

Marine protection and fertilizer strategies

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Marine ecosystems are affected by nutrient (N, P), silicon (Si) and pesticide loads from agriculture. The substances are transported in solution, bound to soil particles via water and wind. Whereas pesticides and its residues might enrich in food chains and environment with detrimental effects, Si is essential for diatom growth and N and P contribute to eutrophication. Misbalancing N:P:Si ratios influence phytoplankton communities and might affect carbon sequestration in oceans. Especially in coastal areas, estuaries and in regions with low water exchange nutrient loads and related algae growth might be followed by oxygen losses and dead zones.

Agricultural soils and landscapes in intensive agricultural areas are loaded with nutrients. Especially P emits over years, variably influenced by management and changing climate. Agriculture must balance N and P released from fertilizers, plant material and soils to the actual plant demand. P soil reserves must be addressed actively, e.g. by phytomining. Those nutrients must be kept in the system, preferably by biological uptake and conversion. Technical measures to avoid nutrient losses and inefficiencies can be seen in adequate timing and application technique of suited organic and mineral fertilizers, erosion prevention, adequate cropping and ploughing regime as well as feeding regimes for livestock and also in landscape and field margin design. The evaluation of entire farm nutrient flows and field balances give important help to avoid and address spatial nutrient imbalances.