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Land Suitability Classification and Suitability Requirements of Major Crops Grown in Kerala.

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Abstract

Land suitability assessment is a land evaluation method proposed by Food and Agriculture Organization to assess the suitability of land for agriculture uses using scientifically standard techniques. Land suitability assessment is the process of matching appropriateness of land for certain uses. Land suitability assessment is needed for preserving the quality of land for future generation. Land suitability assessment trials had been conducted across the country based on current soil and land conditions, without applying any input and land suitability requirement of major crops has been determined at regional scale. The major properties considered for establishing suitability of land assessment for agricultural use are topography, erosion, soil depth, soil texture, soil depth, nutrient status *etc*. Based on the assessment, the land suitability requirements of major crops of Kerala *i.e* paddy, coconut, arecanut, pepper, banana, pineapple, tapioca, rubber has been established. Better economic benefits from crops without hampering the land sustainability can be achieved by cultivating crops in suitable areas.

Keywords: FAO, Land suitability assessment, Soil properties,

Introduction

Land suitability assessment is a specific type of land evaluation method proposed by Food and Agriculture Organization (FAO, 1976) to assess the resources of an area for specific crop rather than for a general use. Land suitability analysis is a prerequisite for sustainable agricultural practices. It assesses the matching of a given type of land for the specified agriculture use. It entails the evaluation of aspects such as climate, geography and soil for the determination of suitability of land for particular agricultural use. Crop requirements and soil features are the most determining factors to assess the suitability of land for a particular crop.

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According to FAO, 1976 "suitability is a measure of how well the qualities of a land unit match the requirements of agriculture practices"

Land Suitability Classification

The Land Suitability Classification is a multi tier system of soil evaluation method developed by FAO, 1976. This system is a four tier system *i.e.*, orders, classes, subclasses and units. At the order level, the land units are grouped into suitable or not suitable based on kinds of suitability and limitation for the particular use. The orders are further divided into classes based on degrees of suitability and limitation, further the classes are divided into subclasses, and further subclasses are divided into land suitability units based on specific management requirements (Sys, 1993; NBSS&LUP, 1994 and Naidu *et al.*, 2006).

A brief description of the orders and classes used in the suitability assessment for major crops grown in the area is given below.

Order "S" (Suitable)

- **Class S_1 (Highly suitable)** - Land having no or slight limitations for the particular sustainable use
- **Class S_2 (Moderately suitable)** - Land with moderate limitations for the particular sustainable use.
- **Class S_3 (Marginally suitable)** - Land with severe limitations for the particular sustainable use.

Order "N S" (Not Suitable)

1. **Class N_1 (Currently not suitable)** - Land with severe or very severe limitations that may be overcome in time but cannot be corrected with existing knowledge at current acceptable cost.
2. **Class N_2 (Permanently not suitable)** - Land having limitations that appear so severe as to preclude any possibility of use of the land.

Agriculture Scenario in Kerala

Kerala is an Agrarian economy. Majority of the population in Kerala are dependent directly or indirectly on agriculture for their livelihood. Cropping pattern in Kerala is dominated by cash crops. Food crops comprising of rice, tapioca and pulses accounted for just 10.21 per cent of the total cultivated area while cash crops (cashew, rubber, pepper, coconut, cardamom, tea and coffee) constituted 62.8 per cent of the total cultivated area.

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Plantation crops like rubber, coffee, tea and cardamom accounted for 26.8 per cent of the total cultivated area. Coconut has the largest area under crop cover (30 per cent) followed by rubber (20.9 per cent) and paddy (7.4 per cent). Of the cultivated area, 4.45 per cent is under banana and other plantains. Little more than 2 per cent is under tapioca and just 0.2 per cent is under ginger and turmeric together.

The state has three distinct elevation zones known as the lowland, midland, and highland regions. Kerala has distinct biophysical characteristics that vary across the state and contribute to its land use dynamics. Based on these characteristics, the state can be divided into six major zones—lowlands and coastal plains, Malabar midlands, Palghat region, southern midlands, foothills, and eastern highlands. Laterite and lateritic soils cover around 60 percent of the total geographical area followed by red soil. Considering the variability observed across the Kerala, agriculture practices need to be done according to the appropriateness of the particular land for the specified crop.

Land Suitability Requirement of Major Crops Adopted In Kerala

1. Land Suitability Requirement for Paddy

Rice is the staple food crop of this region. In Kerala, it is cultivated in about 2.87 lakh hectares and commercial cultivation is restricted to Palakkad, Thrissur Kole lands and Kuttanadu area. The suitability requirements for rice crop in Kerala are

- Rice is a water loving plant. So, the land selected for cultivation need to have abundant water supply.
- It can be grown on a range of soil moisture condition: from waterlogged to well drained.
- The soil pH : 4.5 to 8.0.
- The soils suited for crop: heavy soils to loam soils.
- Soil temperature: 21-35^{0}C
- Fertility requirement: Medium to high status

2. Land Suitability Requirement for Coconut

In Kerala, coconut is grown in about 8.99 lakh hectares and production is 5876 million nuts with an average productivity of 6536 nuts per ha. Among 14 districts of Kerala, Kozhikode has the highest productivity. It is the most important oil cum fibre yielding perennial plantation of the state.

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Fig. 1. Major crops grown in Kerala

Suitability requirement

- Annual rainfall of the area : 1500-2500 mm
- Relative humidity: >80%
- Slope: less than 8%
- Soil type: heavy clay to sandy soils
- Soil pH : 5.1 to 6.
- Soil temperature: 22-31^{0}C
- Fertility requirement: Medium to High statu

3. Land Suitability Requirement for Arecanut

In Kerala, arecanut is grown in about 1.03 lakh hectares and production is 1.05 lakh tons of betel nuts with an average productivity of 1029 kg per ha. It is the most important pan crop of the state.

Suitability requirement

- Annual rainfall: 1500-4500 mm

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- Relative humidity: >80%
- Slope: less than 8%
- Soil pH : 6.0 to 6.5
- Soil temperature: 22-30^{0}C
- Fertility requirement: Low to Medium status

4. Land Suitability Requirement for Banana Plantains

In Kerala, banana is grown in about 1.1 lakh hectares and production is 8.4 lakh tons with an average productivity of 7724 kg per ha. It is the most important fruit crop of the state.

Suitability requirement

- Annual rainfall:100 mm per month
- Relative humidity: >80%
- Wind velocity should not exceed 40 km per hour
- Slopes: less than 3 per cent
- Soil: heavy clay to sandy soils
- Soil pH: 5.5 to 7.0
- Soil temperature: 22-26^{0}C
- Fertility requirement: High

5. Land Suitability Requirement For Tapioca

In Kerala, tapioca is grown in about 0.9 lakh hectares with an average productivity of 26.6 tons per ha. It is the most important tuber and starch yielding crop of the state.

Suitability requirement

- Annual rainfall:1400-1800 mm mm per month
- Soil temperature: 15-35^{0}C
- Relative humidity: >80%
- Slope: 30 per cent
- Soil type: Clayey to deeply clayey soil
- Soil pH: 4.5 to 8.3

Conclusion

Rapid population growth in developing countries means that more food will be required to meet the demands of growing populations. Land suitability assessment and

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cultivation of crops according to the suitability criteria is essential for increasing production to meet the need of population and for planning a sustainable agricultural system.

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