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TitleIn Agricultural Nitrogen Use & its Environmental Implications

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AbstractNitrogen (N) fertilization has been found a powerful tool for increasing crop production since the last six decades. Except for legumes, which fix their N biologically by rhizobium, majority of the crops require N for the production of seed and forage. Ammonium (NH4 +) and nitrate (NO3 +) are major plant available forms of N in soil, the later having six times higher movement in and is therefore prone to leaching loss. Nitrate leaching down the soil profile results in low N use efficiency and contamination of underground water stream which is a major route of NO3 entry into food chain. Nitrate related regulations, its health and ecological issues, contribution of food and water to nitrate ingestion and its main mechanisms of movement in soil hve been described for better understanding of the factors affecting NO3 leaching. Nitrate leaching is governed by a number of factors that affect accumulation and movement of residual NO3 in soil. These factors including plant characteristics, seasonal fluctuations, climate changes and soil properties are discussed in detail. Management of NO3 leaching, which has been the main focus of this chapter is categorized into fertilizer, soil and irrigation based management options. Fertilizer management options take into account the balance use of fertilizers, right dose and time of application and controlled release of N through using nitrification inhibitors and slow release fertilizers. Organic agriculture, conservation tillage and growing of crops in high leaching risk associated season are proposed as soil management options. Irrigation management mainly comes around evapotranspiration based irrigation scheduling and wise use of deficit irrigation. In short, the chapter is an effort to make a comprehensive understanding of the reader about NO3 leaching problem, its possible effect on human health and ecology and measures to manage NO3 leaching without compromise on crop yields.

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