Enhancing coconut productivity in Kerala:
A simple solution to the complex problem

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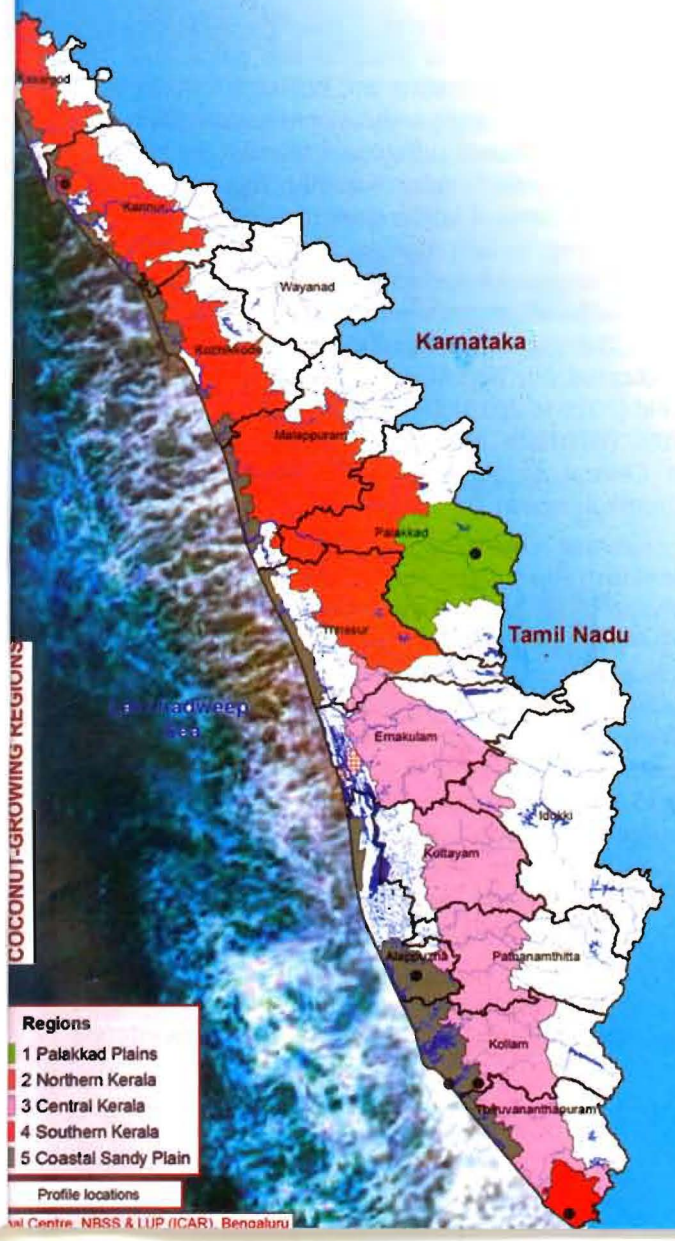
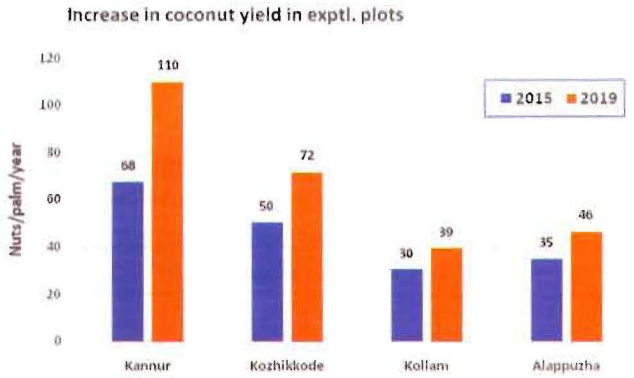
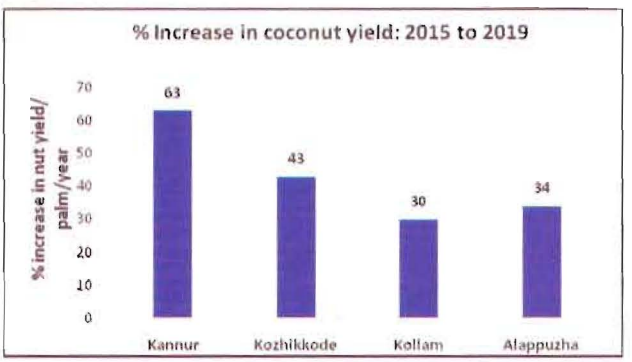


Kerala ranks first in area and production of coconut in the country, but scores poorly in productivity and is ranked sixth among the Indian states. Faced with the prospect of the palm following the fate of rice in the state, the Kerala State Planning Board requested the National Bureau of Soil Survey and Land Use Planning (ICAR) to undertake a research program for enhancing productivity of the palm, in consortium with relevant ICAR institutes working in the state (CPCRI, CTCRI, IISR, KVK's Kozhikode, Alapuzha, Ernakulam and Pathanamthitta and IIITMK). The consortium submitted a project proposal to the KSPB in 2014 with the primary objective of enhancing the palm productivity in major coconut-growing regions of the state through mitigation of soil related constraints to the palm. The project initiated in November 2014 was concluded in March 2020.

Analysis of variability in climate and soil qualities in the major coconut growing regions of the state pointed to the overriding influence of soil qualities over climate on coconut productivity. Based on purposive soil sampling and analysis , the research team zeroed in three major coconut growing regions of the state, viz., Northern laterites, Central laterites, and Coastal plain with the exclusion of Palakkad plain and Southern laterites with limited constraints to the palm, for experiments to alleviate soil related constraints and thereby enhancing the coconut yield significantly.

The major soil related constraints in the regions of focus were strong surface and subsoil acidity, toxicity of aluminium and deficiencies of major, secondary and micro-nutrients. To overcome the constraints



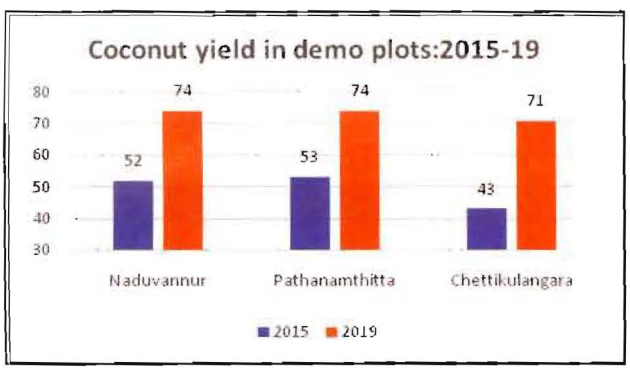


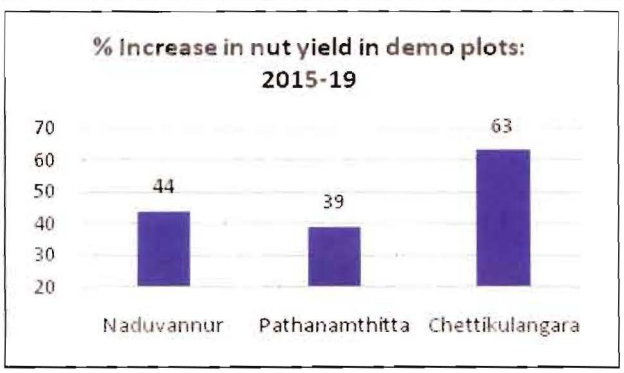
and reduce the cost of cultivation a new set of management practices, termed Best Management Practices (BMP) were formulated. The salient features of the BMP were discontinuing the annual preparation of basins around the palm, return of palm residues to the base in lieu of farm yard manure inputs, external input of liming materials to abate surface, subsoil acidity and aluminium toxicity, and inputs of fertilizers to meet the palm's requirement of not only the major nutrients but also secondary and micro-nutrients. The BMP was tested for its capacity to mitigate soil related constraints to the palm and significantly enhance harvested nut yield through statistically designed experiments and demonstrations in the farmer's fields, in the three regions.

The external input of liming materials and plant nutrients, within a short span of three years, mitigated the surface and subsoil acidity and aluminium toxicities and hiked the soil available nutrients to adequate level for the palm, with the exception of magnesium and boron in laterite soils of Central Kerala and sandy soils of coastal plain. The input of magnesium sulfate was found to be effective for amelioration of subsoil acidity. The rate of input of magnesium and boron were insufficient in central laterite and coastal sandy soils.The BMP followed could increase harvested coconut yield substantially into the fourth year in experiment and demonstration plots. The statistically significant increase in nut yield vindicated our hypothesis. Average increase in nut yield (2015 to 2019) at northern Kerala experimental sites (Pilathara and Naduvannur) was 48% and at Central Kerala sites 32% (Kalluvathukkal and Chettikulangara).

Average increase of nut yield in three demonstration sites in the same period was a whopping 49 % (Naduvannur 44 %; Pathanamthitta 39 %; and Chettikulangara 63 %). Paired test on annual coconut yields in most experiment and demonstration sites proved statistically significant when yield realised in the fourth year (2018-19) was compared with base year yield (2015-16).Average yield increase of 45 per cent (all experiments and demonstrations considered together) realised in the fourth year, after initial input of BMP, assume added significance since the ideal period for evaluating harvested nut yield for coconut palm starts from fifth year.

Analysis of socio-economic profile of coconut farmers unequivocally pointed to the waning interest





in the crop, in line with overall decline of agriculture in the state.Reasons are many; income from other sources outweighing crop production, small size of holdings returning paltry profits, unfair markets, widespread incidence of pests and diseases lacking effective control and so on. Many of the external inputs in BMP are currently not readily available with local fertilizer dealers: lime, dolomite, zinc sulphate, copper sulphate, borax and sodium molybdate. The means of overcoming farmer apathy and bottlenecks on supply side is to make available prepacked inputs for coconut palms at the farm gate, two times in a year, or make it available with all fertilizer dealers in the state, adequately labelled with details of contents and advisory on usage. The program should be assiduously preceded and followed by effective extension strategy to popularise the BMP among coconut farmers

Evaluation of the changes in soil qualities and their reflection on coconut yield enabled modification of BMP evolved before the experiment. AEU-wise revised BMP evolved for Coastal sandy plain (AEU 1 & 2), Onattukara sandy plain (AEU 3), Central laterites (AEU 9& 12), and Northern laterites (AEU10, 11& 13) with divisions for first three years and thereafter follows.

The agronomic management part of BMP for coconut palms remain same for all the regions.

No basins for coconut palm and tillage of inter space unless required for intercrops and no external inputs of organic manure (cow dung or farmyard manure) are required, only the palm residues need to be returned to base of palm.

End note: Discontinuing the practices of basins around the palm and farmyard manure/cow dung inputs together can provide enough cash for liming material and plant nutrient inputs!