakalacheru	Sompalli (Patakota)	R Chenna kista	Muskmelon	288	9.12.19
Mulakalacheru	Sompalli (Patakota)	M Chenna krista	Tomato	577	5.1.20
Mulakalacheru	Edumadakalapalli	D. Anjappa	Tomato	512	6.1.20
Sambepalli	kattuguttapalli	Bayya reddy	Tomato	705	11.1.20
Mulakalacheru	Edumadakalapalli	Ramesh	Tomato	528	23.1.20
Sambepalli	Nadimraajulapalli	R. Ramanarayana naidu	Bitter guard	659	24.1.19
KV palli	Ambuvaripalli	Ramesh babu	Tomato	400	30.1.20
B Kotha Kota	Bayappagari palli	Viswanatha reddy	Tomato	626	10.2.20
B Kotha Kota	Vulavalavari palli	Ranganath	Tomato	195	13.2.20
Sambepalli	Nagireddipalli	T. Venkatramana reddy	Musk melon	485	13.2.20
Mulakalacheru	Jawkalakota	Venkatasivareddy anna	Tomato	243	18.2.20
B Kotha Kota	Vulavalavaripalli	Siva reddy	Tomato	388	26.2.20
Sambepalli	goravandlapalli	B. Raghunadha	Tomato	1240	7.7.20
Total trays installed				9478	

Frequencies

- Farmers who have/have not reached the harvest stage.
- Farmer with/without mulching sheets at the control plot.
- Crop



EXPERIMENT DETAILS :

The farmer's land was divided into 2 plots - experiment plot and control plot.

Experimental plot - Tal-Ya trays were installed

Control plot had two types:

- 8 farmers used mulching sheets to cover the land
- 8 farmers did not cover the land at all

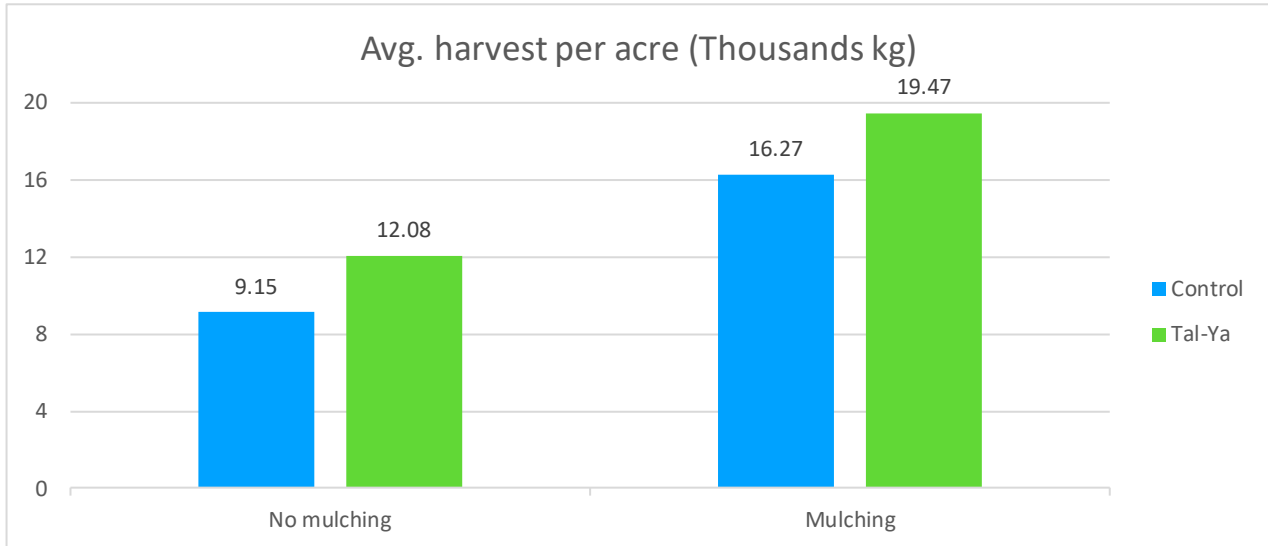
Experimental plot: Tal-Ya trays cover**Control plot: Not covered****Experimental plot: Tal-Ya trays cover****Control plot: Mulching sheets cover**

RESULTS :

In general, the farmers expressed positive reports with the trays. Farmers reported about more branches and flowers compared to the control plot and significantly less weeds, which reduced costs. but most importantly -when the harvest period began- farmers reported on better quality and quantity of produce in the experiment plot. Even on dry days, we have seen less plants facing dry distress in the TalYa than the control.

Harvest

The total Kg amount without damage crop

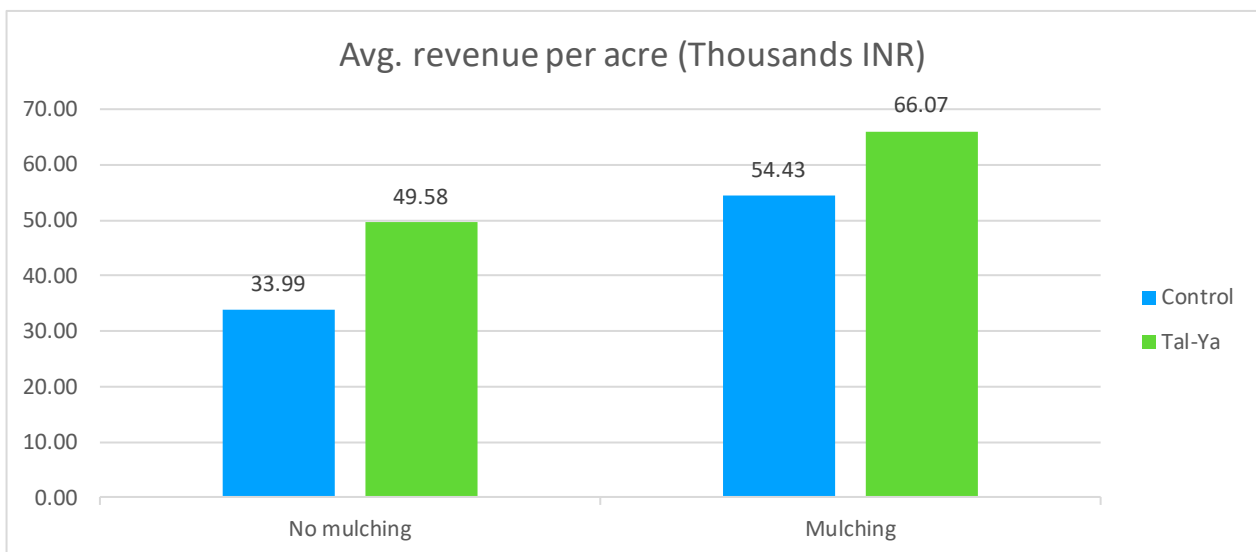


Without mulching Increase of 32%

Under mulching Increase of 20%

Revenue

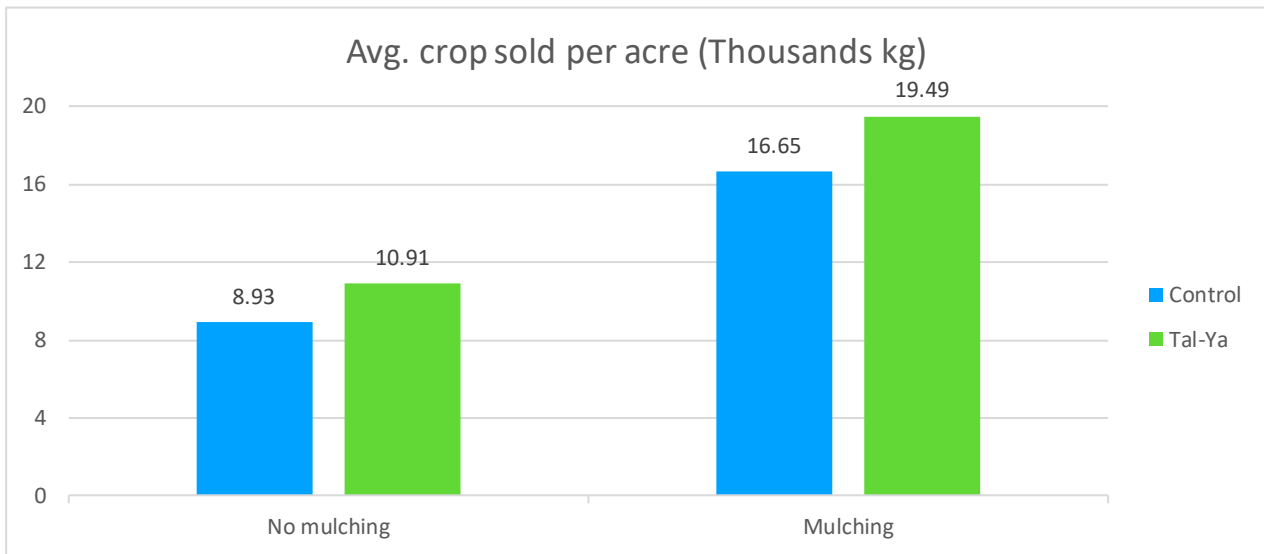
The gross income from Harvest sales



Without mulching Increase of 45%

Under mulching Increase of 22%

The total crop sold

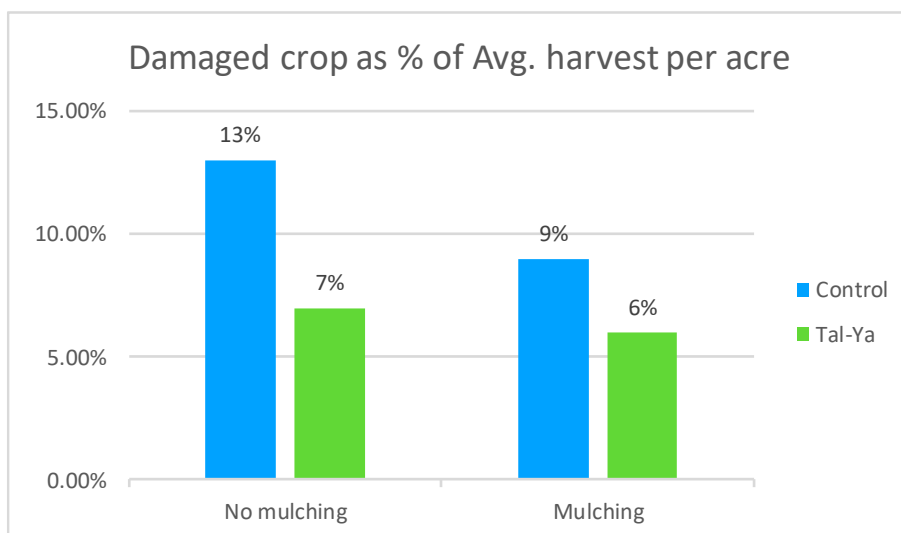


Without mulching Increase of 22%

Under mulching - Increase of 17%

Damaged harvest

Damaged harvest as percent of the total harvest



Without mulching -46%

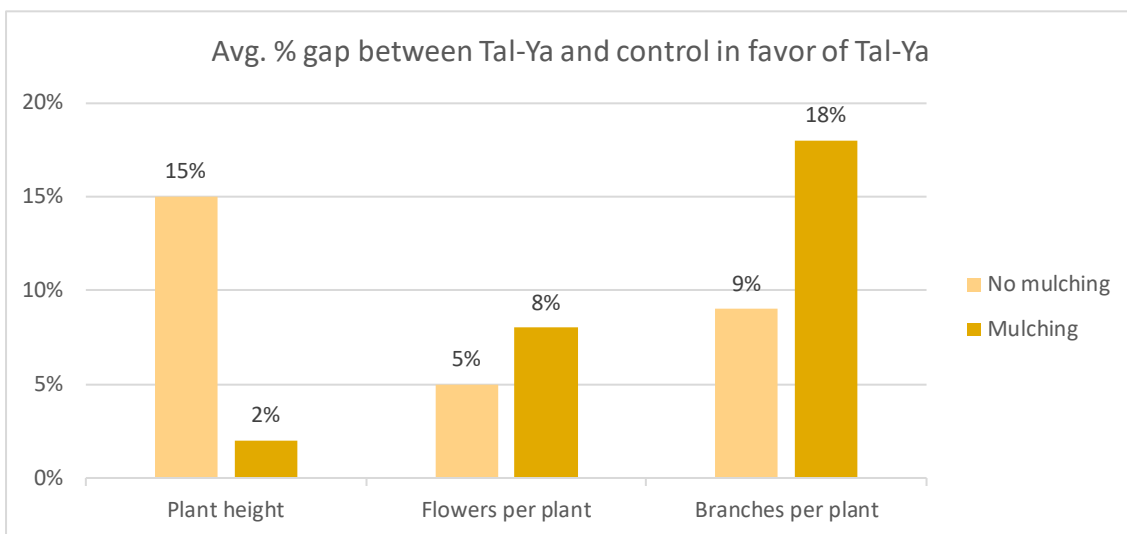
Under mulching -33%

Plant characteristics

In plant characteristics the results in the Tal-Ya plot were better.

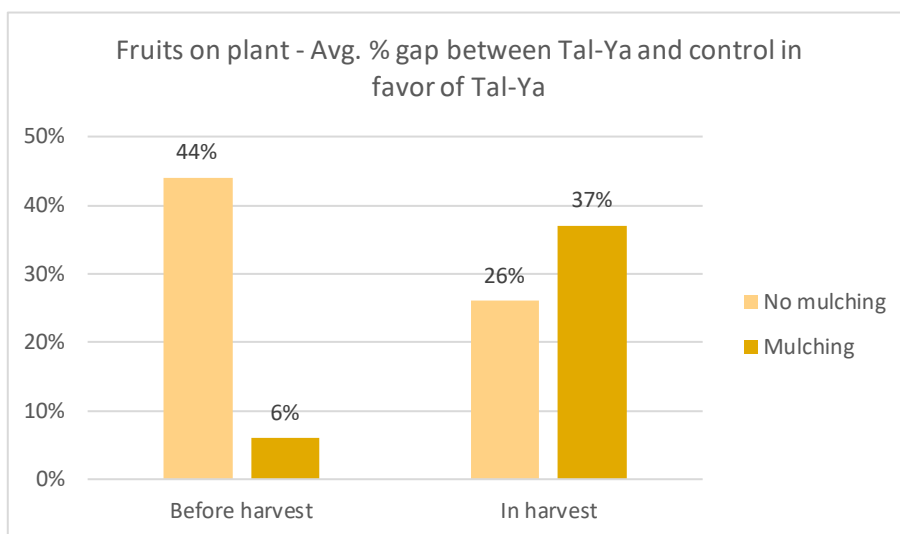
On average there were more flowers, branches and fruits per plant in Tal-Ya and the plants were taller.

Below are the results in percentage – The bars are the gap between Tal-Ya and control in favor of Tal-Ya. The plants in Tal-Ya were on average 10% taller than the control and thus in the other characteristics



No. of fruit on plant

The gap between Tal-Ya and control in favor of Tal-Ya.

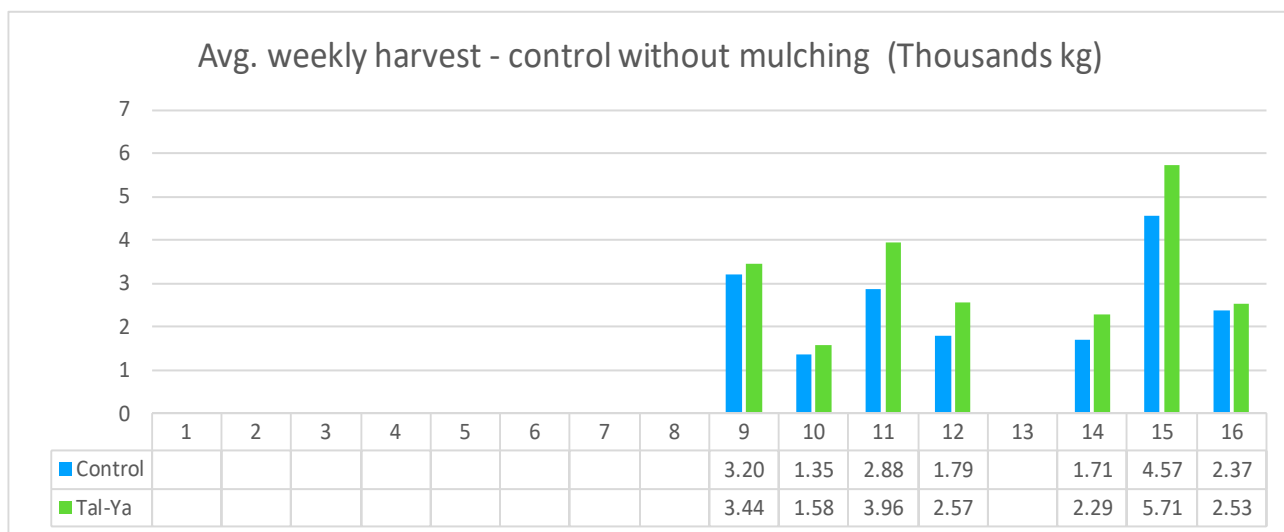
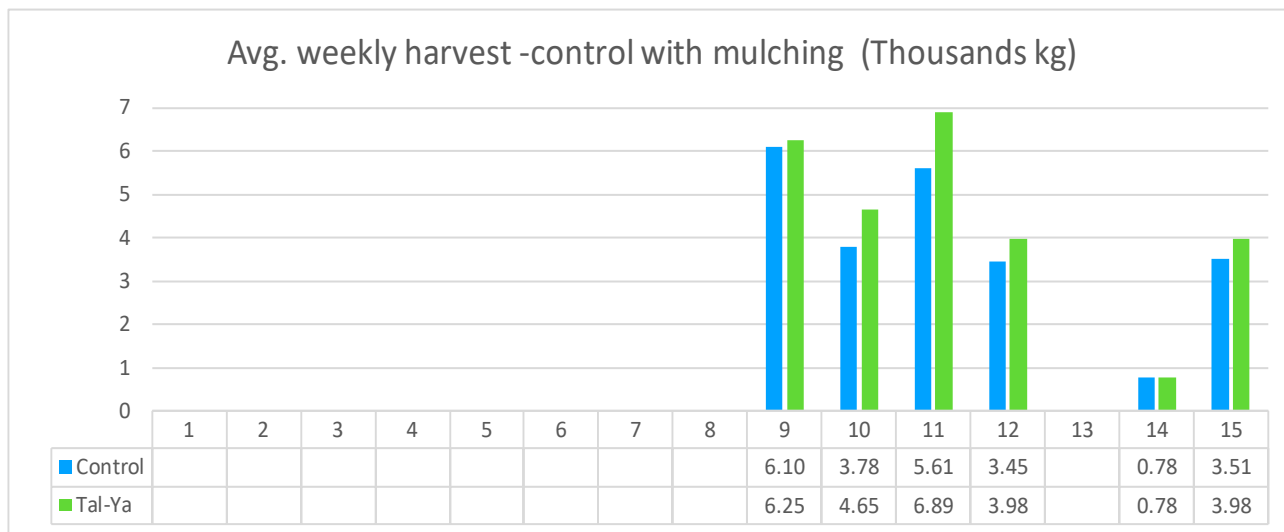


Measurement of the amount of crop per week from the week of planting

The number of weeks here is not calendar - these are weeks according to the first week of planting. each farmer and his first week of planting.

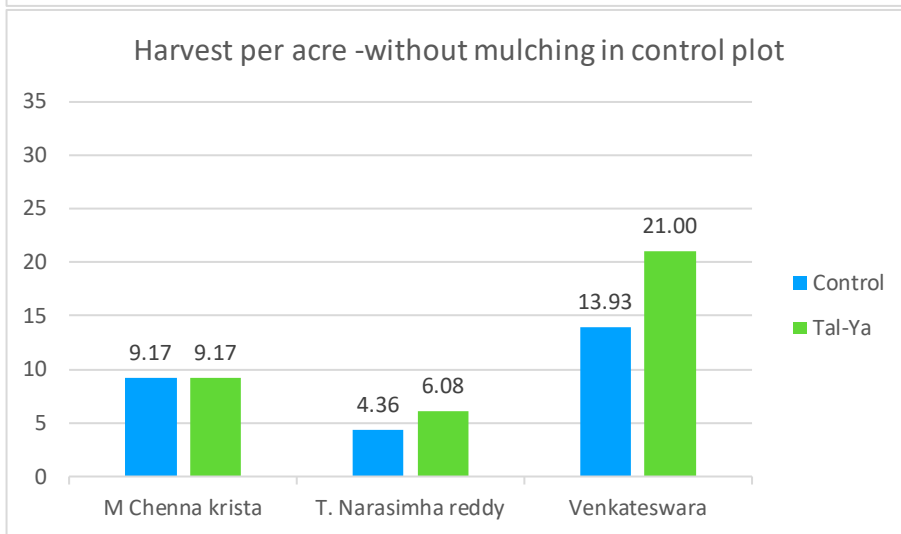
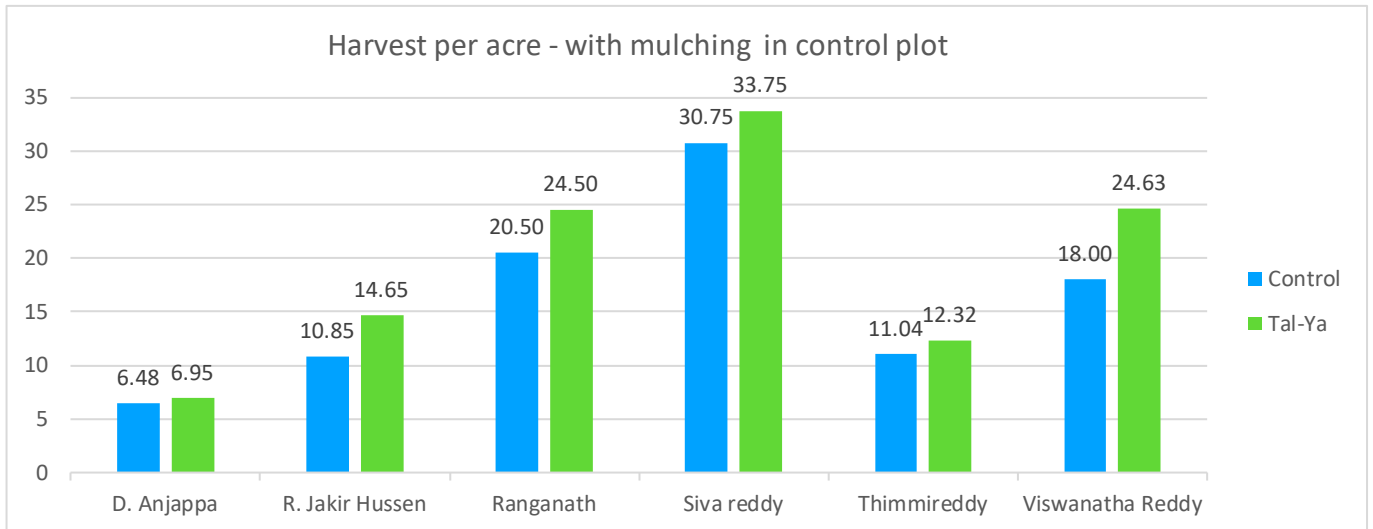
Most farmers start harvesting in the 9th-10th week of planting

Week 13 is the week lockdown announced in India due to of Covid 19 pandemic.

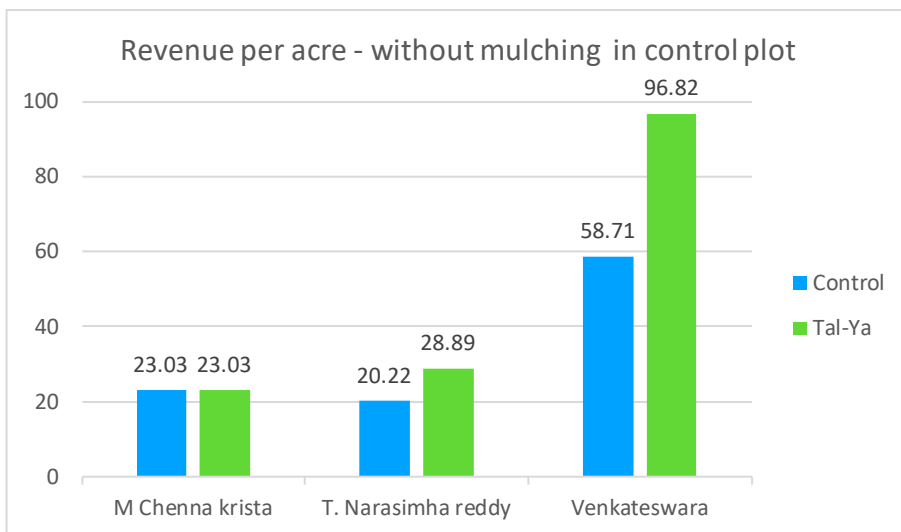
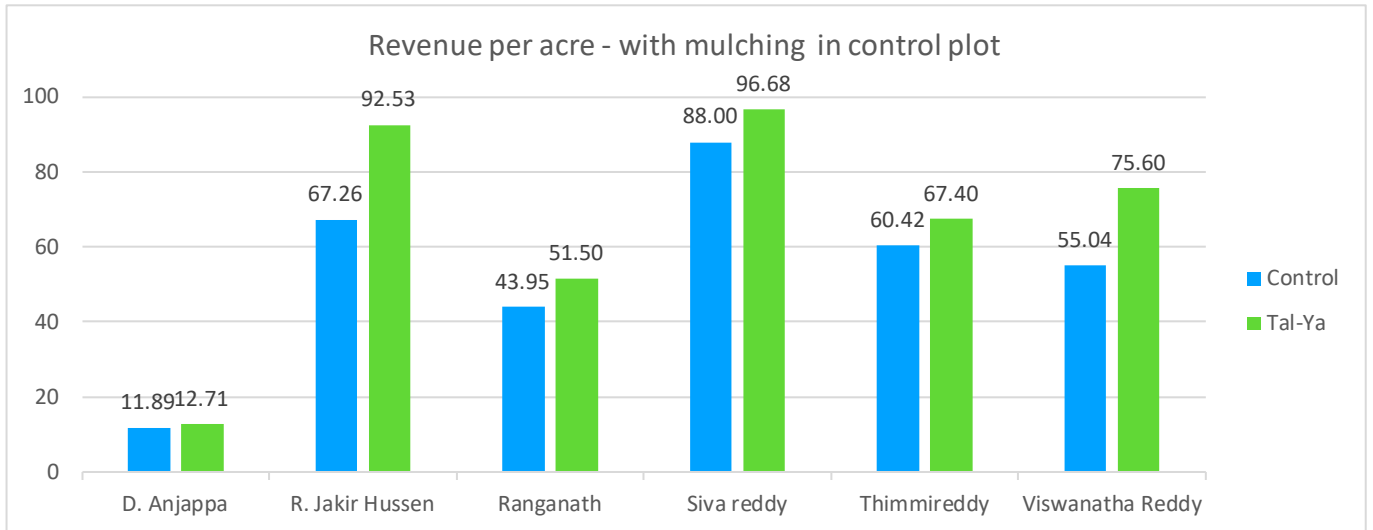


Revenue and Harvest for each farmer

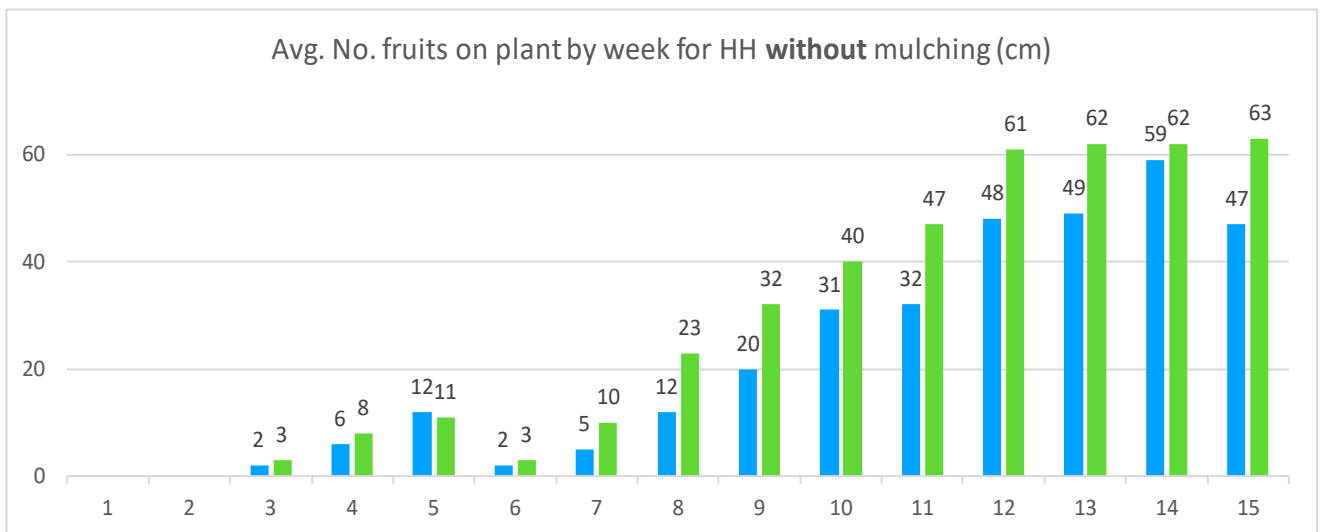
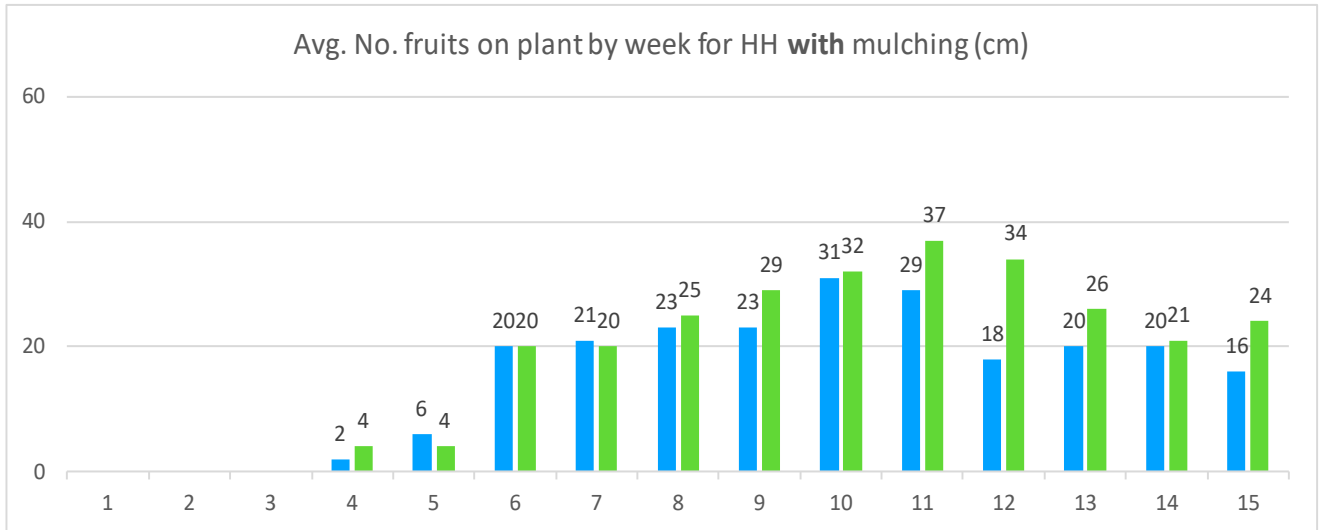
Harvest



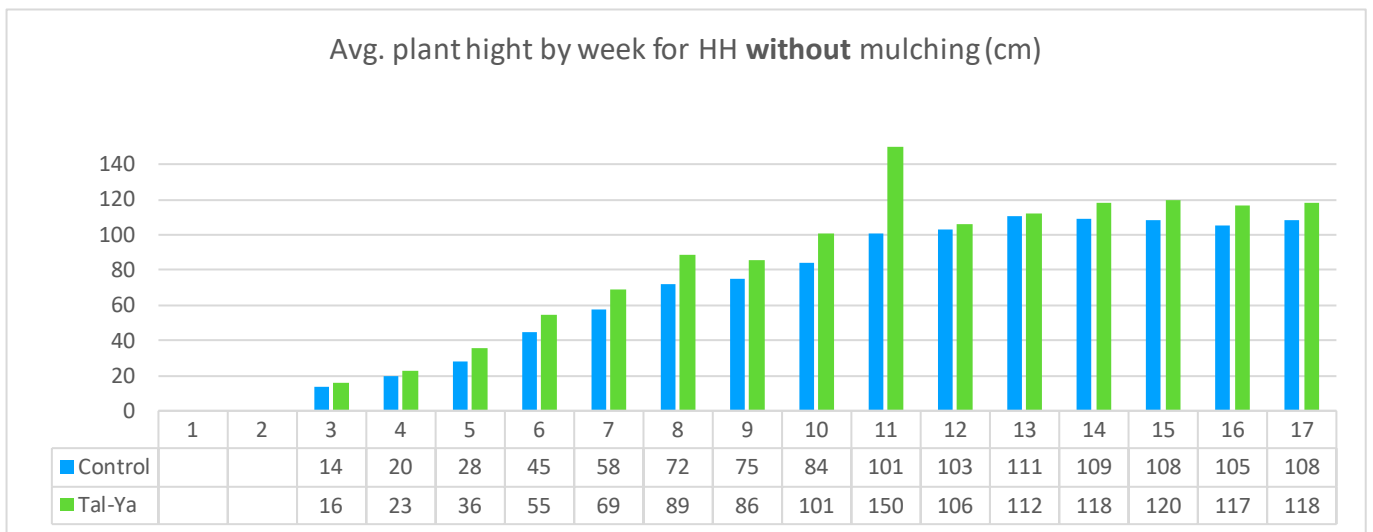
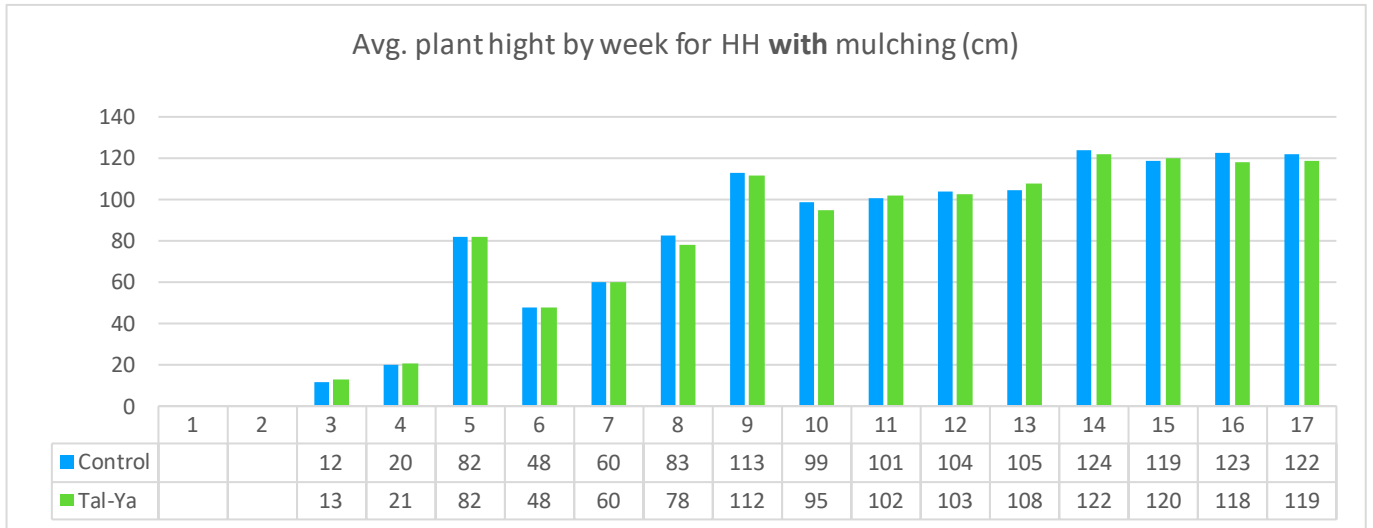
Revenue



No. of fruits in the plant by week

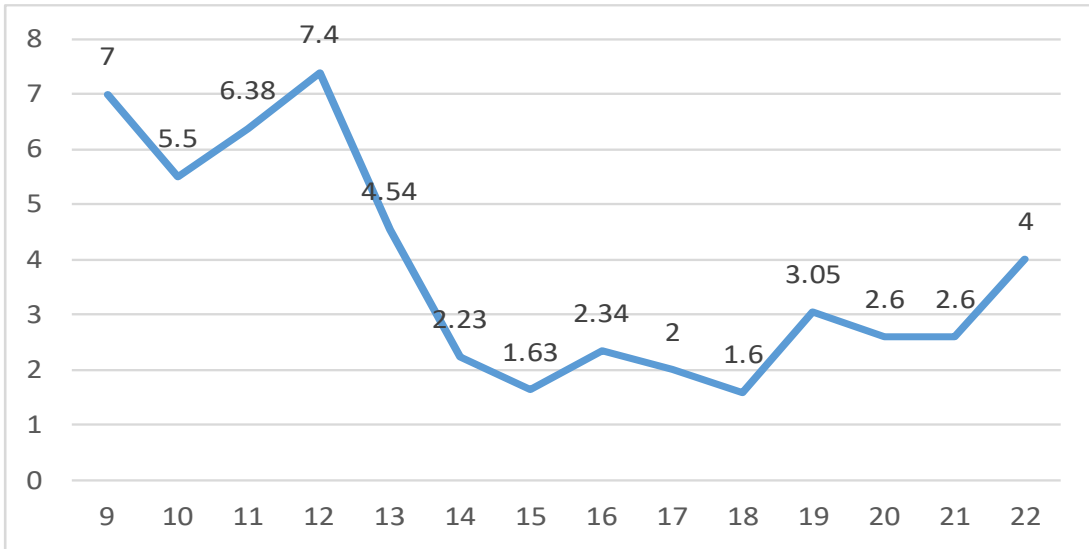


Plant height by week

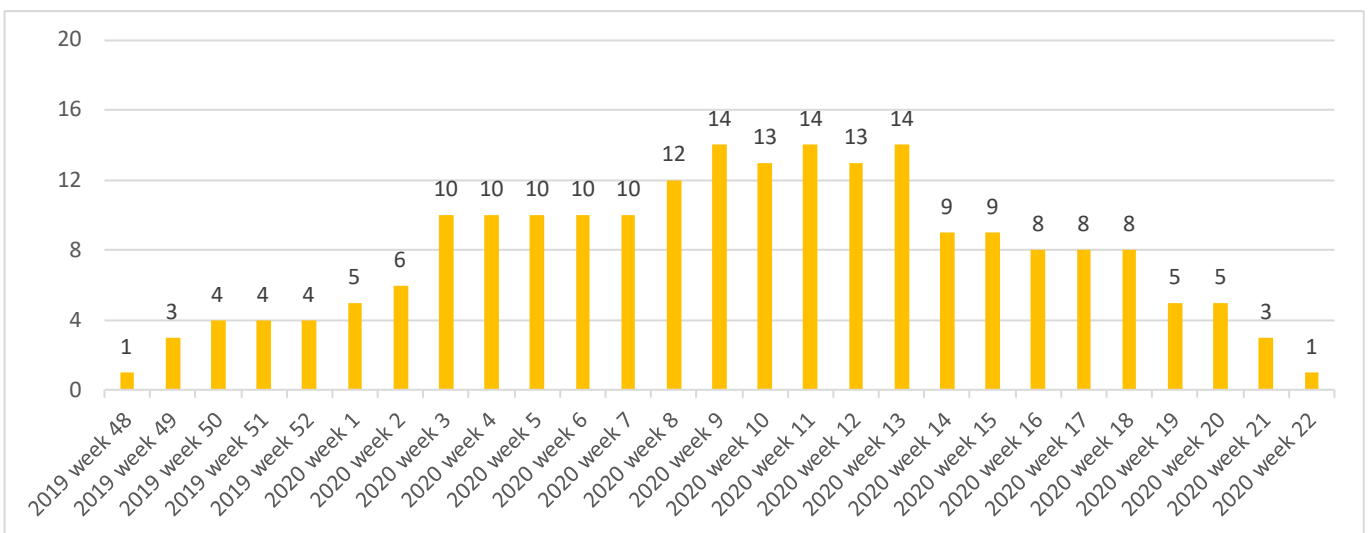


The average price of a kg of tomatoes from the beginning of the experiment

Week 13 is the week lockdown announced in India due to of Covid-19 pandemic.



Number of farmers participating in the trail per calendar week from December 2019 to May 2020



COST-BENEFIT

The analysis numbers below are the expenses for one growing season. The calculation is for 10 years with 2 growing seasons per year. Because the farmers did not complete a full 45-day harvest period due to a lockdown - adjustments were made to the calculation.

Gross income

Gross income calculated by adding to each farmer the missing days, each farmer according to his daily quantity before lockdown. The income of this quantity -calculated at pre-lockdown market price, as shown in the following formula:

$$\text{Gross Incom} = \frac{\text{Total kg (before lockdown)}}{\text{No. of harvest days before lockdown}} * 45 * \text{price of 1kg befor lockdown}$$

Net income

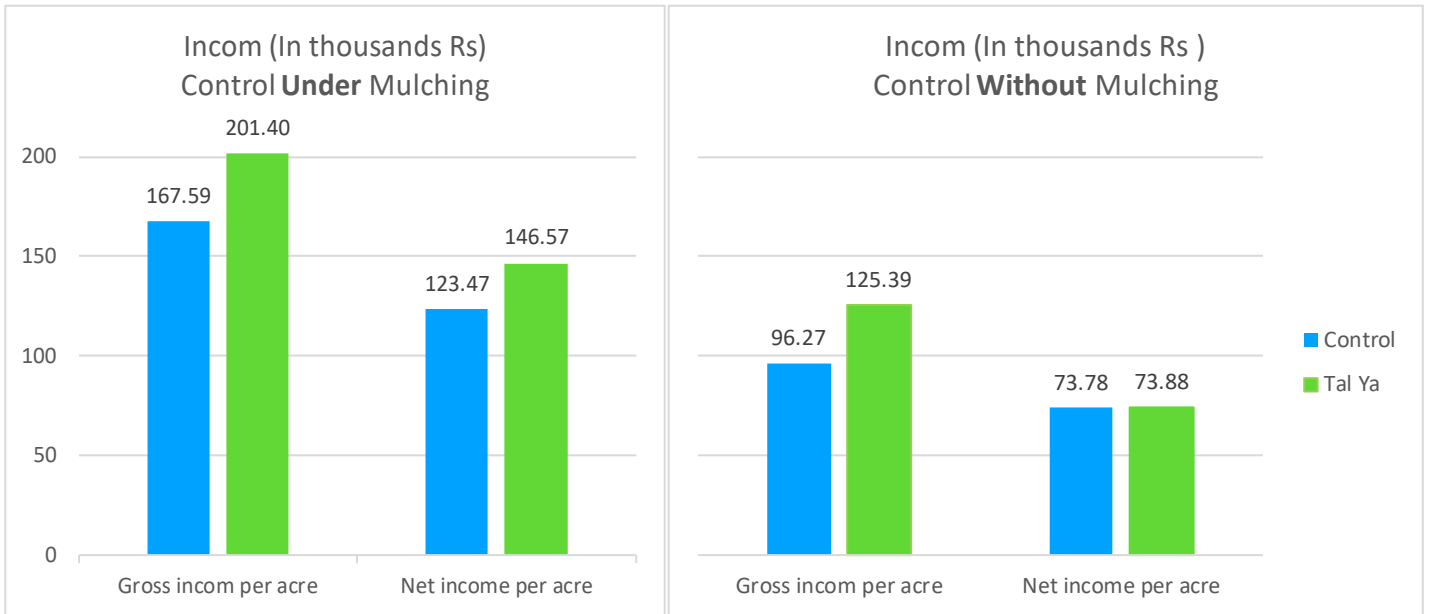
Net income calculated by deducting expenses from the amount gross income, as shown in the following formula:

$$\text{Net Incom} = \text{Gross Incom} - \text{Eepenses}$$

Expenses

The tal-Ya plot expenses, includes a cost of 1.7\$ per Tal-Ya tray - amortised over 20 (10 years, 2 seasons per year).

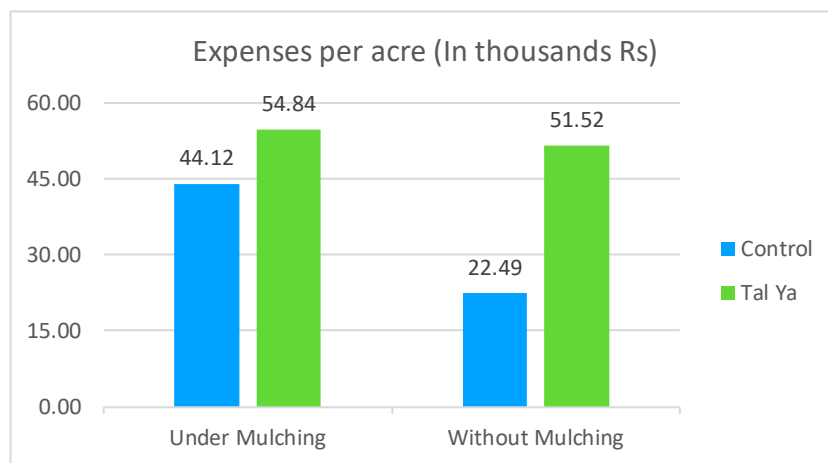
The control plot under mulching expenses, includes costs of the sheets used for one growing season.



Net income

Under mulching – increase of 18%

Without mulching unchanged net income



Expenses

Under mulching – increase of 24%

Without mulching - increase of 29%