

OECD WORKSHOP ON FERTILIZERS AS A SOURCE OF CADMIUM

(Summary of Proceedings¹)

Foreword

This publication contains the papers presented by representatives of governments and industry, and other experts in the field, at the **OECD Cadmium Workshop** held in Saltsjöbaden, Sweden, on 16-20 October 1995. The Cadmium Workshop was co-sponsored by the Swedish National Chemicals Inspectorate (KEMI) and the Dutch Ministry of Housing, Spatial Planning and Environment.

The Cadmium Workshop consisted of an opening plenary session, followed by two subsidiary workshops: the **Sources Workshop**, which addressed all sources of cadmium inputs to the environment (with the exception of fertilizers); and the **Fertilizer Workshop**, which specifically addressed phosphate fertilizers as a source of cadmium inputs to agricultural soil.

The papers published here were given during the Fertilizer Workshop. Its four "parallel sessions" dealt, respectively, with measures and techniques to reduce the cadmium content of fertilizers; implications of measures to reduce the levels of cadmium in fertilizers; accumulation in agricultural soils, and cadmium content in food and human uptake; and uptake into crops and bioavailability. Also included are the final reports of each session.

The papers given during the plenary session at the beginning of the Cadmium Workshop have been published in another volume in this OECD series, *Sources of Cadmium in the Environment*. They concern sources and pathways of cadmium in the environment; the fate of cadmium in the environment; environmental concentrations and trends; transboundary pollution and bioavailability; routes of human exposure and trends; exposure of ecosystems and trends; cadmium in waste; and trade aspects. **The companion volume also contains the papers presented during the six parallel session of the Sources Workshop** (which addressed, respectively, natural and anthropogenic sources; sources of inputs to the environment; products containing cadmium; various non-product sources of cadmium; other sources of cadmium; and cadmium in waste). The final reports of each of these sessions are included as well.

More than 150 officials and experts attended the Cadmium Workshop, representing OECD countries, the OECD's Business and Industry Advisory Committee (BIAC), and several phosphate-producing countries which do not belong to the OECD.

The Cadmium Workshop was followed on 20-21 October by a meeting of the OECD's Working Group on Cadmium Risk Reduction, which included policy experts from Member governments and representatives from BIAC. The objective of this meeting was to examine the reports from the sessions of the Cadmium Workshop and identify points that needed consideration by the Joint Meeting of the OECD Chemicals Group and Management Committee.

There was a consensus in the Working Group on the need to continue efforts to reduce risk from exposure to cadmium; however there was no consensus that *direct concerted* risk reduction action is warranted on an OECD-wide basis. The Group did agree that there were opportunities for Member countries to reduce risk by establishing or enhancing national cadmium risk management strategies. In

¹ This full publication can be ordered from the OECD Publications office located at 2, rue André-Pascal, 75775 PARIS CEDEX 16, France; Tel: (33 1) 45 24 82 00 Fax: (33 1) 49 10 42 76; e-mail: Compte.PUBSINQ@oecd.org; World-Wide-Web: <http://www.oecd.org/publications/>

addition, the Working Group felt that these efforts could be supported, possibly in the context of the OECD, with regard to activities aimed at collecting and sharing more information.

The Joint Meeting, on 8th February 1996, took note of the results of the Cadmium Workshop and Working Group meeting. It accepted the consensus view of the Working Group with regard to direct concerted action, and agreed to the recommendations concerning further work within the OECD on the collection and sharing of information.

The Joint Meeting subsequently recommended that this publication be derestricted. It is published on the responsibility of the Secretary-General of the OECD.

Background

In 1990, the Council of the OECD adopted a Decision-Recommendation on the Co-operative Investigation and Risk Reduction of Existing Chemicals . This OECD Council Act is aimed at the reduction of risks from chemicals to the environment, and/or to the health of the general public or workers. It is based on the premise that international co-operation in risk reduction activities can enhance the technical and institutional aspects of risk management in Member countries through burden-sharing and a reduction of duplicative efforts. Furthermore, such activities can lead to more effective use of the knowledge of risks being generated through, for example, national chemicals reviews and assessments; the OECD co-operative investigation of existing chemicals; and the work of other international organisations conducting hazard and risk evaluations, such as the United Nations' International Programme on Chemical Safety (IPCS).

OECD countries chose cadmium as one of five chemicals (or groups of chemicals) to be included in an initial pilot project on co-operative risk reduction. In 1994, the OECD published a "Risk Reduction Monograph" on cadmium², in which its commercial and environmental life cycle is described and information is provided on international and national positions concerning cadmium's risk to man and the environment, as well as on measures taken by OECD countries to reduce such risk.

Following publication of the Risk Reduction Monograph, OECD countries determined that more information was needed before they could consider whether OECD-wide cadmium risk reduction measures might be necessary. The Governments of Sweden and the Netherlands therefore agreed to co-sponsor a technical workshop which would attempt to fill any existing data gaps and draw together the necessary information on which to base a decision concerning further action.

During preparations for this workshop, a questionnaire was distributed which asked for country-specific information beyond that found in the Risk Reduction Monograph. The Dutch Ministry of Housing, Spatial Planning and Environment commissioned a detailed study of cadmium's sources and pathways, using data generated by the questionnaire and other sources. KEMI also commissioned a report (based in part on the OECD questionnaire) on phosphate fertilizers as a source of cadmium. The

² *Risk Reduction Monograph No. 5: Cadmium. Background and National Experience with Reducing Risk* . Risk Reduction Monographs have also been published on lead, mercury, methylene chloride and brominated flame retardants. **These and other technical reports prepared by the Environmental Health and Safety Division, as well as copies of relevant OECD Council Acts, are available at no charge from the OECD Environment Directorate, Environmental Health and Safety Division, 2 rue André-Pascal, 75775 Paris Cedex 16, France. Fax: (33-1) 45.24.16.75. E-mail: ehscont@oecd.org. For more information, including the full texts of all five of the Risk Reduction Monographs, consult the OECD's World Wide Web site: <http://www.oecd/ehs/>.**

production of these reports, which have been published by the two countries³, laid the groundwork for the OECD Cadmium Workshop held in Saltsjöbaden.

This publication was produced within the framework of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC).

³ *Cadmium, Some Aspects of Risk Reduction* is available from the Dutch Ministry of Housing, Spatial Planning and Environment. It was produced by Jonathan Pearce. *Cadmium in Fertilizers* is available from the Swedish National Chemicals Inspectorate (KEMI). It was produced by the European Environmental Research Group Inc. (Lars Landner, Jens Folke, Mona Olsson Öberg, Helen Mikaelsson and Marianne Aringber-Laanatza). Both were published in September 1995.

Table of Contents

Session A

Measures and Techniques to Reduce the Cadmium Content of Fertilizers

Issue Papers:

Managing the cadmium content of phosphate rock: a contribution to environmental impact mitigation

Arafat Ghosheh, Saleh Bashir and Lana Dabbas

Studies and research on processes for the elimination of cadmium from phosphoric acid

A. Davister

Cadmium removal from phosacid

R.M. Vermeul

Promoting the development and semi-industrial application of a potentially high performing process for cadmium removal from phosphate rock

Abdelaâli Kossir and Abdellah Chik

Report of Session A

Session B

Implications of Measures to Reduce the Levels of Cadmium in Fertilizers

Issue Papers:

The existing instruments for environmental, technical and financial co-operation regarding Africa and the Middle East

Marianne Laanatza

The importance of the phosphate sector to the economy of Senegal

I. Kotlarevsky and D. Fam

Agronomic implications of restricting cadmium content of phosphate rock

T.L. Roberts and M.D. Stauffer

Environmental issues in relation to cadmium in fertilizers

Tayeb Mrabet

Report of Session B

Session C

Accumulation in Agricultural Soils and Content in Food and Human Uptake

Issue Papers:

Current developments in the use of fertilizer phosphorous and the consequences concerning cadmium

G. Bertilsson

Cadmium in mineral fertilizers

Johannes Dettwiler

The role of farmers' organisations in reducing cadmium in food

Jan Eksvärd

Developing an Australian cadmium minimisation strategy

Graeme Evans

Sustainable cadmium management in agriculture: balancing the cadmium fluxes in arable land and grassland

Jens Folke and Lars Landner

Aspects of cadmium accumulation in agriculture

Simon W. Moolenaar, Panos Hatziotis and Theo M. Lexmond

Cadmium accumulation in the soil - an increasing problem

Kierstin Petersson Grawé

Fertilizer input of cadmium into Canadian prairie soils

T.L. Roberts

The role of food regulations in minimising exposure to cadmium

Terry Spencer

Report of Session C

Session D

Uptake into Crops and Bioavailability

Issue Papers:

Cadmium accumulation and availability in agricultural land and the effects of land use changes

Pierre del Castilho, Jan Bril, Paul Römken and Oene Oenema

Factors influencing cadmium content in crops - results from Swedish farm investigations

Jan Eriksson, Ingrid Öborn, Gunilla Jansson and Arne Andersson

Management factors influencing cadmium accumulation in crops

C.A. Grant, L.D. Bailey and W.T. Buckley

Uptake of cadmium by crop plants

L.D. Bailey, C.A. Grant and R.J. Hill

The relations between the cadmium content in soil and in food plants

Kimmo Louekari

Managing cadmium contamination of agricultural land

M.J. McLaughlin, K.G. Tiller and A. Hamblin

Evidence for the leaching of surface deposited cadmium in agricultural soils

Fiona A. Nicholson, Kevin C. Jones and A.E. Johnston

Report of Session D

List of Participants in the OECD Cadmium Workshop