# Resource logistics analysis of agricultural nutrients focusing on phosphorus and nitrogen flows (for special session on MFA & IO modelling)

Topic: Material Flow/Stock Analysis and Input-Output Modelling I
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The global population is predicted to exceed 9 billion by 2050, and in addition, bioethanol production has increased by about three times over the past ten years. As a result, the resources for agricultural production including water, land and fertilizer will be of increasing importance in next few decades. There are growing concerns over supply strategies for essential resources because of environmental problems, such as eutrophication(N,P), acidification (N), resource depletion and price increases(P).

This paper incorporates the agricultural nutrient flows into the 2005 input-output model of the Japanese economy, and integrates international trade statistics on the basis of Global Linkage Input Output (GLIO) model. This paper revealed a complex set of patterns, with some countries relying heavily on just one or two countries to meet their commodity needs, and others drawing from a wide range of sources. In many cases, a strong dependency was noted on a country which itself was heavily dependent on another source for its commodity needs directly and indirectly. Considering the economic structure and geopolitical problems, it was found that special attention should be paid to maintaining a stable supply of agricultural nutrients resources to ensure stability in agricultural production as well as in the many industries which use phosphoric acid(P) and ammonia(N) as an essential chemical materials.