DEVELOPING THE TAXONOMY OF COMMUNITY RISK VARIABLES UNDER THE "NO NET RISK GAIN MODEL" TO SATISFY QUALITY OF LIFE OBJECTIVES DURING FEDERAL FACILITY ENVIRONMENTAL CLEANUP EFFORTS

Larry Lapachin, Intern
Mervyn L. Tano, President
International Institute for Indigenous Resource Management
444 South Emerson Street, Denver, CO 80209
iiirm@iiirm.org

ABSTRACT

An environmentally just risk assessment tool must be developed and employed to adequately identify, assess, and measure the complex array of risks at federal facility cleanup sites. Conventional risk assessment, as practiced in the United States, is currently the most widely used and accepted risk management tool to address federal facility cleanup activities, development, and redevelopment issues. However, inherent limitations exist within these conventional, standard-driven risk assessment policies that do not reflect the values of the impacted community. When applied to a diverse and/or indigenous population, a flawed risk assessment may result because pollution standards based largely on assumptions may not satisfy the cleanup goals of the community. For example, the risk assessment may not account for bioaccumulation effects in flora and fauna that may impact a community's quality of life, including cultural traditions and nutrition and aesthetics.

To overcome these limitations and strive for a more environmentally just risk assessment, the International Institute for Indigenous Resource Management (IIIRM) is developing the "Taxonomy of Community Risk Variables." This Quality of Life evaluation tool is designed to serve as a risk assessment framework to assist tribes, communities both urban and rural, and other stakeholders to identify, characterize, and measure both positive and negative risk factors within their community. The underlying philosophy of this risk assessment process is to ensure a proposed development or cleanup is environmentally just by, at a minimum, imposing no additional risk to the community or, ideally, improving the overall well-being of its citizens by decreasing the overall risk burden.

INTRODUCTION

The United States, as an industrialized nation, produces a wide variety of goods and technologies that make our lives "more convenient and efficient." However, the by-products to develop these goods and benefits, such as means of transportation, the production of energy, and the manufacturing of goods, may pose grave health risks and consequences. Over the past three decades, concern over the "disproportionate distribution" in the amount of environmental hazards and the subsequent consequences that impact minority and low-income communities have led to the environmental justice movement (Institute of Medicine, 1999).

The environmental justice movement is young and evolving and will continue to evolve to influence and shape federal facility cleanup decisions. Defining when (at what stage) and how (by what cleanup technology and/or residual contamination level) a federal facility cleanup site satisfies environmental justice criteria is difficult, if not impossible, to determine because of the vagueness of the environmental justice definition. Traditional risk assessment methods of assessing human and environmental risk are currently being applied, allowing an "acceptable"

amount of pollution to exist or be emitted, while adhering to the "safe" regulatory contamination standards established to safeguard human and ecological health. These "acceptable" cleanup standards are based on assumptive human and ecological health risk standards of a typical suburban lifestyle and were not developed to achieve environmental justice. By default, stakeholders often use this risk assessment framework, adhere to its standards, and assume the risk-based decisions and environmental effects of the federal facility cleanup site will not pose an unequal burden on the host and neighboring communities. A comprehensive, holistic risk assessment model is needed to identify, measure, and account for all the distributive risk burdens affecting the community, including ecological and human health and cultural consequences, within the realm of federal facility cleanup.

QUALITY OF LIFE AND THE TAXONOMY OF COMMUNITY RISK VARIABLES

The promotion of individual well-being and community health has been a central goal in society for many years. The notion of increasing or maximizing an individual's quality of life is an objective sought by a variety of entities, including city governments, the military, health care providers, etc. Each entity and even individual forms their own definition and standards to achieve quality of life, including establishing key indicators to reach their goal. From city to city and individual to individual, the elements and requirements that define quality of life criteria will change. To improve the health of the community, however, citizens must be given the opportunity to communicate their values and perspectives to improve their quality of life.

The International Institute for Indigenous Resource Management (the "Institute") is developing the "Taxonomy of Community Risk Variables" to address quality of life indicators and environmental justice variables impacting a community. The Taxonomy is a comprehensive listing of community risk burdens that describes environmental justice factors that have either beneficial or adverse effects on the human, ecological, and cultural aspects of a community. The Institute is using a broad definition of risk to include factors such as educational attainment levels, access to sacred sites, housing conditions, public transportation, employment status, etc. The Taxonomy is designed to be the primary evaluation tool Indian tribes and communities can use to *identify, define, and measure* myriad environmental, health, social, cultural, and other risk factors that are circumscribed by the impacted communities' sense of justice. By fostering public involvement, the Taxonomy can increase the community's capacity of being well informed and educated on health, environmental, and cultural issues and concerns that affect their standard of living. A knowledgeable community is equipped to make valuable suggestions and contributions during the decision-making process.

NO NET RISK GAIN MODEL

The underlying philosophy of the Taxonomy of Community Risk Variables is the "No Net Risk Gain Model." This model ensures a proposed development and/or cleanup is environmentally just only if it imposes no additional risk to the community on which the development is to occur. "No Net Risk Gain" can be achieved through two methods: by minimizing or eliminating an existing risk, such as the removal of lead based paint in old housing stock; and/or by increasing or introducing a benefit, or community resource, such as the construction of a community-based health care clinic that provides prenatal care. The Taxonomy is a major component of the "No Net Risk Gain" model and can be used in a variety of settings from federal facility cleanup to brownfield redevelopment sites and other development activities.

The Taxonomy consists of three elements:

- Risk Factor

- Characteristics
- Data Measure

RISK FACTOR

The risk factor broadly *identifies* the environmental justice risk variable, such as unemployment, unsafe housing conditions, restricted access to sacred sites, educational attainment levels, etc. that may be affecting a community. The identified risk factors intend to be comprehensive to allow diverse communities to easily identify positive and negative risk burdens impacting their community.

A broad set of identifiable risk factors will allow the community to provide a snapshot of their quality of life, "catching" as many risk variables as possible. To avoid singularly listing every conceivable risk factor, one of the objectives and challenges is to collapse related risks together to allow the community to more easily identify and understand the risk factors and manage the Taxonomy. At the same time, however, the risk factors must provide sufficient detail to include important aspects of their community, such as cultural risk issues that communities may deem critical to positively improve their quality of life. For example, the passing down or teaching future generations the native language or cultural traditions and customs may be collapsible into the educational indicator framework.

CHARACTERISTICS

The second section, characteristics, *describes* the human, ecological, and/or cultural consequence(s) of the risk factor. The characteristics may include several descriptions in attempting to define all of the various facets of the risk factor. For example, the characteristics of a risk factor associated with housing concerns may include lead paint within old housing stock; lack of affordable housing; and the community concern over abandoned housing. The characteristics that may define a community-identified educational risk factor may be include ensuring the passing down of indigenous customs and beliefs to future generations; achievement of students; a high student dropout rate; and the accessibility to computers or modern technology.

DATA MEASURE

The data measure, or metric attached to each risk factor converts the Taxonomy from a tool for identifying and defining the universe of community risk factors into an evaluation tool for *assessing* the environmental justness of the federal facility cleanup. The set of metrics will provide each risk factor with a weight, which is designed to prevent a "trade-off" from occurring during the cleanup process. A "trade-off" is a common occurrence during the traditional risk assessment and cost-benefit process where the risks, both positive and negative, are evaluated equally without regard to the severity or degree of the risk burden. For example, an increase in the number of industrial jobs may be a "traded-off" for an increase in the amount of air pollutants emitted from the factory. The immediate and long-term effects associated with these risk burdens need to be analyzed to provide a holistic risk assessment picture. For example, the creation of employment opportunities may increase the economic viability of the community, including fringe benefits, and retirement options, but may also increase the amount of particulates in the air, causing an increase in the maintenance costs of structural buildings, damage to natural resources (water, land), and increase in respiratory illnesses (asthma). The metrics is designed to enable the community to evaluate the complex set of environmental, health, cultural, and economic risks related to federal facility cleanup to determine whether the proposed activities are environmentally just by imposing no additional risk to that already experienced by the host community.

The Institute is considering a wide variety of data measures to include within the set of metrics, such as life expectancy, per capita income, mortality rates, etc. This approach may offer an alternative to employing traditional economic indicators. In many cases, economic data measures fails as an adequate means to address and measure the community's quality of life. The Institute will suggest the need for additional research to be conducted in areas where a risk factor cannot be adequately quantified.

Data measures, such as percentages and rates, can be used to document selected community demographics at a particular period of time. Specific measurable statistics, such as infant mortality or unemployment rates, taken over a period of time can draw comparisons to previous years, contribute to the understanding of changes occurring, and be used to explain possible linkages and relationships. Although difficult to prove causality, the community can continue to monitor their collective health and well-being throughout the federal facility cleanup process to further study trends within their community, while continually contributing to the community's knowledge base.

An example of the Taxonomy is presented below:

Risk Factor	**Characteristics**	**Data Measure**
Unemployment	*Decrease* in psychological well-being, Mental health, Feelings of self-worth	Life span, lost income *Rates* of hypertension, Mental health disorders, Substance abuse
(Mathers and Schofield, 1998)		
Unsafe Housing Conditions	Lead in all mediums (paint, pipes, soil)	Children with "high" lead-blood levels lose, on average, 5 IQ points
(EPA, 1991)		

The community can also account for gender and age specific subpopulations within the Taxonomy. To account for diverse segments of a community, specific demographic data, such as age, gender, race, ethnic background, employment status, educational attainment, housing, and income are some crucial indicators that need to be identified and addressed to improve the community's environmental health and achieve environmental justice. For example, an unhealthy nutritional diet or the loss of a culturally significant food source may pose a health risk to adults, as well as affect the development of their children. A community may also identify additional community services for the elderly population that is experiencing some basic service and health needs. Oftentimes, pre-existing stressors may be the underlying health concern of sensitive subgroups. Pre-existing ecological factors may be identified to measure their effect on the community's physical, emotional, and psychological health. The community, as firsthand observers of human and environmental health and cultural risk factors, may be able to use the Taxonomy as a tool to document their health status and monitor their risk.

CULTURAL RISK

The risk assessment at a federal facility cleanup site should consider different lifestyles and values of all cultures that may be impacted to "tell the whole story." "Culture" is a collective knowledge and systemic unity that gives members a sense of personal identity and cultural anchorage (Greaves, 1996). The contamination and remediation activities of a federal facility cleanup site may impact different cultures in different areas or degrees of severity. A cultural risk

is any impact to the resources that a culture deems as an inseparable part of their livelihood (Harris, 1998).

Cultural resources that are or may be impaired or impacted during the federal facility cleanup process need to be identified. The Taxonomy identifies a variety of cultural risk components that may be affected during cleanup process, such as accessibility to culturally significant sites, loss of sensory attributes of a site (sound, site, taste, smell), local economy ramifications because of ecological decline or destruction, etc. The wide range of cultural risk burdens may encompass religious, nutritional, geographic (including sacred landscapes), educational, and psychological aspects of a community concerns.

THE TAXONOMY AS AN COMMUNITY EMPOWERMENT TOOL

Communities may use the Taxonomy as a negotiating tool with regulators, developers, and other stakeholders. Community members will be able to identify, define, and articulate community risk factors during the decision-making process. Even though community supplied information and data related to environmental justice concerns may lack scientific attributes, their input and concerns are critical during the decision-making process to strive for collaboration and consensus between all stakeholders. By becoming informed and proactive, community members can build effective relationships and establish and foster positive communication channels with federal facility personnel.

The Taxonomy may also foster and improve the relationship between the community and various social institutions. The collaboration and coordination with families, schools, medical facilities, stores, businesses, welfare services and offices, and recreational facilities is needed to provide relevant information and input during the risk identification phase. The diversity of stakeholder concerns ensures that a wide variety of community risks are being identified. For example, the Taxonomy may serve as a link between the community and public health practitioners and professionals to disseminate information. The Taxonomy, as an empowering tool, should encourage community collaboration and consensus building and prioritize community's needs and concerns.

FUTURE WORK

The Institute is currently meeting with experts in the Denver area to gain feedback and insight on key risk-based indicators identified within the Taxonomy. We are meeting with professionals in the social service, educational, and health fields, as well as community grassroots organizations and environmental justice groups that provide services and conduct research on specific subpopulations. The information gathered is being used to help develop the Taxonomy.

The Institute intends to conduct field tests to determine the applicability of the Taxonomy in culturally diverse communities. Because communities can identify specific risk factors affecting their quality of life, the field testing will be a crucial step to construct a more complete and applicable Taxonomy. For example, impacted communities will possess the knowledge to identify and describe genetic susceptibilities and unique exposure pathways that contribute to adverse or beneficial health effects of its citizens. This process has the capability to empower communities and ensure federal facility environmental cleanup efforts are environmentally just.

REFERENCES

Greaves, T (1996) Tribal Rights. Valuing Local Knowledge. *Island Press,* Washington, D.C., pp 25-40.

Harris, S.G. (1998) Cultural Legacies. Plenary Address at the Society for Risk Excellence Annual Meeting, December 7, 1998.

Institute of Medicine (1999). Toward Environmental Justice: Research, Education, and Health Policy Needs. *National Academy Press*, Washington, D.C.

Mathers and Schofield (1998). The Health Consequences of Unemployment: The Evidence. *Australian Institute of Health and Welfare.*