Geog 464 Learning Objective Outline

LOO 23 Challenges in Integrated and Linked Analysis – the Sustainability Analysis Challenge
23.1 What are the challenges in integrated and linked analysis in terms of the six leverage points outlined by Mitchell addressing integrated resource management? *RUGIS* Chapter 13. Section 13.3
23.2 What are some case studies demonstrating integrated watershed management approach?

23.1 What are the challenges in integrated and linked analysis in terms of the six leverage points outlined by Mitchell addressing integrated resource management? *RUGIS* Chapter 13. Section 13.3
As mentioned in Chapter 1, integrated management of resources is not easy, whether integration occurs across functional themes or across decision situation processes. Much of the challenge is not technical, but social in nature, particularly from an inter-organizational perspective.

Most of the challenges involve institutional arrangements; remember that the first construct of the decision situation assessment involves institutional mandates, or what Mitchell (1990) calls "arrangements". These are "relationships within and among organizations. Institutional arrangements have been defined in various ways as reviewed by Mitchell (1990). He enumerates seven dimensions of institutional arrangements:

(a) legislation and regulations,
(b) policies and guidelines,
(c) administrative structures,
(d) economic and financial relationships,
(e) political structures and processes,
(f) historical and traditional customs and values, and
(g) key participants or actors.

To gain insight into institutional arrangements, Ingram et al. (1984) urge that analysts assemble

a) information about the participants and their stakes,
b) resources to which they have access in pursuing their interests
    legal rules and arrangements,
    economic power,
    prevailing values and public opinion,
    technical expertise and control of information,
    control of organizational and administrative mechanisms,
    political resources, and the
c) biases inherent in alternative decision-making structures.

Assembling such information is what decision situation assessment is meant to do. The previous section points out how to do that at different levels of detail. GIS learners, no matter what level of technical expertise, should take time to appreciate such arrangements.

Based on the seven dimensions of institutional arrangements, Mitchell (1990) synthesizes six types of leverage points (action areas) that can foster integrated management of resources.

(1) context,
(2) legitimization,
(3) functions,
(4) structures,
(5) processes and mechanisms, and
(6) organizational culture and participant attitudes.

The types of leverage points can be considered a framework through which to improve integration management, i.e., ways to improve the flow of information among people and organizations to improve the effectiveness of information. Although each of the types of leverage points is introduced in sequence, the types of leverage points influence each other in various ways. Nonetheless, Mitchell's sequencing is intentional.

Each leverage type represents a necessary, but not sufficient condition for achieving integration management. In different situations, the relative importance of each leverage point could vary. Thus, the institutional framework is meant to be opportunistic in the sense that it identifies points at which leverage may be exerted to improve integration.

When we combine the institutional framework with the decision situation assessment framework (of chapter 2) we provide ourselves with a comprehensive way of understanding how to effect information integration management. Below we further detail the six types of leverage points of the institutional framework.

(1) Context – to understand success or failure of integrative efforts with regard to context, an analyst should have a solid understanding of at least the following four elements (Mitchell 1990).

a) state of the natural environment,
b) prevailing ideologies,
c) economic conditions,
d) legal, administrative, and financial arrangements

(2) Legitimization - as boundary effects will inevitably exist, it is essential to identify the following elements (Mitchell 1990).

a) goals and objectives of pertinent agencies,
b) responsibility, power, or authority of agencies,
c) rules for intervention and arbitration of conflicts by higher authorities

(3) Functions – generic and substantive management functions should be linked explicitly to legitimization and to structures (Mitchell 1990).

a) Generic functions of GIS analysis to provide information sight,
b) Substantive functions specific to a sector or resource, e.g., supply, sewage treatment, pollution control, floodplain management, erosion control, drainage, and wetlands, linkages among water, environment, and economy plus others,
c) Scale is a key concern as in local, state, and federal levels of governance
d) Different mixes of scales, generic, and substantive functions will be appropriate in different situations.

(4) Structures - organizational and inter-organizational relationships devised to carry out functions (Mitchell 1990). When selecting structures, several issues should be considered.

a) match between functions and structural form is often imperfect,
b) regardless of the structure chosen, boundary problems between organizational responsibility and action will emerge,
c) various permutations and combinations could be constructed,
d) single structure is not likely to handle all aspects of a management problem.

(5) Mechanisms and Processes - because legitimization, function, and structures are unlikely to fit together perfectly, *both formal and informal mechanisms and processes are needed to facilitate bargaining, negotiating, and mediating at the boundaries of those arrangements.* Whichever mix of mechanisms is chosen, a variety of processes can be drawn upon to pull together diverse viewpoints.

(6) Organizational culture and participant attitudes - integration, cooperation and coordination depend to a significant extent upon the willingness of participants to make them happen (Mitchell 1990). *Identifying the characteristics of the organizational culture and the participants' attitudes regarding disincentives and incentives for integration therefore becomes important.* Through fuzzy legitimization, unclear functions and cumbersome structures, an organizational culture develops which creates real barriers to integrated and cooperative effort.

Organizational culture and participant attitudes can be crucial to the success of an integrated approach. Since many disincentives regarding integration exist, it is of fundamental importance that the "human dimension" be given equal consideration relative to legitimization, functions, structures and process/mechanisms.

If coordinated management of water and land resource is to be achieved, the scope of a holistic approach must be carefully thought through. Mitchell (1990) recommends a two-stage strategy for a holistic approach:

1) At a strategic level, a comprehensive viewpoint is desirable where that implies scanning the widest possible range of issues and variables; more themes but fewer details.

2) At an operational level, however, a more focused approach should be utilized; more details but fewer themes.

Making a link between the strategic and operational levels supports a sustainable development approach to improving community well-being.

One might say that these two levels parallel Heathcote's (1998) observations of the link among plans (strategic), programming (link between strategic and operational), and implementation (operational).

GIS is used at both (all three) levels to provide insight about conditions and strategies, and it is up to the team working on these issues to bring together the proper insight to foster well-being.

23.2 What are some case studies demonstrating integrated watershed management approach?

American Water Resource Association on integrated water resource management.
http://www.awra.org/about/awards/iwrm-award.html

The Integrated Water Resources Management (IWRM) approach to water resources has been a hallmark of AWRA since its establishment in 1964. The AWRA Policy Statement on Integrated Water Resources Management in the US recommends that water management goals, policies, programs, and plans be organized around the concept. AWRA is committed to helping organizations throughout the nation, and the world, further the implementation of IWRM. AWRA presents many case studies for integrated water water resource management. For example, November 2012
http://www.awra.org/committees/AWRA-Case-Studies-IWRM.pdf