

mali vodovodni sistemi

UPRAVLJANJE

**Pravilnik o higijenskoj ispravnosti vode
za piće:**

**javno snabdevanje stanovništva vodom za
piće je snabdevanje vodom više od pet
domaćinstava, odnosno više od 20
stanovnika**

Obezbeđivanje kvaliteta vode u vodosnabdevanju

aspekti kvaliteta:

tehničko–tehnološki ♦ tehno–konomski ♦ organizacija rada ♦ politika vodosnabdevanja ♦ ekonomsko–politički položaj vodovoda ♦ poslovanje fabrike vode ♦

- ➡ Veliki vodovodni sistemi to (manje-više uspešno) obezbeđuju
- ➡ Mali vodovodni sistemi uglavnom **ne** obezbeđuju

Šta je karakteristično za male vodovodne sisteme ?

Problemi !

(Samo neki) problemi vezani za upravljanje :

- **Izbor izvorišta i zaštita izvorišta !!!**
- **Izbor i kvalitet opreme !!**
- **Kvalifikovano osoblje !!**
- **Novac !!!**

➡ Primer da ovakve probleme imaju i neke od najrazvijenijih zemalja :



Violations and revenues by system size

Pop served	Violations (%)
25-100	21.1
101-500	13.1
501-3300	11.5
3301-10000	11.3

Source: USEPA (1999).

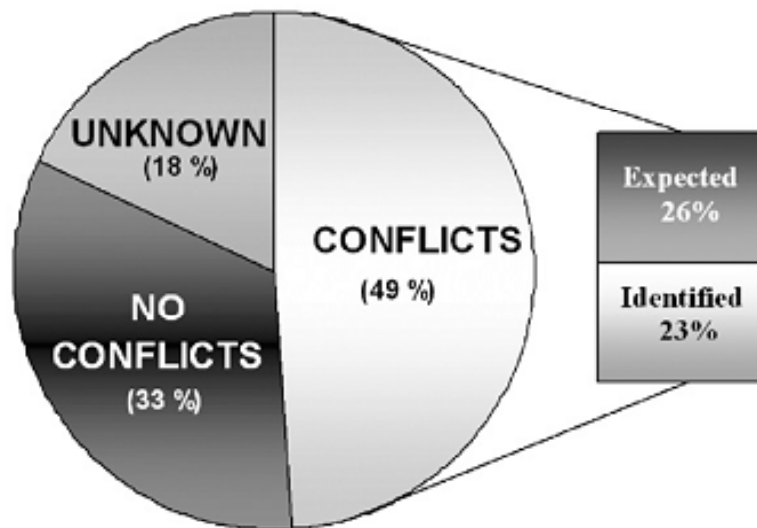
Median revenue per connection and water protection

Pop served	Revenue (\$)	Participation in water protection (%)
25-100	0	28
101-500	144	31
501-1000	223	39
1001-3000	246	35
3301-10000	274	40
10000+	313	50

Source: USEPA (1999).

a

Land use conflict occurrences



n = 147 municipalities

b

Conflicting activities/installations reported by municipalities with identified or expected conflicts

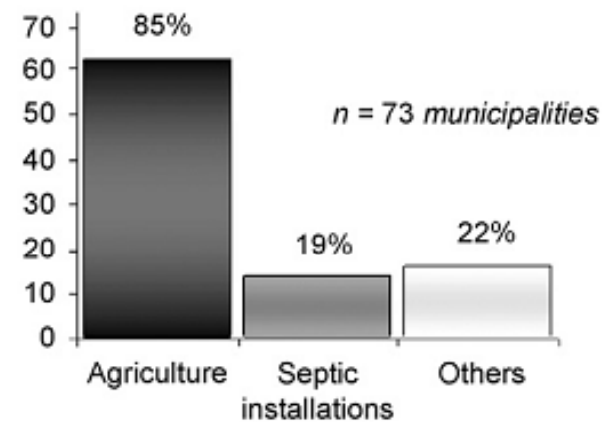


Fig. 5. Occurrences of land use conflicts with GWCR protection areas.

Protection strategies for drinking groundwater sources
in small Quebec municipalities

Kako se radi sada kod nas ?

Mali vodovodi

- **Ostavljani sami sebi**
- **Pripajanje najbližem velikom vodovodu koji se brine o njima**

Kako predlažemo da se radi ?

Stvaranje sistema

Moguće organizovanje :

- **Veliko, složeno preduzeće**
- **Asocijacija više malih vodovoda, sa centralizovanjem samo nekih funkcija**



... **Stvaranje sistema**

... **Moguće organizovanje :**

- **Agencija, pod kontrolom i uz finansijsku potporu vlasti (lokalne / regionalne / centralne)**
- **Privatna inicijativa (jedna firma, više specijalizovanih-povezanih firmi, ...)**

➡ **Primeri tipa vlasništva nad vodovodima u svetskoj praksi:**



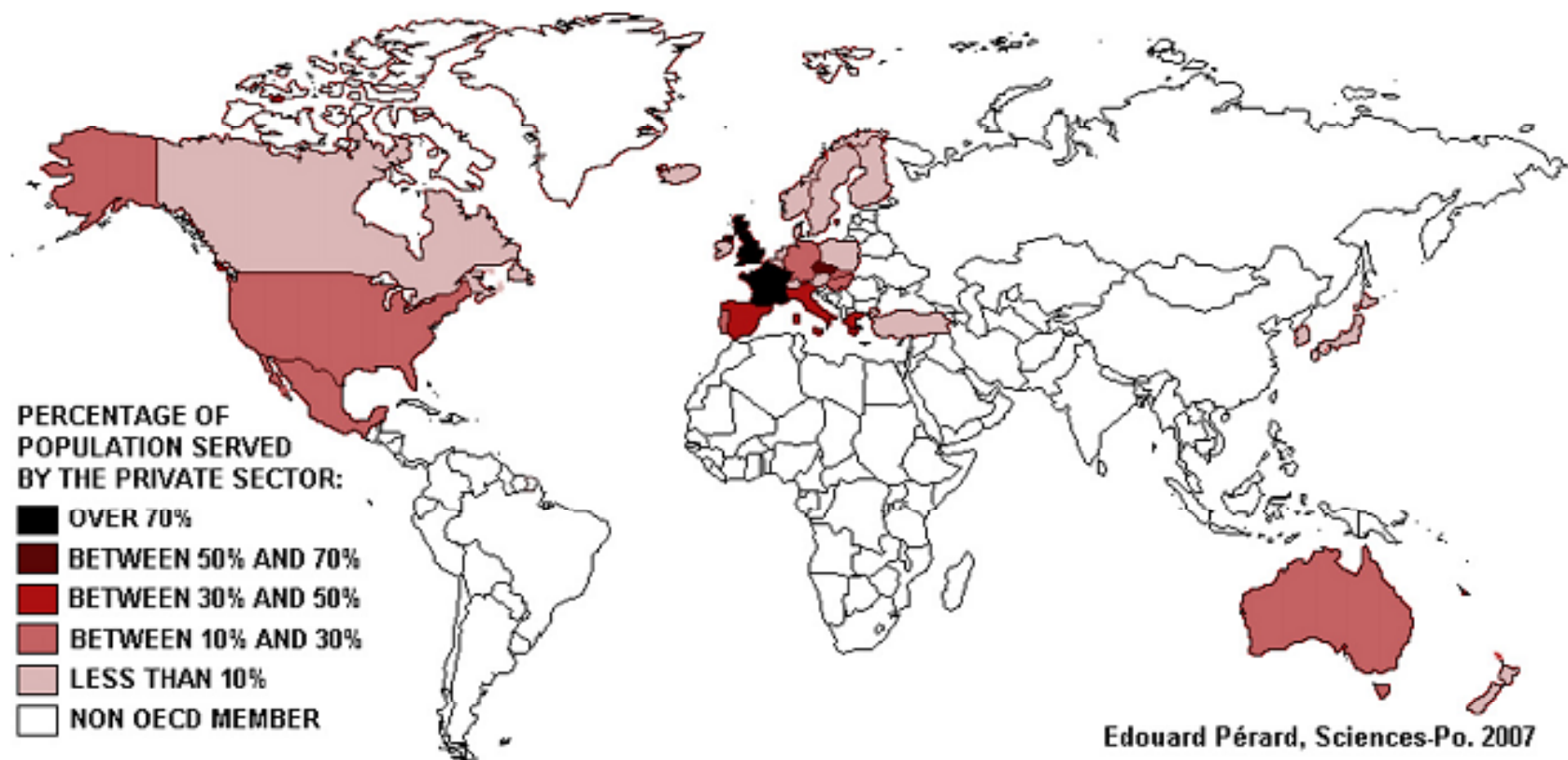


Fig. 1. Private sector participation in water supply in OECD countries. *Source:* Pérard (2007a), based on the review of institutional communication of major private operators, national and local governments, as well as literature review.

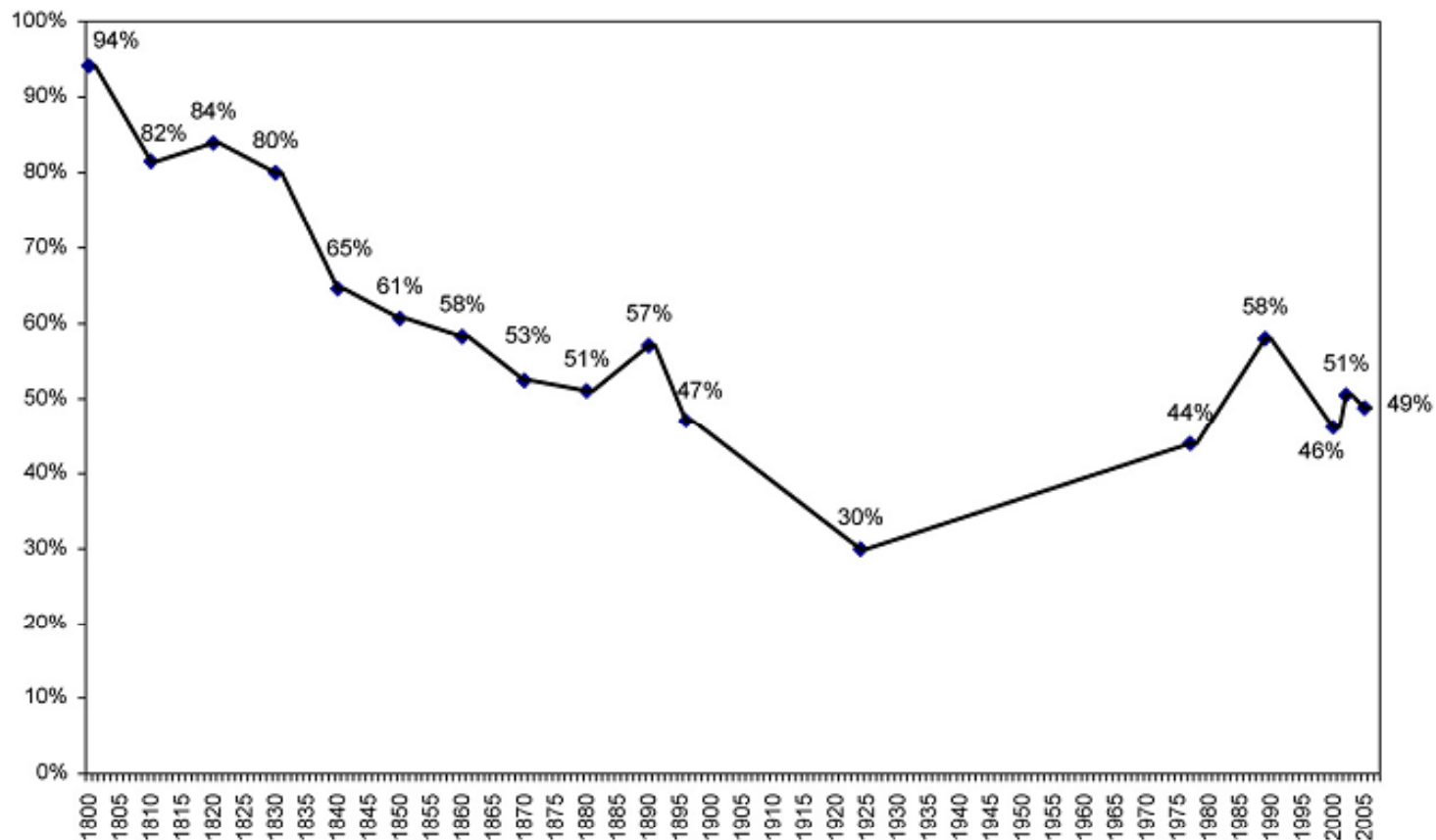


Fig. 2. Percentage of private waterworks in the United States since 1800. *Source:* Pérard (2007a), based on data from Melosi (2000); Jacobson and Tarr (1994); and data provided by the EPA.

The estimation of the percentage of population served by the private sector varies between 10% and 20%.

However, privately owned water providers have remained important in small communities.

Percent ownership of community water systems by size

Pop served	Community/other	Private	Government
25-100	70	23	7
101-500	50	22	28
501-3300	19	18	63
3301-10000	14	16	70
10001+	14	10	76

Source: USEPA (1999).

**Primeri zavisnosti performansi
vodovoda od tipa vlasništva nad
vodovodom:**



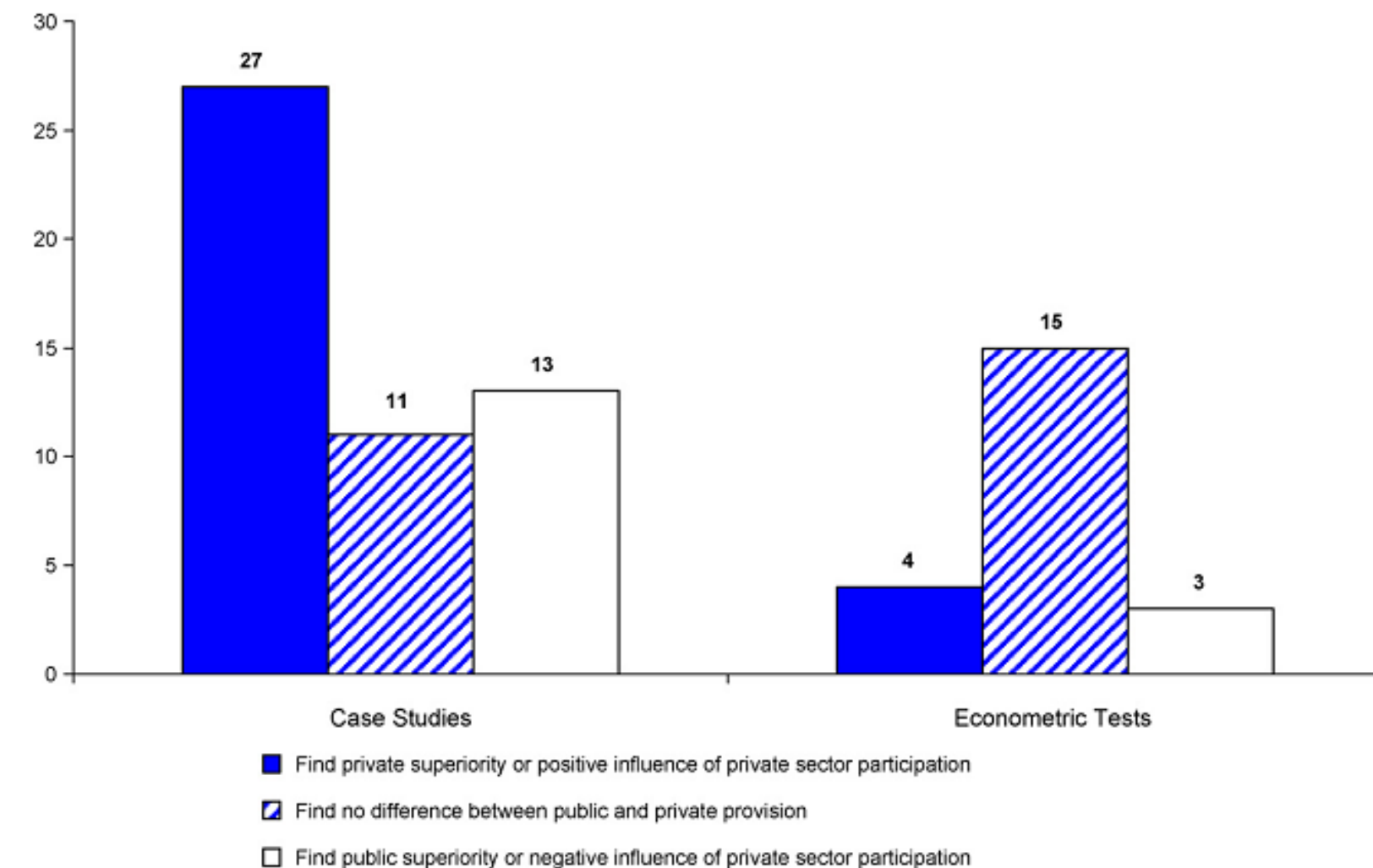


Fig. 3. A review of 51 case studies and 22 econometric tests on public versus private water delivery. Source: Pérard (2007a,b, 2008).

Funkcije sistema :

- **Centrala sistema**

1. **Stručnjaci (hidraš, mašinar, električar, tehnolog, hemičar, mikrobiolog, ...)**

➡ **Saveti / uputstva / ... (telefon, radio)**

2. **Mobilne ekipe (alat, rezervni delovi, terenska merenja i analitika)**

➡ **Intervencije na licu mesta**

3. **Centralni servis (velike opravke)**



... **Stvaranje sistema**

... **Funkcije sistema :**

- **Ostala logistika**

1. **Velike laboratorije (složene analize)**

2. **Proizvođači opreme (tipska oprema)**

- ➡ **Modularna gradnja postrojenja**

3. **Obrazovne ustanove (obuka operatera, dopuna i ažuriranje znanja)**

