



SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF AGRICULTURAL ENGINEERING

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WATERSHED PLANNING AND MANAGEMENT





Land Capability Classification



Land capability classification (LCC) may be defined as a system of grouping land in to various classes based on inherent limitations imposed on sustained use by [soil](#) attributes, topography, drainage and climate.

The guiding principle underlying LCC is “use land according to its capability and treat it as per its need”. The capability classes falls in two groups, one **suited for cultivation** and other **not suited for cultivation**.

Each group is further sub-divided in to four capability based on intensity of hazards and limitations of use. The subclasses are further divides in to unit based on a specific management practice.

Thus land is classified in to eight land capability classes under two broad groups as:

Land suitable for agriculture and other uses which include class I to class IV lands.

Land not suitable for agriculture but very well suited for forestry, grass land and wild life which include class V to class VIII lands.

On map, the capability classes are indicated in different colours as Green (I), Yellow (II), Pink (III), Blue (IV), Dark green (V), Orange (VI), Red (VII), Purple (VIII). Detailed characteristics of each class are given in Table



Land Capability Classification

- Land capability may be defined as the ability of the land surface to support natural plant growth/ wildlife habitat or artificial crop growth/ human habitat.
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- Thus, it indicates the type of land use [viz., human habitation, agriculture, pastures, forests, wildlife habitat, etc.] that is suitable over a particular type of land.
- Different lands have different capabilities depending on the land characteristics like slope, soil type, soil depth and erosion conditions.
- The ultimate goal of allocation of various land capabilities over a vast land area with varied characteristics is to achieve complete soil conservation.
- Complete soil conservation implies perfect soil health and zero soil erosion on a sustained basis. It also facilitates total water conservation and total vegetation conservation.
- Thereby it results in integrated watershed management on a long term basis.



Classification of Land Capability

- The Soil Conservation Service (SCS) of the United States Department of Agriculture (USDA) has done a pioneering work on land capability classification [Klingbiel and Montgomery, 1961].
- According to that, the land capability is classified broadly into two groups based on the cultivability of the land.
- The first group consisting of all the lands which are suitable for cultivation is referred to as 'Group 1 Lands'.
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- The remaining group consisting of all the lands which are unsuitable for cultivation is referred to as 'Group 2 Lands'.
- Each of these two groups are further classified into four classes. Thus 'Group 1 Lands' comprise 'Land Classes I to IV' which are cultivable and 'Group 2 Lands' comprise 'Land Classes V to VIII' which are non-cultivable.



Salient features of Land Capability Classes (LCC)



| LCC | Characteristics |
|--------------------------------------|--|
| Land Suitable for Cultivation | |
| I | Very good cultivable, deep, nearly level productive land with almost no limitation or very slight hazard. Soils in this class are suited for a variety of crops, including wheat, barely, cotton, maize, tomato and bean. Need no special practices for cultivation |
| II | Good cultivable land on almost level plain or on gentle slopes, moderate depth, subject to occasional overland flow, may require drainage, moderate risk of damage when cultivated, use crop rotations, water control system or special tillage practices to control erosion |
| III | Soils are of moderate fertility on moderate steep slopes subject to more sever erosion and severe risk of damage but can be used for crops provided adequate plant cover is maintained, hay or other sod crops should be grown instead of row crops. |
| IV | These are good soils on steep slopes, subject to severe erosion, with severe risk of damage but may be cultivated occasionally if handled with great care, keep in hay or pasture but a grain crop may be grown once in 5 or 6 years. |



Land unsuitable for cultivation but suitable for permanent vegetation

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|-------------|---|
| V | Land is too wet or stony which make it unsuitable for cultivation of crops, subject to only slight erosion if properly managed, should be used for pasture or forestry but grazing should be regulated to prevent cover from being destroyed. |
| VI | These are shallow soils on steep slopes, used for grazing and forestry; grazing should be regulated to preserve plant cover; if the plant cover is destroyed, use should be restricted until cover is re-established. |
| VII | These are steep, rough, eroded lands with shallow soils, also includes droughtly and swampy land, severe risk of damage even when used for pasture or forestry, strict grazing or forest management must be applied |
| VIII | Very rough land, not suitable even for woodland or grazing, reserve for wild life, recreation or wasteland consideration. |



- **Class I Lands:**

- These lands are nearly level with slopes generally within 1%.
- The soils are deep, fertile, easily workable and are not subjected to damaging overflows.
- There are hardly any restrictions or limitations for their use.
- These lands are very good lands which can be safely cultivated by using any farming method to grow any crop, even intensively also.
- However, proper crop rotation and green manure use should be followed to maintain soil fertility



Class II Lands: These lands generally have gentle slope in the range of 1 to 3%. They can be easily cultivated with some conservation practices like contour farming, strip cropping, bund construction or terracing. Therefore one or more of the following limitations exist which slightly reduce the crop choice [Murthy and Jha, 2011]:

- 1. Moderate susceptibility to erosion by wind or water;
- 2. Less than ideal soil depth;
- 3. Somewhat unfavourable soil structure and workability;
- 4. Slight to moderate salinity;
- 5. Occasionally damaging overflows;
- 6. Wetness existing permanently which can be corrected by drainage; and
- 7. Slight climatic limitations on land use and management.



Class III Lands:

- These lands generally have slopes in the range of 3 to 5% and therefore have severe limitations which further reduce the crop choice or require special conservation practices [like contour farming, strip cropping, cover cropping, bund construction or terracing] or both.
- Lands in this class have more restrictions than those in Class II Lands due to land characteristics.
- All the limitations of Class II Lands are applicable here also, but to a greater extent. Hay or pasture crops that completely cover the soil should be preferred.
- On wet lands of this Class -which usually have heavy and slowly permeable soils, a drainage system along with a suitable cropping plan to improve the soil structure is required.



Class IV Lands: These lands have fairly good soils [i. e., having shallow soil depth and low fertility] and generally have somewhat steep slopes in the range of 5 to 8%.

Therefore they have either very severe limitations that largely restrict the crop choice or require very careful management or both.

Lands may be suitable only for two to three common crops which build and maintain soil -like the fully covering pastures, with occasional grain crops which can be grown usually once in five years.

These lands may have one or more of the following permanent features [Murthy and Jha, 2011]:

1. Heavy susceptibility for erosion due to wind, water with severe effects of past erosion;
2. Low moisture holding capacity;
3. Frequent overflows accompanied by severe crop damage;
4. Water logging, excessive wetness and severe salinity; and
5. Moderately adverse climate.



Land Capability Sub-Classes: Lands in Classes II, III and IV are further categorised into sub-classes based on the following limitations:

1. Risk of erosion or past erosion damage is designated by the symbol 'e';
2. Wetness damage or overflow is designated by the symbol 'w';
3. Soil root zone limitations are denoted by 's'; and
4. Climatic limitations are designated by 'c'.



Group 2 Lands: Generally Not Suitable for Cultivation



Class V Lands: These lands generally have slopes in the range of 8 to 12%. They usually have no to little erosion hazard but have other limitations which restrict their use mainly to pastures, forests, wildlife food and cover. Controlled grazing may be permitted. Some of the examples of Class V Lands are:

1. Bottom lands subject to frequent overflows that prevent the normal production of cultivated crops;
2. Stony or rocky lands;
3. Few ponded areas where soils are suitable for grasses or trees.

Class VI Lands: The lands in this Class have shallow soils and generally have quite steep slopes ranging to 18%. They have severe limitations which restrict their use to pastures with very limited grazing, woodlands, wildlife food and cover. Some of the limitations of these lands which can't be corrected are:

1. Severe erosion;
2. Stony texture with shallow rocks
3. Excessive wetness or overflow
4. Low moisture capacity
5. Severe climate.



Class VII Lands: The lands in this Class are generally eroded, rough, having shallow soil depth and steeper slopes ranging to 25%. The soils may be swampy or drought prone, with all the limitations of Class VI Lands even to a higher degree. If there is good rainfall, they may be used for forestry with fully green cover, gully control structures and severely restricted grazing.

Class VIII Lands: These lands are rough with probably the worst soil types and possibly the steepest slopes in excess of 25%. They can only be used with very sound gully control measures for forests –if conducive for tree growth, and also for wildlife habitat. However, tree felling and grazing should be strictly avoided.

Certain lands in Group 2 can be made cultivable with major earthmoving or other effective and costly reclamation operations. In India, both the Class VII Lands and Class VIII Lands are combined as Class VII Lands.