

Assessment and reduction of heavy metal input
into agro-ecosystems

Concerted Action AROMIS

Ursula Roth



**Quality of Life
and Management
of Living
Resources**



Soil protection policy developments

- EU-level
- national level

Knowledge gaps

- input pathways of heavy metals into agro-ecosystems
- relevance of the input pathways
- long-term implications for soils
- options for input reduction

Background

Objectives

Tasks and results

Database

Heavy metal
balances

Input
reduction

Research
demand

AROMIS Consortium



Institutions from

- EU Member States
- Candidate Countries
- Associated Countries

Coordination

KTBL, Darmstadt, Germany

Database

Heavy metal
balancesInput
reductionResearch
demand

Objectives

- assessment of the contribution of agriculture to the heavy metal input into soils
- description and assessment of measures to reduce the heavy metal input
- identification of research demands

DatabaseHeavy metal
balancesInput
reductionResearch
demand

AROMIS Heavy Metal Database




Compilation of data and background information on heavy metals in agriculture

- agricultural inputs (mineral fertilisers, manures, livestock feeds etc.)
- heavy metal outputs (crops, animal products)
- legal regulations (national level, EU-level)

KTBL-Homepage - Microsoft Internet Explorer

Adresse <http://daten.ktbl.de/aromis/welcome.do;jsessionid=B5831E84DDC0083AF14A06006F1EFFBC> Wechseln zu

Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V. | Bartningstr. 49 | 64289 Darmstadt | Fon: +49(0)6151 7001-0 | e-mail: ktbl@ktbl.de

AROMIS

Assessment and reduction of heavy metal input into agro-ecosystems

Welcome to AROMIS

- [Aromis home](#)
- ▶ [Database home](#)
- [Heavy metals and nutrients](#)
- [Heavy metal farm balances](#)
- [Legislation](#)
- [Threshold values](#)
- [Produced / applied amounts](#)
- [Agricultural area](#)

The AROMIS heavy metal database was set up within the framework of the Concerted Action "Assessment and reduction of heavy metal input into agro-ecosystems (AROMIS)". More details of the AROMIS project are provided in the [final report](#).

The database contains information

- on heavy metal contents of the most important agricultural media.
- on the legal framework in the participating countries and in the European Union.
- on heavy metal balances on farm level for a number of selected countries.

The AROMIS database initially contains only the data gathered in the framework of the AROMIS project and does therefore not necessarily contain all information available on heavy metals in the participating countries. KTBL however plans to update the database continuously and therefore invites the database users to contribute to its completion. If you are working in a research project on heavy metals and your data could complete the AROMIS database, they can be incorporated without any problems, of course with a complete reference to your project or publication ([contact](#)).

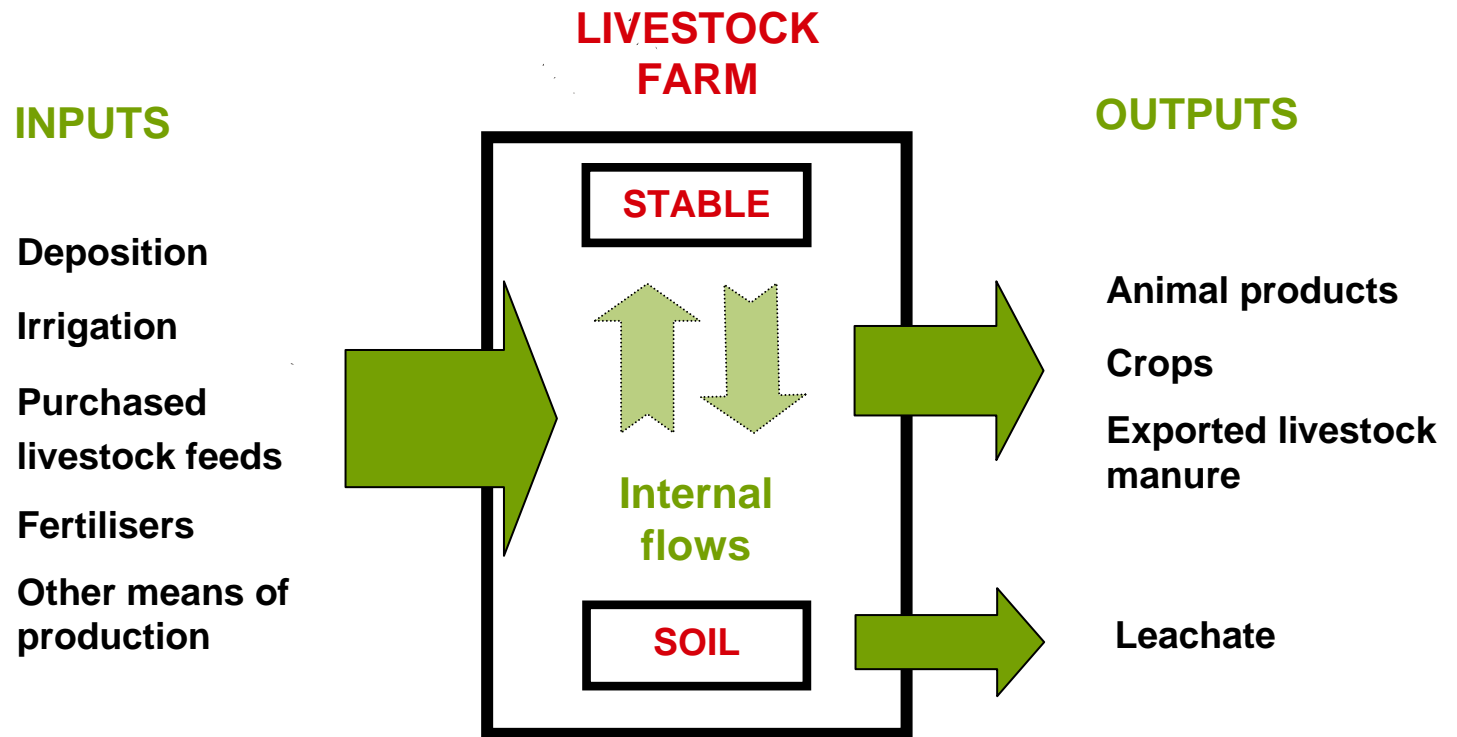
Before using the database please consult the help page for general information on data provenience and comparability and more details on the database contents.

The AROMIS concerted action is supported by the European Commission within the framework of the program "Quality of Life and Management of Living Resources".

Internet

Heavy metal farm balances

- livestock farming
- crop production



In order to

- evaluate the relevance of the various input / output pathways
- calculate the extent of accumulation / depletion of metals for various types of farms
- develop an instrument for the evaluation of the effect of input reduction measures

Livestock
farming



Animal
nutrition



Level of supplementation

Type of supplement
Quality of supplements



Other
inputs



Veterinary medicines
Disinfectants (Cu/ZnSO₄)
Stable equipment

Crop
production



Fertilisation



Metals in mineral
fertilisers

Metals in manures



Plant
protection



Metal based fungicides

Example for input reduction measure



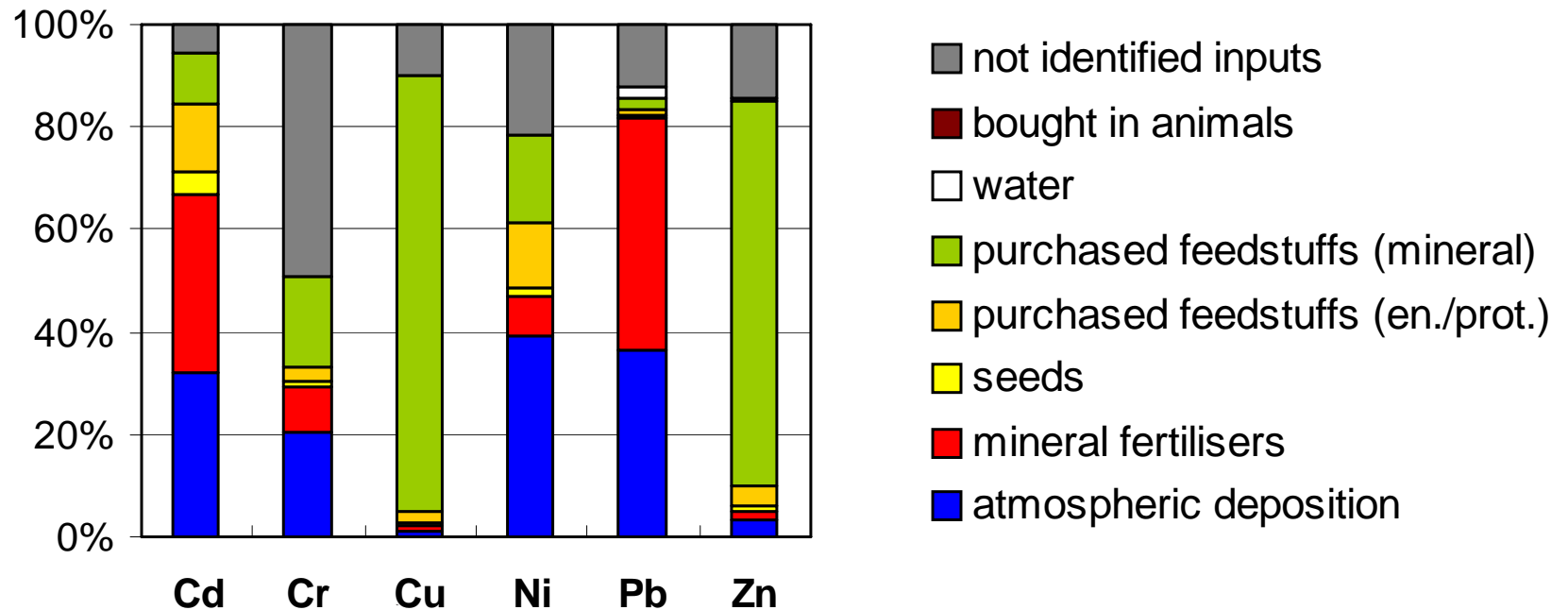
Reduced level of Copper and Zinc supplementation in pig nutrition

according to Commission Regulation (EC) No 1334/2003

DOES IT HELP ?

Heavy metal inputs – pig production farm

all inputs (farm level)



Data source

KTBL / German Federal Environmental Agency (UBA 2004)

University Bonn, Institute of Plant Nutrition (Kühnen 2003)

- 34 ha for feedstuff production
- 80,5 livestock units (sows, pig rearing and finishing)
- measured heavy metal contents of all inputs and outputs

Scenarios

Cu and Zn supplementation according to maximum allowances of

- **70/524/EEC** – Council Directive on additives in feedingstuffs = basis for comparisons (100 %)
- **EC 1334** - EC-regulation 1334/2003 (in force since January 2004)
- **FSC** - proposal of German Standing Committee for Feedstuffs for the revision of EC Directive

Maximum allowances

Scenario	Cu		Zn
	[mg/kg feedstuff (88% dm)]		
70/524/EEC	175 <16 weeks	35	250
EC 1334	170 <12 weeks	25	150
FSC	30 <8 weeks	20	100

Reduction of total farm inputs

Scenario	Cu reduction [%]	Zn reduction [%]
1: 70/524/EEC → EC 1334	27	33
2: 70/524/EEC → FSC	62	49
3: EC 1334 → FSC	49	24

Reduction of manure metal content

Scenario	Cu	Zn
	manure metal content [mg/kg dm]	
70/524/EEC (= 100%)	251	886
EC 1334	182	576
FSC	91	422

Effect on other metals (Cd, Cr, Ni, Pb)

→ evident in feedstuffs, but small on farm level

Research demand

Metals in fertilisers

- improving fertilisation management (choice / quality)

Metals in livestock manures

- optimising feeding strategies (level of trace element supplementation, feedstuff quality)

Metals in soils and plants

- refining models for leaching and soil-plant transfer of metals
- improving long-term scenarios and linking results to quality requirements (water, feedstuffs, food)

Information exchange and technology transfer

- linking research, monitoring, and advisory institutions (European network)

Special thanks to

- all project partners for their contributions and their help
- the European Commission for the financial support
- IUNG for the occasion to present the result of AROMIS

Final report available at KTBL:

www.ktbl.de/shop or mail to h.eckel@ktbl.de