

## 9. Environmental aspects and concerns

Most agrominerals are chemically benign and pose no additional risk to the health of miners or farmers. However, with phosphate rocks there are several environmental concerns that have to be addressed, not only for the large-scale and high-tech production of agrominerals but also for the small-scale sector. The inherent chemistry of several 'natural' sedimentary phosphates are characterized by elevated concentrations of Cd, U and As, which can pose potential health and environmental hazards. The cadmium problem especially has to be addressed, as its accumulation in soils and crops can have potentially harmful effects on humans. More phosphate rocks from sub-Saharan Africa, especially sedimentary PRs, should be analyzed for this potentially harmful element.

There are other environmental concerns with the extraction and use of naturally occurring agrominerals and the disposal of 'wastes' from these operations. Examples include the mining of bird guano from islands close to Madagascar or the Seychelles, which can have serious environmental impacts on marine wildlife. Unprotected extraction of bat guano from caves can have significant health effects through the inhalation of *Histoplasmosis* spores. The disposal of 'wastes' from agromineral operations has to be carefully planned and managed. The disposal of wastes from agromineral operations should be done using best management techniques. Dumping of 'wastes' into the ocean (e.g. from phosphate beneficiation processes in Togo) can have serious negative effects on the environment. Most of these potential damages can be prevented when following 'best environmental management practices' and educating both management and the persons mining and processing the ore.

General environmental concerns are also related to transport and energy uses. More efficient use of fuel wood for agricultural lime 'burning' for example can substantially reduce the environmental damage caused by this practice. It has been demonstrated that it is possible to reduce fuel wood consumption through better kiln designs and management practices. In many cases, the limestone or dolomite resources do not even need to be 'burnt' to be agronomically effective. Transport costs will generally be high if the deposits are not located close to the soils where they are most effective and alternative transportation methods may be required, particularly for small agromineral resources.