



SEDIMENT REUSE, TREATMENT AND DISPOSAL IN NL AN OVERVIEW OF OPTIONS

Dr. Ton Honders
Centre for Soil Treatment
in cooperation with
Ir. P. Hakstege & Ir. R. Ringeling
AKWA - Aquatic Sediment Expert Centre
**(Ministry of Transport, Public Works and Water
Management)**

OUTLINE

- ◆ **THE DUTCH SITUATION**
- ◆ **POLICY ON SEDIMENTS**
- ◆ **PROBLEM DEFINITION (QUALITIES &
QUANTITIES)**
- ◆ **TREATMENT OPTIONS**
- ◆ **DISPOSAL OPTIONS**
- ◆ **COST FACTORS**
- ◆ **TRIGGERS (SUBSIDIES & FMT)**
- ◆ **EPILOGUE**

THE DUTCH SITUATION

- ◆ DELTA OF RHINE & MEUSE
- ◆ MAINTENANCE DREDGING
- ◆ PROBLEM AREAS
 - HARBOURS
 - RIVERS
 - LAKES
 - CANALS
 - DITCHES



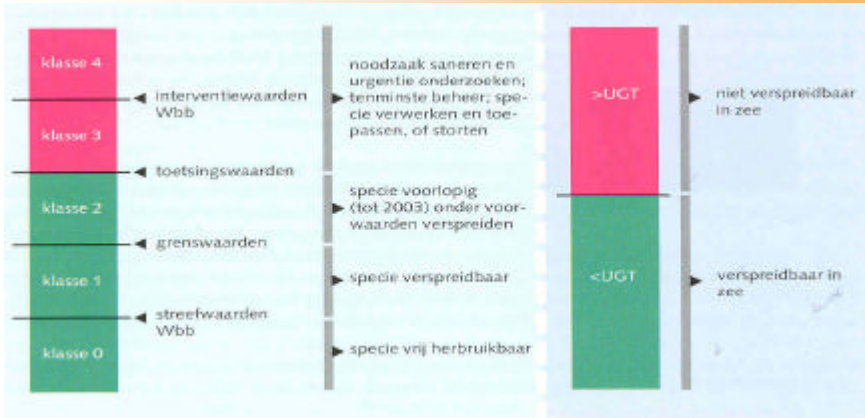
POLICY ON SEDIMENTS

- ◆ PREVENTION
- ◆ REUSE/RELOCATION
- ◆ TREATMENT
- ◆ DISPOSAL

SEDIMENT QUALITIES

FRESH WATER

SALT WATER

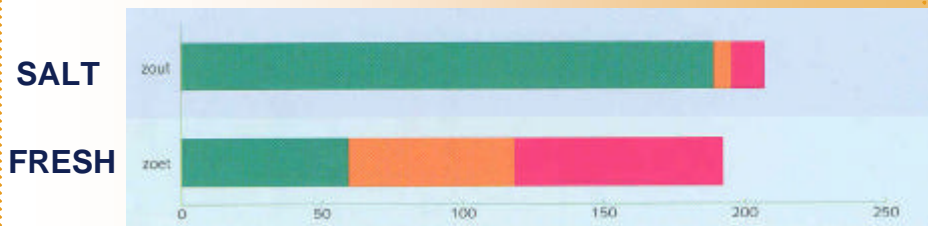


EXAMPLE FOR MERCURY

STANDARD	mg/kg ds
"CLEAN"	0.3
CLASS 1/2	0.5
DISPOSAL IN SEA	1.2
RELOCATION ON LAND	1.6
REMEDIATION	10.0

SEDIMENT QUANTITIES (1)

DREDGING TARGETS 2002-2011 IN Mm3



■ = RELOCATION

■ = NO RELOCATION - "LIGHTLY"

■ = NO RELOCATION - "HEAVY"

SEDIMENT QUANTITIES (2)

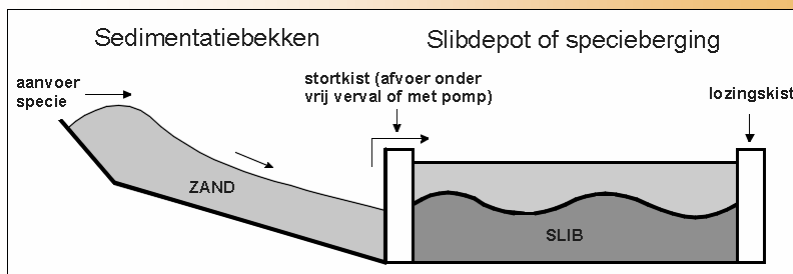
- ◆ RELOCATION = ca. 25 Mm3/YR
- ◆ DISPOSAL & TREATMENT = ca. 5 Mm3/yr
- ◆ TREATMENT TARGET = 20 %

TREATMENT OPTIONS

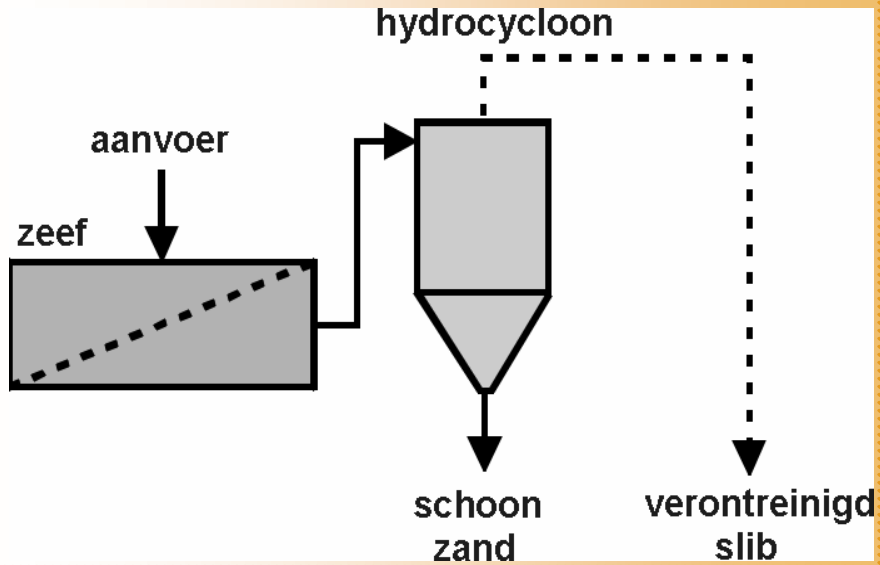
TECHNOLOGY	PHYSICAL	CHEMICAL
SAND SEPARATION (MECHANICAL)	SANDY	ALL
SAND SEPARATION (SEDIMENTATION)	SANDY	CLASS 2/3
RIPENING	CLAYEY	CLASS 2/3
LANDFARMING	SANDY	CLASS 2/3
COLD IMMO	SANDY	CLASS 2/3
HOT IMMO	ALL	ALL

SAND SEPARATION (1)

BY SEDIMENTATION



SAND SEPARATION (4)



SAND SEPARATION (5)



RIPENING (1)



RIPENING (2) - PRODUCT APPLICATION



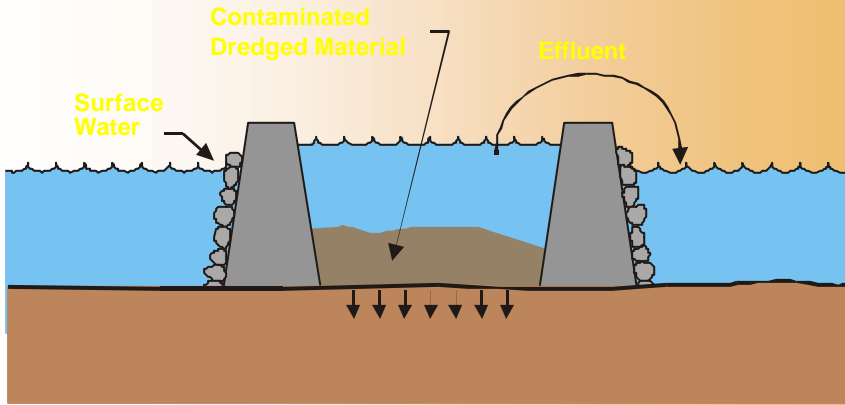
COLD IMMOBILISATION



HOT IMMOBILISATION



CONFINED DISPOSAL (1)



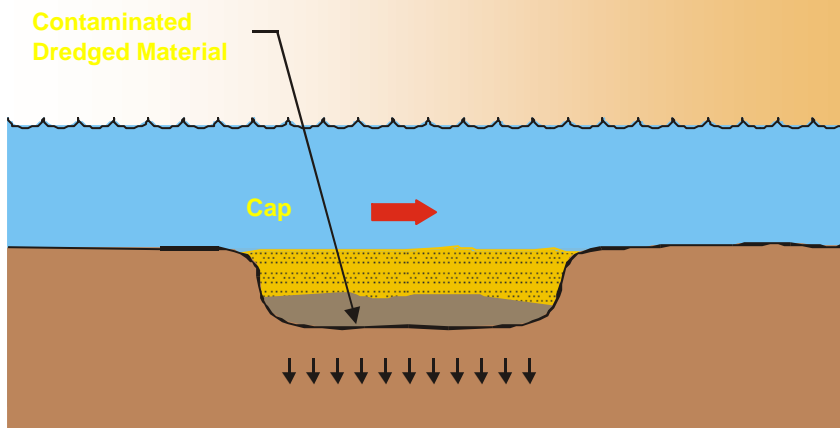
CONFINED DISPOSAL (2)



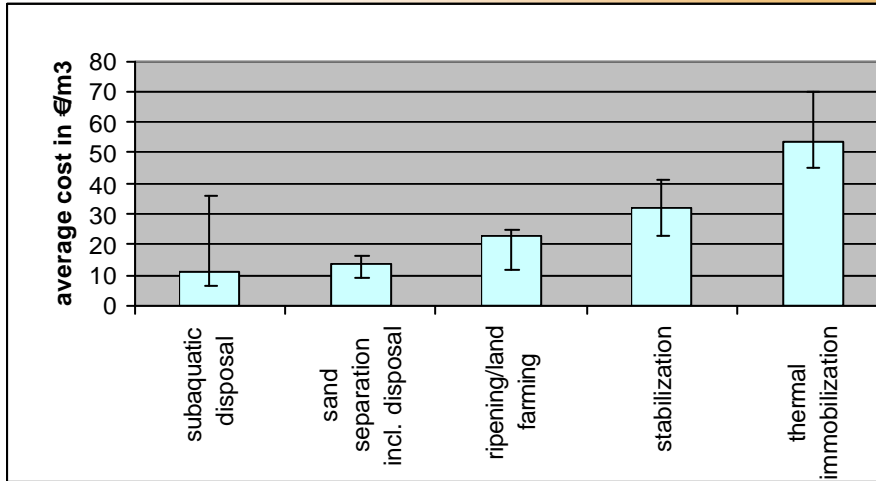
CONFINED DISPOSAL (3)



OPEN PIT DISPOSAL + CAPPING



COST FACTORS



PROBLEM AREAS (1)

- ◆ **BUDGET LIMITATIONS**
- ◆ **PREVENTION**
 - POINT SOURCES DEALT WITH
 - DIFFUSE SOURCES DIFFICULT
- ◆ **DREDGING**
 - OVERDUE MAINTENANCE
 - LITTLE REMEDIATION
- ◆ **RELOCATION**
 - STRETCHED TO THE LIMITS

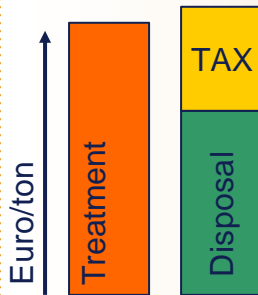
PROBLEM AREAS (2)

- ◆ **TREATMENT**
 - RELATIVELY EXPENSIVE
 - SCARCITY OF LAND
- ◆ **DISPOSAL**
 - RELATIVELY CHEAP
 - NIMBY BOTTLENECK
- ◆ **REUSE (AFTER TREATMENT)**
 - MARKET ACCEPTANCE
 - LOW VALUE PRODUCTS

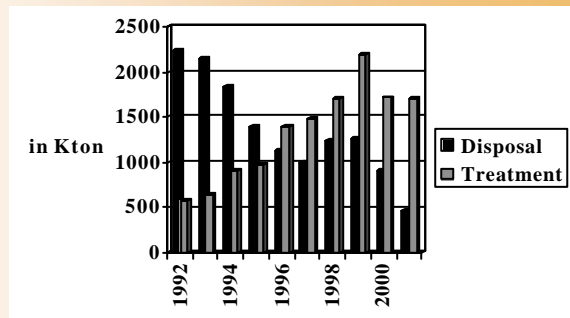
APPROACH

- ◆ **CARROTS (SUBSIDIES FOR)**
 - DREDGING = 80 MEURO
 - LARGE SCALE TREATMENT (PILOT)
= 32 MEURO
 - SMALL SCALE TREATMENT (PROJECTS)
= 41 MEURO
- ◆ **STICK (DISPOSAL TAX)**
 - FMT

FISCAL MANAGEMENT TOOL (FMT)



Experiences with Soil treatment/disposal 1992-2002



FMT FOR SEDIMENTS (1)

- ◆ **TAX = CA. 14 EURO/ton FOR DISPOSAL OF TREATABLE SEDIMENTS**
- ◆ **TREATABILITY IS BASED UPON COST EFFECTIVE TECHNOLOGIES**
 - PHASE 1 - SAND SEPARATION
 - PHASE 2 - RIPENING/LANDFARMING
- ◆ **SEDIMENT > 60 % SAND IS TREATABLE**
- ◆ **PHASE 1 EFFECTIVE SINCE 2002**

FMT FOR SEDIMENTS (2)

- ◆ **INDEPENT ASSESSMENT BY SCG:**
 - 1/9 IN-SITU PROTOCOLS
 - SEDIMENT OR WASTE
 - DIVIDE SAND / NON-SANDY LOTS
 - DEGREE OF CONTAMINATION
 - PERCENTAGE OF SAND
- ◆ **SCG ISSUES CERTIFICATE**
- ◆ **TAX OFFICERS CHECK CERTIFICATES AT DISPOSAL SITE**

FMT EXPERIENCES

- ◆ **ASSESSED (SINCE 02):**
 - ca. 950 LOTS =
 - ca. 14 mM³
- ◆ **IMPROVEMENTS:**
 - PROPER IN-SITU INVESTIGATION
 - BETTER ADMINISTRATION
 - QA/QC SCHEME FOR TREATMENT OPERATIONS
- ◆ **MORE TREATMENT ???**

FMT - PRESENT STATUS

- ◆ **PER 2005:**
 - **CRITERIUM SAND > 60 % REMAINS**
 - **NO DISPOSAL TAX**
 - **ASSESSMENT BY OWNER DISPOSAL SITE**
- ◆ **STEP 2 NOT TAKEN**

EPILOGUE

- ◆ **“SEDIMENTS” IS A COMBINED QUANTITY/QUALITY PROBLEM**
- ◆ **DREDGING, TREATMENT AND DISPOSAL TECHNOLOGY DEVELOPED AND AVAILABLE**
- ◆ **LIMITED BUDGETS**
- ◆ **SUBSIDY TRIGGERS**