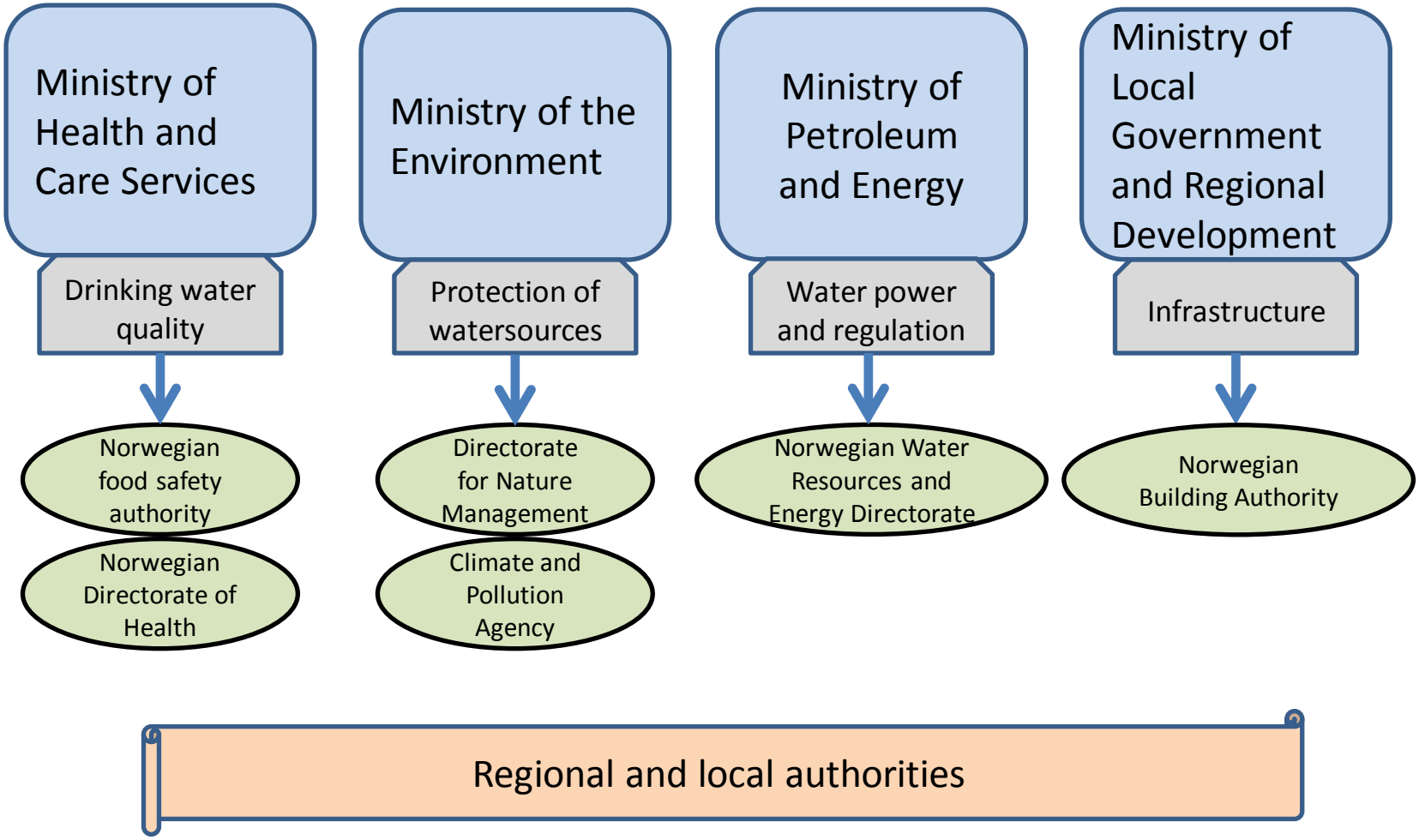
Water management and challenges in Norway

Geir Stene-Larsen

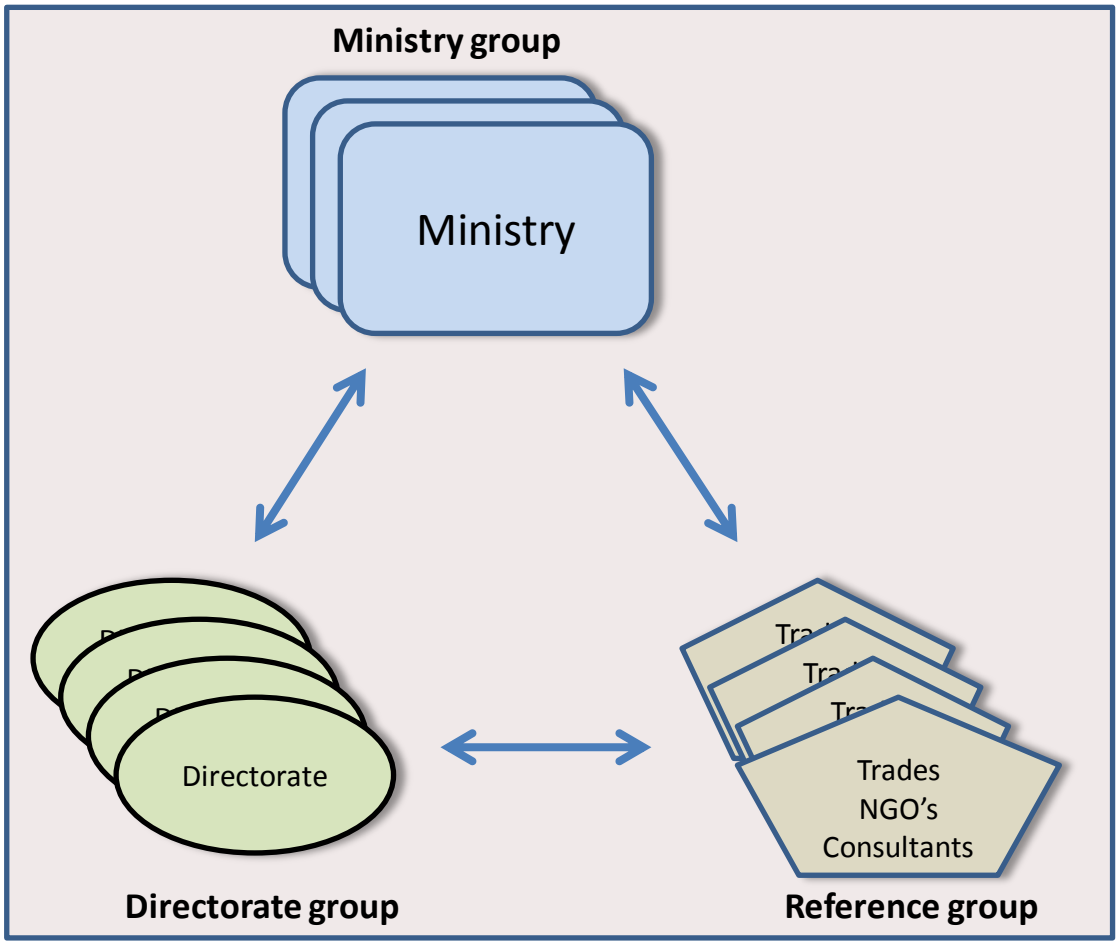
Ministry of Health and Care Services

Photo: Morten Nicholls

Ministries and directorates involved in freshwater management



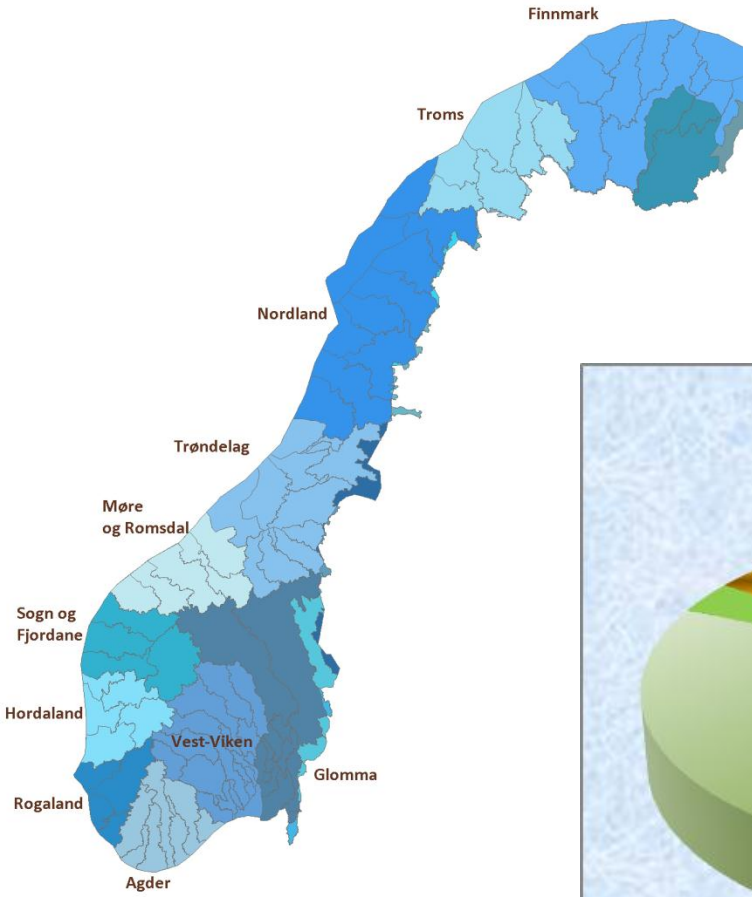
It is established many types of intersectional working relations between authorities, different trades, NGO's and other interest groups. The model used in implementing the Water Framework Directive is one example.



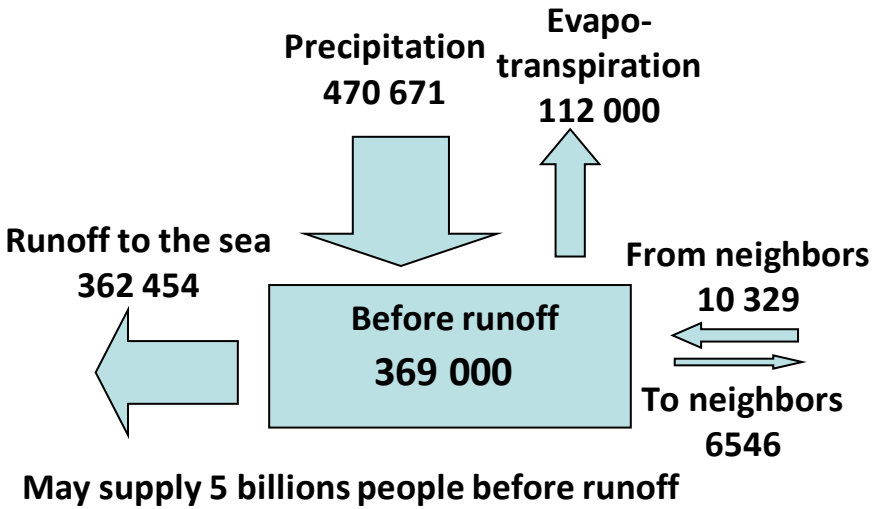
Experience:

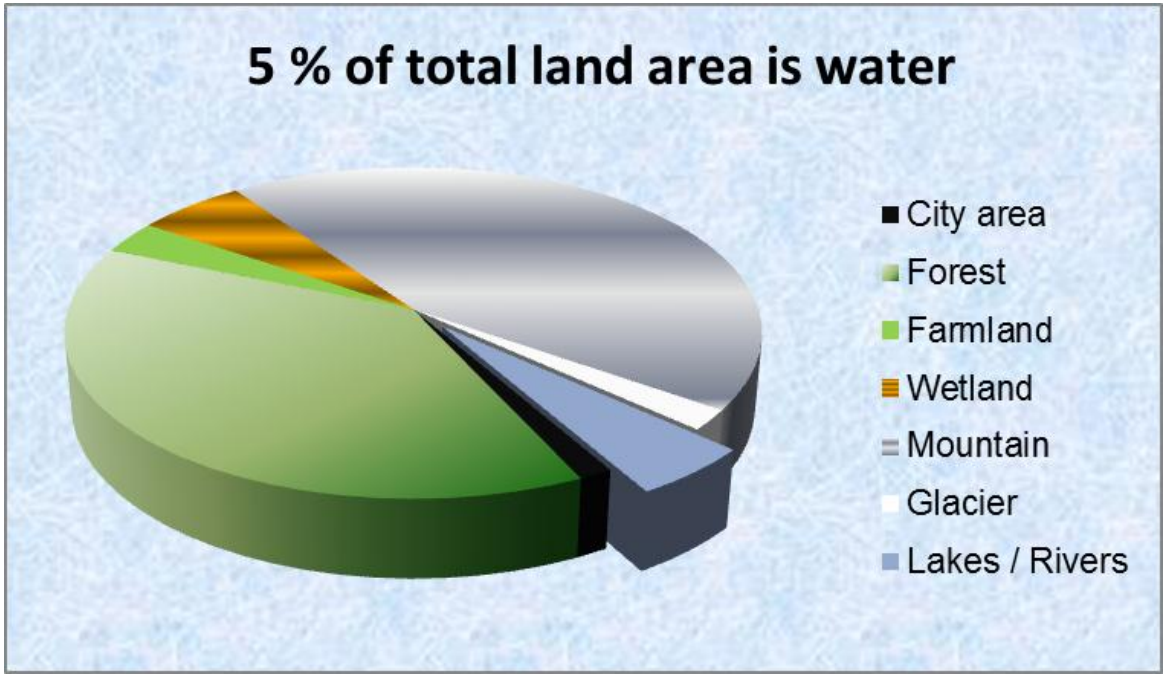
- Many-sided but very important.
- Make better result.
- Commit the parties.
- Time consuming.
- Frustrating.
- Hard to agree with some sectors.
- Some never show up.

Norway



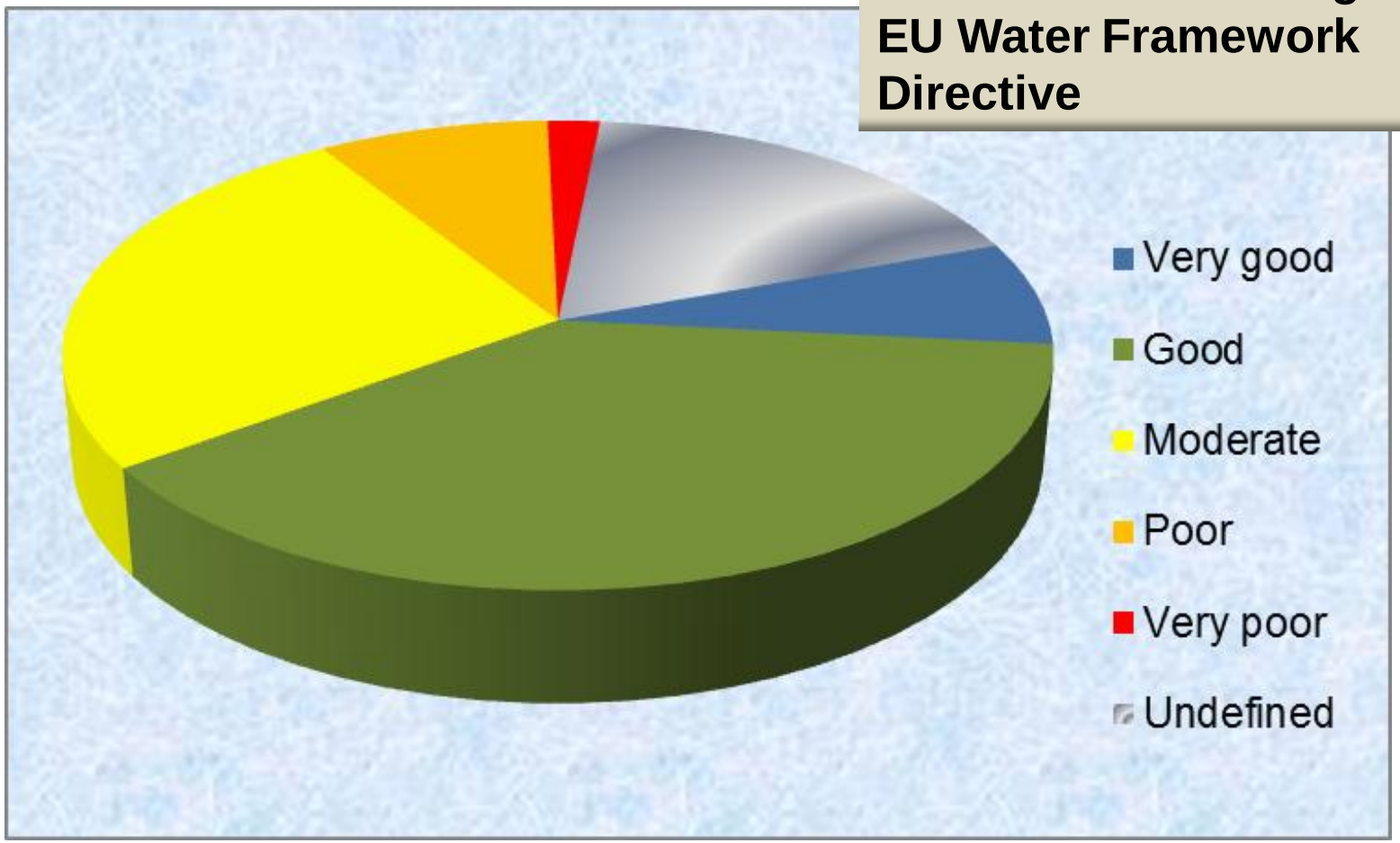
11 River basin region



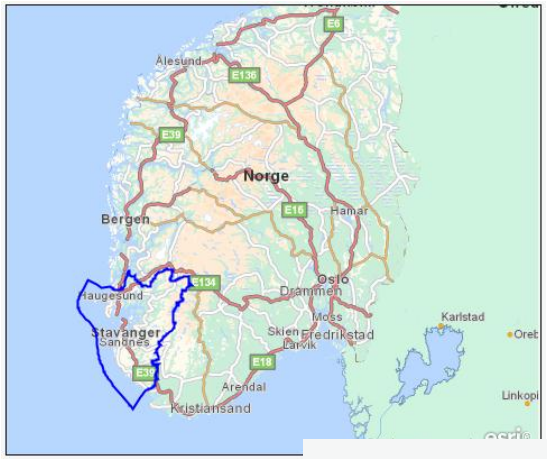


Ecological status for Norway
- Based on about 25000 surface waters

Classified according to EU Water Framework Directive



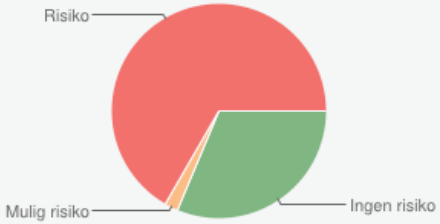
Ecological status – all lakes and rivers in Rogaland county



Risko, alle

Risk not to obtain good status

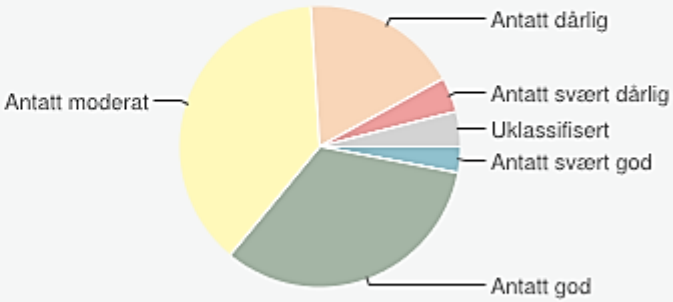
Tilstand	Antal	Prosent
Risiko	782	66,2
Mulig risiko	25	2,1
Ingen risiko	370	31,3
Risiko udefinert	5	0,4



Tilstand

Økologisk tilstand, alle

	Tilstand	Antal	Prosent
Very good	Svært god	1	0,1
Possible good	Antatt svært god	39	3,3
Good	God	5	0,4
Possible good	Antatt god	385	32,6
Moderate	Moderat	3	0,3
Possible moderate	Antatt moderat	450	38,1
Poor	Dårlig	4	0,3
Possible poor	Antatt dårlig	208	17,6
Very poor	Svært dårlig	1	0,1
Possible very poor	Antatt svært dårlig	42	3,6
Unclassified	Uklassifisert	44	3,7



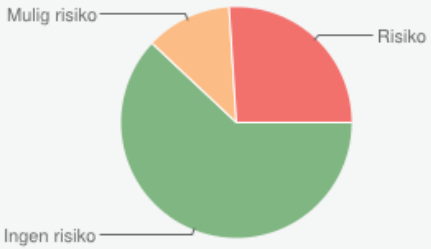
Status

Ecological status – all lakes and rivers in Møre og Romsdal county

Risko, alle

Risk not to obtain good status

Tilstand	Antal	Prosent
Risiko	422	26
Mulig risiko	195	12
Ingen risiko	1007	61,9
Risiko udefinert	2	0,1

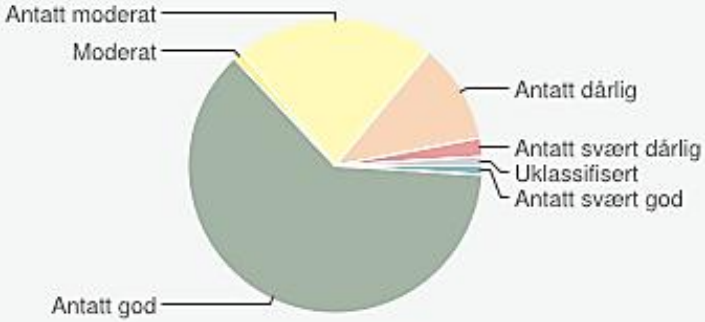


Tilstand

Økologisk tilstand, alle

Tilstand	Antal	Prosent
Svært god	8	0,5
Antatt svært god	13	0,8
God	8	0,5
Antatt god	1003	61,7
Moderat	16	1
Antatt moderat	357	22
Dårlig	4	0,2
Antatt dårlig	173	10,6
Svært dårlig	2	0,1
Antatt svært dårlig	28	1,7
Uklassifisert	14	0,9

Very good
Possible good
Good
Possible good
Moderate
Possible moderate
Poor
Possible poor
Very poor
Possible very poor
Unclassified



Status

Bathing water quality in the Oslofjord - summer 2010

Badevannskvalitet Oslofjorden 2010

(Tabell satt opp geografisk: fra vest mot øst, øyene til slutt)

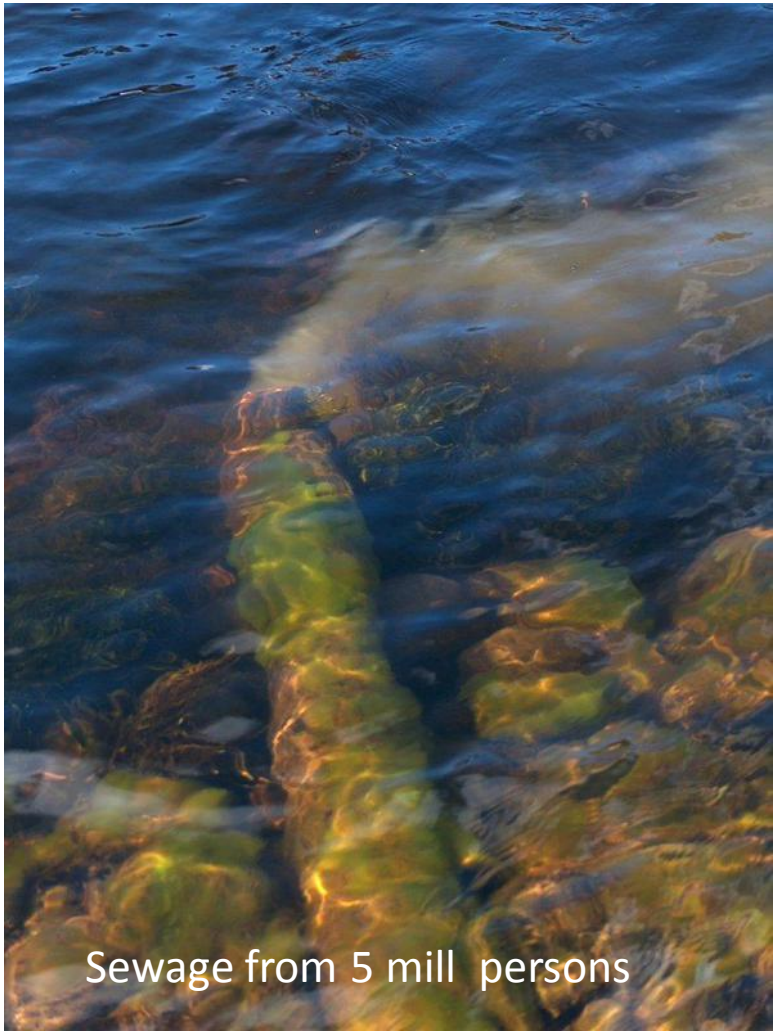
Sted / TBK	uke 21	uke 22	uke 23	uke 24	uke 25	uke 26	uke 27	uke 28	uke 29	uke 30	uke 31	uke 32	uke 33	uke 33B	uke 34
Sollerudstranda	1	11	400	68	47	45	33	>1500	55	230	140	150	11	4	87
Hydrostranda	5	20	200	3	14	35	3	500	15	11	130	79	3		96
Bygdøy sjøbad	60	5	65	9	24	14	36	390	33	16	90	19	14		5
Huk ved restaurant	110	0				7	22			6					38
Solstranda, Huk	6	3	9	17	4	3		90	15	15	40	10	21		39
Paradisbukta	5	2				1				54					17
Ormsund	1	10	0	4	2	5	5	28	6	4	9	9	16	6	44
Solvik (Malmøya)	11	4						41		7					19
Skinnerbukta (Malmøya)	7	0						57		10					24
Ulvøya	1	10				0				8					100
Nordstrand bad	2	1				1				2					89
Katten	8	10				19				220					82
Fiskevollbukta	140	42	0	34	1	190	6	68	44	18	8	12	370		400
Hvervenbukta	15	2	0	1	9	52	4	100	48	5	53	66	5		120
Hovedøya	52	7				5				5					1
Gressholmen	51	4				1				5					4
Rambergøya	11	0				1				1					1
Langøyene	2	3				3				1					5

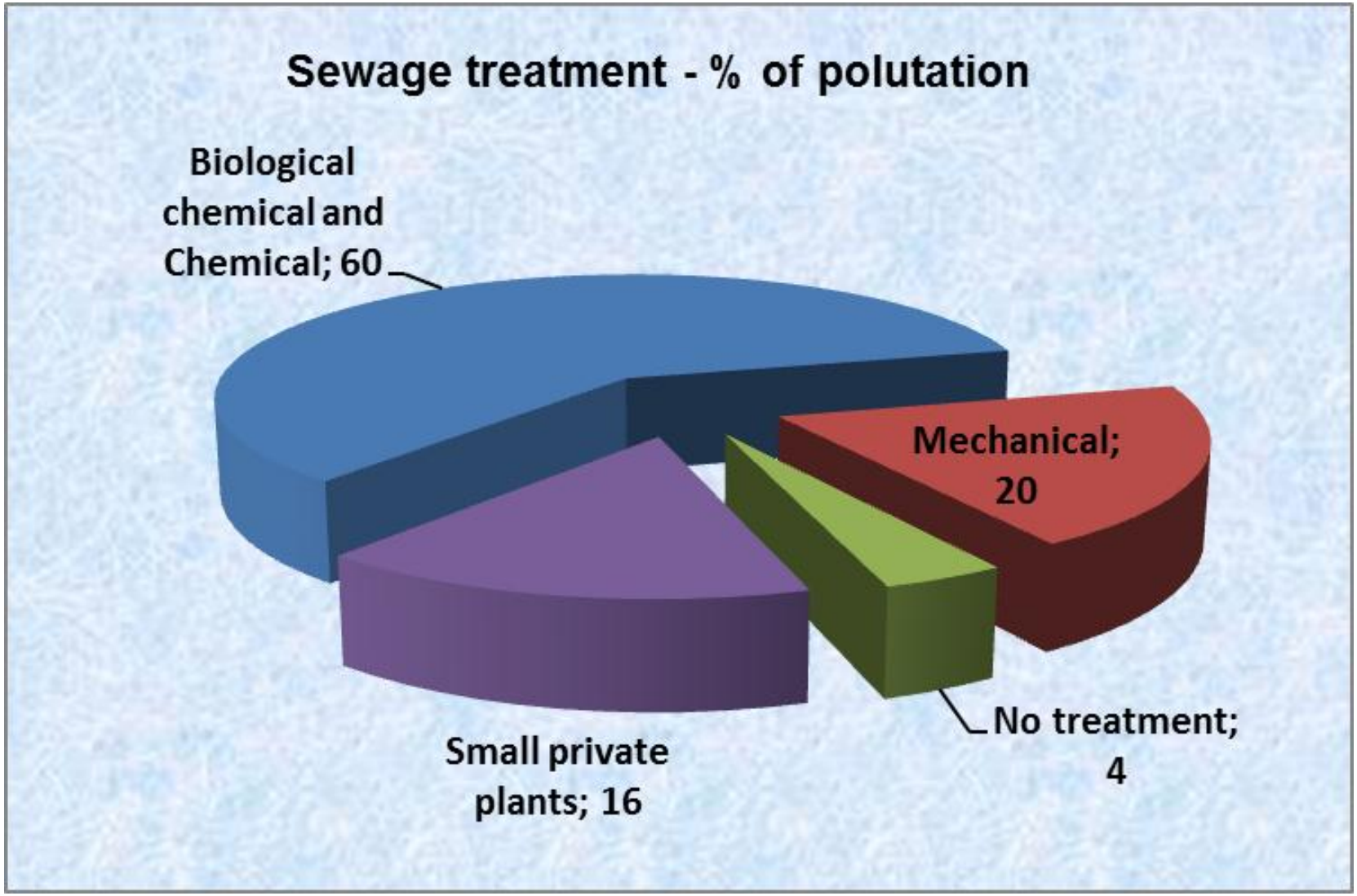
Utmerket	Very good	≤ 250	TKB / 100 ml vann
God	Good	251-500	TKB / 100 ml vann
Dårlig	Poor	> 500	TKB / 100 ml vann

TKB = Termotolerante koliforme bakterier

Ved dårlig vannkvalitet tas det omprøver. Disse publiseres direkte på informasjonsside og legges til som egen kolonne (B)denne tabellen.

Main sources for water pollution in Norway



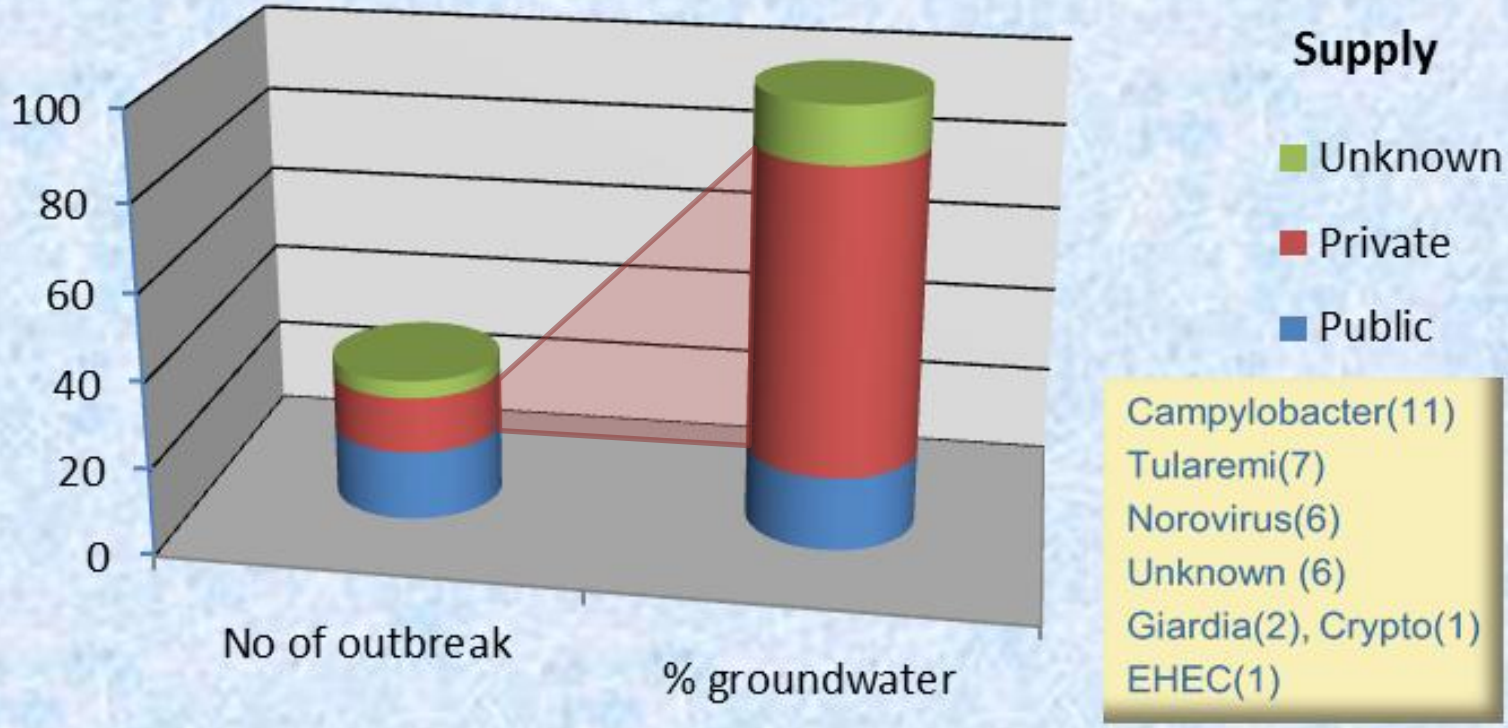


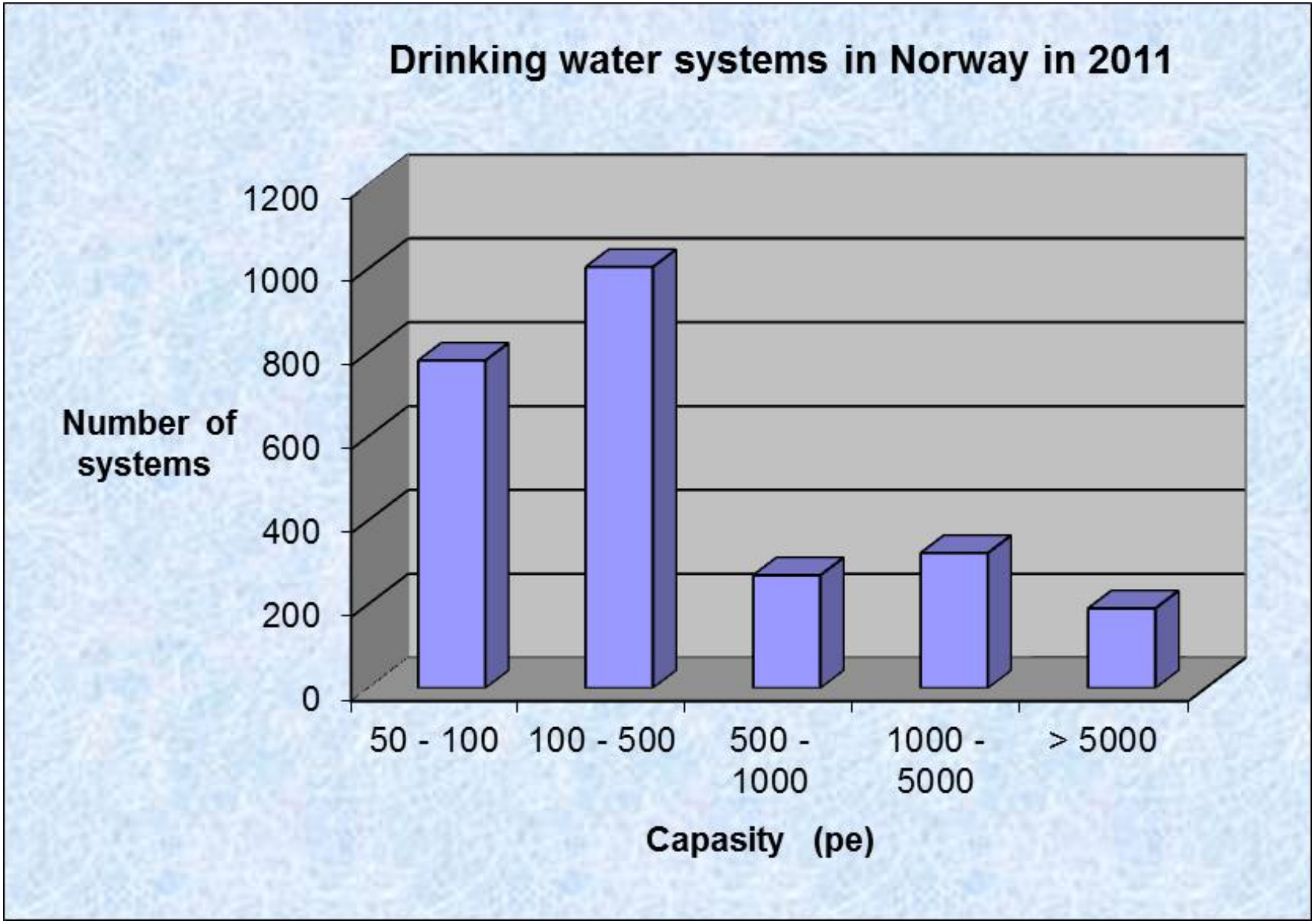
About 2700 sewage treatment plants > 50 pe are serving more than 80% of the population

Stormwater + Combinded sewers = Increased discharges

- **Stormwater to combined sewers will lead to**
  - **Increased overflow discharges**
  - **Increased leakages from sewers**
  - **Reduced treatment capacity**

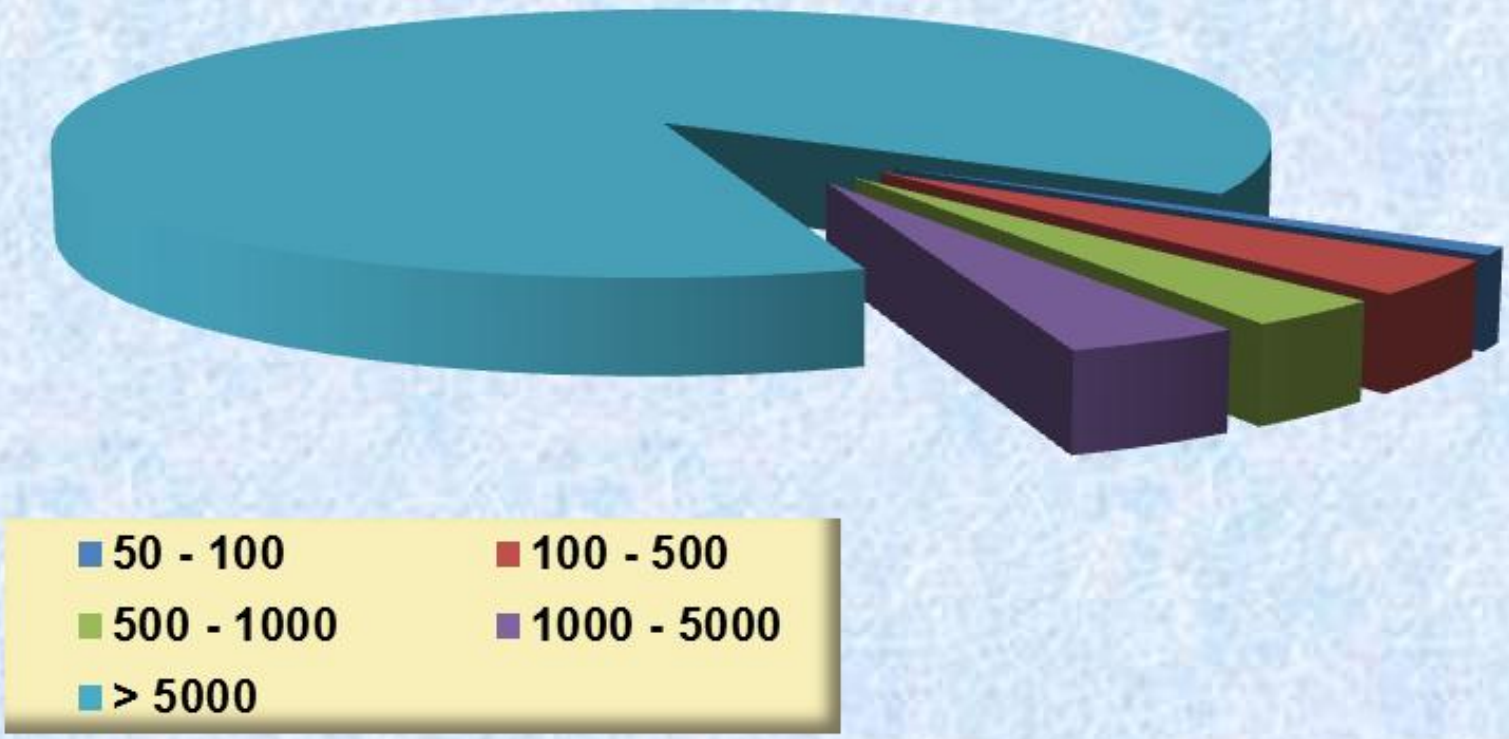
33 outbreaks in 2002-2011 possible due to water.
- More than 5000 persons has been registered sick.



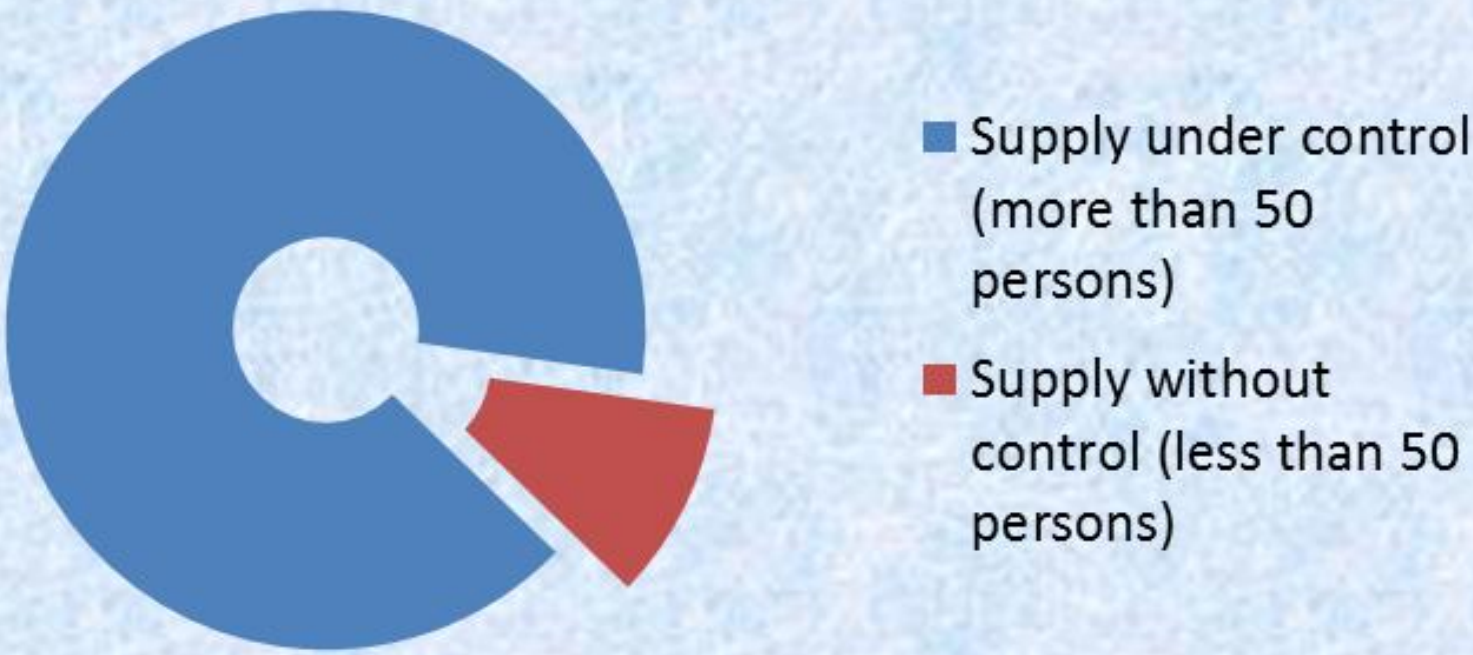


Small water supply systems serving 50-500 persons are the dominating size

More than 80 % of the population are connected to drinking water system that serve more than 5000 persons each

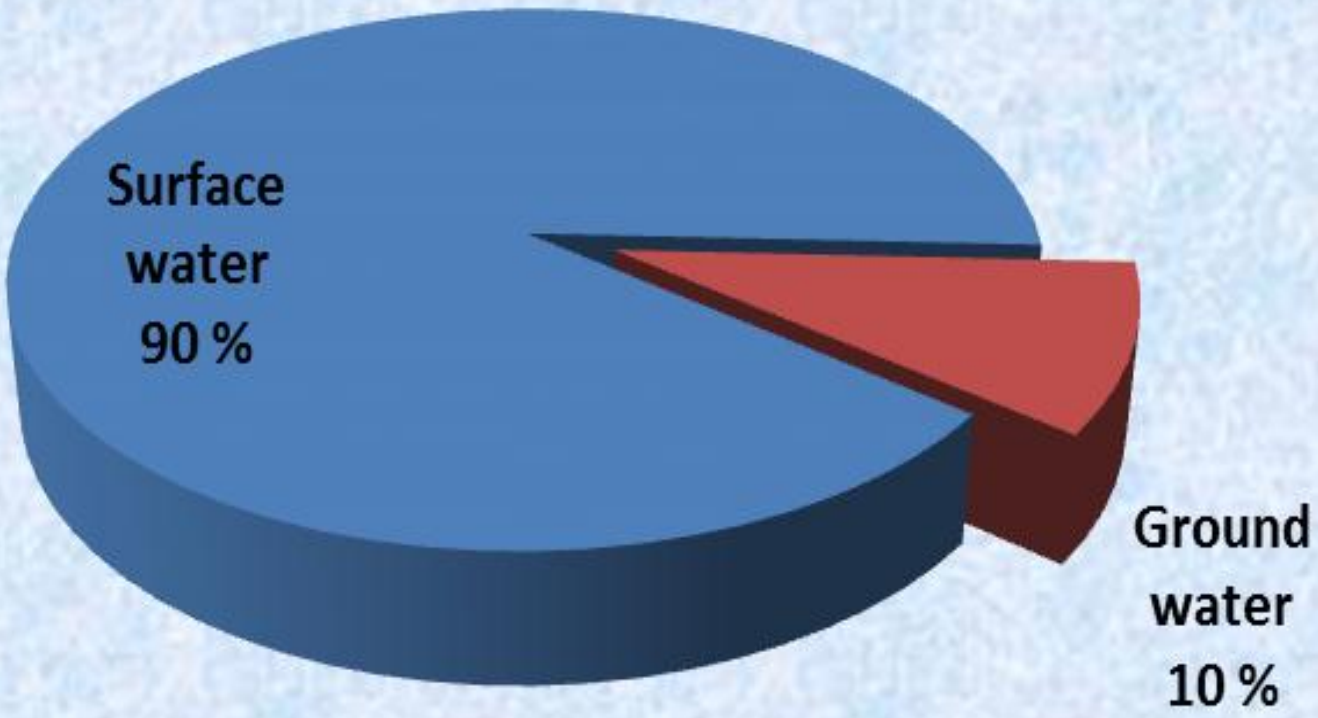


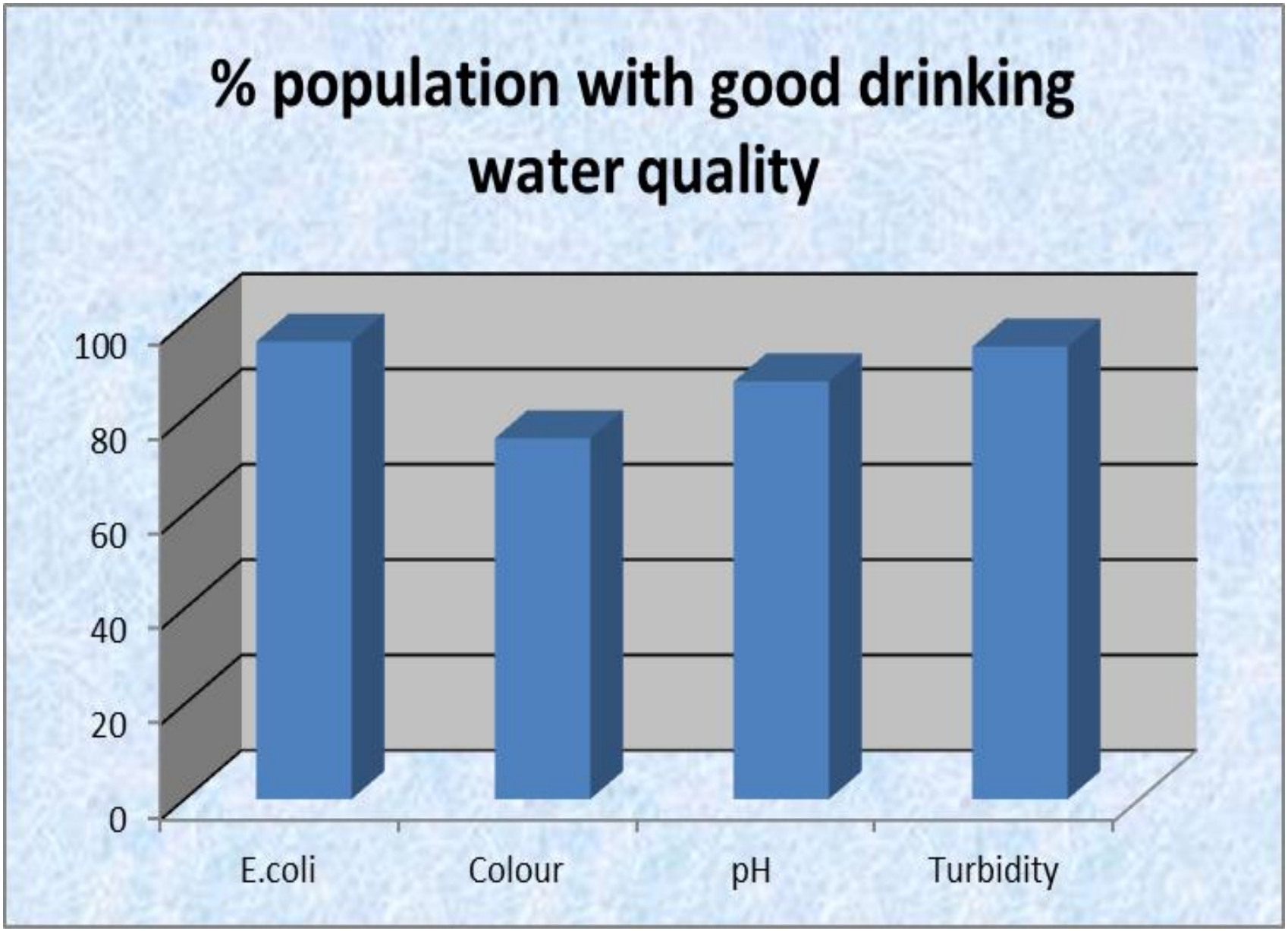
How to close the ring ?



A large portion of the population are connected to a drinking water supply system. But what about the rest ?

Population served by drinking water




% population with good drinking water quality
100
80
60
40
20
0
E.coli
Colour
pH
Turbidity

Important highlights from the Norwegian drinking water regulation

- ✓ Water supply systems serving more than 50 persons shall be approved by Mattilsynet.
- ✓ Risk analysis must be done.
- ✓ Internal control system shall be followed.
- ✓ All surface water shall at least be disinfected.
- ✓ The water system shall have multiple barriers.
- ✓ Safety plans shall exist.
- ✓ Water quality shall be according to the regulation.
- ✓ Results shall be reported to Mattilsynet.

Water Safety Plans (WSP) flow diagram

Assemble the team to prepare the water safety plan

Document and describe the system

Undertake a **hazard assessment** and **risk characterization** to identify and understand how hazards can enter into the water supply

Assess the existing proposed system (including a description of the system and a flow diagram)

Identify **control measures** – the means by which risks may be controlled

Define **monitoring** of control measures – what limits define acceptable performance and how these are monitored

Establish procedures to **verify** that the water safety plan is working effectively and will meet the health-based targets

Develop **supporting programmes** (e.g., training, hygiene practices, standard operating procedures, research and development, etc.)

Prepare **management procedures** (including corrective actions) for normal and incident conditions

Establish **documentation** and **communication** procedures

The Norwegian drinking water regulation

§ 5

§ 14

§ 10

§ 10

Table 7
and table 4

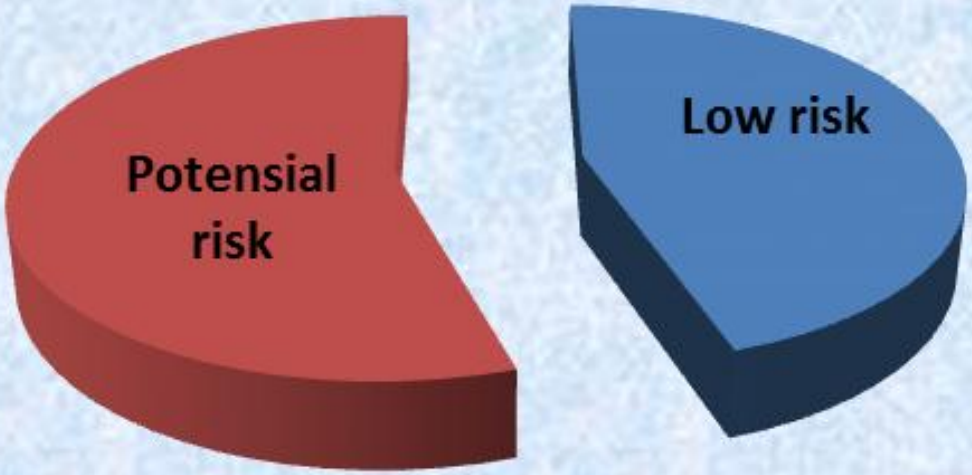
§ 5

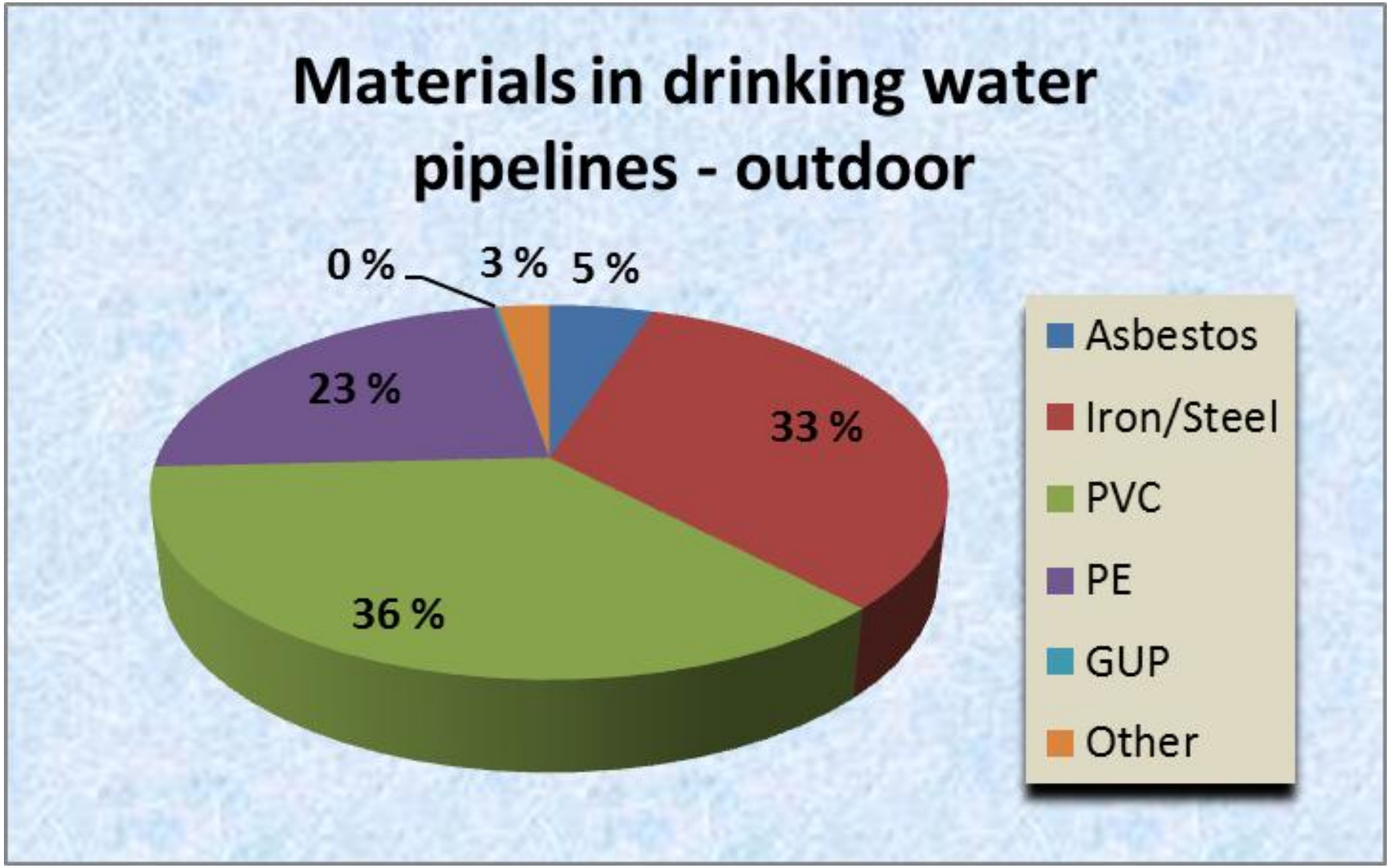
§ 5

§ 11

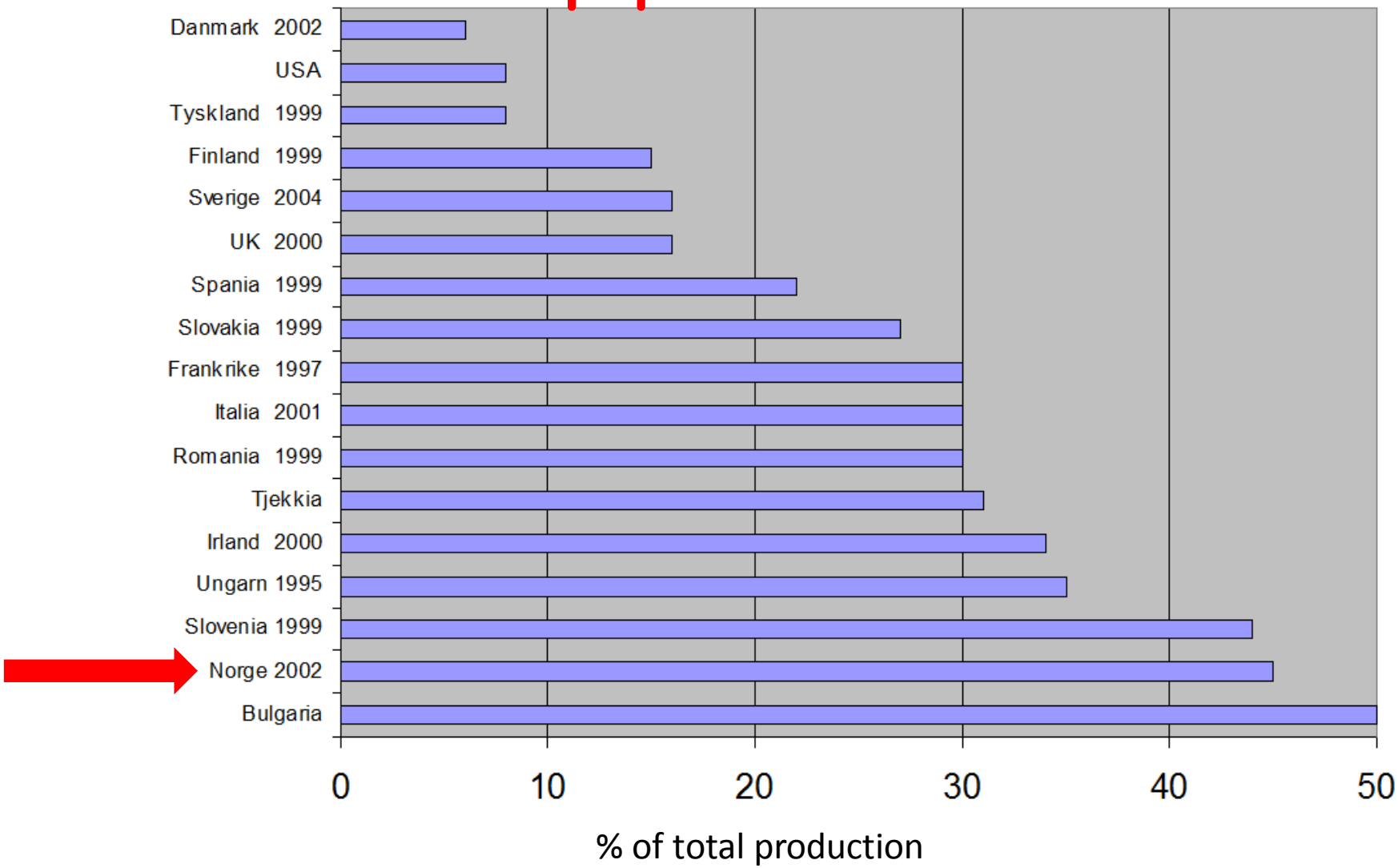
§ 5

Risk for backflush in drinking water systems

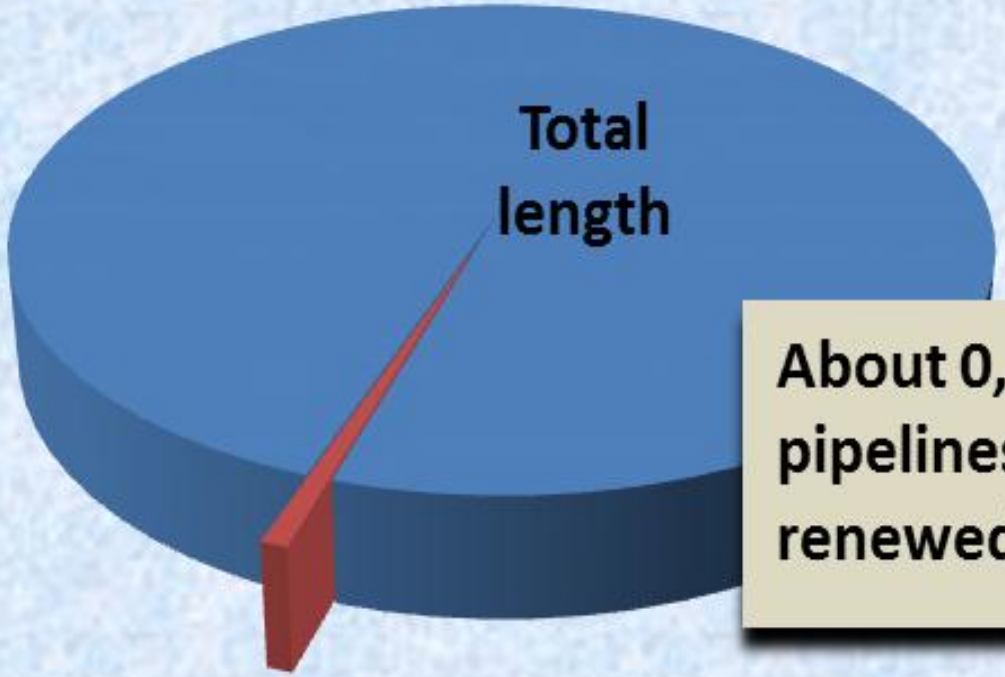



Materials in drinking water pipelines - outdoor
0 %
3 %
5 %
23 %
33 %
36 %
Asbestos
Iron/Steel
PVC
PE
GUP
Other

Leakage from drinking water pipelines



Drinking water pipelines - outdoor



About 0,8 % of the pipelines where renewed in 2011

Summary

- Cooperating is important but also challenging.
- Many water sources with good quality but also local pollution in some areas.
- Many small water supply system with unknown status.
- Inadequate treatment of both sewage and drinking water.
- Leakage and low renewal factor for pipelines.
- Risk for bacterial contamination of the water.