Among the leading coconut producing states of India, Kerala ranks first both in area and production. Coconut and coconut based mixed cropping is the largest land use system in the state contributing about 20 per cent of total agricultural GDP. It is paradoxical that, in the land of coconut, the average yield of the palm is abysmally low (around 50 nuts per palm per year), just half of what is realised in the adjoining Tamil Nadu. Many reasons are attributed to the decline of palm in the state.

1. Large fluctuations in market price for coconut, consequent to trade liberalization and cheap imports of palm oil.
2. Shift in source of livelihood for the population, from agriculture to other sectors of economy and consequent neglect of the palm.
3. Widespread incidence of pests and diseases, many of them lacking effective control: leaf rot, root wilt, lethal yellowing, incidence of mites, leaf mining caterpillar, red palm weevil etc.
4. High cost and scarcity of labour and low level of mechanization.

However, we have evidences to believe that decline in soil qualities are primarily responsible for the low yield realisation. Analysis of variability of agro-climate, soil qualities, and palm health and productivity across the state enabled delineation of five distinct coconut-growing regions.

1. Central and eastern Palakkad plains: The region comprising Alathur, Chittur and Palakkad taluks are climatically constrained for the palm, but scores high on soil qualities. The soils do not present any serious constraints to coconut and consequently palms are healthy and productive. The low rainfall and drought spells, however, warrant irrigation for the palm.
2. Northern Kerala: The region is delineated to represent areas with high rainfall, but long dry period (around five to six months in a year), comprise northern half of Thrissur district and land area beyond in north direction, but excluding high ranges. Coconut in the region is constrained by long dry period, strong acid reaction of soil and mineral plant nutrient deficiencies.

3. Central Kerala: Land area of the state north of Thiruvananthapuram city to southern half of Thrissur district, excluding Western Ghats, constitutes the region. While the climate is conducive for the palm, the soils are severely constraining with very strong surface and subsoil acidity and acute deficiency of mineral nutrients, in particular secondary nutrients calcium and magnesium and micro-nutrient boron.

4. Southern Kerala: The land area of Kerala south of Thiruvananthapuram city has most conducive climate and soil qualities for coconut.

5. Coastal sandy plain (including Onattukara): The sandy soil terrain along the coastline constitutes the region. The climate is fairly good, but soils are very infertile.

Climatic constraints in the regions follow the order: Central and eastern Palakkad > Northern Kerala > Central Kerala > Coastal sandy plain > Southern Kerala and soil constraints follow the order: Coastal sandy soils > Central Kerala > Northern Kerala > Southern Kerala > Central and eastern Palakkad.

Soil related constraints in the low productive regions (Northern Kerala, Central Kerala and Coastal sandy plains) are

1. Strong acidification of surface and subsoils
2. Deficiencies of plant nutrients, mainly potassium, calcium, magnesium, boron and boron.
3. Toxicity of aluminium, particularly in subsoil,

Surface and subsoil soil acidity can be alleviated by application of lime and gypsum and mineral nutrient deficiencies by external inputs of mineral fertilizers containing major, secondary and micro-nutrients.

In the context of reviving the fortune of coconut in the state malady of the palms in the central region, relative to northern region, merit particular attention. In the former coconut palms suffer from very low productivity and poor health; leaf rot, root wilt, lethal yellowing etc. The analysis of a large body of legacy and new data sets on soil qualities helped explain
the differences in palm health in the central region compared to northern region. The following conclusions were drawn.

1. The common perception about tropical soils in their natural environment (forest) is that they are fertile, supporting large biomass. Our studies have revealed that in central Kerala even the forest soils are strongly acid and depleted of basic cations, particularly in subsoils. In difference, forest soils of northern region are only slightly acid and have adequate reserves of basic cations in surface and subsoils. Conversion of forests to crop production systems often result in loss of fertile top soil. The process resulted in exposure of very infertile subsoil in central region, providing impetus to the maladies of coconut palms therein. The relatively base rich subsoil in northern region ensured reasonable health of the palms despite the loss of fertile top soil.

2. Agricultural intensification of twentieth century (driven by population pressure) in the central region far exceeded the process in north. The food shortages in the former region lead to intercropping of coconut with a host of perennial and annual crops and thereby further depleting mineral nutrients from the relatively infertile soils. Coconut palm suffered severely in the process. The green revolution model of agricultural development focused on external inputs of mineral plant nutrients, but restricted to major nutrients N, P and K, was of little solace to the palm in the strongly acid, calcium, magnesium and boron deficient soils. In fact, the inputs further aggravated soil acidification and intensified deficiencies of the secondary and micro-nutrients.

The soil related constraints to coconut in the state, though severe and debilitating, can be easily overcome through a proper mix of soil amendments and external inputs of mineral plant nutrients and the cost of palm management can be brought down by subtle changes in the agronomy of the palm. Regaining the palm health and thereby ensuring satisfactory level of productivity and profitability of coconut based land use systems must be a primary goal for the state in agriculture development. Coconut based mixed cropping systems make better sense for the ecologically fragile state for ensuring bio-diversity and providing environmental, economic and social services.