
What makes a good sustainable development plan? An analysis of factors that influence principles of sustainable development

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Abstract. A key question faced by practitioners trying to plan for sustainable development is: what can be done in planning practice to influence promotion of sustainable development? This research addresses that question by investigating three dimensions of the planning process (political support for the concept, participation, and resource commitment), the organization of local land-use plans, and state planning mandates to determine how they influence the support plan policies have for principles of sustainable development. We use plan content analysis as well as survey data for forty-two communities across the United States to analyze factors which influence such support. Our findings highlight that the presence of a state planning mandate, most applicable to US planning, as well as having a variety of groups participating in the planning process, are key factors that increase overall plan support for the sustainable development principles. Recommendations for planning practice are offered based on our findings.

Introduction

The United Nation's 1992 Environment and Development Conference in Rio de Janeiro propelled the concept of sustainable development into the public consciousness. Land-use planning in particular was readily viewed as an appropriate venue for sustainable development policies (Beatley, 1995; Berke, 1994; Rees, 1995; UN, 1992). Since that time the concept has been heralded as both a critical paradigm shift for planning practice and as yet another planning 'bandwagon' waiting to be replaced. Discussions and debate have focused on three general questions: What is sustainable development? How are we doing in promoting sustainable development in planning? And, what can be done in planning practice to influence our promotion of sustainable development?

Literature trying to define the concept of sustainable development has been extensive (for example, Beatley, 1995; Rees, 1990; Viederman, 1993; Wheeler, 1996). The concept is general enough to find applicability in a variety of areas, which makes it both widely accepted and widely disputed. Definitions touch on diverse topics, including planning, architecture, ethics, business, agriculture, and psychology. Although debate over the meaning of the concept continues, the sustainability literature has been able to coalesce on three major sustainable development goals: environmental protection, social and intergenerational equity, and economic development. We take these goals as foundational to the concept and leave further inquiry into meaning for other research efforts.

Literature responding to the second and third questions has been much less forthcoming. Previously (Berke and Conroy, 2000) we addressed "how are we doing?" by examining local land-use comprehensive plans from across the United States. We defined six principles of sustainable development as a means to measure the progress of plan policies to promote the concept: harmony with nature, livable built environment, place-based economy, equity, polluters pay, and responsible regionalism. Through plan coding

we measured the strength with which two groups of local land-use plans forwarded these principles. The two groups of plans were marked by whether or not they integrated the concept into a plan vision statement or as an overarching theme for the plan. Although no significant difference was found between the two groups, the ability to measure how well plan policies promote sustainable development provides a useful tool for analysis.

There remains, however, little critical evaluation of what can be done in planning practice that will help promote sustainable development both in the USA and internationally. The purpose of this research has been to determine whether dimensions of the planning process and state planning mandates are related to promoting the concept in local land-use plans. We used a sample of local plans and a survey of community planning directors to examine the influences of the planning process on plan sustainability scores.

We addressed two primary questions:

1. Does support for dimensions of the planning process and the integration of sustainable development as an organizing concept in plans lead to greater support for the principles of sustainable development in local plans?
2. Does the presence of a state planning mandate lead to greater support for the principles of sustainable development in local plans?

Answers to these questions provided insight into important elements of the planning process that planners can affect to promote sustainability in plan policies.

We begin with a review of the literature on sustainable development and plan quality, to derive potential influences on the degree to which plans promote these principles. Next we discuss the methodology used for the plan evaluations, survey, and regression analyses. Afterwards we present a summary of the findings of our analysis. We conclude the paper with a discussion of our recommendations for planning practice based on the findings.

Influences on the degree to which plans promote sustainable development

The literature on sustainable development addresses both the characteristics of a sustainable community (for example, Beatley, 1995; Beatley and Manning, 1997; Rees, 1990; Roseland, 1998) and the process by which a sustainable community is developed (for example, Beatley, 1995; Campbell, 1996; Grant et al, 1996; Rees, 1995). Plans as a product of the process and as a guide for promoting a sustainable community have also begun to receive attention in the literature (Berke and Conroy, 2000). Given the growing interest in the potential influences on the degree to which plans promote sustainable development, increased attention has been given to analyzing the dimensions of the planning process, including testing various forms of participation, resource allocation, and resource commitment. Additional attention has also been given to analyzing the organizational framework of local plans as an influence on their ability to promote sustainability, as well as the role of state planning mandate designs.

Campbell (1996) argues convincingly that the procedural path to a sustainable future is fraught with conflicts. Conflicts are both an inherent and a necessary aspect of planning for sustainable development because of the pursuit and balancing of the three main goals of environmental protection, social equity, and economic development. This argument is supported by Blowers (1993) who notes that conflicts in sustainable development are a reflection of the complex decisionmaking environment necessary to pursue these goals concurrently.

Researchers on sustainability are united in their argument that the best way to address these conflicts is through a community-based collaborative planning process partnering planners and citizens (Beatley, 1995; Blowers, 1993; Campbell, 1996; UN, 1992; WCED, 1987). In an ideal collaborative approach, there is a genuine exchange of needs, ideas, responsibilities, and control in the planning process, though this ideal

may be a challenge in practice. A collaborative approach is fundamental to the sustainability paradigm and is linked with promoting a sense of community, equity, and empowerment (Innes, 1996; UN, 1992). Collaborative planning processes recognize the complexity of the planning environment and look to minimize the destructive aspects of disputes by getting issues and concerns onto the discussion agenda for resolution. Participation research provides ample evidence that, when people are involved in the decision making process, they are more likely to be supportive of its development and implementation (Grant et al, 199; Potapchuk, 1996). Participation helps to build social capital in a community which in turn strengthens the community (Potapchuk and Crocker, 1999). Not surprisingly, government entities also note less hostility from citizens and better policies from the partnership (Berry et al, 1993).

Participation in the planning process is argued to be a critical part of a paradigm shift toward planning for sustainable development for broader reasons than conflict resolution (for example, Roseland, 1998; UN, 1992; WCED, 1987; Wild and Marshall, 1999). Research in Sweden supports the increased participation associated with Local Agenda 21 (LA21) actions through expanding stakeholder identification in the planning process (Adolfsson Jörby, 2002). LA21, an outcome of the 1992 Rio conference, stresses community involvement in a locality's pursuit of sustainability. Additionally, Hester notes that "local participation is best suited to help reform personal day-to-day unsustainable behavior because it represents the local part of thinking globally and acting locally" (1999, page 12). Further, public involvement in the planning process is advocated because "planners cannot create sustainable communities without commitment from community residents to change the way they live on the land, and their attitude towards it" (Grant et al, 1996, page 341). The planning process provides a forum for realizing the ideals of participatory democracy as a means for democratic discourse (Innes, 1996).

Research on the planning process has also examined resource commitment as a measure of the local capacity building that exists for planning in the community. Local capacity plays an important role in the successful introduction, adoption, and implementation of many planning-related efforts, such as growth management, hazards planning, and coastal zone management programs (Berke and French, 1994; Dalton and Burby, 1994; DeGrove, 1992). Resources, such as technical skill from planners and funding sources, provide information and expertise necessary to prepare high-quality plans (Berke and French, 1994).

Political and community support given to planning process activities has also been addressed in the literature. This support, an indication of the local commitment to the process, is considered essential for translating initial community interest into specific plan policies which become part of an adopted plan (Berke and French, 1994; Berke et al, 1996; Dalton and Burby, 1994; DeGrove, 1992). Local support, often in conjunction with local resource commitment, has been cited as especially important for the initial adoption and eventual implementation of growth-management measures (DeGrove, 1992).

The literature has also given attention to the use of vision statements in plans to guide policy development. Vision statements are a formal statement of a community's desired future. They are developed through a process referred to as visioning and are increasingly linked with planning for sustainable development (Olson, 1995). As defined by Steven C Ames of the Oregon Visions Project Committee (1993, page 7), "visioning is simply a process by which a community envisions the future it wants, and plans how to achieve it. It brings people together to develop a shared image of what they want their community to become." Cautions exist on its long-term usefulness and there is concern that the terminology, which lacks universal definition and harbors

implicit assumptions, may be akin to a daydreaming exercise as it lacks either a theoretical basis or a record of success (Helling, 1998; Shipley, 2002; Shipley and Newkirk, 1999).

However, visioning, or perhaps more appropriately goal setting (Shipley and Newkirk, 1999), remains an opportunity for public participation, consensus building, debate, and dispute resolution as a community sets its direction for sustainable development. Visioning can refine the concept of sustainable development in the community as it becomes formalized in a vision statement and as the organizing theme of the community's comprehensive plan. Arguments for the visioning process and statement center on their potential for directing community action toward achieving a sustainable future (Helling, 1998; Shipley and Newkirk, 1998). Inclusion of the vision statement in the community comprehensive plan serves as a touchstone for planning policies and activities, and indicates the plan's intent to put forth policies supporting sustainable development (Berke and Conroy, 2000; Healey and Shaw, 1997).

Finally, considerable research has focused on the influence of state-level planning mandates on local plans in the USA (for example, Berke and French, 1994; Burby and Dalton, 1994; Dalton and Burby, 1994; Deyle and Smith, 1998). Burby and Dalton provide strong evidence that state planning mandates have a positive effect on the strength of policies in local plans. Other studies have shown the positive effect state-level mandates have had on adopting local growth management tools that are consistent with the local plan (Dalton and Burby, 1994). The planning literature has also provided some insight into the design of state mandates (May, 1993) as well as the local compliance with state mandates (Deyle and Smith, 1998). The consistent thread in these studies is that state planning mandates are able to act as a lightning rod, shifting opposition to planning away from local government while directing plan content.

Drawing on the literature on sustainable development and planning process, in the following discussion we present the three sets of factors that are expected to influence local plan support for the principles of sustainable development: three dimensions of the planning process (political support for sustainable development, participation effort, and resource commitment), integration of sustainable development as an organizing concept of the plan, and the presence of a state planning mandate. These factors, plus an assessment of the local context, provide the foundation for the evaluation of local planning processes and local plans.

Dimensions of the planning process

The three dimensions of the planning process for this study consist of local political support for sustainable development, participation effort, and resource commitment. This section presents more detail on each dimension.

Support for sustainable development in the planning process

Successful adoption of a sustainable development planning paradigm requires the support of the local community (Healey and Shaw, 1997). Such support can be a challenge when the concept itself inspires debate and political tensions (Campbell, 1996). The paradigm adoption process is expected to be full of trade-offs, conflicts, political reorganization, and integration, and will require local commitment to remain steadfast to the sustainability goal (Beatley and Manning, 1997; Blowers, 1993; Campbell, 1996; Healey and Shaw, 1997). A critical characteristic of support for sustainable development is the explicit focus on the concept in the planning process. An explicit focus on sustainable development as an overarching or organizing concept during the planning process is expected to influence plan support positively for sustainability. This is not to say that communities that do not acknowledge the concept cannot take steps toward sustainability; in fact, the terminology

itself may be so politically charged that it cannot be productively incorporated into community actions. However, communities focusing on the concept demonstrate a broad and active interest in planning for sustainable development. Support for sustainability during the planning process should result in stronger support for sustainable development principles in the resulting plan.

Participation effort

A strong public participation effort involves a wide range of interests, and provides for frequent, sustained, and influential participation of a variety of citizens so that the plan and its outcome are representative of the community. Informed participation in decision-making institutions that affect people's lives, such as long-range comprehensive planning, is at the root of civic democratic practice and therefore sustainable communities.

In their book, *The Rebirth of Urban Democracy*, Berry et al (1993) maintain that successful local participation efforts must have sufficient breadth and depth. Participation breadth is the "extent to which an opportunity is offered to every community member to participate at every stage of the policymaking process" (page 54). Breadth measures *who* is involved. Participation breadth stipulates that local programs must be as inclusive and open as possible. Sustainable development compels the participation of a diverse set of interests. Transportation, pollution, housing, and economic problems defy distinctions defined in racial, income, political, and geographic terms. Even in the most localized setting, land-use and development issues are rarely the sole concern of a few groups (or individuals), as they reach across neighborhoods, communities, regions, and even nations. Participants in planning for sustainable development not only become informed of the planning process and alternative visions of their community's future, but they also add insight into what makes the community a livable one for them.

Participation depth means that participants do more than simply show up to public meetings. Depth is the "extent to which the citizens who choose to participate have the opportunity to determine the final policy outcome by means of the participation process" (Berry et al, 1993, page 55). It reflects the level of control afforded participants, ranging from feedback-only options (weak) to participant self-determination (strong). Participation depth in planning for sustainable development holds that all citizens be equally empowered and fully informed to ensure that they can exert influence on decisions that affect them (Innes, 1996). Equally empowered means an acknowledgment of equal individual worth, regardless of age, gender, race, ethnicity, or income. Fully informed requires informed, open, and responsible public deliberation. Depth ensures that decisions are justifiable to each participant, regardless of their social, cultural, and economic circumstances. It also ensures citizen control and power sharing with established governing authorities. Programs that lack depth lead to token participation. They tend to emphasize simple one-way forms of communication that merely provide citizens with information as a way to educate them to accept a decision that has already been made.

Planning for sustainable development engages in a participatory process that has breadth and depth. Under the sustainability approach, lay people's knowledge of place is validated. Shutkin (2000, page 129) contends that the sustainability model of planning "embraces a bottom-up approach to problem-solving, empowering people to work together, initiate action, experiment, and learn facts." The role of the planner is to foster an exchange of information and an open discussion of ideas. With the help of planners as experts, lay people have an opportunity to act for themselves, rather than having planners telling them how to solve their problems. The later approach disempowers the community because it robs citizens of an important reason to come together and work to solve problems in the cooperative spirit that forms community solidarity.

However, participation is no panacea. An overwhelming imbalance of power between opposing groups, with one or a few dominant groups can thwart a balanced and open participatory process. A powerful group can simply refuse to participate on equal terms and suppress other moderating or opposing views (Crowfoot and Wondollock, 1990). It is also hard to achieve meaningful participation. Too many participants are likely to generate a process dominated by conflict as representatives of different groups strive to be heard (Barber, 1981; Grant, 1994).

Resource commitment

The priority given to a particular public policy issue by a local government can rise or fall according to the availability of resources. Indeed, resources devoted to planning can have a strong effect on the time, attention, and overall effort directed to planning. Impressive resources do not always guarantee success in creating strong plans, nor do deficiencies in resources necessarily spell doom. However, resources have been found to be generally useful in affecting the ability of communities to innovate, and to formulate long-range plans that focus on creating physically and socially healthy places to live (Burby and May, 1997; Campbell, 1996). Thus, resources are obviously a potentially important dimension in planning for sustainable development.

The process associated with planning for sustainable development is one that adds its own level of complexity to the planning process because of the explicit integration of environmental, social, and economic goals, and its long planning horizon (Beatley, 1995; Campbell, 1996; Healey and Shaw, 1997). The resources which are typically applied to long-range sustainability planning, therefore, usually are not adequate. Cronin (1995) and Shutkin (2000), among others, suggest that low accomplishment is largely caused by inadequate resources. These observers contend that a key reason for lack of support has been the neglect by mainstream—professional environmentalism to confront many local environmental and social problems. Mainstream environmentalism has almost exclusively been oriented toward wilderness, public land, and natural resource conservation, or toward pollution control of large stationary point sources (for example, power plants, industrial smokestacks, and sewage treatment facilities). Left out of the movement have been people themselves and the environmental and social issues that are closest to home (Cronin, 1995).

Investment in resources to support proactive, local-planning-oriented approaches would represent a shift from investing in the top-down, largely after-the-fact approaches to environmental and social problem solving of the mainstream environmental community. Infusion of resources at the local level would build the capacity of communities to self-organize and design long-range sustainability plans that meet local citizens' needs and desires. It would also embrace a more diverse set of interests that would cut across racial and economic lines, compared with the homogeneity of the mainstream environmental movement that is largely white and middle-class (Snow, 1994).

The number of planners and funding sources, as well as the number of years dedicated to the process, may also increase attention to sustainability issues and subsequently increase the amount of resources committed to address those issues during the process. The commitment of more resources is expected to produce positive support for sustainable development in plans because they provide the means to evaluate problems and generate alternative solutions. The result can be improved understanding of local environmental, social, and economic problems, and an increased likelihood of formulating viable solutions.

Integration of sustainable development as an organizing concept of the plan

The local plan has been described as “part intention, part feasible future” (Innes, 1996, page 461). The intention part may be seen as the plan’s overarching theme, vision, or goals which set out the dream that plan policies hope to realize. Although the effectiveness of the plan to achieve the dream either in the short or long run has been the source of debate (Helling, 1998; Lucy, 1994; Neuman, 1998), the plan still serves to guide local planning activities (Kaiser et al, 1995).

Good plans describe the current status of a community, present a vision or direction for the community’s future, and provide concrete policies that not only guide actions to achieve the vision, but are strong enough to insure that they will be followed. A ‘sustainable development’ plan differs in content from this description primarily in that the community’s vision, and therefore the orientation of plan policies, is focused on becoming a sustainable community. The comprehensive plan becomes an “agent of change” for the community to realize a sustainable vision (Neuman, 1998). Integration of the concept, as a dimension of the plan itself, shows at a minimum an awareness of the concept, if not an indication of the “systematic transformation of the planning agenda” anticipated with adoption of a sustainable development planning paradigm (Healey and Shaw, 1997).

Plans using the concept of sustainable development in their vision statement or as an overarching theme or organizing concept are said to integrate the concept in the plan (Berke and Conroy, 2000). Communities integrating the concept in their plans demonstrate both an awareness of the concept and an explicit acknowledgment of it as the goal for their community’s future. Therefore, integration of concept of sustainable development in the plan, which is used to differentiate the plans in this study, is expected to produce positive support for sustainable development by plan policies.

State planning mandate

The presence of a state planning mandate is the third factor expected to influence the support for sustainable development in plans. A number of studies have shown that communities in US states which mandate local planning have higher quality plans (for example, Berke and French, 1994; Berke et al, 1996; Dalton and Burby, 1994). State mandates are an international anomaly of sorts. In fact, in countries such as England and Wales, land-use plan content is determined locally with little discussion of higher level government input (Counsell, 1999). In areas outside the USA, LA 21 efforts are the catalyst to promote sustainability—particularly environmental aspects of sustainability—at the municipal level. There is, however, some evidence that such planning efforts are expanding beyond the local areas in countries such as Sweden (Rowe and Fudge, 2003).

State mandates can serve as a catalyst for local planning to adopt a sustainability framework by providing information and financial resources for the planning process. Mandate language also can specify local plan content and attention dedicated to specific plan elements through minimum standards that affect principles of sustainability. As a result of the standards and resources, mandates can guarantee that sustainability-related policies are placed on the local political agenda. They have also been an important way to defray political fallout that may arise from restrictive sustainability-related policies by serving as a scapegoat (Berke and French, 1994). Therefore, presence of a state-level planning mandate should positively support sustainable development in plans.

Local context

Planning for sustainable development, as with any general planning activity, depends upon the local community context. The economic, social, and physical development factors making up the local community context can influence local planning for sustainable development (Beatley, 1995; Berke and French, 1994; Rees, 1995). Local community context includes the median home value and population change.

In general, more affluent communities are expected to produce more 'sustainable' plans given the likely availability of planning resources such as computing facilities to conduct impact analyses or geographic information system reports, or being able to afford assistance from outside consultants. These communities may also be more supportive of growth-control measures that may positively correspond to principles of a livable built environment and harmony with nature; however, they may also be more exclusive and, therefore, more likely to have a negative impact on the equity principle of sustainability. Overall, the level of affluence is expected to have a positive impact on the support for sustainable development in plans.

Percentage population change is expected to be an important variable for further characterizing the community context as found in previous studies related to planning policies (for example, Berke et al, 1996; Dalton and Burby, 1994). Population change captures the development pressures that may exist in a community. Communities experiencing population growth may feel more urgency to control how development responds to the growth. As a result, increased attention may be given to the concept of sustainable development. Therefore, a positive percentage population change is expected to have a positive effect on the support for sustainable development in plans.

Research methods

This research was conducted in three major steps and drew on two primary data sources: a content analysis of local comprehensive plans and a telephone survey. The first major step involved selecting a sample of plans and applying the Berke and Conroy (2000) method for evaluating the strength with which plans advance the principles of sustainable development. A telephone survey of local planning directors was then conducted to evaluate three dimensions of the plan-making process: political support for sustainable development within communities, efforts designed to support public participation, and resources committed to plan preparation. The third and final step was to evaluate how these dimensions influenced the extent to which plans support the sustainability principles.

Sample selection

As with the Berke and Conroy (2000) study, we took an exploratory approach to develop the study population of community plans. The initial task was to identify a group of plans that explicitly integrated sustainable development as a central organizing framework, and a second group that did not use sustainable development but were noted as high-quality plans. Of community plans that potentially integrated the concept of sustainable development 135 were identified through a review of US federal agency reports (that is, Environmental Protection Agency and Housing and Urban Development), three newsletters of sustainable development organizations, sustainable community conference proceedings, and one computer mail list server. This sample selection process was an expansion of that for the Berke and Conroy study.

To assure that the plans reflected contemporary and comparable practice, community size and time limitations were used to filter the plans. Only plans that were prepared between 1987 and 1998 were used. Additionally, small jurisdictions were thought to lack the resources to initiate a sufficient planning effort, so communities with populations of

fewer than 2000 were excluded. Communities with a population larger than one million were also excluded because the associated planning programs in such large cities were considered unique and not generalizable to the study population. The population size and time-frame parameters reduced the study population to 115 communities. A plan was then obtained from each of these communities.

An initial content analysis was then conducted to determine how the sustainable development concept was used in these plans. The concept was used as a central organizing framework in twenty-five plans. Twenty-one of these included the core values of sustainability (environmental protection, economic development, and social equity) in an introductory vision statement that guided the goals and policies in subsequent plan elements. Four plans did not include a vision statement, but contained language that consistently referred to the core values of sustainable development and translated these values into policies throughout the plan. Though the total was lower than expected, these communities still demonstrated considerable variation in geographic location and population size. The communities that produced sustainable development plans are located in twenty-two states and are equally distributed in population size across a range from about 20 000 to 998 000 people.

Twenty high-quality plans that did not acknowledge sustainable development as an organizing concept were selected from the remaining ninety-five plans. Three of these twenty plans were subsequently dropped because the communities that produced them were undergoing plan revisions at the time of the telephone survey. The respondents from these communities expressed some confusion in answering questions about the three dimensions of the planning process, because the current experience was more easily remembered. Consequently, the original control group of twenty was reduced to seventeen.

This control group of plans were considered to be high-quality efforts for two primary reasons. First, all were documented in agency reports or professional practice journals as commendable plans that tackle a range of substantive issues, including, natural resource protection, inner-city redevelopment, growth management, urban design, and social justice. Second, ten plans were American Planning Association award winners at the national or state-chapter level.

No significant differences between the control group and the sustainable development group were found for population size, percentage population change between 1980 and 1990, and percentage required to plan by a state mandate. Although the control group of seventeen plans is not representative of all plans that do not explicitly integrate the concept of sustainable development, it provides a rigorous test of the impact of sustainability on plans. High-quality plans were considered the appropriate and conservative control group because of the expectations that planning for sustainable development represents the best of planning practice (Beatley, 1995; Beatley and Manning, 1997; Healey and Shaw, 1997; Rees, 1995).

Plan-evaluation method

The next phase of the study involved development of a method for evaluating the strength with which policies in plans promoted six sustainable development principles. This study used the protocol established in the Berke and Conroy (2000) study. We first classified each policy on the basis of the sustainable development principle promoted by the policy. The principle was identified on the basis of the goal that was linked to a given policy and/or the rationale to support the policy that was included in the text of the plan. Then, we identified the type of development-management technique (for example, zoning and subdivision regulations, or capital facility programs) stipulated by each policy for promoting a given principle. Finally, we evaluated each policy

as suggested in the plan (score = 1) or required by the plan (score = 2). 'Suggested' policies contained key words such as *encourage*, *consider*, *intend*, or *should*. Policies were considered 'required' if they contained words such as *shall*, *will*, *require*, or *must*.

As with the Berke and Conroy study, the protocol was pretested to increase reliability in evaluation scores by comparing the results of the author and another researcher, who independently applied the protocol to the same plan. The team evaluated several trial plans, each time comparing results, resolving differences in interpretations, and refining the protocol. This process was continued until the interpretations of principles, development-management techniques, and the regulatory versus voluntary orientation of the policies were standardized and plans could be consistently evaluated.

Four of the sample plans were evaluated using the protocol by two coders working independently of each other. An intercoder reliability score which equaled the number of coder agreements for plan policies divided by the total number of policies was computed. An overall reliability score of 84% was achieved for plans that were double coded. A score in the range of 80% or above is generally considered acceptable (Miles and Huberman, 1994).

The three items of information for each policy statement that were derived from the evaluation were then used to create an index for each sustainable development principle. Two sets of indices were created. One set was for each of seven plan elements (housing, transportation, environment, energy, land use and design, economic development, and public facilities). The second set was for each of the six categories of development techniques (land-use regulations, property acquisition, capital facilities, financial incentives, building codes and standards, and public education). Computation of each index consisted of two steps. The first was to sum the scores assigned to policies under each principle within each plan element (or category of development-management techniques). A higher score represented a higher level of community commitment and activity devoted toward achieving a given principle. The second step was to standardize the indices by dividing the sum of scores by the maximum possible score and multiplying by 100. The total sustainability score was compiled by summing the standardized scores of the individual principles.

Survey of communities

A survey provided data used to analyze the relationship between the dimensions of the planning process and the advancement of sustainability principles in the plan. The questionnaire used for the survey was designed to obtain data on the three dimensions of the plan-making process. The survey used both closed-ended and open-ended questions. Closed-ended (or discrete choice) questions provided quantitative responses about the plan-preparation process. Follow-up open-ended questions provided qualitative explanations of the rationale for answers to closed-ended questions. The questionnaire was administered through telephone interviews with directors of planning departments that administered comprehensive planning functions. Responses were obtained for forty of the forty-two sample communities.

Analysis approach

This research used regression analyses to examine the influence of the planning process dimensions (political support for sustainable development, participation effort, and resource commitment), state-level planning mandates, and the integration of sustainability as an organizing concept in the plan on the total scores of principles of sustainable development as measures of plan sustainability. The large number of potential independent variables in conjunction with the small sample size necessitated the use of a data-reduction method before the final regression analyses could be run. This study

followed the three-step data-reduction process using correlation and preliminary regressions based on variable categories set forth by Rohe and Gates (1985) and Berke and Beatley (1992).

The data-reduction process eliminated all variables from two dimensions of the planning process: political support for the concept, and resource commitment. The lack of influence of these dimensions on plan sustainability scores was unexpected. One possible explanation for this finding is that the variables that remained after the reduction process dominated the analysis and substituted variables in the other dimensions. This is especially likely for a state planning mandate. Mandates have been suggested to substitute for local capacity and commitment to specific factors of the planning process (Burby and Dalton, 1994; Burby and May, 1997). The same may be true with respect to sustainability. In particular, planning mandates may serve as a substitute for local sustainability support and resource commitment which would not be as necessary when planning requirements have been specified.

Influences on sustainable development in plans

The purpose of this analysis has been to determine the influence that participation breadth (part of the participation effort dimension of the planning process), presence of a state planning mandate, population change, and the integration of sustainability as an organizing concept in the plan have on the total sustainability score of the plan. A comparative summary of these variables and their sources is shown in table 1.

Table 1. Variable means comparison between groups and variable source.

Variable	Sustainable development ^a				Source
	integrated in plan		not integrated in plan		
	mean ^b	SD	mean ^b	SD	
<i>Sustainable development</i> (dependent)					
Cumulative scores total of the six principles of sustainable development for each community	20.3	11.4	21.6	14.3	plan document
<i>Participation breadth</i> (independent)					
Total number of types of groups included in plan-preparation process	13.7	4.0	12.6	5.2	survey
<i>Sustainable development integrated in plan^c</i> (independent)					
Dichotomous value of 1 = concept integrated in plan; and 0 = concept not integrated in plan	1		0		plan; Berke and Conroy (2000)
<i>State mandate</i> (independent)					
Dichotomous value of 1 = mandated local plan; and 0 = no local mandated plan	0		0		Burby and May (1997)
<i>Population change</i> (independent)					
Rate of change in population between 1980 and 1990	10.9	11.1	15.2	16.5	1990 US Census

^a Comparison of mean scores of integrated and not integrated plans for each variable were not significant at a $p < 0.05$ level.

^b Mode is used for comparisons of dichotomous variables. SD is standard deviation.

^c This variable represents the classification of the plans and was not part of the mean score comparison.

Table 2. Influence of key variables on support for sustainable development in plans (total score of all sustainable development principles).

Variable	Regression coefficients		T-statistic	Probability > T
	unstandardized	standardized		
Presence of state planning mandate	13.00	0.50	3.95	0.0004***
Participation breadth	0.82	0.28	2.33	0.02**
Percentage population change (1980–90)	0.23	0.26	2.04	0.04**
Integration of concept in plan	-2.57	-0.10	-0.84	0.40

Adjusted $R^2 = 0.46$
Probability > $F = < 0.0001$
** $p < 0.05$; *** $p < 0.01$

A regression analysis was conducted to examine how the well the independent variables explain the variation in the total sustainable development principle scores for the plans in the sample.

Table 2 shows the result of the regression model for the total score of the principles of sustainable development. Three variables were significant at the $p < 0.05$ level or better: the presence of a state planning mandate, participation breadth, and the percentage population change between 1980 and 1990.

The total sustainable development score is most strongly influenced by the presence of a state planning mandate. This finding confirms expectations and is consistent with the literature on plan quality emphasizing the importance of a state-level planning mandate for plan policies supporting hazard mitigation (for example, Berke and French, 1994; Berke et al, 1996; Burby and May, 1997; Dalton and Burby, 1994). Mandates provide communities with some level of guidance for constructing policies that promote principles of sustainable development. The mandates can also serve as a scapegoat for instituting unpopular policies that forward the principles. State mandates can force attention to sustainable development as a general planning ideal. They may also require specific policy content, such as natural hazards and affordable housing regulations, which promotes individual principles of sustainable development. Additionally, the state planning mandates may substitute for local support for sustainability and local commitment of resources in the planning process, neither of which are currently significant influences of support for the concept in plans.

Participation breadth also had a positive impact on the sustainable development total score. This finding supports the positive value of public participation in the planning process, long held as important by planners in general (Day, 1997) and sustainable development proponents in particular (Hester, 1999). The participation-breadth finding confirms our hypothesis that an increase in the variety of participants increases the support of plan policies that forward sustainability principles. Increased participation breadth means an increase in the variety of opinions, concerns, and expertise that will be represented in the participation process. Participants can introduce issues to be addressed by the plan that may have otherwise gone unnoticed or in which the level of interest may not have been fully understood. Participant ideas and concerns can influence those sustainability-related policies that may not have been formulated without such participation. The significance of participation breadth adds to the continued push for citizen involvement, as well as the involvement by relevant government agencies, in public policy processes (for example, Innes, 1996; Lowry et al, 1997).

Increasing participation breadth forces inclusion of less frequently considered groups such as other government organizations. It also highlights that successfully promoting sustainable development in plan policies works best with the top-down state mandates *in conjunction with* bottom-up local participation.

Positive population change increases the total plan sustainability score. Dalton (1989) found that rapidly growing cities had to deal with more plan amendments and zoning changes than did their more slowly growing counterparts. Interpretation of the significance of the positive effect of population growth on sustainability scores rests upon the physical and social repercussions of such growth. Stresses associated with population growth (for example, land-consumption rates, utility-provision demands, loss of open space) may force attention to balancing new development with existing land-use patterns and environmental resources. Additionally, population growth may heighten awareness of resources affected by pollution or development and increase demands for those responsible to be held accountable for negative impacts. Communities experiencing population growth may, out of necessity, refocus their planning efforts to balance new development appropriately with existing land-use patterns and environmental resources to retain the positive community characteristics and amenities that drew people to them in the first place.

Insight into planning for sustainable development can also be gained by looking at what was not significant in explaining plan sustainability scores: integration of the concept of sustainability into the plan. The reason for this may be that, although the plans in this study were passed after the 1992 UN conference in Rio, the internalization of sustainability concepts and ideals may not have yet moved past the awareness stage. Planners writing the comprehensive plans may not have had enough familiarity with the concept or plan-writing experience in general to translate broad principles effectively into specific policies promoting sustainable development (Berke and Conroy, 2000). Therefore, although sustainability code words were incorporated into the plan vision or goals, the lack of follow-through in the policies may have resulted in some of the low-scoring plans from the communities that integrated the concept in their plan.

Additionally, this finding accounts for the concern that planners may have used the sustainability concept in the planning process to advance sustainability principles, but they did not use code words for sustainable development in the plan because the concept may not have been politically acceptable. The intent of planners may have been to use the principles for sustainability in writing plans because they are less well known and may be accepted as common sense. However, this finding challenges the plausible explanation that, although code words for sustainability were not used in plans, plans still advanced sustainability principles as a result of focusing on the concept during the planning process.

Recommendations

The two research questions examined the influence of four factors on sustainable development principle scores: dimensions of the planning process, state planning mandates, integration of the concept in plans, and local context. The findings from this analysis show that state mandates are a key factor for promoting total sustainable development scores. Participation breadth and population change were also important factors for promoting total sustainability principle score. The final meaningful finding was that integration of the concept in the plan was not a significant influence.

Based on our findings, we first recommend the adoption of state planning mandates to promote planning for sustainable development at the local level. Mandates have been shown to have a strong and positive effect on the quality of natural hazard

mitigation planning (Berke and French, 1994; Berke et al, 1996; Burby and May, 1997) and the adoption of development-management tools by local governments (Dalton and Burby, 1994). Similarly, in this research state mandates have been shown to have a positive effect on plan sustainability scores. The overwhelming influence of existing state mandates on principles of sustainable development provides confidence that state mandates prepared with the goal of specifically promoting sustainability principles will have an even greater influence. Planners therefore have an opportunity to guide the local, regional, and state-level pursuit of sustainable development by initiating and getting involved in the writing of such mandates. Perhaps it is not a surprise that in the USA where LA 21 efforts have not been adopted with vigor, a state-level planning mandate is important for inspiring sustainability-minded policies. Local-government-based sustainability initiatives appear much more prominent outside of the USA (for example, Adolfsson Jörby, 2002; Counsell, 1999; Rowe and Fudge, 2003), leading to the assumption that such mandates may not have as much applicability on the international stage.

State-level planning mandates are an effective but incomplete means for promoting sustainable development at the local level. Local commitment to a sustainable future is a critical component of success and is the foundation of LA 21 efforts worldwide. Participation promotes local commitment and complements the use of a mandate. This research has shown the importance of participation by a broad section of the community in the planning process to advance principles of sustainable development in the plan. Participation activities in the planning process are becoming more the rule than the exception, however, and ensuring diverse participation still presents a challenge to planners. Representation of the diversity of a community, although undoubtedly time consuming, pays off in plan policies that better promote sustainability. We further recommend the continued emphasis on and integration of participation into the planning process.

Participation efforts require that planners assume the role of facilitator to ensure that all stakeholders are represented and that the participation process is one that is balanced in an overall manner. In order to promote a broad participation process, it is critical that planners stress that participants' inputs matter; participants must know that their suggestions and decisions will be listened to and acted upon (Crowfoot and Wondolleck, 1990; Innes, 1996). As facilitators, planners will also need to address the conflicts and trade-offs that will emerge from the participation process in order to make it a productive one. Thoroughly publicizing the participation process combined with community outreach will also be important for increasing the diversity of participants in the process (Rohe and Gates, 1985).

Finally, we recommend the continued education of planning students and practitioners on translating sustainability ideals into practice. Critics may argue that the sustainability agenda is nothing beyond 'good planning' activities; indeed, increased citizen participation, for example, has been a planning staple for decades. However, it is going beyond the status quo effort in these areas that transforms a good planning process into a sustainability-oriented one. We have highlighted some of the added expectations associated with a sustainability-oriented process in our discussion. Translation of sustainability ideals into planning processes as well as plan policies requires best-practice information, and sharing of practical experiences—both successes and failures. Networks of information are critical resources for planners as they attempt to shift planning policy toward a sustainable future.

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