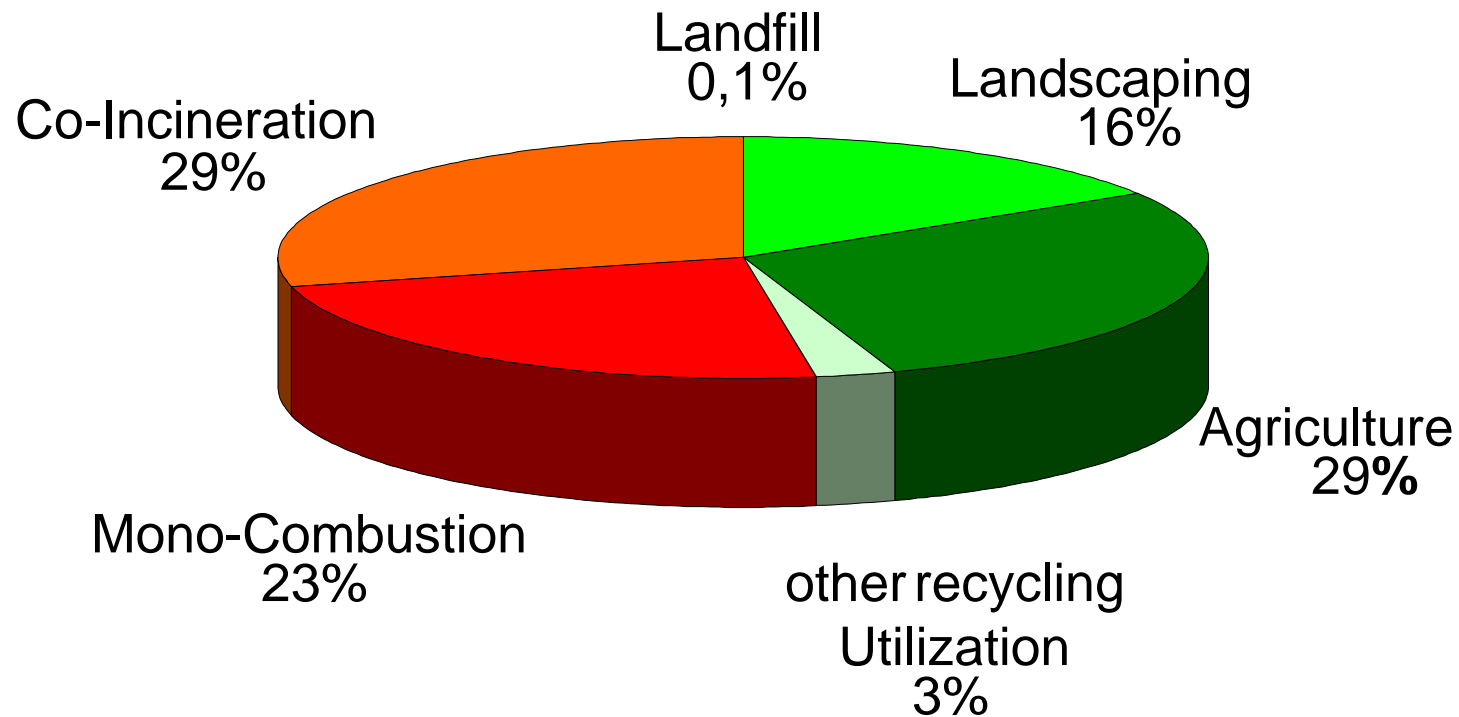


Perspectives on Sewage Sludge Disposal in Germany

Siegrid Mayer
Rainer Könemann



Pathways of Sewage Sludge Disposal 2008 in Germany (2 Mio. to Dry Matter)



Development and Prognosis of Disposal Pathways in Germany in %



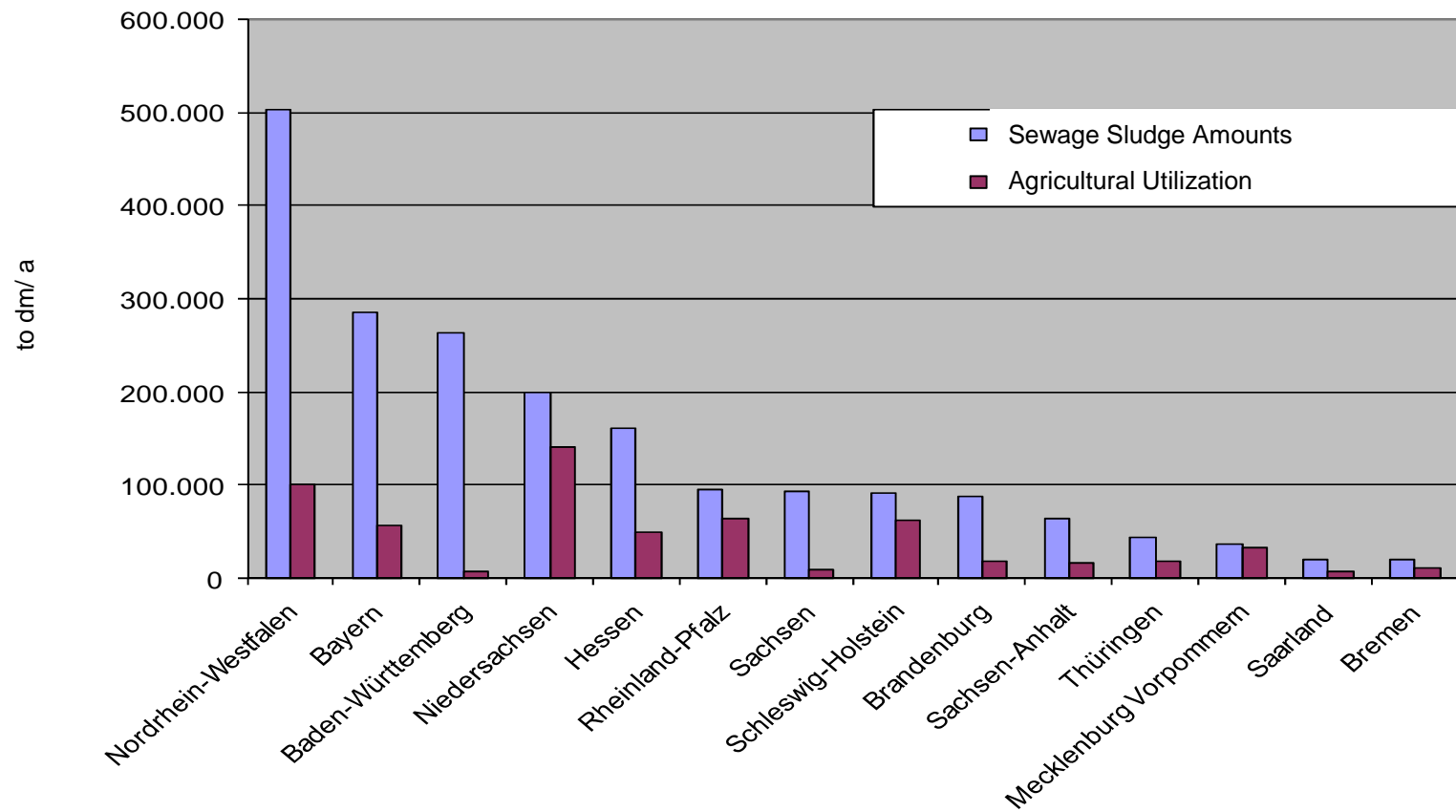
Disposal Pathway	1991	1996	2003	2007	2015
Landfill	48	11	3	0	0
Agriculture and Landscaping	35	66	56	47	35
Combustion	10	20	38	49	65
Others	7	3	3	4	0



Sewage Sludge Amounts Agricultural Utilization in various Federal States (FRG)



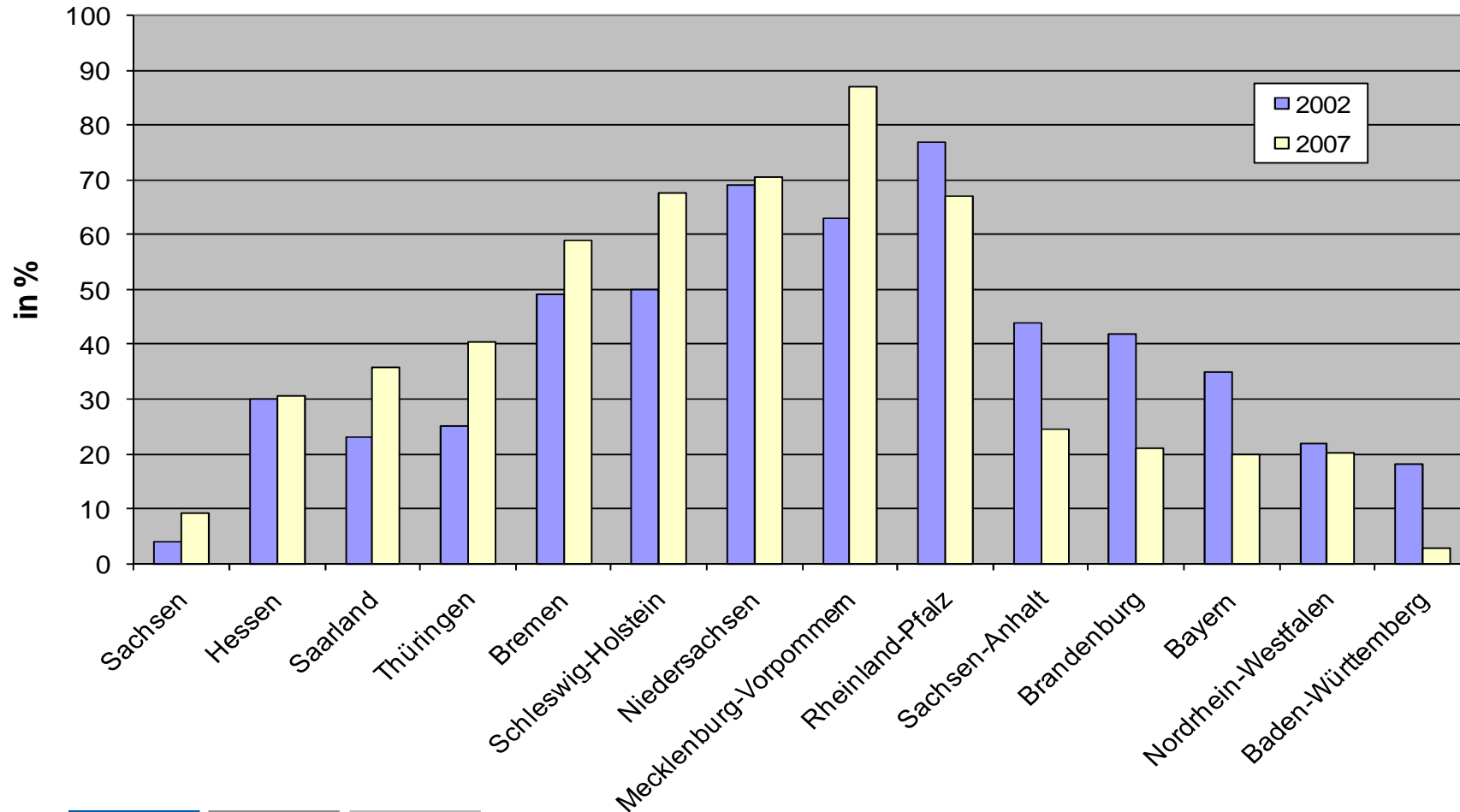
Quelle: Thomas Langenohl, Kläser&Langenohl GbR



Changes in Agricultural Sludge Utilization in the Federal States (FRG) 2002-2007



Quelle: Thomas Langenohl, Kläser&Langenohl GbR



Limits and Limit Suggestions on Heavy Metal in Sewage Sludge (mg/kg TS)



	Pb	Cd	Cr	Ni	Hg	Cu	Zn
AbfKlärV (1992)	900	10/5	900	200	8	800	2500/ 2000
AbfKlärV (2011)	120 150	2,5 3	100 120	60 100	1,6 2	700 850	1500 1800
DÜMV	150	1,5	2 (Cr ^{VI})	120	1,0	--	--

AbfKlärV = Sewage Sludge Regulation

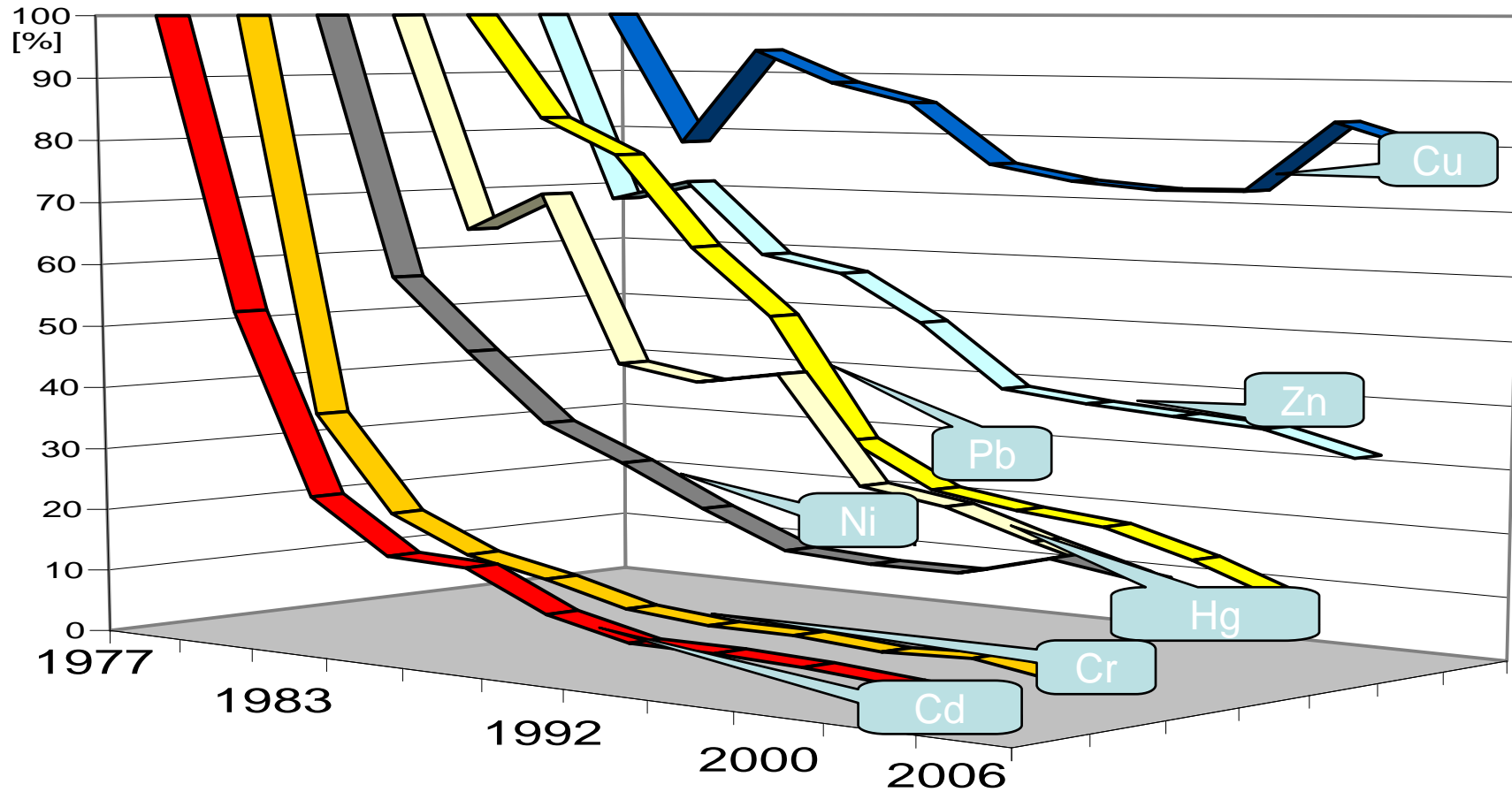
DüMV = Fertilizer Regulation (EC) No. 2003/2003



Development of Sewage Sludge Qualities: Heavy Metal Contents 1977 to 2006



(Content 1977 = 100%)



Limit Suggestions for Organic Contaminants in Sewage Sludge (mg/kg TS, dioxin = mg TE/kg TS)



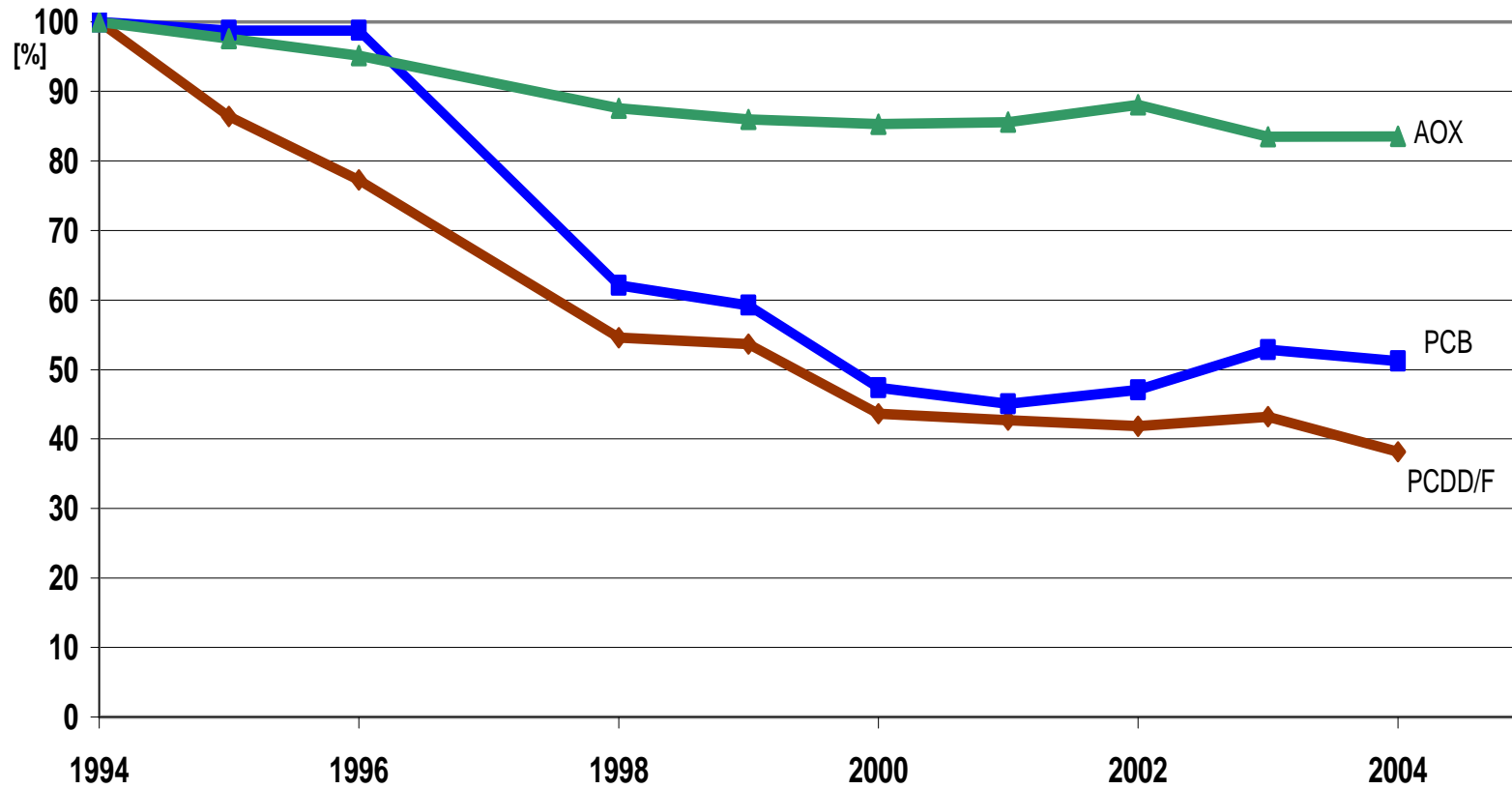
	PCB	Dioxine/ Furane	AOX	B(a)P	PFT (PFOA+ PFOS)
AbfKlärV (1992)	0,2 per Kongener	100 ng	500	-	-
AbfKlärV (2011)	0,1 per Kongener	30 ng	400	1	0,1
DüMV	-	-	-	-	0,1

AbfKlärV = Sewage Sludge Regulation

DüMV = Fertilizer Regulation (EC) No. 2003/2003



Development of Contents of Organic Contaminants according to AbfKlärV 1994 to 2004



Pros and Cons of the different Sewage Sludge Uses (1)



	Pro	Con
Use on Land and Landscaping	<ul style="list-style-type: none">+ Use of nutrients+ Conservation of phosphate resources+ Disposal way with low energy consumption and favorable CO₂ footprint+ cost-effective disposal ways	<ul style="list-style-type: none">– Possible contaminants bare potential risk for soil and groundwater– Limited planning certainty



Pros and Cons of the different Sewage Sludge Uses (2)



	Pro	Con
Mono-combustion (-incineration)	<ul style="list-style-type: none">+ high planning certainty for sewage plant operators+ destruction of organic contaminants+ increased energy use is possible	<ul style="list-style-type: none">– use of nutrients is hardly possible; recovering P from ashes is elaborate and costly. Technics not yet established– costly disposal way



Pros and Cons of the different Sewage Sludge Uses (3)

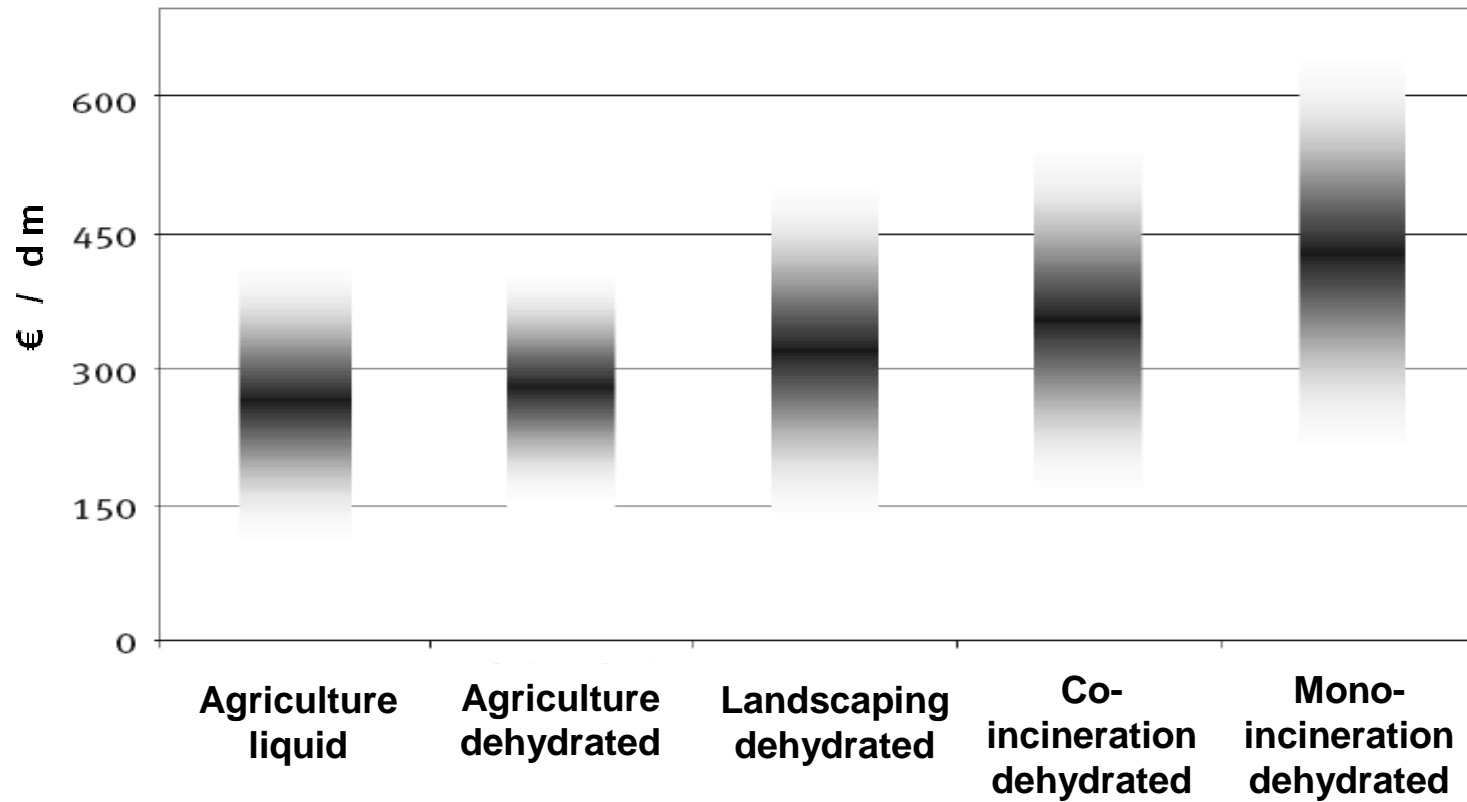


	Pro	Con
Co-incineration	<ul style="list-style-type: none">+destruction of organic contaminants+ increased energy use is possible+ cost-effective disposal ways	<ul style="list-style-type: none">– use of nutrients is hardly possible; recovering P from ashes not possible– environmental pollution by great transport distances



Costs of Sewage Sludge Disposal

(incl. Costs for Deydration and Transportation)



The DWA's Point of View



- ▶ **Conserving resources of nutrients in the recycling management**
- ▶ Sewage sludge contains Phosphorus, Nitrogen and micro-nutrients
- ▶ Natural Phosphorus deposits will be exhausted within the next approx. 100 years
- ▶ DWA is pro agricultural use of low-emission sewage sludges





- ▶ **Safe Disposal by Thermic Treatment**
- ▶ Incineration provides safety of disposal at relatively high costs.
- ▶ Utilization of Phosphorus from ashes of mono-incineration of sewage sludges
- ▶ Developing methods of P-reclamation before disposing by way of co-inineration



Thank you for your attention!

Contact:

Siegrid Mayer

Rainer Koenemann

hanseWasser Bremen GmbH

Tel.: +49 421 988 1214

E-Mail: koenemann@hansewasser.de

www.hansewasser.de

