

Alfisols of the Semi-Arid Tropics: Problems and Potentials

Alfisols are the third most important soil order in the world, covering 13.1% of the world area. In the semi-arid tropics, Alfisols cover a much larger area of potentially arable and grazable lands than Vertisols, which have until now received far more attention from ICRISAT researchers. About 62% of the world's Alfisols are located in West Africa and India

Mixed farming is the rule when crops are produced for home consumption or local markets. Animal production for meat, milk and wool utilizes virtually all the rural land not used for crops. Overgrazing and over population of animals is common and often causes serious soil erosion and degradation.



Traditionally, Alfisols (*right*) are cropped during the rainy season. Because of the erratic rainfall patterns that typify the semi-arid tropics, crop yields on Alfisols are low and unstable. Experimental evidence, however, indicates that these soils are capable of producing more food with appropriate soil and water management.

Some of the serious constraints to crop production in Alfisols are:

- Low moisture storage capacity and the likelihood of moisture stress
- Greater runoff and loss of water
- Percolation, loss of water and nutrients
- Workability problems (Alfisols are easy to work when wet but harden on drying and require greater amounts of energy for tillage)
 - Crusting
 - Erosion
 - Low soil fertility

High yield increases of several crops were obtained under improved management practices over the traditional technology in trials undertaken at ICRISAT-Patancheru and elsewhere. The improved land treatments included graded bunds, contour farming and furrowing, and improved management (including high-yielding varieties, timely planting and fertilizer application).

Because the water-holding capacity of Alfisols is too low to allow postrainy season cropping, efforts are being made to extend the cropping season through the use of intercropping, relay planting or by shortening the growing season by using short-duration varieties. Efforts are also made to identify promising cropping patterns.

The scope for run-off farming from Alfisols is high. The tanks serve as percolation tanks and recharge the aquifers. The introduction of percolation tanks and wells impart economic viability and social cohesion to certain cropping patterns. Water from the wells can be pumped up to an elevated point and applied to crops even at the upper end of watersheds. With the use of appropriate technology, Alfisols can produce high yields.

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