

## Citizens' involvement in risk management: the view of community members

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### Abstract

**Background:** Industrial risk management plays a central role in creating supportive environments for health. This paper examines the community's trust in citizens' involvement in risk management, investigating differences among settings exposed to different levels of industrial risk. Additionally it aims to identify the social demographic characteristics of those manifesting high trust in citizens' involvement in risk management.

**Methods:** The survey, performed in Sardinia between 2006 and 2007, was carried out in three representative areas this Region: a metropolitan area, an industrial area, and a rural area. A questionnaire was administered to 1,104 citizens to investigate community's trust in citizens as "risk managers".

**Results:** Trust in citizens' involvement in risk management was expressed to a greater extent by residents in the rural area, by those with a high level of education, and by older women. The expression of high trust in citizens' involvement was more likely in older higher-educated women (58-69%) than in lower educated ones (52-63%) and, to a lesser extent, in both genders with higher education (42-51%).

**Conclusions:** A consistent number of the community's members would entrust citizens with risk management not only in areas with a severe industrial impact, but also in those areas where industrial risk is considered of limited entity. The community's tendency towards citizens' involvement in risk management appears to be an intrinsic trait of the community itself rather than an attitude triggered by a specific problem. Older women, and adults with higher education can be recognised as categories in which potential early adopters of risk management can be easily found.

*Key words: risk management, trust, socioeconomic context.*

### Introduction

The Ottawa Charter states the importance of effective community action in setting priorities, making decisions, planning strategies and implementing them to achieve better health. At the heart of this process is the empowerment of communities, their ownership and control of their own endeavors and destinies. The Third International Conference on Health Promotion, Sundsvall, calls upon people in all parts of the world to actively engage in making environments more supportive to health [1].

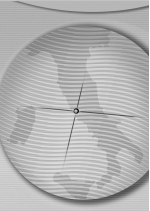
The industrial progress which has characterized European countries during XX century has also inevitably caused a disequilibrium in the environment, by generating risk situations even in areas considered as not actually industrial. In fact, environmental pollution is determined by various anthropic activities (traffic, electromagnetic fields, waste management, agricultural activities,

pesticides...) which, at different levels, impact upon both urban areas and rural ones. For this reason, there is a growing interest and demand for environmental and health protection.

Industrial risk management, which aims to reduce the negative effects of the risks that threaten community health, plays a central role in creating supportive environments for health.

In Italy industrial risk management is almost entirely controlled by stakeholders such as Government, Experts, Environmental or Green Groups, Health Services, Trade Unions and Industry. Usually, citizens are neither involved nor consulted over decisions in risk management, and they are just informed about the final resolutions, above all in those areas where industrial impact is less severe.

Citizens' exclusion from decision making undermines the credibility of the risk management process, and weakens the community's trust in



stakeholders in charge of health and environmental protection [2,3]. Whenever potential hazards linked to industrial development appear, citizens express distrust of official decisions thus stopping or slowing any initiative [4]. Citizens' exclusion generates conflicts between the community and the stakeholders officially responsible for risk management, further complicating the process itself.

The realisation of an industrial risk management process, based on citizens' involvement and on inter-sectorial collaboration, is a way of enabling community empowerment [5,6]. This process is often slow, and it generally needs to be in order to ensure relevance to community aspirations, cultural sensitivity, and improved chance of sustainability. Because of this, it is necessary to promote the development of risk management processes in those areas where industrial risk is not yet severe also, in order to enhance community preparedness to manage future events representing a serious threat for the health, safety, security or wellbeing of the community [7].

Understanding to what extent community members would entrust citizens with risk management is the first step in order to foster public involvement in risk management. Community participation, if not directly requested by the community, requires some kind of access point and penetration. Simply approaching community members and asking them to participate proves unsuccessful [8]. In order to start community participation, Health Promoters need to know which key people represent these access points and where to find them. People who would entrust citizens with risk management, that is people who consider citizens' involvement as important, can be considered as the access point for their community, those who could more easily be involved as stakeholders in risk management [4,9].

In 2002, we carried out a survey in an industrial district, in order to identify trustworthy stakeholders for industrial risk management. Citizens were listed among the other stakeholders conventionally assigned to risk management. Overall, the results showed that half of the interviewees expressed high trust in citizens' involvement in risk management, suggesting that a consistent number of citizens could be available to be involved in a community action aimed towards safeguarding their health [4]. The survey took place in an area declared by the Italian Ministry of the Environment as "at high risk of environmental crisis", and therefore the high trust in citizens' involvement in risk management can mainly be due to the community's awareness of industrial risk severity [10].

One point remains unsolved: would community members also entrust citizens with risk management in those areas where industrial risk is considered of limited entity?

This paper aims to explore the public opinion regarding citizens' involvement in risk management in settings with different levels of industrial risk and it examines to what extent public opinion would entrust citizens with management of environmental risk linked to the pollution of air, water, and soil triggered by industrial activity.

Additionally, this research aims to identify the social and demographic characteristics of those who would entrust citizens with risk management, in order to provide a basis for identifying the more appropriate targets for any mobilization strategy.

### Settings

This survey was performed in Sardinia between 2006 and 2007, and it was carried out in three areas that are representative of the different settings existing within this Region: a metropolitan area, an industrial area including two industrial towns, and a rural area including five towns (three in low-lying areas and two in mountainous areas).

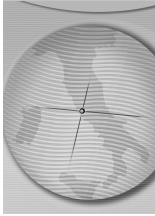
*Metropolitan area.* The urban agglomerate around the capital city (Cagliari), home to around 400,000 inhabitants, is the site of the main industrial (heavy and light industry) and commercial centres of the region. It presents a high level of community density, heterogeneity and pluralism.

*Industrial area.* The considered industrial towns, home to around 8,000 inhabitants, have an economy based on heavy industries, and they present low levels of community density and high heterogeneity. In fact, these communities are characterised by demographic movement and often by social contrasts stemming from two opposed necessities: the need for industries as sources of employment and development, and the growing concerns about the harmful risks for health and the environment.

*Rural area.* The selected rural towns, with no more than 4,000 inhabitants, are characterised by an economy based on agriculture, livestock, tourism and light industries (manufacturing). They present low levels of community density and low heterogeneity.

### Methods

A representative sample was selected through quota sampling, according to gender, age, and education level, from demographic data from each of the considered areas. The total sample



consisted of 1,104 citizens (544 male and 560 female), 368 in the metropolitan area, 298 in the industrial area, and 438 in the rural area, aged between 18 and 70 years of age.

A closed format questionnaire including eight questions was used. The questionnaire, analogous to the one used in previous research [4,11], included the following sections: social and demographic data (age, gender, education level, employment), risk perception of several risk factors (infectious diseases, lifestyle, environmental pollution, accidents, electromagnetic fields), opinions about solutions to minimise risks linked to industrial activities, risk management, and favourite communication tools.

The questionnaire was administered, through interview, by postgraduate students attending the School of Public Health, who had been trained by the researchers of the Department of Public Health. The proportion of non-responders was less than 8%; these people were substituted by people with the same demographic characteristic.

This study focused on the following question:

- To what extent would you entrust the following organizations with the management of risks arising from industrial activities?

Eight stakeholders were listed: citizens, green (environmental group), trade unions, experts, health service, local government, central government and industry.

The possible levels of entrusting were “high”, “low”, “nothing” and “I do not know”. For the analysis, the levels “low”, “nothing”, and “I do not know” were considered jointly as “low”, because only “high” could be interpreted as a clear orientation towards the approval for citizens’ involvement in risk management.

According to the aim of the research, the attention was focused on citizens as stakeholders

in risk management. Hence the sample was split into two categories: the first one included community members who would entrust citizens with risk management, and the other one included those who would not entrust citizens. A descriptive analysis of the level of entrusting according to area of residence, gender, age and education, was performed.

In order to investigate the socio-demographic characteristics of community members oriented towards citizens’ involvement in risk management, a multivariate logistic regression was performed. The tendency towards citizens’ involvement in risk management (people entrusting citizens versus who would not) was the dependent variable; gender, age class (young 18-30; adult 31-60; old > 60), education level (primary school = low, high degree or higher = high), and area of residence (metropolitan, rural, and industrial areas) were the independent variables. The second order interactions between the independent variables were also included in the model. The logistic regression analysis was performed through a backward procedure based on eliminating the least significant interaction and independent variables at each step.

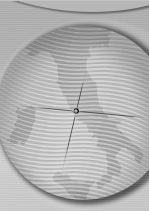
The results are reported indicating the Odds Ratio, CI 95%, and the p value for each variable. Additionally the probability of being oriented towards citizens’ involvement in risk management was calculated for several combinations of the considered variables on the basis of the coefficients and of the constant estimated through the logistic model.

## Results

Table 1 shows the proportion of people expressing high trust in the involvement of a number of stakeholders in risk management,

**Table 1. Proportion of citizens expressing high trust in the involvement of the following stakeholders in risk management, according to area of residence.**

STAKEHOLDER	AREA OF RESIDENCE		
	METROPOLITAN	INDUSTRIAL	RURAL
Central government	0,40	0,22	0,56
Local government	0,61	0,33	0,60
Green	0,59	0,63	0,54
Health service	0,57	0,63	0,61
Trade union	0,10	0,13	0,16
Industry	0,32	0,14	0,25
Experts	0,57	0,73	0,69
Citizens	0,40	0,40	0,49



according to area of residence. Independent of the area of residence, 60% of citizens, express high trust in Experts, Health Services, and Environmental groups. A high trust in the local government is declared by 60% of residents in metropolitan and rural areas, but only by 33% of citizens in industrial areas. Central government receives high trust by 56% of rural area residents, by 40% of metropolitan residents and by 22% of industrial area residents. The proportion of high trust expressed for trade unions and industry were always very low.

The descriptive analysis, reported in Table 2, shows that the tendency toward entrusting citizens with risk management is expressed to a greater extent by residents in rural areas, by women and by adults, whilst no relevant differences were observed for education.

Table 3 displays the results of logistic regression analyzing the tendency towards entrusting citizens with risk management as a function of demographic and social variables. The data showed that the considered variables significantly influenced the tendency toward entrusting citizens with risk management. The area of residence appears to influence the tendency towards citizens' involvement in risk management, and highlighted that in the metropolitan and industrial areas this tendency was expressed to a lesser extent than in the rural areas. The level of education had a slight effect too: the tendency towards citizens' involvement is 1.31 fold higher in people with high education

Gender and age classes significantly affect the tendency towards citizens' involvement, and their effects reveal an interaction (interaction gender by

young class: value= 0.27 and  $p < 0.01$ ; interaction gender by adult class: value=0.33 and  $p < 0.01$ ).

As a consequence of the interaction between gender and age classes, the influence of gender is relevant only in the older age class in which the tendency towards citizens' involvement is fourfold higher in women than in men; in the adult group there are gender differences but without persuasive statistical evidence, while, in the younger class, no gender differences were observed.

The effect of age classes varies across gender: in men, the tendency towards citizens' involvement was twofold higher in adults than in older classes, whilst the young class did not significantly differ from the older class. In women, the tendency towards citizens' involvement is higher in the older class than in the younger one ( $OR = 1/0.39 = 2.5$ ), and the adult group was not significantly different from the older class.

Table 4 displays the probability of being oriented towards citizens' involvement in risk management according to specific levels of demographic and social variables.

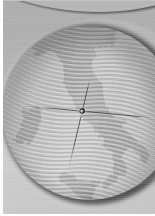
Overall, this probability ranged in metropolitan and industrial areas from 28-29% to 58-60%, while, in rural areas it was greater, fluctuating between 38% and 69%.

In metropolitan and industrial areas, the probability of being oriented towards citizens' involvement was highest in older women with high education (58-60%), and it settled around 50% among older women with low education and adult women with high education. The lowest probabilities were seen in older men (21% -26%) and in younger low-educated men and women (28-29%).

In rural areas, the highest tendency towards

**Table 2. Descriptive analysis: trust in citizens involvement in risk management according to area of residence, education, gender, and age class.**

		TRUST IN CITIZENS	
		Low	High
Area of residence	Metropolitan	60%	40%
	Industrial	60%	40%
	Rural	51%	49%
Education	Low	57%	43%
	High	55%	45%
Gender	Men	61%	39%
	Women	52%	48%
Age classes	Youngs (18-30)	63%	37%
	Adults (31-60)	53%	47%
	Olds (> 60)	58%	42%



citizens' involvement were observed in older women of both education levels (63-69%), in adult women with low and high education (55-62%), and in adult men with low and high education (48-54%). The lowest probabilities were shown by older men of both education levels (30-36%).

### Discussion

A successful risk management program requires both inter-sectorial collaboration and community participation, but a good balance between these two objectives is a difficult task [8,12]. Realizing a participatory risk management requires a deep knowledge about citizens' trust towards the different stakeholders responsible for risk management, including the citizens themselves [4]. This research suggests that a relevant proportion of people value the involvement of Experts, Health Services, and Green in risk management favorably. Additionally our results highlight that a consistent number of the community's members would entrust citizens with risk management not only in areas with a severe industrial impact, but also in those areas where industrial risk is considered of limited entity.

People living in rural areas, characterised by mild industrial risk, are more inclined to involve citizens in risk management than residents of

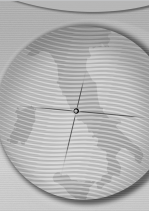
metropolitan and industrial areas. This result points out that the community's tendency towards citizens' involvement in risk management is not influenced by risk severity, but it appears to be an intrinsic trait of the community itself rather than an attitude triggered by a specific problem. As reported in the introduction, communities living in rural areas present a high level of cohesion and a high sense of community, consisting of a shared history and identification. In these communities, the sense of belonging, the common place of interest, and the sense of making a difference to a group, all promote citizens' involvement in a community action for their health [8,13,14].

In contrast, the lower social cohesion of metropolitan and industrial areas could discourage participation by fostering depersonalized relationships, thus introducing new challenges in the process of shared risk management. When community action programs are implemented in these areas, this weakness has to be taken into account, and additional resources should be dedicated in order to foster social cohesion, which would consequently facilitate community involvement.

Additionally, the results point out that the tendency towards citizens' involvement in risk management is more developed in higher educated people and in

**Table 3. Multivariate analysis: trust in citizens' involvement in risk management as a function of gender, age, education and area of residence.**

VARIABLES	COMPARISONS	OR	C.I. 95%	p
AREA OF RESIDENCE	<i>Rural area</i>	1		
	Metropolitan vs Rural area	0.61	0.46 - 0.82	0.001
	Industrial vs Rural area	0.65	0.48 - 0.88	0.01
EDUCATION	<i>Low education</i>	1		
	High vs Low education	1.31	1.01 - 1.70	0.04
GENDER conditional on age	<i>Young Men</i>	1		
	Young <b>Women</b> vs Young <b>Men</b>	1.10	0.69 - 1.75	0.70
	<i>Adult Men</i>	1		
	Adult <b>Women</b> vs Adult <b>Men</b>	1.35	0.99 - 1.83	0.057
AGE CLASSES conditional on gender	<i>Old Men</i>	1		
	<b>Young Men</b> vs <b>Old Men</b>	1.44	0.74 - 2.80	0.28
	<b>Adult Men</b> vs <b>Old Men</b>	2.12	1.15 - 3.93	0.02
	<i>Old Women</i>	1		
	<b>Young Women</b> vs <b>Old Women</b>	0.39	0.21 - 0.72	0.003
	<b>Adult Women</b> vs <b>Old Women</b>	0.71	0.41 - 1.22	0.21



# ITALIAN JOURNAL OF PUBLIC HEALTH

older women. However, the gender difference in trusting citizens' involvement is declining across generations. In fact, whilst among the older class, women appear to be more oriented towards citizens' involvement, in the adult and younger classes these differences are negligible perhaps due to the fading of traditional gender divisions.

The results reported in Table 3, showing the probabilities of expressing high trust in citizens' involvement, could suggest a practical method for identifying "the access point of the community", those who would entrust citizens

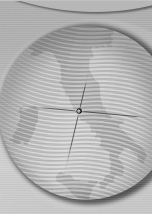
with risk management. This might also represent categories of citizens primed to be available for involvement in risk management activities and we could probably find such representatives therein.

According to these results, the high trust in citizens' involvement in risk management is more likely in older women with high (58-69%) and low education (52-63%) and, to a lesser extent, for adults of both genders with high education (42-51%); in rural areas also, less educated adults manifest a probability of involvement of around 50%.

These findings confirm the strong connection

**Table 4. Probability of expressing high trust in citizens' involvement in risk management according to specific levels of social and demographic variables.**

AREA OF RESIDENCE	AGE	GENDER	EDUCATION	PROBABILITIES
METROPOLITAN AREA	YOUNG	MEN	Low	0.28
			High	0.33
		WOMEN	Low	0.29
			High	0.35
	ADULT	MEN	Low	0.36
			High	0.42
		WOMEN	Low	0.43
			High	0.50
	OLD	MEN	Low	0.21
			High	0.26
		WOMEN	Low	0.52
			High	0.58
INDUSTRIAL AREA	YOUNG	MEN	Low	0.29
			High	0.34
		WOMEN	Low	0.31
			High	0.37
	ADULT	MEN	Low	0.37
			High	0.44
		WOMEN	Low	0.44
			High	0.51
	OLD	MEN	Low	0.22
			High	0.27
		WOMEN	Low	0.53
			High	0.60
RURAL AREA	YOUNG	MEN	Low	0.38
			High	0.45
		WOMEN	Low	0.40
			High	0.47
	ADULT	MEN	Low	0.48
			High	0.54
		WOMEN	Low	0.55
			High	0.62
	OLD	MEN	Low	0.30
			High	0.36
		WOMEN	Low	0.63
			High	0.69



between involvement and social power [13]. Historically, the woman's social role was to take care of herself as well as of others, and, in 'her' old age this attitude naturally flows into an interest for active participation in community management [15]. In metropolitan and industrial areas, higher educated adults normally represent the main detectors of the social power and are not accustomed to delegating choices that can affect their lives. In rural areas also, low educated adults are often associated with having a powerful role in the town.

The social demographic categories in which the probability of expressing high trust in citizens' involvement is at least 50% could be expected to be the access point for the development of community action.

According to Rogers' theory on "Diffusion of

Innovations", these categories can be recognised as groups in which potential early adopters can be easily found, thus assuring, also because of their social power, a powerful trigger for community action [8]. Additionally, they could facilitate the involvement of other community members through a snowballing process.

On the contrary, other important social and demographic categories, particularly young people and older men, appear skeptical and cautious towards citizens' involvement in risk management and could be excluded in community actions. Although it is unrealistic to expect total community involvement, innovative strategies should be experimented and implemented in order to enhance the involvement of young people.

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