

## URBAN AND RURAL VALUES: TECHNOLOGICAL PERSPECTIVES

*Bruce E. Tonn*

*Oak Ridge National Laboratory  
University of Tennessee  
Knoxville, United States*

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In this highly interactive session, the participants explored interrelationships between urban and rural values and the application of advanced and exotic technologies in urban and rural settings. Participants first discussed and prepared lists of core urban and rural values, drawing upon their cultures, experiences, and backgrounds. Next, participants discussed and listed typical problems that currently afflict urban and urban areas. Then, the participants considered the acceptability of using advanced and exotic technologies to solve current and future urban and rural problems. The results of each part of this session are presented immediately below.

The first part of this session focused on eliciting from the participants typical urban and rural values. It was explained that there are different types of values. *Held values* are fundamental values that represent core beliefs. These values do not often change and are usually not subject to compromise or trade-offs. Honesty and loyalty are examples of held values. *Instrumental values* represent valued states of the world and/or public policy goals that express held values. Clean water and safe neighborhoods are examples of instrumental values.

The following values were elicited during the session:

*Urban Values:*

Clean air  
Being with people  
Preventing starvation  
Community  
Equity  
Good housing  
Street smarts  
Convenience  
High Culture  
Urbanity  
Freedom  
Self-government  
Multiculturalism  
Safe environment

*Rural Values:*

Solitude  
Land  
Community  
Equity  
Accessibility of water  
Sustainability  
Cooperation in need  
Integrity of species  
Private property  
Stewardship  
Austerity  
Self-sufficiency

There are several observations that can be made about these lists of values. The first observation is that the initial lists of values, both rural and urban, contained mostly instrumental values, such as good housing and accessibility of water, respectively. Additional values were added to the lists during the discussion of the various technologies and these values were held values. In other words, discussions about specific technologies did a better job of revealing people's held values than did a general, brainstorming type of discussion.

The second observation is that the lists of urban and rural values are not that distinct. City dwellers may value urbanity and multiculturalism, which are essential characteristics of cities. Rural inhabitants may value solitude and self-sufficiency, which can be achieved in rural settings. Otherwise, values such as community and equity and freedom and private property can be seen to cross-cut urban and rural settings.

The lists of problems afflicting urban and rural areas elicited from participants are as follows:

Urban Problems:

Traffic congestion  
Waste management  
Pollution  
Lack of clean water  
Crime  
Alienation  
Housing  
Energy  
Jobs  
Homeless  
Pessimism

Rural Problems:

Lack of transportation  
Lack of Education  
Water quality and accessibility  
Soil degradation  
Physical infrastructure  
Social infrastructure  
Energy  
Agricultural production  
Out migration  
Jobs

These are formidable lists of problems. The lists would certainly have been longer had more time been available for this brainstorming task. While these lists do overlap to a degree (e.g. jobs, energy), the lists diverge a bit more along urban and rural dimensions than do the values. For example, in urban areas, traffic congestion is the problem whereas in rural areas just having access to transportation is the problem. Out migration is a problem for rural areas and it is known that immigration is a major problem for the major cities in developing countries. Overall, the participants were very knowledgeable about problems facing urban and rural areas.

Next, four technologies were presented for discussion: toxic waste incinerators, intelligent transportation systems, genetically modified organisms, and nanotechnology. Each is a purported technological solution to one or more of the problems listed above and cross-cut urban and rural contexts.

Toxic waste incinerators are used to burn toxic wastes, to produce electricity and to eliminate the need for land disposal of toxic wastes. On balance, reactions to this technology were negative. It was argued that the toxic waste incinerators would result in more rather than less pollution, especially more air pollution. Several participants stated that they did not trust the science behind arguments that such incinerators are safe. Trust, it turns out, is a key held value that impacts many decisions about technology.

It was discussed that people's risk perceptions greatly influence technology decisions, in both urban and rural settings. People's risk perceptions about a

technology such as toxic waste incinerators may differ widely from positions held by so-called technology experts. In a democracy, the experts need to understand people's perceptions and underlying concerns and values. They also need to be able to communicate the risks associated with technologies such as toxic waste incinerators. Communicating probabilities of risks is especially challenging, as people generally do not understand probabilities, such as a  $10^{-6}$  risk of dying of cancer. Because of the issue of trust, experts also need to develop and clearly explain plans for managing risks associated with the technologies.

The second technology discussed was intelligent transportation systems (ITS). Targeted mostly for congested urban areas, ITS will have the capability to manage traffic flows through a city's highways and major streets. This is accomplished through powerful computer technologies that accept as input where and when people wish to drive and produce as output suggested routes. This technology drew both supporters and critics. Supporters felt that computers are more efficient than human brains, could definitely improve traffic flows, would reduce pollution and energy use, and improve safety. The system would also create an environment where people would cooperate to reduce congestion, using the system as a cooperation facilitator. Opponents felt that ITS just supports the old paradigm of transportation, people driving around in gas guzzling automobiles. People might lose their cognitive abilities for spatial-navigation. There would be a loss of personal freedom and privacy because the system would know where everyone is at all times. Also, it is fair to say that another held value began to emerge during this discussion, one that is generally against advanced technology's holding an important role in everyday life.

The third technology brought up for discussion was genetically modified organisms (GMOs). GMOs hold promise to improve agricultural productivity in rural areas. New crops would be designed to ward off pests and not be harmed by pesticides and herbicides. Some crops might have the ability to fix nitrogen in the soil, and survive droughts and frosts. Presumably, the crops would produce higher yields, too.

The discussion about GMOs brought out several additional values. Supporters noted that GMOs held great promise to feed starving populations. Genetic engineering could also help to preserve biodiversity, which to some is an important value, if some key species could be engineered to withstand climate change and invasive species. Opponents re-iterated the lack of trust in the science and in the scientists working for profit-making companies who tout GMOs. Some felt that GMOs violated a held value that life ought not to be tampered with. Opponents also stated that starvation could also be dealt with through better food distribution systems.

Assessing the acceptability of GMOs brought more held values into the discussion than did the discussions of the other two technologies. Opponents of the other two technologies might have been able to accept those technologies under certain circumstances, meaning that instrumental values were primarily driving their opinions. However, opponents of GMOs appeared much less likely to compromise in this case. Tampering with life is a held value not easily traded-off.

The fourth technology presented was nanotechnology. Unlike the other three, which either exist or are being implemented in some form, nanotechnology is not close to being a reality. However, the promise of nanotechnology is such that futurists should begin considering its impact on society. For discussion purposes, nanotechnology was described as a black box that could take inputs of matter (e.g. carbon) and produce food, clothes, glass, and other items for use by households. Each home would have a nanotechnology black box or would have access to black boxes located in neighbourhoods.

This vision of nanotechnology generated much discussion. Proponents cited the technology's ability to save energy, provide more free time to people, decentralize production and distribution of products. The technology could herald a 'new society'. It was this new society aspect that most concerned opponents. There could be loss of employment and culture associated with traditional methods of production. There could be a loss of humanity and widespread boredom. Could the systems be used to produce weapons or lead to other security risks? Would the systems be affordable? In general, the nanotechnology world did not appeal to, and maybe even scared, opponents.

In hindsight, it is clear that different people look at technology in different ways. Some proponents value change and progress through technology. Some opponents value traditional ways of living and non-technological worlds. These values are not easily classifiable into urban or rural perspectives.

In conclusion, the session was useful for introducing the processes of value elicitation and evaluating the acceptability of new technologies. Participants learned through the discussions how values impact technology acceptance and how difficult technology decisions can be. Much more time could have been spent in identifying values that influence technology acceptance that did not surface during the initial discussion of urban and rural values. The discussions raised several issues that developers of new technologies need to consider if they hope to implement their creations.