

Water-related risk perceptions in the Sonora River Basin

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Outline of presentation

- Water-related risk perception literature
- Water quality and the Sonora River Basin
- Methods
- Results
- Discussion
- Conclusion

Water-related risk perception....

- Definition of risk perception (Slovic, 1987; Weber 2001)

“People are disturbed, not by things, but by their view of them”

Epictetus

Water-related risk perception....

- Few water-related risk perception studies (Axelrod and Slovic 1997; McDaniels et al 1997; Poblete-Davila 2005)
- Few developing world studies of risk perceptions (Corral 2003; MacLennan 2000; Ryley et al. 2006)
- Water-related risks are often underestimated (Dumars et al. 1995; Ingram et al. 1995; MacLennan 2000; McDaniels et al. 1997; Poblete-Davila 2005)

Contributing Factors to Risk Perceptions

Direct Experience:

- Experience with risks (Weber 2001)
- Severity of risks (Kasperson et al. 1988))
- Controllability of risks (Slovic 1993; Weber 2001)

Indirect Experience:

- Trust in risk managers (Slovic 1993)
- Communications regarding risks (Granger et al. 1992; Kasperson et al. 1988)

Other factors:

- Knowledge about the risks (Weber 2001)
- Poverty levels (Bennet and Calman 1999))
- Specific cultural contexts (Bennet and Calman 1999))
- Quality of risk communications (Granger et al 1992))

Risk Perceptions
(Slovic 1993; Weber 2001)

Risk Tolerant:
Willingness to accept a certain amount of risk despite uncertainty (Satterfield et al. 2004)

Risk Averse:
Unwilling to accept something that has uncertainty in the result (Satterfield et al. 2004)

Risk perception research

- Beliefs, values, behavior and culture are important in understanding risk perceptions (Benett and Calman, 1999)
- Interviews and participant observation allow better assessment of risk perception in developing world context where little is known (Ryley et al. 2006)
- Knowledge of risk perceptions allow the development of more effective risk communication messages (Granger et al. 1992; Ryley et al. 2006)

Risk perception study in the Sonora River Basin:

Objective:

Understand perceptions of water-related risk in a rural, developing world setting.

Purpose:

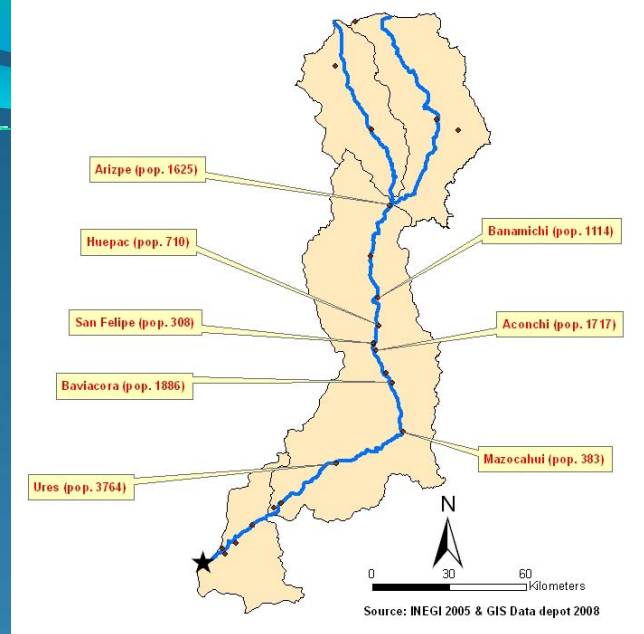
Improved understanding can help decision makers, water managers, and public health officials improve their management and risk-related communications.

The overarching goal:

The development of integrated tools that will promote community-based decision making protecting water resources and public health.

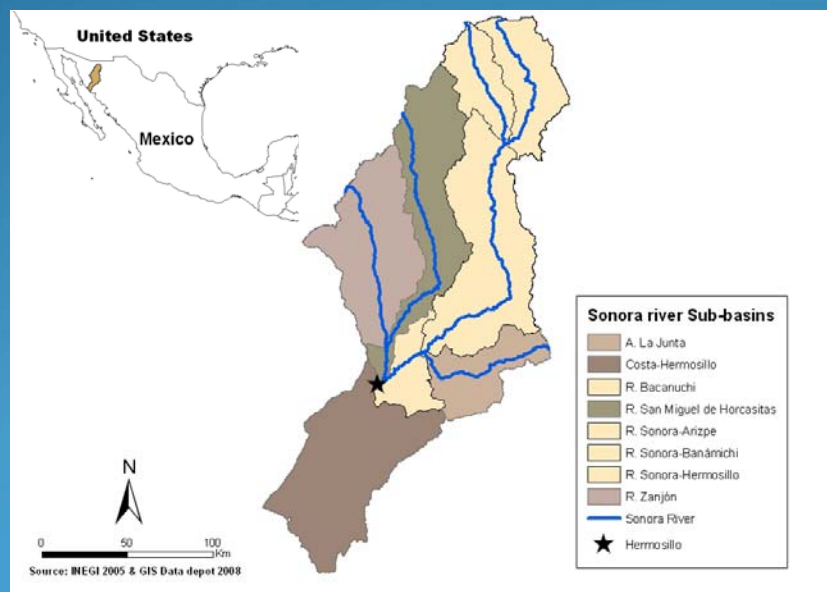
This will include hydrologic studies, surface water quality modeling, and contaminant transport processes.

Sonora River Basin



Summer monsoon season

Dry season Feb - May



Methodology

Research methods:

- * 75 semi-structured interviews with community members, health workers, officials, and priests
- * Participant observation

Question topics:

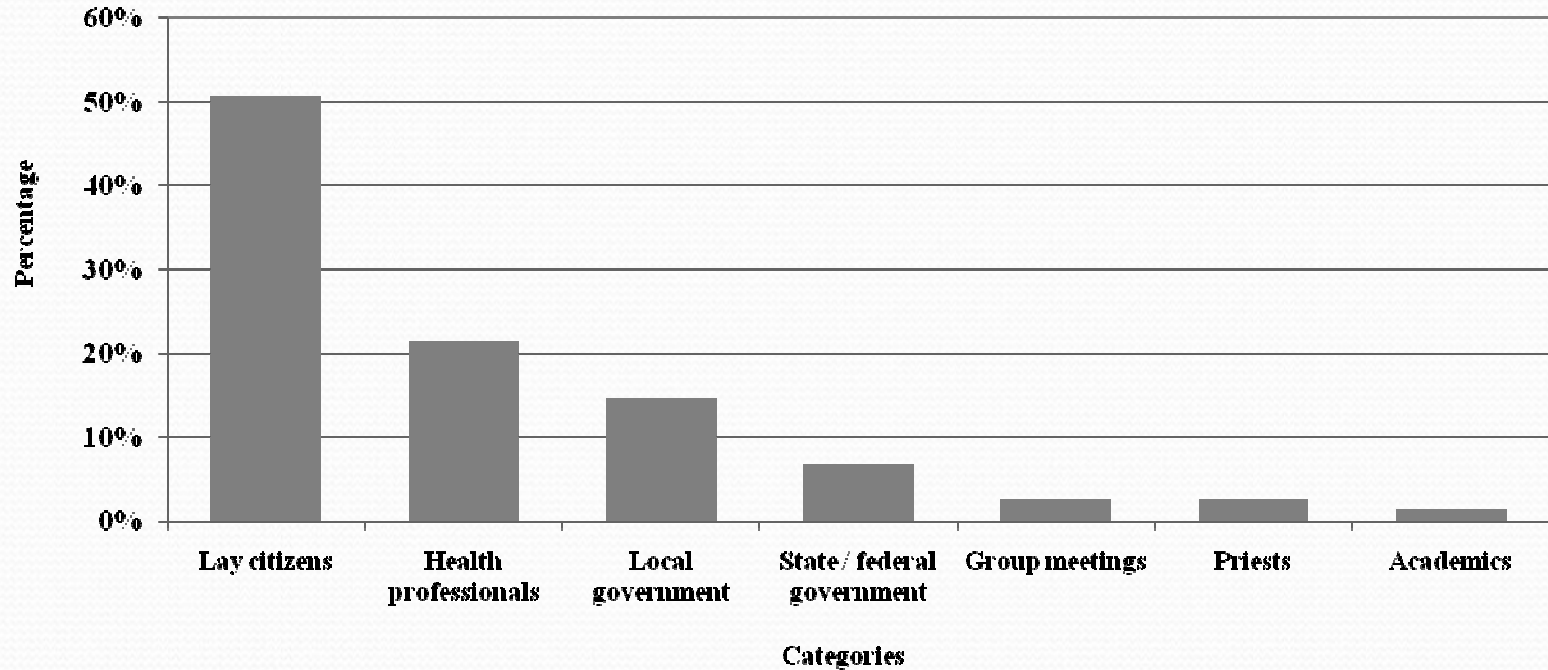
- * Perceived risks associated to waterborne diseases
- * Knowledge of risk reduction strategies
- * Sources of information used in water-related decisions
- * Trust in information sources



Banamichi's wastewater holding pond.

Interviewee Demographics

Percentage of interviews by category



Ages of respondents:	
20-30	9 (12%)
30-40	16 (21%)
40-50	29 (38%)
50-60	16 (21%)
60-70	4 (5%)
Over 70	1 (1%)

Social Classes	Estimated Monthly Income (US dollars)	All interviewees	Lay Citizens
High	> \$2,000	9 of 75 (12%)	4 of 38 (11%)
Medium / High	> \$1,200	11 of 75 (15%)	--
Medium / Low	\$500 to \$1200	43 of 75 (57%)	23 of 38 (61%)
Low	< \$500	12 of 75 (16%)	11 of 38 (29%)

Major findings

- Drinking water-related risk perceptions differed greatly between local government officials, lay citizens, and health professionals.
 - Twenty-seven (36%) interviewees believed that there were no water quality problems in their community.
 - Forty-one (55%) interviewees believed local drinking water quality was good. Sixty-three percent of lay citizens, almost all officials, but only only 1 (out of 16) health official believed local drinking water quality was of high quality.



Baviacora's wastewater discharge point into the Sonora river

Major findings

- Lay citizens did not believe that waterborne diseases posed serious threats to human health.
 - Thirty-eight percent of interviewees stated that they (or a family member) had gotten sick from drinking water, but they did not believe these illnesses were serious.
- For instance, one said:
- Getting sick is no big deal, stomach aches are common, only some people, children and elders are sensitive to tap water.* (Interviewee 20)
- Only 1 of 38 lay citizens and 5 of 11 officials mentioned that there had been local Hepatitis A outbreaks.



Arizpe's wastewater holding pond.

Major findings

➤ Interviewees believed that the risk associated with discharges of wastewater from upstream communities was low.

- Only 18 (24%) knew that untreated wastewater from most river communities is discharged into the river.

For instance, one said:

The wastewater is contained in the pond away from the water wells, it causes no problems. (Interviewee 68)

and another:

There are no problems with the water or wastewater, if there were problems with the water being bad, everyone would be talking about it, and people are not talking about that. (Interviewee 54)

Discussion

- Under-estimation of water-related risks has been connected to low education levels (Ingram et al. 1995; Mclennan 2000), however our fairly highly educated interviewees still believed that local drinking water quality was of high quality.
- A lack of media coverage of water-related risks can decrease risk awareness (Ingram et al 1995) and could be a factor in our study area.



Baviacora's recreational location in the Sonora River

Discussion

- In contrast to prior work in a local urban setting (Corral et al, 2003) we found few non-health professional interviewees concerned about local drinking water quality.
- This study adds a deeper understanding of water-related risk perceptions in a rural setting in Latin America to the risk perception literature.



Elementary children in San Jose de Baviacora with “Protect Our Water” banner.

Conclusions

- Few water and wastewater treatment standards for rural Mexico
- Low impact of local health professional information campaigns.
- Lay citizens' and officials' beliefs that local drinking water carries little risk hinders treatment improvements.



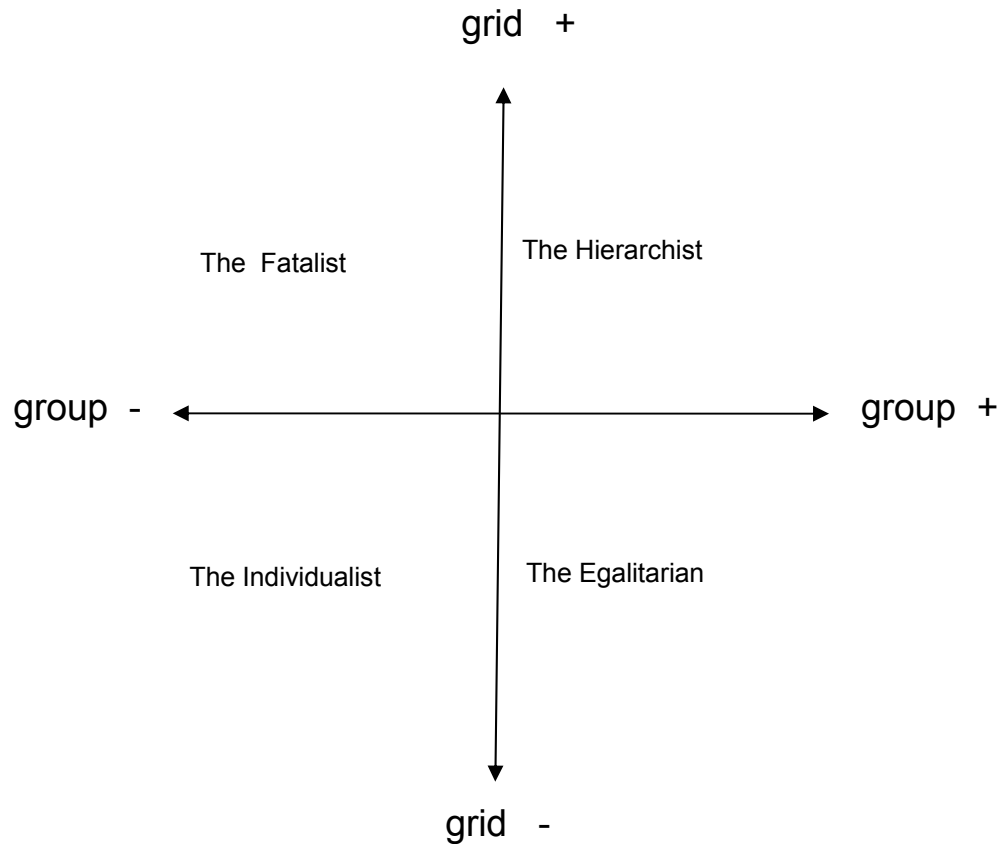
Ures “wastewater holding pond”

Questions and Comments
Thank you!!

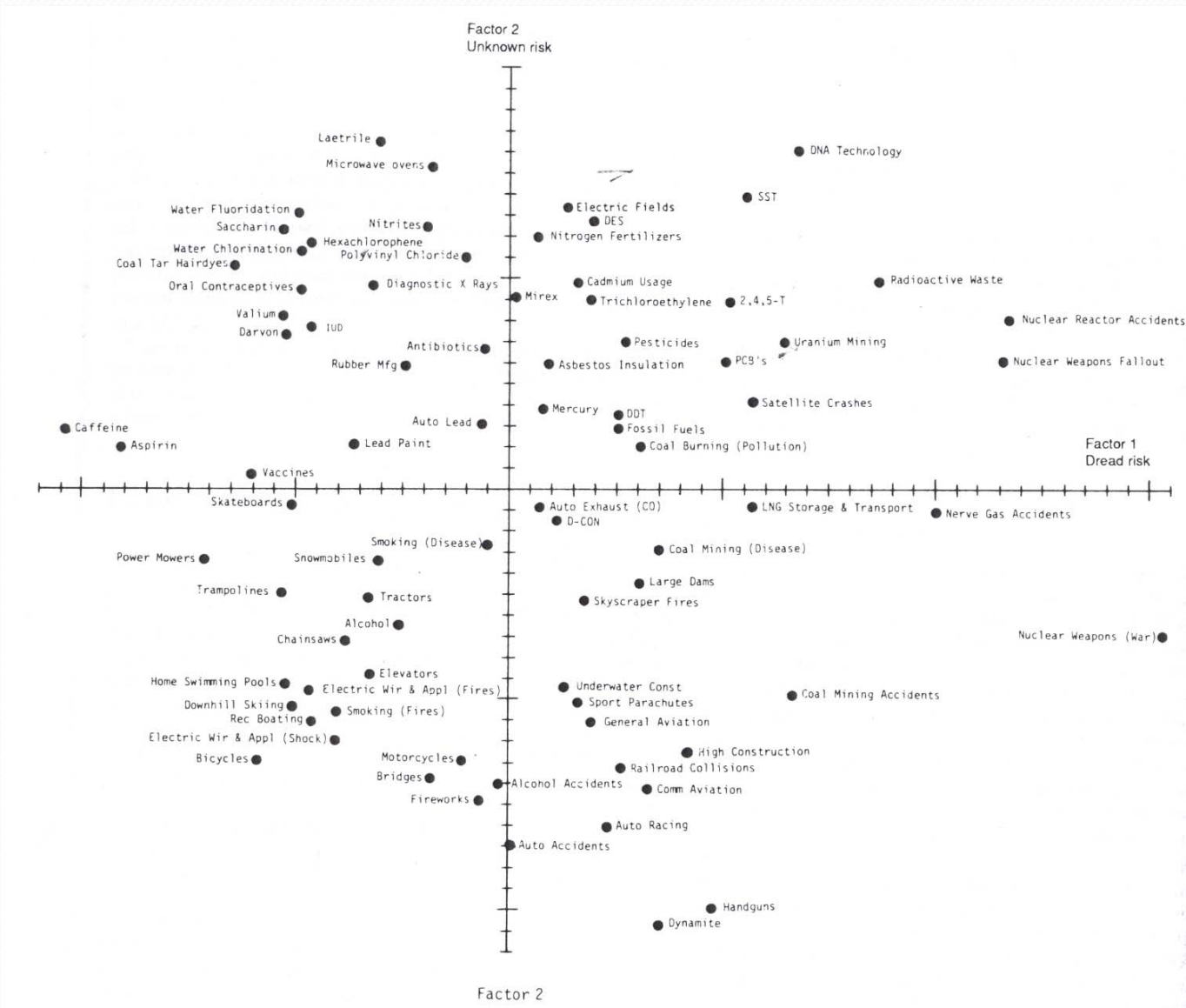


The Field of Risk Perception

- Risk perceptions have been studied mostly under psychological and sociological disciplines.
- There are three main approaches in which risk perceptions have been studied:
 - ***Axiomatic measurement paradigm:*** Attributes of risky options are described as probability functions over possible outcomes (i.e. Combining mortality rates or financial losses and their likelihood of occurrence).
 - ***Socio-cultural paradigm:*** Examined the effect of group and culture level variables on risk perception.
 - ***Psychometric paradigm:*** Tries to identify people's emotional reaction to risky situations and how those reactions may affect their judgment beyond objective consequences.



Douglas and Wildavsky's 1982. Cultural Typology
(Also known as the four ways of life).



Paul Slovic. 1987. Perception of Risk