



# **ICCL 2017 survey**

## **Contaminated Sites & Groundwater Management**

Copenhagen, 4-5 October 2017



# Introduction



- ◆ legacy of land contamination for > 200 years
- ◆ significant threats to groundwater
- ◆ common international concern
- ◆ context and approaches country-specific
- growing demand for water
- Water crisis in the TOP3 risks (World Economic Forum; 2015)



# Questionnaire



21 QUESTIONS (17, 22, < 50 ;-)) to characterize and understand

- ◆ **Context (Q5 – Q11)**
- ◆ **Legislation / Policy / Regulations (Q 12 – Q 16)**
- ◆ **Technical issues: (Q17 – Q 21)**
- ◆ ***Crucial future developments***



# Responses: 18



- ◆ **EUROPE: Denmark, Finland, Flanders, France, Luxemburg, The Netherlands, Switzerland, Austria**
- ◆ **SOUTH-AMERICA: Argentina, Peru, Colombia**
- ◆ **ASIA: South Korea**
- ◆ **Australia: ACT, New South Wales, Tasmania, South Australia, Victoria, West Australia**



# Questionnaire



21 QUESTIONS to characterize and understand

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- ◆ **Technical issues: Q17 – Q 21**
- ◆ **Crucial future developments**



# Results ...



21 QUESTIONS to characterize, **learn & understand** about

- ◆ How to ask questions?
- ◆ common language and terminology (e.g. area approach)

→ **PRELIMINARY ANALYSIS** (qualitative)



# Context (1)



- ◆ Q5: Is GW-contamination a challenge for your country/region?

**YES IT IS!**

- ◆ Q5 (b) What share of public water supply stems from groundwater at country / regional level
  - ❑ SOUTH-AMERICA:
    - ❑ 20 – 25 %
    - ❑ Colombia (regionally): 10 – 100 %



# GW & Public Water Supply



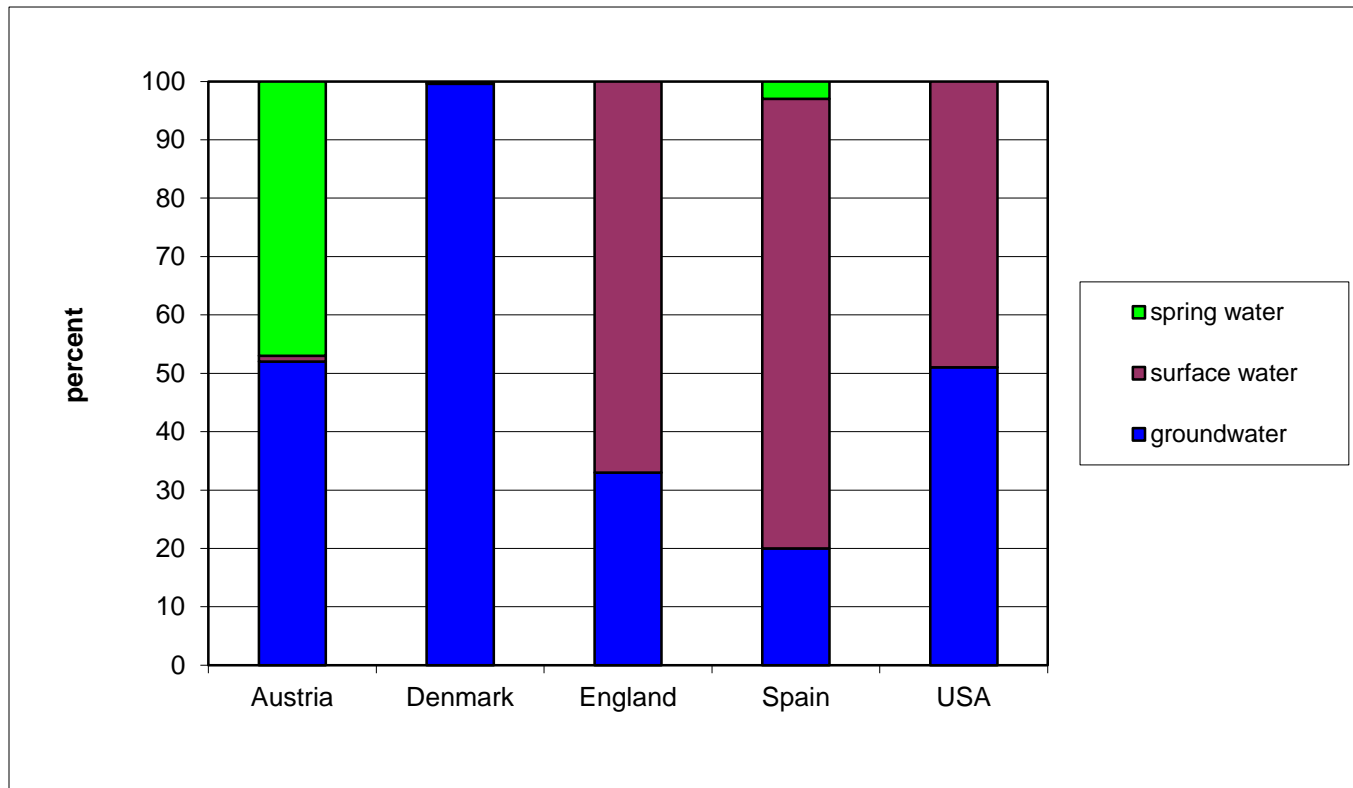
- ◆ What share of public water supply stems from groundwater at country / regional level
  - ❑ SOUTH-AMERICA:
    - ❑ 20 – 25 % (regionally): 10 – 100 %
  - ❑ EUROPE:
    - ❑ ~ 50 % (FL, NE, LU) - 100 % (DK, AT)
  - ❑ South-Korea: 11 %
  - ❑ AUSTRALIA: < 1 % (ACT) – 46 % (WA)



# ICCL 1999 COMPARATIVE STUDY

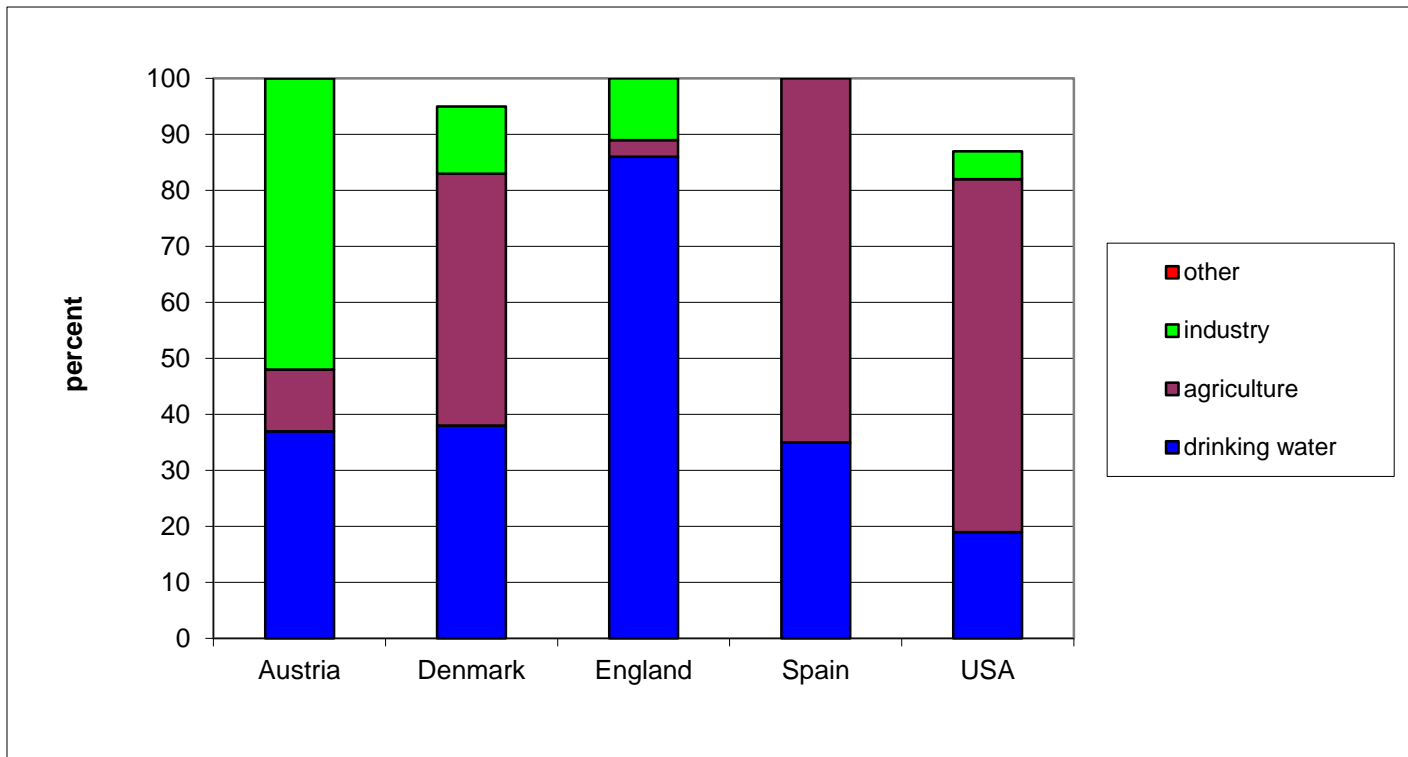


## GW & Public Water Supply



# ICCL 1999 COMPARATIVE STUDY

## Categories of Water Use





# Details (Numbers) provided



- ◆ Q6:
  - Sites estimated to potentially affecting groundwater resources adversely?
  - Sites showing results providing evidence for contamination likely to be affecting groundwater?
  - Sites estimated to be in need of remediation or other active risk management?
  
- ◆ Q6 a/b: „likely GW-impacts“ (estimate, evidence)
- ◆ Q6c: GW-remediation (estimate)

# “Work Loads“ in comparison (South-America, KR, Australia)



	likely GW-impacts (estimate)	(evidence)	remediation (estimate)
CO	1.500	several 100	?
PE	no data	no data	no data
AR	no data	no data	no data
KR	124	10	80
ACT	> 200	> 200	~ 50
NSW	149	?	?
TAS	?	?	?
SA	1.100	?	?
VIC	?	?	?
WA	?	1.224	312

# “Work Loads“ in comparison (Europe)



	likely GW-impacts		remediation
	(estimate)	(evidence)	(estimate)
BE (FL)	85.000	13.400	4.237
DK	12.000	4.582	?
FR	?	3.000	?
LU	?	?	?
FI	26.000	3.200	400
AT	10.000	280	2.000
NL	1.500	1.500	1.500
CH	38.500		2.000



# Pollutants (1)



- ◆ **Q7: Most important substance group or substances?**
  - ❑ METALS & METALLOIDS:
    - ❑ South-America, Australia, France
    - ❑ Hg, As, Cr, Pb
  - ❑ LNAPL: YES (differences regarding MTBE)
  - ❑ DNAPL: YES (few countries data limitations?)
  - ❑ OTHERS (data availability?)
    - ❑ Pesticides, PFAS/PFOS (Australia & Europe)



## Pollutants (2)



- ◆ **Q8: Which substance group or substances remain or emerge?**
- relation and/or difference to Q7 might have been unclear?
- Answers Q8 equal more or less answers to Q7, which may reflect general expectation/perception:
  - already identified substances (groups) will remain
  - new substances (like e.g. PFAS/PFOS) will keep emerging



# Q9: Major pollution sources



- Agriculture
- Industrial activities
- Oil production, distribution and storage
- Dry cleaners
- Landfills
- Mines
- (Transport)
- Urban contamination
- Others: fire fighting, (*illegal drug wastes, gulf courses*)





- ◆ **Q11: When did the majority of contamination occur?**
  
- EUROPE: 1950 – 1990 (LU > 2000)
  
- SOUTH-AMERICA: variation / differences
  
- SOUTH-KOREA: 1970 – 1980
  
- AUSTRALIA: limited records /data



# Future trends



- ◆ **Q10: Is there any evidence that the extent (area and/or volume) of GW-contamination is growing, stable or reducing over time?**
- **EUROPE (data availability?)**
  - Growing: NL, BE (FL)
  - Stable: NL, LU, AT
  - Reducing: DK, NL, LU, CH, AT
  - No data: FI, FR
- ◆ **SOUTH-AMERICA, KOREA, AUSTRALIA**
  - Growing: general expectation
  - Data availability limited



- ◆ **Q12: How does your national / regional policy about contaminated sites / contaminated soil relate to groundwater management? If not considered, is the GW contamination management regulated by another policy (e.g. water protection)?**

## □ EUROPE

- National Soil legislation (e.g. NL)
- WFD and resp. national legislation (e.g. AT)
- Specific laws (e.g. CH)
- Several national laws (e.g. DK)

## ◆ SOUTH-AMERICA, AUSTRALIA

- Not regulated

## ◆ SOUTH-KOREA: Soil & water legislation



# Policy Objectives



## ◆ Q13: If regulated, what are the main policy objectives?

	<b>POLICY OBJECTIVE (1)</b>	<b>POLICY OBJECTIVE (2)</b>
<b>BE (FL)</b>	remediate until 2036	prevent new pollution
<b>DK</b>	prevent, remove or limit	
<b>FR</b>	good status by 2027	
<b>LU</b>	prevent and limit	
<b>FI</b>	prevent and limit	
<b>AT</b>	prevent and limit	good quality and status
<b>NL</b>	risk based	fit for use
<b>CH</b>	DWS	
<b>KR</b>	stable supply	good quality



# Policy & Management Approaches



- ◆ **Q14:** Often, several sites contaminate the same groundwater resource (at the catchment level). Are you allowing for an “area” approach” managing multiple sources together? Or are you applying a site specific approach?
- ❑ **YES: BE (FL), NL, DK, AT, AR**
- ❑ **SITE-SPECIFIC: AUSTRALIA, CH, FR, LU**
  
- ❑ **Other countries: some interests**



◆ Q15: if you are considering an area approach, how are you dealing with the chain of liability applicable to contaminated land management:

□ **COMPLEX QUESTION – ISN'T IT?**

## ANSWERS REFLECT

- polluter-pays-principle
- chain-of-liability
- Others: polluter only (e.g. AT)



◆ Q15 (b/c): is there a difference between new and historic contamination?

□ *BE (FL); NL; CH, AT*

## REFERENCE DATES

□ EUROPE (e.g.): NL 1987, AT 1989 (usually upon enforcing new legislation)

□ ARGENTINA: 1991/1994/2001

□ South-Australia: 1995



# Q16: Financial Incentives



- ◆ **Q16:** Under your national / regional legal / policy / regulation context, are there financial incentives (such as tax breaks, or grants, national / regional special funds) that encourage groundwater contamination management?:
- ◆ EUROPE: BE (FL), FR, LU, AT, CH, NL
- ◆ AUSTRALIA: CAT



# Q16 (b) Orphan sites & public funds

- ◆ EUROPE: YES
- ◆ SOUTH-AMERICA: AR, PE some possibilities
- ◆ SOUTH-KOREA: YES
- ◆ AUSTRALIA: YES (SA, WA, VIC)



# Future trends



## ◆ (Q22): Crucial developments in the future

👎 I didn't read through ... 😞

❑ **My invite: Raise your voice and tell us!**



# THANKS !



## ENJOY DAY 2!

## KEEP ON MAKING PERSONAL CONTACTS!

