

available in generic form or can be derived from other generic data and what information has to be generated specific to each case.

#### Evaluation of 40 selected cases

Based on the first two steps, a selection of 40 cases will be analysed with regard to their environmental impacts. This step aims to test the usability of the categorization system and data sources determined and to feed the resulting findings back to the methodology development process. In selecting example cases, a widest-possible spectrum of abiotic raw materials, extraction regions, deposits, forms of organization and applied extraction methods will be taken into account.

#### Development of an assessment system

A system for assessment of the environmental risks of mining projects will be developed on the basis of the findings and data obtained in the preceding steps. The aim here is, not the replacement of on-site technical inspections, but to provide a method for the initial assessment of mining projects which is also accessible to technical personnel who have no expert knowledge of geology or mineralogy.

#### Integration into a criticality system

This step will examine whether the methodology and the data generated can be further aggregated so as to allow them to be used to assess the “environmental criticality” of a given raw material, independently of individual mining situations.

#### Derivation of recommendations for action

In addition, the project will develop recommendations for policymakers, industry and scientists aimed mainly at improving the sustainability of the supply of abiotic primary raw materials in terms of their environmental impacts.

#### Project team

**Öko-Institut e.V.**  
Schicklerstr. 5-7,  
10179 Berlin, Germany  
Tel.: 030 405085 0  
[www.oeko.de](http://www.oeko.de)  
Contact: Günter Dehoust (project leader)



**ifeu-Institut für Energie- und Umweltforschung Heidelberg**  
Wilckensstr. 3,  
69120 Heidelberg, Germany  
Tel.: 06221 4767 0  
[www.ifeu.de](http://www.ifeu.de)  
Contact: Jürgen Giegrich



**projekt consult GmbH**  
Beratung in  
Entwicklungsländern  
Lärchenstr. 12,  
61118 Bad Vilbel, Germany  
Tel.: 06101-509712  
[www.projekt-consult.de](http://www.projekt-consult.de)  
Contact: Dr. Michael Priester



**Duration**  
April 2013 - June 2016

The project is funded by the Federal Environment Agency under the Environmental Research Plan (UFOPLAN) (project no. (FKZ): 3712 93 302)

**Commissioned by:**  
Federal Environment Agency  
Wörlitzer Platz 1, 06844 Dessau-Roßlau, Germany  
Section III 2.2 - Resource Conservation, Material Cycles,  
Minerals and Metal Industry  
Contact: Jan Kosmol  
E-mail: [jan.kosmol@uba.de](mailto:jan.kosmol@uba.de)

Internet: [www.umweltbundesamt.de](http://www.umweltbundesamt.de)

[/umweltbundesamt.de](https://www.facebook.com/umweltbundesamt.de)

[/umweltbundesamt](https://twitter.com/umweltbundesamt)

#### Photo credits:

Cover © Michael Priester / projekt consult  
Inside on the left: © Airwolf / Fotolia.de  
Inside on the right: © Carol Meneses / Fotolia.de

Date: April 2014



# ÖkoRess

## Environmental Limits, Environmental Availability and Environmental Criticality of Primary Raw Materials



Federal Ministry for the  
Environment, Nature Conservation,  
Building and Nuclear Safety

**Umwelt  
Bundesamt**

## Background

The use of raw materials is increasingly becoming a focus of public debate. While the discussion in past years was characterized by concern about the short- to medium-term security of raw materials supply, it is becoming increasingly clear that in addition to this economic focus there are also other sustainability aspects which must be considered when it comes to the supply of raw materials and the assessment of their availability.

This is because the extraction of raw materials like coal, ore and quarry stone is the one step in the production chain which most directly encroaches on nature. Encroaching on nature means not only that the land areas concerned change; many of them also comprise valuable ecosystems, intriguing landscapes, a wide variety of plant and animal species as well as river basins and structures for the local climate which merit protection. In addition, the various phases of a mining project also give rise to emissions to air, soil and water. While these are mostly an impact close to the mining site, they can spread in normal operation and during accidents to affect areas far beyond it. They therefore significantly determine public perception of mining.



Of course, this is true not only of domestic raw materials, but also of mining projects in other countries and continents. While these extraction regions are located outside of the German economic system, many of them are major suppliers of raw materials to German industries and therefore an important part of the production chain.

A detailed analysis shows that environmental impacts per unit of quantity of abstracted raw material vary broadly depending on type of deposit, extraction method, and the standards and aftercare measures applied. Each raw material and each mining project, therefore, has very specific environmental impacts.

Nevertheless, in many cases it is of key importance for political and industry decision-makers to be able to evaluate the ecological risks of individual raw materials and mining projects by means of a reliable assessment system.

## Aim of the project

The project seeks to contribute to ensuring that environmental aspects are given greater consideration in the supply of primary mineral raw materials than has been the case in the past. It wants to do so by developing a sound and practicable system enabling a reliable comparative assessment of different raw material extraction, processing and refining activities.

Once developed, the assessment system will be tested and refined by means of different case studies. In addition, the project will explore to what extent an assessment system of this kind can be integrated into higher-level systems for assessing the criticality of raw materials.

The project outcomes will improve existing knowledge of current and future environmental risks from raw materials production and processing. The project thus hopes to help resource protection policies at national, European and international level reach their goal of improving the sustainability of raw materials extraction and use and of reducing the associated environmental impacts as far as possible.

Close coordination with current UFOPLAN projects on the subject of resource conservation ensures utilization of synergies between the projects and provides a broad platform for joint expert workshops.



## Methodology

The approach applied in the project is based on the following steps:

### Classification of the environmental impacts of mining projects

The various environmental impacts of mining projects will be examined by way of example and categorized in terms of their causes and modes of action, taking into account such factors as type of deposit, mineralogy and extraction methods used. Local geographical factors such as the vulnerability of an ecosystem to interference by mining activities will also be taken into account. Finally, environmental limits relevant to mining will be identified and the extent to which the environmental limits concept can be operationalised for assessment will be explored.

### Determination of available data and existing assessment approaches

Based on the categorization developed, data sources and existing assessment systems will be identified. This will also include an analysis as to what information is already