

CLIMATE WARMING CAUSES MARKED DECLINE IN NATURAL RUBBER PRODUCTION IN TRADITIONAL RUBBER GROWING REGIONS OF INDIA

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Mathematical models developed earlier showed that maximum and minimum temperatures were the two most important weather parameters that determined rubber productivity and both had a negative impact on rubber yield in the traditional rubber growing areas (Satheesh and Jacob, 2011; Satheesh, 2014). In the present study, we made use of these models on the influence of climate warming on natural rubber yield to estimate past productivity of natural rubber in parts of the traditional heartland of rubber cultivation in India (based on the then existing temperatures) and compared the same with actual commercial productivity as obtained from growers' fields and published by Rubber Board.

Commercial productivity of natural rubber from growers' fields registered a steady increase over the years even as the local climate continued to warm, apparently contradicting the model prediction. Increase in the area under the high yielding clone, RR11 105 that came into tapping over the years was responsible for masking the adverse impact of climate warming on productivity until recently.

Our results show that there existed a gap between estimated productivity based on temperature sensitivity models and the actually realized productivity in field. The differences were more pronounced in the past than in the more recent years when yielding area under the high yielding clone did not continue to register any marked increase and the warming effect started to have an overriding adverse effect on productivity as compared to the past. The difference between estimated productivity and actual productivity became zero in 2010 and since then productivity must have started to decline, contrary to the general perception.

Projecting future yields without taking the impact of weather variables into consideration will not be correct. Our analyses clearly show that rising temperatures (warming effect) have now become strong enough to make a dent in productivity of natural rubber in India, overriding the positive influence of clone (clone effect). Since there has been no expansion in highly productive young area under tapping (compensating for the decline in productivity) it is concluded that total production of natural rubber in the country must have taken a beating since early this decade. This can explain the increased import of natural rubber and increased use and production base of synthetic rubbers in the country in recent times which is certain to have serious implications for the sustainability of the natural rubber sector the country.

Keywords: Climate warming, Mathematical models, Natural rubber production, Productivity