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A study on the yield gap analysis of rubber cultivation in Kanyakumari district of Tamil Nadu

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ABSTRACT

The present study was conducted to analyse the yield gap in rubber cultivation in Kanyakumari district of Tamil Nadu since the district stands first in the area cultivated under rubber in the state. In this district, Thiruvattar block was selected based on the maximum area under rubber cultivation. The sample size of 150 respondents was taken from the six villages of Thiruvattar block by using proportionate random sampling method. A well-structured and pre-tested interview schedule was used for data collection. In this study yield gap II ie the difference between potential farm yield and actual farm yield was analysed as 34.80 per cent. Majority of the respondents (76.00%) had a yield gap of 21-30 per cent followed by 16.67 per cent who had 10-20 per cent of yield gap and 7.33 per cent of the respondents had a yield gap of more than 30 per cent. Majority of the respondents (74.67%) perceived non-availability of labour for doing recommended practices as the major reason for yield gap followed by perceived insect damage (65.33%), diseases (61.33%), high temperature (60.67%), poor rainfall (58.67%) and reduction in number of rainy days (58.67%) as the reasons for yield gap. Less than half of the respondents perceived soil erosion (48.00 %), lack of drainage facility (48.00%), high cost of labour (41.33%), excess rainfall (26.67%), lack of knowledge on recommended practices (20.00%) and erratic rainfall (14.67%) as the reasons for yield gap.

Keywords: Actual yield; rubber cultivation; perceived factors; potential yield; yield gap

INTRODUCTION

Natural rubber is a solid product obtained by coagulating the latex produced by certain plants particularly the rubber tree. There are about 900 plant species producing natural rubber but only a few fit for commercial exploitation. Among these para rubber or *Hevea brasilensis* is the most commercially exploited species. Rubber trees are now widely planted in 20 countries around the world for the production of latex (Teoh et al 2011). The cultivation of rubber is the main source of livelihood for millions of people in many rubber growing countries of the Far East who depend directly or indirectly on wages or profit received from rubber plantation. Natural rubber forms the raw material for a very large number of articles useful to human beings.

Natural rubber, an industrial raw material of strategic importance is among the most versatile agricultural products and finds use in about 50000 products across the world. In India around 35000 products are made out of natural rubber. The rubber industry produces wide range of products like auto tyres, auto tubes, automobile parts, footwear, belts, cables, wires, battery boxes etc.

India's natural rubber production is on the increase steadily over the past decade. Rubber cultivation in India has been traditionally confined to hinterlands of southwest coast mainly in Kanyakumari district of Tamil Nadu and Kerala. Kerala and Tamil Nadu together constitute the traditional rubber growing regions in the country. Kerala alone contributes 89 per cent of the total rubber production in India and here an area of 721612 ha is under rubber plantation. Tamil

Nadu contributes another 3 per cent of the total natural rubber production. Kanyakumari is the only district under rubber plantation in Tamil Nadu with an area of 24324 ha.

The demand for rubber in India is bound to increase steadily in the coming years with the developments taking place in industrial, agricultural and transportation sectors and as a result of increasing efforts to find new uses of rubber. The rubber plantation industry has to be geared up to increase its per unit yield and expansion in planted area. Improving the quality of sheet rubber is essential for healthy growth and sustainability of the Indian rubber plantation industry. Hence an analytical study has been taken up to analyze the yield gap in rubber cultivation.

METHODOLOGY

The southern district of Tamil Nadu ie Kanyakumari was purposively selected as it is the only district in Tamil Nadu where rubber is being cultivated in larger area. A sample size of 150 rubber growers was selected for the study. Out of four Taluks in Kanyakumari, Kalkulam Taluk and out of three blocks in Kalkulam Thiruvattar block was purposively selected as it had more area under rubber cultivation.

Out of nine revenue villages of selected Thiruvattar block six villages viz Shurlacode, Thirparappu,Thumbacode, Ponmanai, Thiruvattar and Macode which had the maximum area under rubber were selected. A well-structured and pre-tested interview schedule was used for data collection. The data were collected with the help of the interview schedule related to their yield gap and the factors perceived for the gap. Percentage analysis was used in descriptive analysis for making simple comparisons.

Gomez (1977) developed the conceptual model of yield gap. The difference between experiment station yield and actual farm yield was referred to as yield gap. Instead of comparing the actual farm yield directly with the experiment yield the author introduced an yield level intermediate between the above two called as potential farm yield and yield obtainable in a farmer's field from the improved technology. Thus yield gap was divided into two components viz yield gap I and II. The difference between experiment yield and potential farm yield represented yield gap I while the difference between potential farm yield and actual farm yield represented yield gap II.

Potential yield is the yield of a crop when grown in environments to which it is adapted with nutrients and water are non-limiting with pests, diseases, weeds, lodging and other stresses effectively controlled (Evans and Fischer 1999). Potential yield depends on location as it relates to weather but is independent of soil which is assumed to be physically and chemically favourable for crop growth. The climatic factors that influence potential yield are radiation, ambient CO_2 concentration and temperature (Van Ittersum et al 2013). Photosynthesis, growth and potential yield are also responsive to fraction of diffuse radiation and vapour pressure deficit (Rodriguez and Sadras 2007).

In the present study yield gap II was analyzed ie the difference between potential farm yield (Y_d) and actual farm yield (Y_a) which was considered as yield gap:

$$\text{Yield gap II} = Y_d - Y_a$$

where Y_d= Demonstration plot yield (potential farm yield), Y_a= Actual yield

RESULTS and DISCUSSION

The yield gap found in study area is presented in Table 1.

Table 1. Yield gap in rubber cultivation (n= 150)

Potential farm yield (kg/ha)	Average actual farm yield (kg/ha)	Yield gap (kg/ha)	Per cent yield gap
1500	978	522	34.80

The potential farm yield in the study area was 1500 kg/ha. The average actual farm yield obtained by the respondents was 978 kg/ha that accounted for an yield gap of 522 kg/ha (34.80%).

Data given in Table 2 reveal that more than three-fourth of the respondents (76.00%) had an yield gap of 21-30 per cent followed by 16.67 per cent who had yield gap of 10-20 per cent and only 7.33 per cent of the respondents had an yield gap of more than 30 per cent.

Table 2. Distribution of respondents according to yield gap (n= 150)

Gap (%)	Number	Percentage
10-20	25	16.67
21-30	114	76.00
>30	11	07.33
Total	150	100.00

The data on perceptions of the respondents about the factors influencing the yield gap are depicted in Table 3. Nearly three-fourth of the respondents (74.67%) perceived non-availability of labour for doing recommended practices as the major reason for yield gap followed by insect damage (65.33%), diseases (61.33%) high temperature (60.67%), poor rainfall (58.67%) and reduction in number of rainy days (58.67%). Less than half of the respondents perceived soil erosion (48.00%) and lack of drainage facility (48.00%) followed by high cost of labour (41.33%), excess rainfall (26.67%), lack of knowledge on recommended practices (20.00%) and erratic rainfall (14.67 per cent) responsible for yield gap.

Table 3. Distribution of respondents according to perceived influencing factors for yield gap (n= 150)

Perceived factors	Number	Percentage
Lack of knowledge on recommended package of practices	30	20.00
Non-availability of labour for applying recommended practices	112	74.67
High cost of labour	62	41.33
Insect damage	98	65.33
Diseases	92	61.33
Poor rainfall	88	58.67
Excess rainfall	40	26.67
Erratic rainfall	22	14.67
Reduction in number of rainy days	88	58.67
Lack of drainage facility	72	48.00
High temperature	91	60.67
Soil erosion	72	48.00

Multiple responses

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