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EFFECT OF THE CONSERVATION MEASURES ON THE LAI AND PRODUCTIVITY OF THE PERENNIAL PLANTATION

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ABSTRACT

Continuous contour trenches helps for infiltration of water, prevents soil and nutrient loss from micro-catchment. These nutrients are fully utilise by plant for growth it ultimately increase the leaf area index and fruit production of the perennial plantation. Field experiment have been carried out at Dr. PDKV Akola to examine the impact of continuous contour trenches on the LAI and productivity of perennial plantation in CCTs treated micro-catchment and untreated micro-catchment. The result shows that Leaf area index of CCT treated (T_1) micro-catchment was more by 15.19 % over untreated (T_2) micro-catchment in custard apple plantation and in Atemoya plantation Leaf area index of CCT treated (T_1) micro-catchment was more by 20.31 % over untreated (T_2) micro- catchment. Average fruit production of custard apple in CCTs treated (T_1) over untreated (T_2) micro-catchment is more by 61.58 % whereas Average fruit production of Atemoya in CCTs treated (T_1) micro-catchment over untreated (T_2) micro-catchment is more by 77.08 %.

KEYWORDS: Continuous contour trenches, LAI, productivity, perennial plantation, micro-catchment.

INTRODUCTION

Agricultural drought is common in drylands. Soils of shallow depth, low fertility, and poor water holding capacity and the resultant soil moisture stress during crop growth are some of

the major constraints. Integrated Watershed management is being recommended for improving the productivity of drylands. Activities aimed at conserving the natural resources, particularly soil and water, and their judicious development and utilization form the backbone of the watershed programmes. As a part of better land management, several land treatments such as contour farming tied ridging, broad bed furrows, continuous contour trenches are being suggested for erosion control and rain water conservation. If basic needs of plantation are fulfil then it reflects on its appearance. It grows healthy plant with healthy fruit. LAI abbreviate as leaf area index it define as one sided green leaf area per unit ground surface area. It is dimensionless quantity. LAI ranges from 0 (bare ground)-10(dense conifer forest). Leaf area index is one of the most widely used measurement for describing plant canopy structure it also useful for plant canopy functioning. In past time, measuring Lai was difficult and time consuming in recent year develop technology have made measuring LAI much easier.

Study Area

The present Field experiment was conducted at All India Co-ordinated Research Project for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during 2014-15. The site is situated at the latitude of 20^0 43' North and Longitude of 77^0 02' East. The altitude of this place is 307.41m above MSL. The climate of the place is semi-arid and characterized by hot dry summer and cool winter.

MATERIAL AND METHODOLOGY

Monitoring of plant growth was done by calculating leaf area index of Custard apple and Atemoya of two micro-catchment A and C which are treated (T_1) by CCTs and B and D which are untreated (T_2). The observations were recorded at 15 days interval.

For leaf area index estimation, three plants large, medium, and small were selected. Number of large, medium, small leaves was counted of each large, medium, and small plant. Area of that leaves was determined by leaf area meter (Fig 1). LAI was calculated by dividing the area of total number of leaves of large, medium and small leaves by the area occupied by the plant (5x5m). Height of Custard apple and Atemoya plantation of two micro catchments was measured by measuring tape.

Fig 1: Leaf area meter.

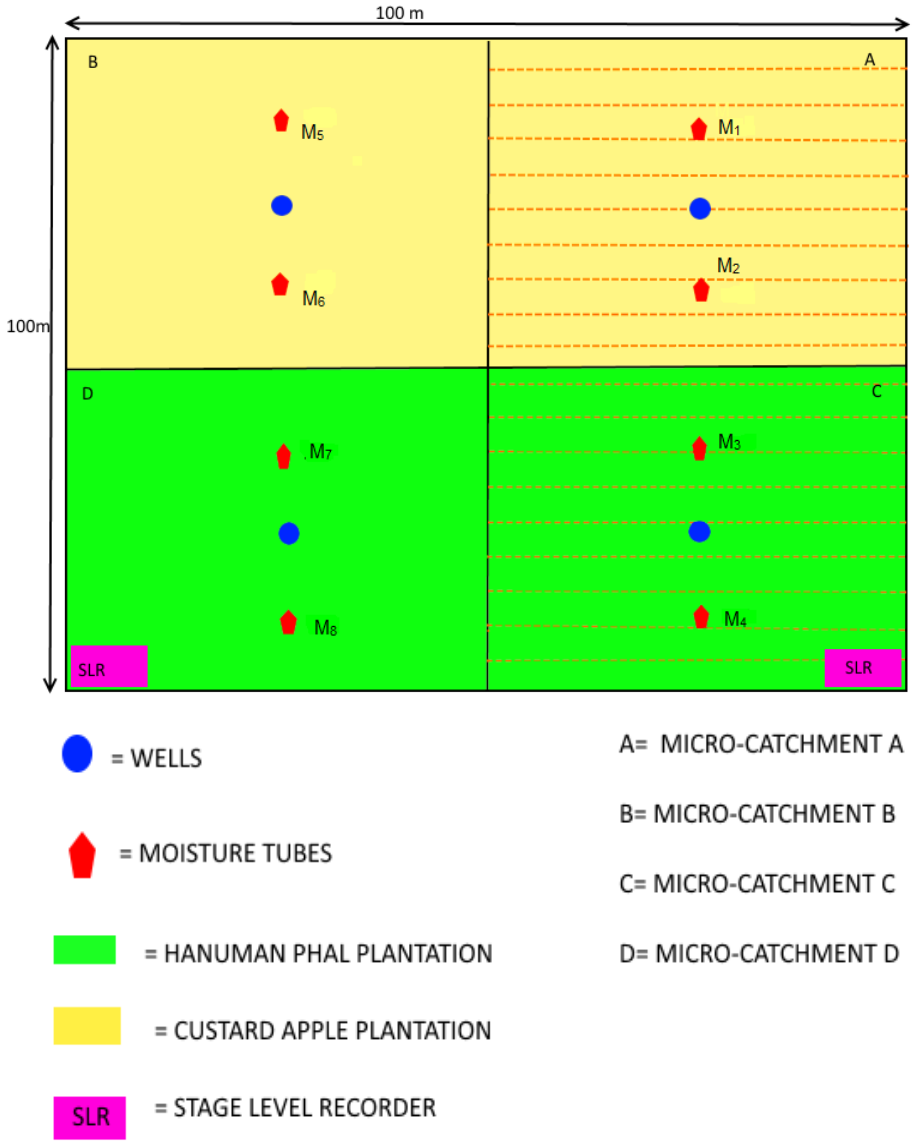

Fig. 2: Layout of the Experimental Area.

Yield Determination

Yield of Custard apple and Atemoya (Hanuman phal) was monitored by weighing of matured Custard apple and Atemoya (Hanuman phal) of each tree separated by physical features of ripeness of treated (T_1) and untreated (T_2) micro-catchment. Separate reading of fruit production of each plant of Custard apple and Atemoya (Hanuman phal) of treated (T_1) and untreated (T_2) micro-catchment was recorded and comparison between treated (T_1) and untreated (T_2) micro-catchment has been made.

RESULT AND DISCUSSION

Impact of CCTs on growth of perennial plantation

Impact of CCTs on growth of Custard apple

Leaf area index of custard apple was estimated by taking the observation fortnightly the area of leaves were determined by leaf area meter. The estimated LAI obtained is presented in Fig 3 for treated (T_1) and untreated (T_2) micro-catchment.

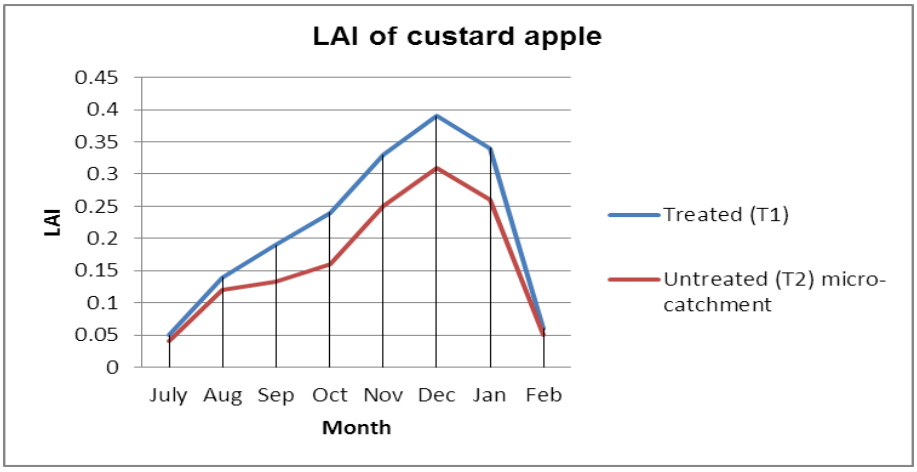

Fig. 3: Leaf area index of custard apple in CCT treated (T_1) and untreated (T_2) micro-catchment.

From Fig. 3, it is observed that there is increase in LAI from July to December in both treated (T_1) and untreated (T_2) micro-catchment and decrease in LAI from December to February in treated (T_1) and untreated (T_2) micro-catchment was observed. There is positive impact of CCTs on Leaf area index of Custard apple compared to untreated (T_2) micro-catchment. Leaf area index of CCT treated (T_1) micro-catchment was more by 15.19 % over untreated (T_2) micro-catchment in custard apple plantation. This indicates that the growth of plantation in CCT treated (T_1) micro-catchment was more as compared to untreated (T_2) micro-catchment.

The positive impact of CCTs on leaf area index ultimately resulted into better plant growth. The increase in LAI of treated (T_1) over untreated (T_2) micro-catchment was observed maximum in the month of October.

Impact of CCTs on growth of Atemoya

Leaf area index of Atemoya was estimated by taking the observations fortnightly the area of leaves were determined by leaf area meter. The estimated LAI obtained is presented in Fig.4 for treated (T_1) and untreated (T_2) micro-catchment.

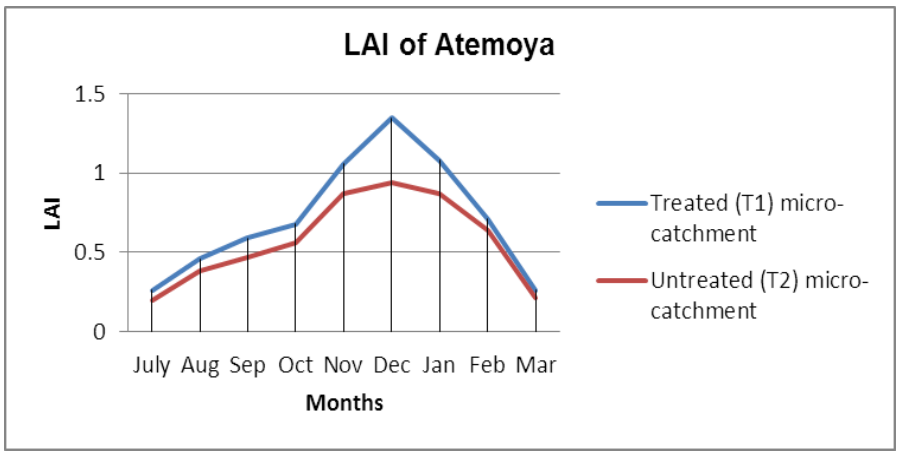

Fig. 4: Leaf area index of Atemoya in treated (T_1) and untreated (T_2).

Micro-catchment

From Fig. 4, it is observed that there is increase in LAI from July to December in both treated (T_1) and untreated (T_2) micro-catchment and decrease in LAI from December to March in treated (T_1) and untreated (T_2) micro-catchment was observed. There is positive impact of CCTs on Leaf area index of Atemoya compared to untreated (T_2) micro-catchment. Leaf area index of CCT treated (T_1) micro-catchment was more by 20.31 % over untreated (T_2) micro-catchment in Atemoya plantation. This indicates that the growth of plantation in CCT treated (T_1) micro-catchment is more as compared to untreated (T_2) micro-catchment.

The positive impact of CCTs on leaf area index ultimately resulted into better plant growth. The increase in LAI of treated (T_1) over untreated (T_2) micro-catchment was observed maximum in the month of December.

Impact of CCTs on fruit production of perennial plantation

Impact of CCTs on fruit production of custard apple

Picking of custard apple was done depending upon the physical appearance of ripeness of custard apple. It was started in the month of November and was carried out up to end of December. The fruit production of custard apple in treated (T_1) and untreated (T_2) micro-catchment is presented in Fig 5.

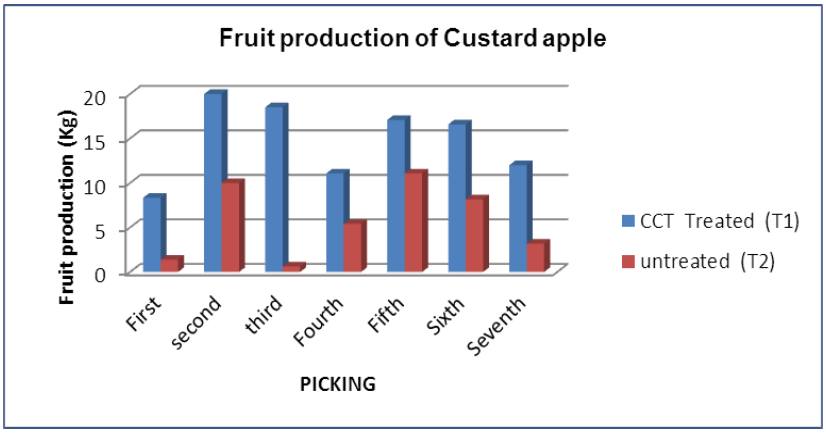

Fig. 5: Picking wise fruit production of Custard Apple.

There is positive response of CCTs on fruit production compared to untreated (T_2) micro-catchment for custard apple plantation. Average fruit production of custard apple in CCTs treated (T_1) over untreated (T_2) micro-catchment is more by 61.58 %.

Impact of CCTs on fruit production of Atemoya

Picking of Atemoya was done depending upon the physical appearance of ripeness of Atemoya. It was started in the month of November and was carried out up to end of March. The fruit production of Atemoya in treated (T_1) and untreated (T_2) micro-catchment is presented in Fig. 6.

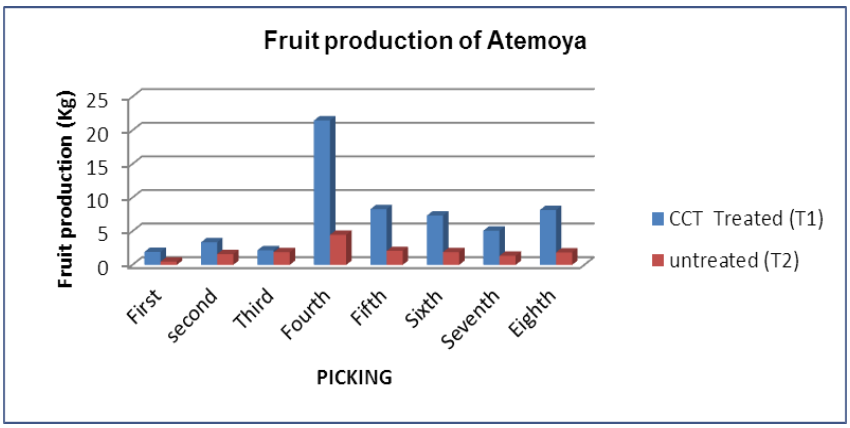

Fig. 6: Picking wise fruit production of Atemoya.

There is positive response of CCTs on fruit production compared to untreated (T_2) micro-catchment for Atemoya plantation. Average fruit production of Atemoya in CCTs treated (T_1) micro-catchment over untreated (T_2) micro-catchment is more by 77.08 %.

SUMMERY AND CONCLUSION

The Leaf Area Index (LAI) of custard apple and atemoya plantation in CCT treated micro-catchment (T_1) is more by 15.19% and 20.31% respectively over untreated (T_2) micro-catchment.

Average fruit production of custard apple and atemoya plantation in CCT treated (T_1) micro-catchment is more by 61.58% and 77.08% respectively over untreated (T_2) micro-catchment.

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