



## **A Systems Approach to Community Land Use Education, Planning, and Action**

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*“Contributing to the well-being of small towns and rural communities.”*

**A Systems Approach to Community Land Use Education, Planning, and Action**  
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**By Timothy Collins**  
**and**  
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*The integration of sustainability and community requires a systems perspective focused on the relationships among numerous stakeholders.*

- Edwards, 2005, p. 29

**Abstract**

This paper discusses the academic and applied roots of a Land Use Toolbox that takes a systems approach to land use education, planning, and action. The toolbox recognizes crucial community sustainability elements to link ecological and sociocultural facets of local and regional land use. A matrix links stakeholder community interests with cross-cutting themes such as watersheds, economic development, government, and quality of life, along with individual and community activities.

**Introduction: How the project came about**

The story we are presenting involves a meeting of research and practice, with a dose of teamwork. It grew out of an extension agent's field experiences and reflection from 2001 to 2005, developing into a land use toolbox that takes a systems approach to education, research, organizational planning, and action. It turned into a partnership

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between Penn State Cooperative Extension and the Northeast Regional Center for Rural Development.

Initially, our goal was to develop a land-use model for a website and curriculum with:

- multiple points of entry based on stakeholders' interests;
- core topical matter; and
- cross-cutting topical matter.

What we ended up with was:

- a starting point for in-depth analysis of the land use “problem” from a community development perspective;
- a recognition of the complexity of the land use problem from social and environmental viewpoints;
- the ability to assess organizational capacity to deliver programming and conduct research; and
- the potential to plan and develop priority areas for both research and programming.

Our story is unfinished because of a career move, limited resources, and the daunting scope of the project. The toolbox emerged from local practice and a team approach that tapped a reservoir of community development knowledge at Penn State University and the Northeast Regional Center for Rural Development, along with several other Land Grant Universities in the Northeast. This paper is a story about/reflection on the practical and theoretical roots of the project.

### ***Protecting hallowed ground***

Gettysburg, Pennsylvania, holds a special place in American history because of its fame as the site of a brutal battle that helped turn the tide of the Civil War against the South. Dr. Collins arrived in Gettysburg in February, 2001, joining Penn State Cooperative Extension as a community development agent in Adams and neighboring York County, with responsibility for land use. He remembers being in awe of what had

happened in Gettysburg in 1863. Not only that, he was struck by the beauty of the landscape of the Appalachian Piedmont, with its rolling hills, orchards, dairies, and grain farms interspersed with small settlements.

Yet, changing land use was clearly evident in this urban fringe area. As he wrote in his first newspaper column in late March, 2001:

You've probably noticed signs of the time: farms being developed as housing subdivisions; a major new manufacturing facility and an electric generating plant; proposals for larger-scale agriculture production facilities; new shopping areas; and increased traffic, even when tourism is at its low seasonal ebb.

Adams County is indeed poised at a crucial historic moment. We already have seen changes in our rural landscape. We certainly will see even more growth and development. Like it or not, this is the reality we face (Collins, 2001).

The reasons for past and coming changes in the area were clear. Adams County is at the western edge of the East Coast metroplex, located about 55 miles from Baltimore and 75 miles from Washington, DC (Map 1). It had experienced relatively steady population gain since the 1950s (Chart 1) and a long-term decline in the amount of farmland, dating back to the 1800s (Chart 2). In his early presentations to community members, Dr. Collins drew on economic and community development literature to show people why Gettysburg was going to face increasing development pressures sooner, rather than later. These factors included:

- Attractive, small town qualities, including a rich sense of history;

- Relatively low cost of living, especially compared with nearby Maryland. In fact, contractors touted Pennsylvania's lower housing costs that resulted from lower land prices and a limited building code (Figure 1);
- Relatively low taxes, compared with Maryland;
- Climate, with somewhat mild winters;
- Tourism, which brought a constant stream of people to see the area's rural, scenic beauty and high quality of life; and
- Location, location, location.

### ***The Regional Picture***

Participation in the project by the Northeast Regional Center for Rural Development (NERCRD) grew out of the recognition of rapidly changing land use in the center's 13-state area. In the four years before development of the toolbox, NERCRD had allocated most of its resources to the subject of land use. This decision was based on stakeholder input. NERCRD brought together extension and research faculty to develop a comprehensive land use agenda; to develop grant applications that allow the agenda to be carried out; to identify leading curricula in land use from around the nation; and to identify gaps in land use extension programming. A number of publications on the subject are available in print format and on the center's website.

The Northeast contains about 22% of the U.S. population on 6.7% of the land area. While holding the largest consolidated metropolitan area, the Northeast also has some of the most rural states. Goetz (2003) points out a number of factors and issues in the region:

- Land on the urban fringe is cheaper, valued highly by homebuyers (a private benefit);
- Farmers sell out when the amount offered exceeds profits from agriculture plus non-pecuniary benefits;
- Current residential development is widely believed to have negative public impacts;
- The Northeast is more generous than any other region of the country in converting land to accommodate newcomers; and
- Within the Northeast, Pennsylvania is by far the most generous in land conversion.

***Who's talking to whom? Or not***

As Dr. Collins began to lay out his community development program, which focused on participatory action research and leadership development, he grew increasingly aware that the county's leadership pool was limited, and different land-use groups across the county were not necessarily talking to each other. Numerous organizations were engaged in various aspects of land use, ranging from the National Park Service and its volunteer organizations, to the Chamber of Commerce, a land and watershed organizations. In addition, the county had recently spent \$3 million on a new Agriculture and Natural Resources Center to house extension, the county farmland preservation program, the volunteer-run land conservancy, the Conservation District, and the U.S. Department of Agriculture. The facility did not house the county planning office, which seemed to be a shortcoming in the county commissioners' strategy to bring the units together to improve communications about land use.

Legalities and turf impeded wider intergovernmental communications. Pennsylvania law puts county planning commissions into an advisory capacity, so it was difficult for the agency to communicate the importance of coherent planning to Adams County's 34 municipalities. Elected officials of townships and boroughs have ultimate legal authority for land use decisions within the municipality. Each municipality has its own advisory planning unit, with widely varying degrees of government and citizen expertise and interest in planning. Pennsylvania law allowed contiguous municipalities to develop a joint comprehensive plan and land use ordinances, but this approach was not all that common at the time.

Although Adams County generally appeared to be a relatively healthy community (or group of communities), turf wars and inefficient communication among government agencies, nongovernmental organizations, and interested citizens left considerable room for community development efforts to build networks, synthesize diverse knowledge and perspectives, and build leadership capacity.

## **Where practice meets theory**

### ***Systems thinking***

Land use is a complicated subject that lends itself to a systems approach. Systems thinking is hardly new. According to Bellinger (2004), Descartes and Bacon developed an analytic framework for understanding, as well as the scientific method. Newton, with the discovery of the laws of motion and gravity, provided us with a clockwork paradigm for understanding the universe. His incomplete paradigm embodies essentially a linear

cause-and-effect relationship, a short-term perspective for understanding how things really work.

Some see the emergence of modern systems thinking in 1956 when J. W. Foster at MIT applied his knowledge from electromechanical research toward corporate management (Bixler, et al., 1996). Senge (1990), also an MIT professor, brought systems thinking to the fore by making it into a management pillar, “the Fifth Discipline” that complements "personal mastery," "mental models," "shared vision," and "team learning." As Bellinger (2004) notes, when we go beyond the linear cause and effect paradigm to study behavior patterns and then to study systemic interrelationships among parts of systems, we develop a much deeper understanding about the way things operate.

***Planning: Moving toward a holistic, inclusive approach***

Planning, by definition, is a systems-based effort to integrate various facets of resource allocation in a community into a holistic blueprint for future activities. Yet, planning has been hobbled by the view that it is restrictive, not constructive or creative like infrastructure development (Wertz, 1982). Even so, planning activities grew markedly across the United States during the 1920s. The Great Depression helped emphasize the importance of planning:

The theory of *laissez faire* and the practice of uncoordinated social and institutional development have too long been applied to both the physical and functional aspect of rural institutions and to rural social life. In many communities there has been no planned development at all, but simply an extension of social statics from well into the past up until the present time.

Fortunately, neither the doctrine of *laissez faire* nor the belief in social statics is in good standing at the present time. These have given way before the attack of the more dynamic and more productive theory of social tESIS, which holds that the social and institutional life of a community, county, state, or nation may be purposely planned or directed

in order to achieve certain predetermined ends and objectives. Such a theory has given meaning and usefulness to the term *planning*.

The present volume represents a compilation of various attempts which have been made to attack, *systematically*, certain rural problems and to plan for a rural life designed to achieve individual adequacy, on one hand, and social effectiveness on the other [italics added] (Cole and Crowe, 1937, p. vii).

Cole and Crow (1937) outline three major subdivisions for comprehensive planning: human resources, natural resources, and economic. By the late 1970s, researchers were adapting systems engineering approaches to comprehensive planning that were said to account for scientific, technical, legal, institutional, social, economic, political, and other social factors (Haimes, 1982). These systems approaches allowed for the development of potential mathematical alternatives to help individual or group decision-making (Nijkamp and Rietveld, 1982).

The development of computers enhanced the climate for systems approaches to land use. Weisz (1977) outlines a land use planning models seminar offered in the spring and summer of 1974 at the University of Arizona. Students came from urban planning, landscape architecture, and agricultural economics, as well as some professional planners and faculty; other participants came from several university departments. In addition, class members worked informally with representatives from government agencies.

Students used computers to compile a subdivided, mapped inventory of resources and resource-based uses in the study area near Tucson. They also developed economic criteria for the suitability of each site for each land use, as well as quality indices for characteristics such as visual quality, ecological damage, vegetation, topography, soils, wildlife habitat, and groundwater. From this information, student teams developed plans

using computer generated maps; a professional judgment plan; a linear programming model; a community development, financial feasibility model; and a land use game.

As the example above illustrates, planning has tended to be top-down, emphasizing the leadership of experts and technological solutions. This was true, despite Cole's and Crowe's (1937) philosophy that planning values must be human values. For example, they quote (p. 18) the Clackamas County, Oregon, Planning Board's purposes, including "[c]reation of an informed public opinion leading to active cooperation of public bodies and citizen support for the Board's recommendations." In listing desirable practices for county planning boards, they note that lay members should decide policy questions, while technical decisions should be made on the advice of technical experts. This type of top-down planning did not build community capacity for what Mathews (1998) calls dialog and deliberation, speaking and listening to develop processes for meaningful community decision making.

Over the next 40 years, pressures mounted to change planning processes:

A dynamic urban environment, rapidly changing values, social transformations, and the increasing range of quantitative and qualitative problems, all call for a flexible approach to planning. Such an approach requires a heightened sensitivity to changing circumstances, a responsiveness to shifting priorities as well as evolving goals and objectives. In essence, the present argument underlines the demanding task of planning water projects with the help of some idealized new "social calculus" which balances what is technically sound, environmentally non-damaging, economically viable, legally pertinent, socially acceptable, and last, but not least, politically feasible. It is indeed such a creative synthesis and balancing of diversified planning considerations that call attention to some meaningful articulation of the socio-cultural factors which tend to hinder or facilitate water resources planning. . . (Vlachos, 1982, p. 256).

Vlachos (1982) goes on to note the central role of participatory planning, citing the need for transformations from:

- elitist to participatory planning;
- deterministic to contingency planning;
- reactive to anticipatory planning;
- predetermined to an iterative process;
- presumed goals and objectives to ill-defined problems; and
- fixed to a learning process.

These points capture evolving thinking in both planning and community development about the need for citizen participation; recognize the complexity of planning and community change; and suggest the notion of a continuously learning community.

***Planning: The quest for sustainability***

In discussions of planning over the years, the future survival of the community is integral. Cole and Crow (1937, p. 121) don't mention sustainability *per se*, but their context for planning involves pursuing objectives that are moving targets and preserving resources for the future. In their time, planning implied the "rearrangement and the prearrangement" of the environment and land for their most effective use for both present and future generations. This was at least a stab at sustainability and, to some extent, intergenerational equity.

Leopold's (1968) articulation of a "land ethic" in the late 1940s ultimately had profound impact on both planning and community development. Where Cole and Crow (1937) profess a pragmatic creed of human domination and use of the land within a context of conservation for future use, Leopold (1968, p. 203-204) suggests a different standard:

All ethics ... rest on a single premise: that the individual is a member of a community of interdependent parts. His instincts prompt him to compete for his place in the community, but his ethics prompt him also to co-operate (perhaps in order that there may be a place to compete for).

The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land.

Leopold's holistic land ethic suggests limitations on human behavior, a challenge to Adam Smith's notion of insatiable wants and needs and continuous growth that permeates capitalist economic thought. The need for limits emerges in later literature from the environmental movement, such as Schumacher (1975) and Meadows, et al. (1972). In addition, Leopold's land ethic suggests the need for a systems approach because of the complex relationships in the combined social and natural community.

Since the 1980s, the gradual emergence of the concept of sustainability – typically defined as the three Es: ecology, economy, and equity – has had a significant impact on planning and community development activities. Sustainability reinforces the need for systemic approaches to communities. Because it is a new paradigm that builds on earlier notions of conservation and environmentalism, it opens the way for increased emphasis on education (cf. Edwards, 2005).

### ***Planning: The role of Smart Growth***

Although it is sometimes a politically charged concept, Smart Growth offers something of a compromise between those who oppose growth and those who seek unbridled growth. Dresner (2002) distinguishes between sustainability and sustainable development, noting that the two terms are often used interchangeably. But there is a difference. Sustainable development, according to Dresner, is a compromise that puts environmental considerations into the framework of economic development, while sustainability puts the environment first.

A similar compromise exists with the concept of Smart Growth, which has emerged somewhat in tandem with sustainable development. According to the U.S. Environmental Protection Agency's Smart Growth website ([http://www.epa.gov/smartgrowth/about\\_sg.htm](http://www.epa.gov/smartgrowth/about_sg.htm). Accessed March, 2006), Smart Growth changes the land use debate from whether growth is good or bad to discussions about how and where to accommodate new growth, which is considered inevitable:

Smart growth is development that serves the economy, community, and the environment. It provides a framework for communities to make informed decisions about how and where they grow. Smart growth makes it possible for communities to grow in ways that support economic development and jobs; create strong neighborhoods with a range of housing, commercial, and transportation options; and achieve healthy communities that provide families with a clean environment.

In so doing, smart growth provides a solution to the concerns facing many communities about the impacts of the highly dispersed development patterns characteristic of the past 50 years... (Smart Growth Network, <http://www.smartgrowth.org/pdf/gettosg.pdf>. Accessed March, 2006).

As the Smart Growth Principles below suggest, it is a holistic approach to land use planning. It attempts to account for environmental, economic, and social needs – including, to some extent, equity – hallmarks of sustainable development and sustainability. The difference is its position toward growth:

1. Mix Land Uses;
2. Take Advantage of Compact Building Design;
3. Create a Range of Housing Opportunities and Choices;
4. Create Walkable Neighborhoods;
5. Foster Distinctive, Attractive Communities with a Strong Sense of Place;
6. Preserve Open Space, Farmland, Natural Beauty, and Critical Environmental Areas;
7. Strengthen and Direct Development Toward Existing Communities;
8. Provide a Variety of Transportation Choices;
9. Make Development Decisions Predictable, Fair, and Cost Effective; and

10. Encourage Community and Stakeholder Collaboration in Development Decisions (U.S. Environmental Protection Agency, [http://www.epa.gov/smartgrowth/about\\_sg.htm](http://www.epa.gov/smartgrowth/about_sg.htm), Accessed March, 2006).

## **Community development**

### *Approaches to community*

Researchers have specified numerous approaches to community. For example, Warren (1963) describes community as space, as people, as shared institutions and values, and as interaction with internal (horizontal) and external (vertical) linkages. At this time, many researchers recognized the community as a relatively static social system made up of subsystems, such as government, local media, organizations that work within the community and organizations that have external connections. Despite the recognition of widespread social change, these approaches to community emphasized stability and cohesiveness.

Christenson and Robinson (1980) list four main components to define community: people, area or territory, social interaction, and identification with the community. While there is agreement on the “people” part of the definition, place is often debated, as are the significance of social interactions and psychological identification with the community. Mehrhoff (1999) offers numerous approaches to define community, including groups of people, social interaction, shared values, shared territory, rediscovered community, key to personal identity, social order, social system, field of action, and an ecological system (defined as an adaptable social environment).

Wilkinson (1999, p. 7) offers a suggestion for approaching communities that can be useful in a local context:

What is needed is a conception of community that recognizes its complexity. The community is an arena of both turbulence and cohesion,

of order and disarray, of self-seeking and community-oriented interaction; and it manifests its dualities simultaneously. It should be studied for what it is and on its own grounds – not as an ideal type of an old form of social life, but as a dynamic and changing field of interacting forces.

Merhoff (1999, p. 37), in the tradition of Leopold (1968), adds another level of complexity to the idea of community. He notes that global pressures, linked with a lack of awareness of and respect for the local ecology, challenge community survival. He draws from the work of Lewis Mumford, which predates current discussions of sustainability, to conclude:

Community prosperity in the long term must rest on healthy natural systems. In fact, a community's natural environment can become the logical starting point for undertaking a fundamental reordering of a community's identity and future vision.

It is not our intention here to elaborate on the theoretical merits of each of these approaches to community. But theories about communities have affected our practice and the construction of our Land Use Toolbox. Our systems approach to land use as a part of community development is rooted in a theoretical heritage that views sustainable communities as groups of people in a particular place, an ecological setting that includes natural and built environments. This community is subject to external forces that may be beyond its control. It is a dynamic system, with subsystems that allow for social interactions of its residents, as well as nonresidents who may work in the community or use its amenities. We recognize that community change is inextricably linked to economic development, transportation, and changing land use, with all of their obvious and sometimes not-so-obvious impacts.

### ***Approaches to community development***

Community development in the twentieth century emerged partly out of the recognition of the impacts of widespread change on communities, as well as the need to build capacity of rural communities (cf. Phifer, et al., 1980). Warren (1963) outlines the emergence of community action and community development as process. Community action brings people together from across the community (horizontally) around a particular issue or project. Community development as process also strengthens horizontal relationships, but works in the long run, not on an *ad hoc*, project-by-project basis. While community development as process includes planning, it moves beyond planning to build a framework for coordinated community actions, “a purposeful attempt to improve communities under democratic conditions of participation” (Phifer, et al., 1980, p. 19).

In a review of literature from various community development sources, Christenson (1980) lays out three broad themes of community development: self-help, technical assistance, and conflict. Based on articles that appeared in the *Journal of the Community Development Society* from 1970 to 1979, he refines these themes into nine content areas: philosophy and strategies; citizen participation; needs assessment; roles; training; evaluation; conflict; community services; and ideal types of communities. He notes the limited, but increasing number of articles on theory during the decade.

### ***The role of the interactional community***

Wilkinson (1999) offers a valuable contribution to community theory. He synthesizes different streams of community theory to conceptualize an interactional community with three properties as a:

- local ecology, an organization of social life to meet daily needs and adapting to changes in a territorial and social environment;
- comprehensive interactional structure that expresses multiple common needs and interests of its residents, a more or less common life; it also can serve needs of people from outside its boundaries, or, its residents can go outside its boundaries to have needs fulfilled; and
- bond of local solidarity where people share a common life, act together, solve common problems, and seize opportunities for improving their circumstances.

Wilkinson's (1999) contribution is a significant synthesis of community literature, but can be faulted. It does not embrace the language of sustainable development that entered policy and academic discussions by the early 1980s, especially at the international level (Dresner, 2002). Even without consideration for sustainable development, however, Wilkinson's conceptualization of the community as a dynamic field of complex individual and group social interactions moves beyond viewing the community as a more or less static system. As Wilkinson puts it, the field approach emphasizes the processes that create and change community structure over the impact of structure on processes. This is a different view from earlier theories of community that focus on boundary maintenance and community as a locus of control.

In recent years, the community development theory has evolved with models that focus on the workings of local social relationships or social capital. As Emery and Flora (2006) show, a community capitals framework is systematic, linking natural, built, financial, political, social, and cultural capitals to build community capacity with goals of

a healthy ecosystem, vibrant regional economy, and healthy, happy communities. Bridger and Alter (2006) are highly critical of social capital theory applied to community development, noting the disconnection of communities and place, as well as other factors that make community boundaries so permeable. They echo Wilkinson (1999), when they discuss the complexity of communities, and call for leadership development programs that incorporate the interactionist approach. Bhattacharyya (2004) notes that many local issues are manifestations of larger problems. He calls for political action and networking among community organizations to gain political clout.

### **Linking practice with research and theory**

Wilkinson's (1999) theoretical position requires a systems approach to understand the dynamics of the community field. From a community development perspective, it is crucial to understand the actors and organizations (the stakeholders) and their interests and motivations to facilitate community change or agency (cf. Luloff and Bridger, 2003). For example, Richardson (2000) outlines a systems approach to integrate rural development efforts. Her discussion of the Environmental Programs/Partnerships in Communities (EPIC) model lays out a comprehensive approach to linking various rural development projects under a vision of general goals. The philosophy of EPIC links environmental conditions with the development programs, linking outreach with research, and drawing on the knowledge of local citizens and community development practitioners.

With land use, what Wilkinson (1999, p. 33) calls "locality orientation" or sense of place becomes particularly important. In a historically rich area, such as Gettysburg,

sense of place is a rallying point for aligning different stakeholders in the community field toward sustainable land use. This required a systems analysis of the community field. In addition, Adams County has developed a tradition of civic engagement, a condition that meets Bridger's and Alter's (2006) conditions for the use of a community capitals framework. The stakeholder approach for the Land Use Toolbox was developed at the same time social capital theory was being developed. Its goals are similar, but it takes a particular issue facing communities – land use – and follows it into deeper detail. Because the toolbox uses a stakeholder approach, it is generalizable to other communities where land use is high on the local agenda.

#### *Program assumptions at the local level*

Dr. Collins initially approached community development in Adams County based on a macrosociological model (Sanderson, 1988) that was easily adapted to a mid-level community systems thinking approach (Table 1). This model offered checkpoints for initial understanding of community processes and human agency. With its potential for analysis of the interactions of material, social and ideological factors, the model helped in setting an overall objective of developing high-quality, accessible education programs to help build community capacity for sustainable land use. The objective led Dr. Collins to make a number of assumptions to underpin his community development efforts:

- Land use decisions are crucial to environmental and community sustainability – a relationship of ecology, economy, and equity with government processes and local values;

- People solutions are as important as technological solutions – a relationship of technology, extension methods, schools, ways of gaining and transmitting knowledge, and human agency;
- Building social processes through participatory decision making is as important as finding solutions – a focus on government policies and leadership that links with extension methods, ecology, local economy, and ways of gaining and transmitting knowledge;
- Adapting and using local knowledge is crucial to building social processes that continuously address ongoing social change – links with ways of gaining and transmitting knowledge, extension method, participatory government, the economy, and ecology;
- Leadership is forward looking. It guides sustainable change by listening well, building coalitions, and serving people’s diverse needs – depending on the leader, may link with any other part of the model, especially human agency.
- The extension agent is engaged in learning along with the community. Dr. Collins knew he did not have all, if any of the answers. He could facilitate learning by building interactive social networks and providing resources that people could use to interpret local conditions and make informed decisions.

With these assumptions in mind, Dr. Collins set several programming goals designed to help citizens understand:

- forces of social and technological change;
- relationships between natural and built environments;
- government operation and policies; and

- how “ordinary” citizens can and do become community leaders.

Figure 2 illustrates how Dr. Collins viewed extension’s role in taking research results from the “hard” and “social” sciences and facilitating their use in the community. Extension agents distill the science and provide educational opportunities that let people use local knowledge to adapt science-based knowledge to improve their lives. In community development, the key is to make that knowledge accessible to build local collaboration. In doing this, it is important to enhance the capacity of individuals and groups to improve communications, trust, and leadership with a goal of sustainability. It depends heavily on local knowledge and self-selection by those who have an interest in various aspects of land use. Changing conditions in Adams County had already generated considerable interest in land use. Success of the effort also depended on the willingness of the agent to admit he was not anything close to the ultimate authority on land use knowledge in the community, while helping community members to find answers to problems that they perceived. This is the major reason Dr. Collins adopted a participatory research/learning approach in his programming.

Figure 3 suggests that the quest for sustainability is a moving target that demands constant attention to changing technology and how to keep people current to both build leadership and change behaviors to meet changing times. Based on Sanderson (1988), technology is defined as knowledge, skills, tools, and processes that people need to adapt and create to improve their communities and make them sustainable. In this effort, extension agents deal with understanding both “Technological Problems” and “People Problems.” Within communities, there might not be widespread agreement on what the problems are or how to deal with these problems. People have different values that shape

how they perceive and act upon various problems. Old solutions to technological and people problems may no longer work or may turn out to have unforeseen negative consequences. There may be real suspicions about new technology.

Leadership building for sustainability is a continuous process of negotiating changing “Technological Problems” and “People Problems.” Extension works with people and groups in communities to facilitate examination of a range of technological and people solutions to help them figure out what works in their community. Leadership building is not a top-down process. Extension provides technical expertise and offers possible suggestions to dealing with problems. But extension agents’ role as educators and capacity builders demands that they empower individuals and communities to develop their own leadership potential, along with understanding of their own changing problems and strategies for dealing with them.

The clear implication of these models is that both leaders and citizens in general need to have a common working understanding of the material, social, and ideological aspects of land use. While each of these forces may be more or less dynamic at times, understanding them should allow communities to make more informed decisions based on sustainability with consideration for ecology, economy, and equity. Extension has a clear role to play in the educational process, the fourth “E” (Edwards, 2005).

## **The Land Use Matrix**

### *Stakeholders as a system*

After Dr. Collins had been with Penn State Cooperative Extension for about a year, he took on leadership of efforts to develop a statewide land use curriculum. Based

on his field work, he realized there was a need to align the various land use interests in the county to improve communications. He considered different approaches to land use education and recognized the need for a systems approach that accounted for more than the seemingly divided environmental (technical) and social aspects of land use. The curriculum focus was to be on citizens especially, as well as government officials. To develop local capacity and leadership with a wider view of land use decision making, Dr. Collins decided to define land use broadly. He settled on a stakeholder approach to offer different individuals and groups access to a core knowledge base that showed interrelationships across various perspectives. The overarching theme was to focus on community sustainability from unified environmental and social sciences perspectives.

As it turned out, the model also offered possibilities for organizing and focusing extension's education efforts. With a team of extension field staff and specialists and Dr. Goetz, the original model was fleshed out to include more stakeholders, potential topic areas, and existing and potential extension programs. With funding from NERCRD, we developed a website for the Land Use Toolbox and documented publications and resources from land use organizations across the Northeast (<http://www.cas.nercrd.psu.edu/Toolbox/index.htm>; Figure 4).

The Land Use Toolbox (Figures 5 and 6) focuses on multiple stakeholders. It then drills down into multiple facets of land use topics of interest within and across stakeholders. Topics within a stakeholder area could become the basis for a curriculum within that particular area, yet would contain material pertinent to other stakeholders to create a common language. Topics that cut across stakeholder interests have the potential

to offer core information and tools to help community members become more familiar with a broad range of information from different stakeholders' perspectives.

In terms of program delivery, we divided potential and already developed programs into two areas under the heading of "You and Your Community." One set of programs is aimed at individuals ("What You Can Do"), and the other is aimed at groups ("What You Can Do with Others"). Our goal was to give citizens and government officials access to information in a number of settings and formats with the hope of building networks across stakeholder groups. Some programming, such as participatory action research and land use discussion groups, actually was intended to let participants help build the curriculum.

Stakeholder areas were chosen based mostly on field experience in Adams County. These included land preservation; planning and zoning; water and sewer; historic preservation; fiscal impacts of development and taxation; housing; rural preservation; and healthy communities. Economic and retail development and transportation represent different stakeholders, but are not listed as such. They are "givens," complex issues that cut across all stakeholder areas. As the curriculum is developed, they need to be addressed not only in and of themselves, but as they touch the other topic areas. Housing is listed both as a stakeholder area and as a cross-cutting topic because it is such an important aspect of all facets of land use, including both the costs of development and equity.

Besides providing a framework for the core curriculum, the matrix is intended to help with the following:

- developing broader understanding of land use planning;
- linking individuals and communities;

- facilitating citizen research;
- linking environmental science and the impacts of built infrastructure;
- capacity building for leaders and everyday citizens;
- providing information for decision making and action; and
- showing the importance of sustainability as both a practical goal and a broader ideal.

## **Outcomes So Far**

### *NERCRD website<sup>2</sup>*

The Land Use Toolbox is supported by a searchable database of land use links. The creation of this database was the first step in developing the website. Websites with information related to land use topics were documented and their information entered into the database. Initially, sites of Northeastern government agencies and Land Grant Universities were explored. From these sites, links to relevant nonprofit organizations were found. Internet searches with key topic words found additional nonprofit organization websites. All links from the existing NERCRD Land Use Toolbox were also incorporated into the database. Websites with useful information not specific to the Northeast were also included as part of the “Locations outside of the Northeast” section. After a suggestion at the 2004 Regional Workshop on Extension Land Use Programming, websites about land use in Washington, D.C., were entered into the database.

Each database entry contains the site name with hyperlink, the URL address, the entity that manages the site, a link to a short description of the website’s content, the topics that the site falls under, and the states that the site is applicable to. The content of each website was thoroughly explored before a decision was made about its pertinent topics. The original database contained 1,326 entries.

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<sup>2</sup> Most of this subsection was written by Sidney Kuhn, who was employed in Adams County with funding from NERCRD to develop the website.

A website consultant created the basic design of the Land Use Toolbox based largely on the Land Use Toolbox matrix. Once the database was completed, all entries were transferred to the proper web pages according to their jurisdiction and topics. Each entry into the website contains links to all relevant topics and states, as well as a link to the described page. Most entries contain links to the homepages for an organization, or specific department or division of a government agency or university. The content of these pages may change over time, but there is less risk of the entire page becoming defunct.

Once entries were made into the toolbox, all pages were checked for spelling or broken links. Images were chosen from the Internet and placed on pages to represent each state. Then email or mail addresses were documented in the database for each link, so that the permission to link to the sites may be obtained through the use of a boilerplate letter. Copies of the completed toolbox were sent to the NERCRD office to be loaded onto the Internet.

The Land Use Toolbox contains links to websites connected with land use in the Northeast, or one of its many subtopics. Although the toolbox focuses mainly on rural land use topics, urban land use sites were included because of effects on land use in rural areas. Websites managed by non-profit organizations, government agencies and universities were included in the toolbox, while sites advertising or managed by a business or for profit were avoided. Most links included in the toolbox are applicable to an entire Northeastern state or other large region within the Northeast. A few sites containing information about local governments and local nonprofit organizations were included because these sites are replicable examples for other local organizations and

governments. Websites with different opinions about land use topics were included in the toolbox; therefore users are exposed to all opinions about a topic and can make their own decisions. For example, pages managed by the Sierra Club and the Farm Bureau were both included in the toolbox, although they express very different opinions about concentrated feeding animal operations.

The website is designed to be divided into two levels, one for the general public, and one for extension staff. For each group, possible uses include:

*General Public*

- easy access to information by topic and state;
- topics reflect various land use constituencies;
- links lead to common, core information for various constituencies; and
- program delivery system for self-paced and interactive programs.

*Extension staff*

- networking tool for developing and sharing extension curriculum – Northeast Extension Land Use Network;
- guide for curriculum development across constituent interests;
- source of downloadable programming for extension staff and communities;
- repository of links to crucial land use data;
- repository of research reports;
- program delivery system for local meetings, professional development, conferences, meetings, etc.; and
- a distance education portal.

**Conclusion: The complexity of land use issues**

The Land Use Toolbox Matrix offers a systems approach to land use that draws from several different literature traditions, including community development, sociology, systems thinking, and planning, Smart Growth, and sustainability as an environmental and social concept. Its stakeholder and topical approach suggests not only the complexity of land use issues, but offers a way to link diverse individuals and organizations in joint

efforts address community land use obstacles and opportunities. In this sense, it draws from community interactional theory to increase community capacity.

The Toolbox's cross-cutting thematic approach suggests the possibility of core education materials that can address citizens and leaders who have differing approaches to land use and planning. Curriculum and programming can be designed to enhance networking and decision making capabilities, and to help different land use stakeholders develop joint action steps in their quest for community sustainability. Development of the model offers extension an opportunity to strategically plan curriculum priorities and their implementation. Finally, the organization of the Toolbox also offers a platform for research by suggesting areas of potential interaction among stakeholders and various facets of land use.

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Map 1: Gettysburg Location



Chart 1

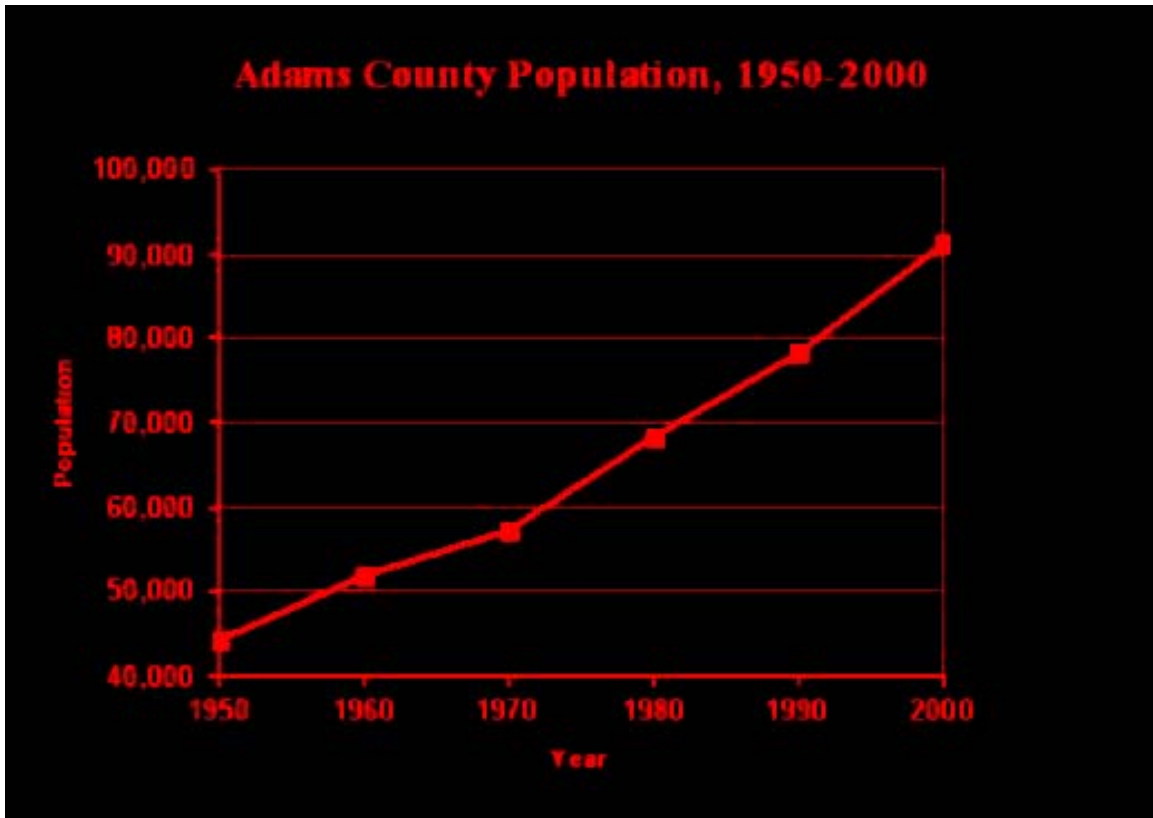
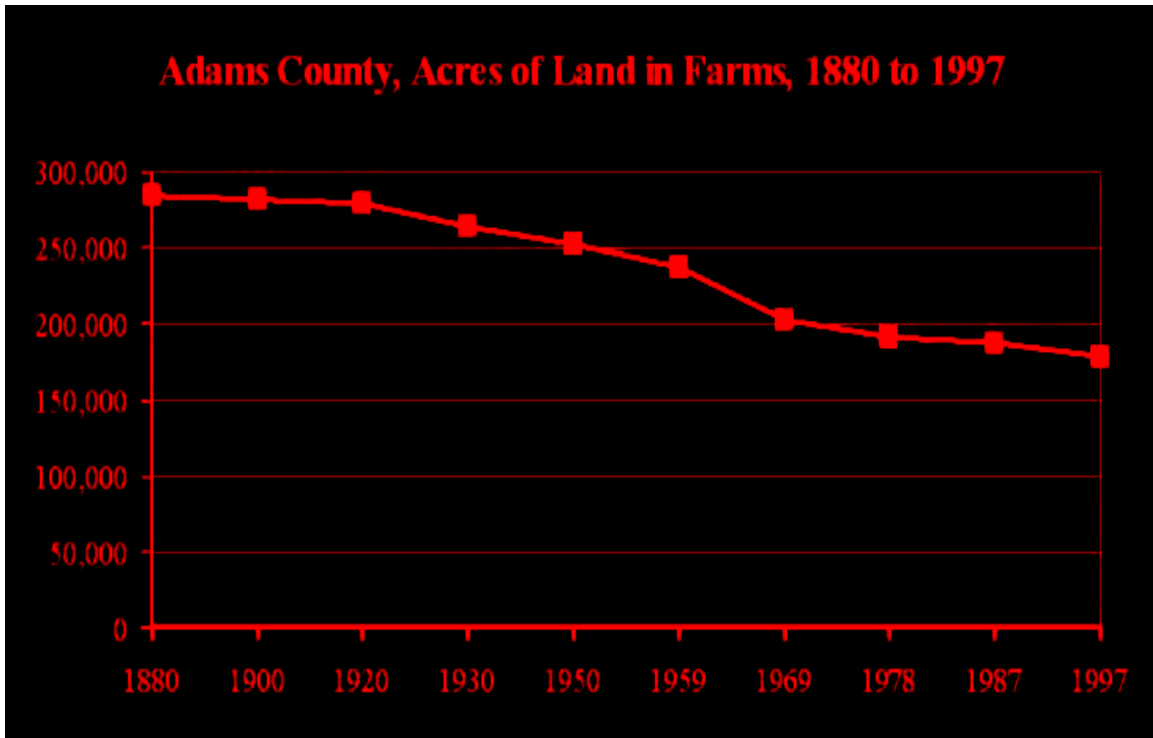


Chart 2



**Table 1: Systems approach to a community**

<b>Material Infrastructure</b>	<b>Social Processes</b>	<b>General Ideology</b>
Local - regional economy	Federal and State land use laws and agencies	Beliefs, values, norms
Ecology Watersheds, groundwater Soil types Natural features	Local land use laws and policies Local, state, and national land use organizations	Local knowledge
Built infrastructure Cultural amenities Development patterns	Local schools	Sense of place
Demographic trends	Maryland land use laws	Local traditions/History
Technology	Extension methods -Participatory action research -Leadership development -Discussion groups	Ways of gaining and transmitting knowledge  <i>Human agency</i>

**Adapted from Sanderson, 1988**

Figure 1: Developers selling Pennsylvania housing

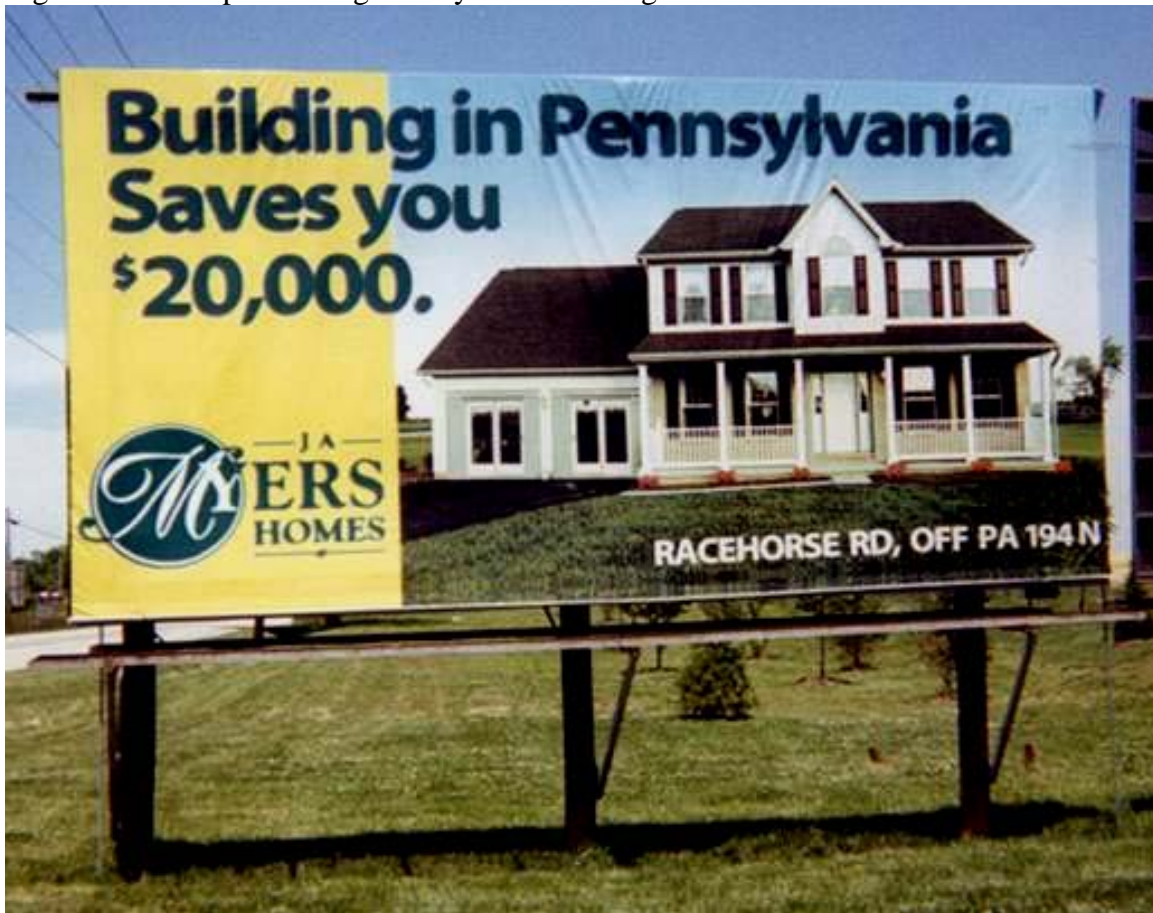


Figure 2: Building leadership for sustainability

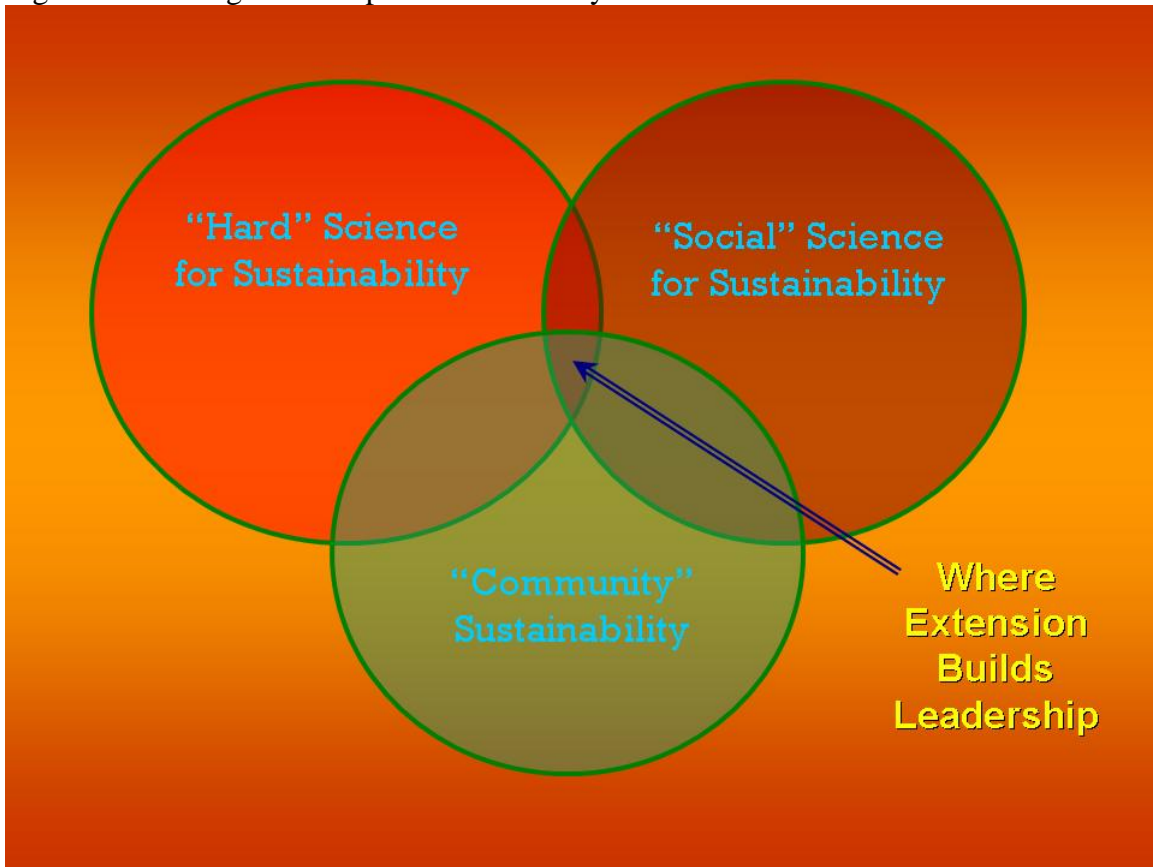


Figure 3: Bridging technological and people problems

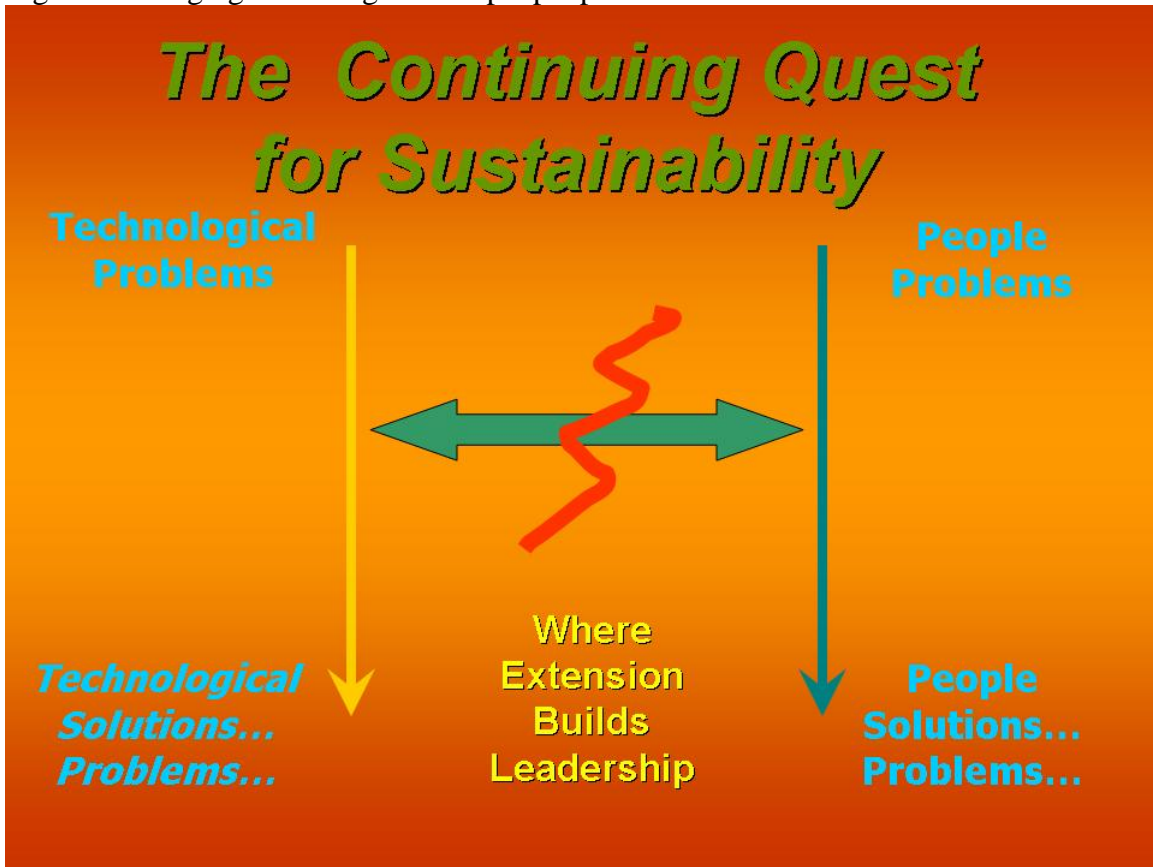


Figure 4




 <b>The Northeast Regional Center for Rural Development Land Use Toolbox</b>		
<b>Geographic Map and List</b>	<b>Start by clicking on link.</b>	<b>Topic List</b>
	<b>CT</b> <a href="#">Connecticut</a> <b>DE</b> <a href="#">Delaware</a> <b>ME</b> <a href="#">Maine</a> <b>MD</b> <a href="#">Maryland</a> <b>MA</b> <a href="#">Massachusetts</a> <b>NH</b> <a href="#">New Hampshire</a> <b>NJ</b> <a href="#">New Jersey</a> <b>NY</b> <a href="#">New York</a> <b>PA</b> <a href="#">Pennsylvania</a> <b>RI</b> <a href="#">Rhode Island</a> <b>VT</b> <a href="#">Vermont</a> <b>WV</b> <a href="#">West Virginia</a>	<b>Ag &amp; Rural Change</b> <a href="#">links / topic files</a> <b>Fiscal Impact/ Taxation</b> <a href="#">links / topic files</a> <b>Healthy Communities</b> <a href="#">links / topic files</a> <b>Historic Preservation</b> <a href="#">links / topic files</a> <b>Housing</b> <a href="#">links / topic files</a> <b>Intergovernmental Cooperation</b> <a href="#">links / topic files</a> <b>Land Preservation</b> <a href="#">links / topic files</a> <b>Planning/Zoning</b> <a href="#">links / topic files</a> <b>Transportation</b> <a href="#">links / topic files</a> <b>Water/Sewer</b> <a href="#">links / topic files</a> <b>You and Your Community:</b> <b>What You Can Do</b> <a href="#">links / topic files</a> <b>What You Can Do With Others</b> <a href="#">links / topic files</a>
	<b>Locations Outside the Northeast</b> <a href="#">links / topic files</a>	
	<b>Colleges of Agriculture in the Northeast</b> <a href="#">links</a>	
	<b>Search site for:</b> <input type="text"/> <input type="button" value="Start Search"/> <input type="button" value="Reset"/>	
<input type="button" value="Email this page to a friend"/>	<input type="button" value="Help"/>	
	<input type="button" value="Extension Sign In"/>	
 <b>College of Ag Sciences</b> World Campus Outreach Cooperative Extension Penn State Public Broadcasting	NERC RD ©2004 The Toolbox is a joint effort of The Northeast Regional Center for Rural Development (NERCRD) and Penn State Cooperative Extension in Adams County. This page was last updated on March 17, 2004. Links included in this Toolbox are provided for your convenience and do not constitute an endorsement. Questions and suggestions may be directed to extension staff <a href="mailto:AdamsExt@psu.edu">AdamsExt@psu.edu</a> .	

Figure 5

# Land Use Toolbox Stakeholders/Topics

## Land Preservation

State Planning Code  
 County Planning  
 Municipal Planning  
 Planning as fiscal tool  
 Cost of Community Services  
 County Zoning  
 Municipal Zoning  
 Ag Protection Zoning  
 Conservation Zoning  
 Standards for Ordinances  
 Intergov. Coop.  
 Farmland Easements  
 Tax Incentives  
 Ag Economic Development  
 CAFOs  
**Transportation**  
**Economic Development**  
**Retail development**  
**Housing**  
 Open/Green Space  
 Recreation  
 Watersheds  
 Groundwater and Stormwater  
 Land Conservancies  
 Brownfields  
**Conflict**  
 Living Near a Farm  
 Good Neighbor Relations  
 Viewsheds  
 Funding Options  
 Suburbanization  
 Condemnation  
 Importance of Place  
 Revitalizing Towns  
 Forestry  
 GIS  
 Charting/Visioning  
 Community Asset Mapping  
 Future of Agriculture in Our Community  
 Smart Growth  
 Design Principles  
 Healthy Lifestyles  
 Sustainable Communities

## Planning/Zoning

State Planning Code  
 County Planning  
 Municipal Planning  
 Planning as fiscal tool  
 Cost of Community Services  
 County Zoning  
 Municipal Zoning  
 Ag Protection Zoning  
 Conservation Zoning  
 SAIDO  
 Standards for Ordinances  
 Intergov. Coop.  
**Conflict**  
**Viewsheds**  
 Living Near a Farm  
 Open/Green Space  
 Recreation  
 Septic Systems  
 Wells and groundwater  
 Stormwater  
 Community facilities  
 Demographics  
 Legal Issues  
 Suburbanization  
 State v. Local control  
 Brownfields  
 Revitalizing Towns  
 Community Forestry  
 Watersheds  
 Importance of Place  
 GIS  
 Charting/Visioning  
 Community Asset Mapping  
 Future of Agriculture in Our Community  
 Smart Growth  
**Transportation**  
**Economic Development**  
**Retail development**  
**Housing**  
 Design Principles  
 Low-impact Development  
 Traditional Neighborhoods  
 Healthy Lifestyles  
 Sustainable Communities

## Water/Sewer

State Planning Code  
 County Planning  
 Municipal Planning  
 Planning as fiscal tool  
 Cost of Community Services  
 Tax Incentives  
 Districts  
 Funding Options  
 Fed.-State Water Code  
 State v. Local control  
 Intergov. Coop.  
 Role of Conservation District  
 Watersheds  
 Watershed Groups  
 Land Conservancies  
 Septic Systems  
 Wells and groundwater  
 Stormwater  
 Building Codes  
 Brownfields  
**Conflict**  
 State v. Local Control  
 Open/Green Space  
 Recreation  
 Forestry  
 Community Forestry  
 GIS  
 Charting/Visioning  
 Community Asset Mapping  
 Smart Growth  
**Transportation**  
**Economic Development**  
**Retail development**  
**Housing**  
 Design Principles  
 Low-impact Development  
 Sustainable Communities

## Historic Preservation

State Planning Code  
 County Planning  
 Municipal Planning  
 County Zoning  
 Municipal Zoning  
 Conservation Zoning  
 HARBS  
 Building Codes  
 Tax Incentives  
 Funding Options  
 Individual Sites  
 Neighborhood Associations  
 Scenic Routes  
 Rails to Trails  
 Land Conservancies  
 Brownfields  
**Viewsheds**  
 National Trust for Historic Preservation  
 Importance of Place  
 Revitalizing Towns  
 Rehabilitation & Restoration  
 Condemnation  
**Transportation**  
**Retail development**  
**Economic Development**  
**Housing**  
**Conflict**  
 GIS  
 Charting/Visioning  
 Community Asset Mapping  
 Smart Growth  
 Traditional Neighborhood  
 Sustainable Communities

## Fiscal Impact/Taxation

Local Taxes  
 Fiscal Impacts  
 Fiscal Modeling  
 Build Outs  
 GIS  
 Cost of Community Services  
 Planning as fiscal tool  
 Open/Green Space  
 Demographics  
 Court decisions  
 Intergov. Coop.  
 Brownfields  
 Smart Growth  
 Tax Incentives  
**Transportation**  
**Economic Development**  
**Retail development**  
**Housing**  
 Sustainable Communities

## Healthy Communities

State Planning Code  
 County Planning  
 Municipal Planning  
 County Zoning  
 Municipal Zoning  
 Conservation Zoning  
 Cost of Community Services  
 Open/Green Space  
 Rails-trails, Bike Paths, Walking Trails, Greenways  
 Recreation  
 Intergov. Coop.  
 Design Principles  
 -Walkability  
 -Mixed Use  
 Low-impact Development  
 Importance of Place

## Rural Preservation

Ag Economic Trends  
 Ag Economic Development  
 CAFOs  
 State Planning Code  
 County Planning  
 Municipal Planning  
 Planning as fiscal tool  
 Cost of Community Services  
**Transportation**  
**Economic Development**  
**Retail development**  
**Housing**  
 Rural Development  
 Demographics  
 Forestry  
**Conflict**  
 Living Near a Farm  
 Good Neighbor Relations  
 Intergov. Coop.  
 Suburbanization  
 GIS  
 Charting/Visioning  
 Keeping Ahead of Change  
 Importance of Place  
 Revitalizing Towns  
 Smart Growth  
 Future of Agriculture in Our Community  
 Sustainable Communities

Land Conservancies  
 Environmental Boards  
 Traditional Neighborhoods  
 Community Forestry  
**Viewsheds**  
 Watersheds  
**Transportation**  
**Retail development**  
**Economic Development**  
 Funding Options  
 GIS  
 Charting/Visioning  
 Community Asset Mapping  
 Smart Growth  
 Revitalizing Towns  
 Healthy Lifestyles  
 Sustainable Communities  
**Housing**

Figure 6

# Land Use Toolbox

## Programming

### You and Your Community:

#### *What You Can Do*

Local Decision-maker Worksheet  
Intro to Local/County Government  
Leadership  
Knowing Your Community - Directory  
Existing Organizations - Directory  
Healthy Lifestyles

### What You Can Do with Others

Charting/Visioning  
-Build Outs, e.g., PA Blueprint  
-Intergenerational Futures Festival  
-Charettes  
-*Future of Agriculture in Our Community*

Participatory Action Research  
*Community Asset Mapping*

**Conflict/Cooperation Modules**  
Engaging Youth  
Involving Local Schools

#### Sustainable Communities

Municipal planning education  
E-government  
**Land Use Discussion Group**  
Keeping Ahead of Change  
*Cost of Community Services*

Building Local Coalitions  
Start a Land Conservancy/Watershed Group,  
etc.  
-How to Become a 501c3  
-Neighborhood Associations  
-HARBS  
*Funding Options*  
-Grant Writing

GIS

Healthy Lifestyles