

LAND SUITABILITY CLASSIFICATION FOR COCONUT

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The concept of land in the land suitability classification is wider than that of soil or terrain. Land comprises the physical environment, including climate, relief, soils, hydrology and vegetation to the extent that these influence potential for land use. The variation of each of the above factors influence the coconut productivity to varying degrees. However, within a unit of fairly uniform climate and relief, soils is the main cause of differences in the productivity of coconut. Hence, variation of soils in each agro - climatic region was employed as a basis for the present land suitability classification for coconut.

Among large number of soil physical and chemical characteristics, there are three key soil characteristics, the interaction of which gives rise to favourable or unfavourable conditions for the performance of the coconut palm. They are soil texture, effective soil depth (rooting depth) and soil drainage status. For example, shallow soils impose severe limitation on root distribution of the palm resulting in poor moisture and nutrient availability. Heavy textured soils (clay) have poor soil aeration and disturb root penetration. Poorly drained soils also inhibit oxygen availability to roots, but imperfectly drained soils provide conditions for the palm to use moisture at deeper layers (more than 60 cm) in the soil while the oxygen availability to roots remain undisturbed in the surface soils. The occurrence of different soil types having different combinations of the above - mentioned key soil characteristics and other factors like climate and land form etc. were used for the demarcation of suitability regions for coconut.

The present suitability evaluation is concerned with broad inventory of coconut lands within the major coconut growing area of the country (the coconut triangle) according to the fitness of different land units for coconut cultivation in their present condition. The evaluation is qualitative in the sense that costs and returns were not calculated in detail but considered in general terms. Land in itself, without inputs, rarely

if ever possesses productive potential. Thus, the suitability was assessed by comparing the required inputs, such as fertilizer, moisture conservation measures and soil conservation measures with the yield that can be obtained in return. The aspect of environment degradation was also taken into account when assessing suitability. For example, there can be favorable conditions in a soil for coconut cultivation in mid country with higher slopes and land use for coconut may appear to be highly profitable in the short run, but such land use may lead to soil erosion, progressive degradation or adverse changes in river regimes.

Diagnostic Criteria

Suitable land : Land on which sustained cultivation of coconut is expected to yield benefits which justify the input without acceptable risk or damage to land resources.

Unsuitable land : Land which has qualities that appear to preclude sustained cultivation of coconut.

A land can be classed as unsuitable for coconut for the following reasons:

- i) Cultivation of coconut is impractical due to poor physical and/ or chemical properties of the soil (e. g. rocky area, lagoons)
- ii) Coconut cultivation could cause severe environmental degradation (e. g. erosion by cultivation in steep slopes)
- iii) The cultivation is technically impractical. (e.g. (a) depth of soil is not sufficient to support the root distribution of the palm (b)

poor drainage or water logging condition inhibits oxygen availability to roots (c) water is not available for irrigation in dry areas.

Land Suitability Classes

Land suitability classes reflect the degree of suitability of each land unit for coconut cultivation. The classes are numbered consecutively, in sequence of decreasing degree of suitability. Five suitability classes are recognized for coconut.

- S₁ - Highly suitable:** Land having no significant limitations to sustained coconut cultivation and will not require inputs above an acceptable level.
- S₂ - Suitable to highly suitable:** Lands having minor limitations to sustained coconut cultivation that will slightly reduce productivity but will not require input above an acceptable level (eg. limitations in nutrient availability due to sandy texture or moisture availability for a brief period of the year, particularly in the Dry Zone)
- S₃ - Suitable :** Land having some limitations to sustained coconut cultivation that will reduce productivity and increase required input to the extent that the overall profit is attractive but inferior to class S₂ land (e. g. moisture availability is suppressed during dry spells).
- S₄ - Moderately suitable:** Land having limitations which in aggregate are moderately severe for sustained coconut production. The limitations will reduce coconut productivity and increase required input to the extent that the overall profit will be moderately attractive and appreciably inferior to that expected from class S₃ and above (e. g. integrated effect of shallow rooting depth and lack of moisture).
- S₅ - Marginally suitable :** Lands having limitations which in aggregate are severe for sustained coconut cultivation. These limitations would reduce productivity and increase required input to the extent that the expenditure will be only marginally justified (eg: integrated effect of two or more factors such as very shallow rooting depth, poor moisture availability and lack of

solar radiation etc.).

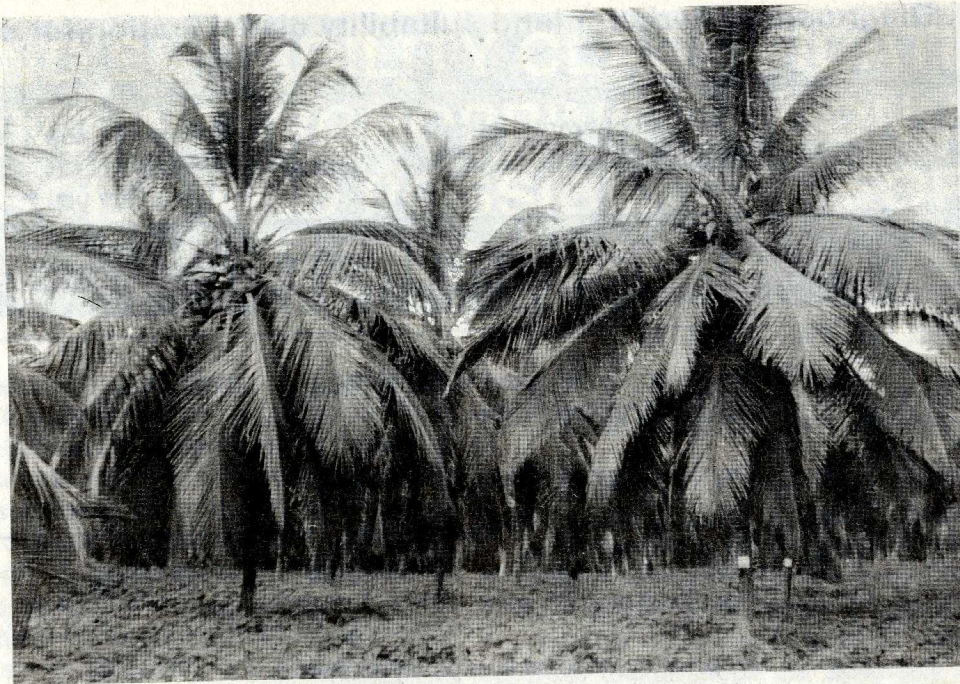
Unsuitable lands are further classified into two classes

- N₁ - Currently unsuitable :** Land having limitations which cannot be corrected with existing knowledge at currently acceptable costs. The limitations are so severe as to preclude successful sustained cultivation of coconut (e.g. Poorly drained, clayey, saline soils bordering lagoons).
- N₂ - Permanently unsuitable:** Land having limitations which appear so severe as to preclude any possibility of successful sustained cultivation of coconut (e.g. steep rocky areas)

Soil characteristics, agro - climatic conditions and the potential crop yield employed for defining each of the suitability class are given in Table 1.



Coconut plantation in a class 4 land



Coconut plantation in a class 1 land



Coconut plantation in a class 5 land

Table 1. Diagnostic criteria for land suitability classification for coconut

Agroclimatic region	Soil characteristics	Potential Crop Yield (nuts/ ac/ yr)	Suitability Class
IL ₁	Very deep, loamy sand to sandy loam, well - drained to imperfectly drained soils	More than 6000	S ₁
IL ₃ & DL ₃	<ol style="list-style-type: none"> 1. Very deep, loamy sand to sandy loam, imperfectly drained soils 2. Very deep, sandy imperfectly drained soils 	5000 - 6000	S
IL ₁	<ol style="list-style-type: none"> 1. Deep, loamy sand or sandy loam, imperfectly drained soils 2. Deep, sandy, imperfectly to poorly drained soils 	5000 - 6000	S ₂
WL ₃	<ol style="list-style-type: none"> 1. Deep, loamy sand to sandy loam, imperfectly drained soils 	5000 - 6000	S ₂
IL ₃	Moderately deep, loamy sand to sandy loam, imperfectly drained soils	4000 - 5000	S ₃
DL ₃	Very deep, loamy sand to sandy loam or sandy, well drained soils (Latosols and Regosols)	4000 - 5000	S ₃
IL ₁ & WL ₃	Moderately deep, sandy clay loam or gravelly sandy clay loam, well drained soils	2000 - 4000	S ₄
IL ₁ , IL ₃ & WL ₃	<ol style="list-style-type: none"> 1. Shallow, sandy clay loam or gravelly sandy clay loam, well drained soils 	1000 - 2000	S ₅