Improving nutrient use efficiency for sustainable agricultural systems

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Crucial to improve fertilizer use efficiency (NUE) worldwide

$\text{NUE} = \frac{\text{N input}}{\text{N output}}$
Fertilizer Best Management Practices: 4Rs

Right fertilizer Source, at the Right Rate, at the Right time and in the Right Place

Conservation practices include: Cover crops; No-till; Strip-till; Grass waterways; Drainage water management etc
Fertilizer Best Management Practices

Also part of the 4R toolbox:

➢ **Integrated Plant Nutrient Management (IPNM):** applying on-farm *organic* fertilizers and supplementing them with *mineral* fertilizers

➢ **Balanced fertilization,** i.e. assuring a proper supply of all macronutrients and micronutrients in a balanced ration;

➢ **Site-specific nutrient management (SSNM),** i.e. supplying plants with nutrients to optimally match their needs for nutrients;

➢ **Fertigation,** entails combining fertilizers with irrigation water.