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Sustainable development indicators: a case study on the city of Flagstaff and Coconino county

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The application of capitalist theory and the perception of an autonomous economy have created a range of environmental and social ramifications not addressed via traditional economic reasoning. In order to effectively and efficiently abate sustainability issues, the sustainable development discourse developed evaluation methods such as sustainable development indicators to gauge progress towards sustainability in communities without using traditional cost–benefit methods of analysis. The indicators created in this work are intended to be applied as a method of project evaluation in local community development departments. Using local growth management policy as a basis, these indicators have been designed to show how a development project contributes to policy goals that relate to all three dimensions of sustainability: environmental, economic, and socio-economic.

Keywords: sustainability; economic indicators; environmental indicators; economic development

Introduction

As with many communities throughout the United States, the City of Flagstaff and Coconino County, Arizona, are currently attempting to improve their economic conditions via an environmentally sustainable route. This emphasis is due to a changing value system in the constituency of the region, which elevates environmental priorities to equivalent, and in some cases, more important levels than economic priorities. Coconino County may be defined as a high desert region and is the largest county geographically in the state of Arizona, yet it also qualifies as the least populated in the state. Flagstaff is the primary city in the county, with a population of approximately 65,000, and sits at an elevation of 7000 ft. in the midst of 13 Native American tribes, most notably the Navajo Nation and Hopi Tribe. Over the last decade, the City of Flagstaff and Coconino County have committed to redefining growth and sustainability in the northern Arizona region as required by both the state and its constituency. In order to accomplish this task, the city and county participated in a redesign of the general growth plans and goals for the area; a process which included citizen participation in defining those goals. Sustainability was defined in the context of community demands, which placed a priority on the conservation and preservation of the surrounding ecosystem. A content analysis of those growth plans revealed that although a participatory approach was taken in the design of policy, there was no operationalization of policy goals within the policy design, and thus no efficient and effective way to gauge how a community development project contributes to the community goals articulated in the plans. This paper develops project-specific sustainability indicators intended to be applied by project managers for the purpose of gauging whether or not a project contributes to already articulated community goals pertaining to sustainability.

Sustainability is defined along three dimensions: environmental, economic, and social. These three dimensions categorize the vital contributions made to a community by a sustainability framework. The typology also displays the expansive and interrelated capacities of sustainable development policy. For this study, we use the policies and goals from the city and county plans. These policies correspond to the indicators that have been developed. From these growth management policies, indicators were derived that operationalize policy goals during the project development process. This monitoring mechanism becomes an efficient way to respond to questions asked by decision-makers, and an effective way to promote all three dimensions of sustainability in community development projects. Both of these jurisdictions are considered as a single case study in this research, given their overlapping nature in Northern Arizona and the regional approach to economic development that must often be applied in similarly sparsely populated areas. The city and county adopted an Intergovernmental Agreement (IGA) to more intently engage local governments in the implementation process. This IGA replaced the former General Management Plan and adopts the Regional Plan as the agreed upon set of principles that will be applied to regional development in this area.

The county and city produced comprehensive development plans in 1999 and 2001, respectively. These plans were formed through a succession of town meetings that were expected to derive a listing of community priorities. Although the meetings were held throughout the city and county regions, the majority of citizens who were able to participate represented mostly the middle and upper socio-economic demographic, which resulted in a listing of

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community priorities that emphasized the environmental facet of sustainability over the socio-economic.[1] The community priorities were then evaluated by a steering committee of local and citizen experts and manifested in the County's 'Comprehensive Plan' and the City's 'Regional Land Use and Transportation Plan'. In this way, a bottom-up and top-down approach to policy was taken by the city and county such that community values were reflected in the actual principles from which policy originates.

Since the approval of these development plans, growth in the City of Flagstaff and in Coconino County has been relatively slow within the context of the sustainability principles elucidated in the development plans for land use and growth management. Although environmental principles have been maintained in most expansion and development projects approved by the city and county, attention to social sustainability principles such as affordable housing and livable wages and economic sustainability principles including environmentally friendly industry development, have been lacking. This is due to a poorly defined approach to implement the policy itself. Analysis of the plans showed a visible disconnect between the policy design, with its articulation of sustainability principles, and the operationalization of those principles to provide usable knowledge for decision-makers in the implementation process. Currently, the City and County Planning and Zoning Commissions participate in an annual review process for policy amendments and larger scale projects. Smaller projects are reviewed as they occur throughout the year. Neither the city nor the county has applied an aggregate policy goal review process or a proactive project analysis. The aggregate review process monitors the progress of policy towards ultimate goals, while the proactive project analysis constitutes a method by which the local governments evaluate a single project to make sure it coincides with policy goals prior to any action taken by the city or county.

For the city, projects are initially reviewed by the Development Review Board then move to the Planning and Zoning Commission, with final approval by City Council. In accordance with language appearing in the Regional Land Use and Transportation Plan, at each point the project should be evaluated in terms of the sustainability principles; however, there is no formal process for this type of analysis. Hence, the implementation of the plan is inhibited by the lack of a direct operationalization of the sustainability principles in the actual policy design. In addition, there is no annual progress review of the plan to verify that city projects have contributed to the goals articulated in the plan; only an annual process for amendments to the plan conducted by the Planning and Zoning Commission.

The county operates in similar circumstances, with no formal review process for projects and an implementation process that does not directly apply sustainability principles to analysis. The Community Development Director reviews all projects to determine what, if any, amendments are needed from the Planning and Zoning Commission. Following this review, the projects are forwarded to the Board of Supervisors for ultimate approval. Each entity is responsible for its own analysis of project compatibility to sustainability goals. In addition, the county has lacked the budget to apply zoning and subdivision ordinance amendments that would sufficiently implement the plan, such as an environmentally sensitive land ordinance and a subdivision design ordinance.[2]

In order to increase attention to social and economic sustainability principles, the sustainable development (SD) policy design itself must become more effective. To improve the effectiveness of SD policy, evaluative mechanisms must be integrated into the policy design so that decision-makers receive a comprehensive overview of each project's contribution to policy goals of sustainability. The initiation of a sustainable development indicator (SDI) set has become a primary method to the successful integration of sustainability principles in policy, allowing for project specific or annual evaluation of policy in terms of goal accomplishment (Brugmann 1997). The SDI set should be derived from a dynamic information system rather than from a discrete, inert data base in order that the true movement of capital (natural, built, and human capital) from project to project may be accurately traced (Meadows 1998). In addition, the effectiveness of SD policy may be improved through the expansion of 'incentives' for sustainable development (Mol and Sonnenfeld 2000). These indicators may be initially identified through observation of local governments with similar demographics and policy priorities.

A crucial element in the design process of SD policy is the formulation of sustainable development indicators. Indicators may be developed in order to measure the increase or decrease in sustainability for a particular facet of the locality (Bossel 2001). International attention by the United Nations Council on Sustainable Development (UNCSD), the World Council on Environment and Development (WCED), the Organization for Economic and Community Development (OECD), the World Bank, and a plethora of non-governmental entities such as The Sustainability Institute and The Sustainable Seattle Group have furthered the process of indicator formulation via analysis of methodological frameworks. Categorizing indicators has been found to be the most effective approach in research and development. Sets of indicators may be economic, environmental, and social, within which there are headline indicators, goal-oriented indicators, or leading, linkage, and leverage point indicators (Meadows 1998). Given the diversity of core values that may be established in the design of SD policies, a multitude of frameworks have been established in order to conceptualize the primary dimensions of SD for the locality, provide the linkages among dimensions, group and measure issues, and justify the selection and aggregation of indicators. Some commonly applied frameworks are: pressure – state – response, human well-being/ecosystem well-being, issue- or theme-based, and capital accounting based frameworks (Meadows 1998). Irrespective of the framework applied, indicator development and research must be rigorous and systematic

with close ties to policy goals in order to be effective and efficient (Atkisson 1996).

The most current research on methodological frameworks has found that although international recognition has been given to the viability of sustainability indices, a more comprehensive vantage of the state of a community may be achieved through the establishment of an information system. The type of data required for a complex and interactive information system necessitates the cooperation of all local government departments, given the specificity of information needed to make the database holistic. This information system provides a more exact and clear conceptualization of the aforementioned objectives for frameworks (Meadows 1998). The data collected for this holistic information system emerge as a solid foundation from which indicators may be derived.

A dynamic model for indicator development, normatively speaking, must include qualitative and quantitative data, be reflective of community values be reflective of or linked to policy objectives (Mickwitz 2005), identify critical linkages, dynamic tendencies, and leverage points for action, as well as distinguish between stocks and flows, and be able to aggregate data to higher levels (Meadows 1998). The last characteristic is dependent upon the time and energy available to the researchers and the goals of the policy. Most research on the international and national levels emphasizes this point; however, local capacity dictates in many circumstances the ability to accomplish this. Aggregation of data, while quintessential to global performance measurement, is sometimes not plausible on a local level (Atkisson 1996). In some cases, international or national sustainability indices do not correspond to local goals or measurements. In addition, many approaches to SD require a contextual reference given the specificity of place, which further complicates the idea of aggregation. This then becomes a question for the locality to decide whether or not to fashion indicators that may be readily aggregated to higher levels of analysis.

The most current research in the field of sustainable development and planning points to the development of indicator systems as an effective way to evaluate progress towards goals of sustainability.[3] Scholars hypothesize that sustainable development indicators may help evaluate current policy and its ability to meet goals thus indicating the need for change, as well as signal the need for new policy design. The generation of an information system from which sustainable development indicators may be derived, allows for the creation of indicators that may better display the linkages between thresholds, time-bound targets, and overall policy objectives. Thus the capacity of SD indicators to influence policy is increased, allowing sustainable development policy to become more effective.

Methods

Understanding the objectives and goals of policy is the first step to obtaining concept definitions that can be applied to indicator development as a means to evaluate policy progress. This section identifies major developments and lessons learned in the application of an indicator system that effectively track progress toward achieving community goals entailing all three dimensions of sustainability. First, policy design, indicator application, and the major goals of policy in the context of indicator development are identified. Ensuing this, the narrative approach applied to the content analysis of city and county policy is explained followed by discussion of the primary method of analysis used, 'structured, focused comparison'. Finally, we look at the design of the research questions in this study and the evaluation of the best approach to policy operationalization.

Policy design following a participatory methodology is pertinent to the development of policy that bears in mind functional issues that permeate the community (Nygren 1999). This lends legitimacy to the policies developed. However, the operationalization of policy is imperative to the ultimate success and achievement of community goals. Without a monitoring mechanism to evaluate progress towards policy goals, there is no measure of performance, nor is there accountability for municipal projects. Traditional methods incorporate differing forms of annual, semi-annual, or quarterly reports presented by individual directors or local government commissions. Historically, indicator systems have been applied to the private sector as a means of fiscal monitoring and goal evaluation with regard to tangible capital developments, in addition to national monitoring of economic conditions. This method of evaluation was first introduced in the 1960s; however, by the late 1970s indicator development as a means of monitoring social conditions fell by the wayside due to inordinate costs of data collection (Kingsley 2006). Recently there have been many advances in data collection that lend more readily to the application of indicator systems as a means of evaluation for socially oriented policy goals (Kingsley 1998).

Four major changes have occurred over recent years that have effectively changed the capacity of indicators to monitor social accounts. These include: advances in computer hardware that have expanded computer capacities for storing and manipulating data and reducing costs; address matching and advances in GIS software to aid in identification of areas in need of attention; advances in the availability of automated administrative data for more advanced and less time consuming demographic analysis; and advances in local institutional development that offer non-governmental associations that are essentially 'data intermediaries', providing external low cost resources for data collection (Kingsley 2006).

The use of indicators as a performance measure for social accounts gained momentum in the 1990s through application in federal legislation. The Federal Interagency Forum on Child and Family Statistics (1997), the President's Council on Sustainable Development (1996), and the Government Performance and Results Act (1993) have all articulated the need for improved monitoring mechanisms in the form of indicator systems. In addition, the United Nations Division for Sustainable Development

has established its own methodology for the development and application of sustainable development indicators; categorizing them as aggregate, headline, and goal-oriented indicator sets (UNDSD 2005). In light of these applications, indicators design has now progressed adequately enough such that it may be used to measure not only the economic dimensions of development, but the socio-economic and the environmental as well.

The methodology applied to this research is largely qualitative in design, looking to understand the basis of sustainable development policy design through a variety of methods including narrative inquiry and the 'structured, focused comparison'. A content analysis of the City of Flagstaff's Regional Land Use and Transportation Plan and Coconino County's Comprehensive Plan was performed to identify community goals and priorities articulated in policy. The qualitative research progressed with a series of interviews and the use of narrative inquiry to verify the meaning and purpose of policy and the current project development process. The narrative inquiry is a method of open-ended interview questions that aims to understand the meaning and purpose behind the language used in current policy. This approach captures the full meaning behind concepts such as 'livable wages' and 'varieties of employment opportunities', thus permitting these terms to be further operationalized in this research.

The contextual analysis used here applies Fischer's narrative approach to policy analysis and prescription (Fischer 2003). In order to wrestle with the overgeneralizations and often inappropriate policy prescription afforded by traditional positivist research, Fischer offers a post-empiricist method that entails the use of local, contextual knowledge and participatory inquiry in policy analysis. He approaches policy analysis from broad principles surrounding the effects of discourse on public policy and how the policy analyst may in turn affect the discourse. For Fischer, contextual knowledge is the epistemic foundation that distinguishes his approach from traditional positivist research. It is the emphasis on the context of a phenomenon, or rather, the temporal and spatial scales that values and behavior are embedded. Fischer recognizes that an adequate account of social action requires the context of time and space. Without context, policy analysis is relegated to a narrow lens of causal inferences. Hence, attention to context permits the policy analyst to escape the determinism of economic reasoning and consider many correlations between different events and an outcome. This post-empiricist, narrative approach to policy analysis is grounded in the theory of social constructionism, whereby knowledge of beliefs and values becomes core to understanding policy and its effects.

Through this analysis a series of contingent generalizations concerning policy design and the operationalization of goals was developed to provide usable knowledge for decision makers to apply in the implementation process. The contingency of policy design is particularly important in light of the complex issues involved in sustainable development. Policy that is permanent in approach and design is not conducive to the effective management of local growth issues given the tendency of environmental and socio-economic circumstances to change in the short term. Hence, policy design that permits a streamlined amendment process and a contingent approach to decision-making, which factors in contextual facets on a per project basis, is an effective and efficient method to sustainable development policy.

The second step involved research on global, national, and local levels regarding SD policy design and implementation at the local level of analysis. In order to obtain a perspective of how local communities have attacked the problem of unsustainable development, two case studies were examined, one national and one international. These case studies from the City of Seattle and the Finnish region of Kymenlaakso offer examples of the process for designing sustainable development policy and were applied to the analysis of the city and county policy design process and project development process.

Qualitative research methods have the ability to identify causal processes and mechanisms, which better guide the policy-maker compared to strict quantitative analysis. George and Bennett (2005) offer a well-developed theoretical defense of qualitative methodology that articulates the importance of theory development and testing through 'structured, focused comparison' and application of specific research tools, such as process-tracing and within-case analysis. Through well-defined epistemological and ontological assumptions that develop the reasoning behind methodology, George and Bennett note that theory-oriented case studies, both single and comparative, represent the best qualitative approach leading to middle-range theories that are likely to constitute usable knowledge for policy-making. Given the complexity of the research questions and the focus on the local level of analysis, the interpretive method afforded by George and Bennett offers a way to combine the qualitative and quantitative processes so that the knowledge produced may be more readily applied in the current political conditions. This methodology is appropriate given its emphasis on the inductive study of single cases and attention to qualitative research questions and interpretation, which pursue measuring via operationalization processes.

George and Bennett's fundamental theoretical approach to qualitative research is their method of 'structured, focused comparison'. This method provides the basis for their methodological approach consisting of three phases: movement through the five design tasks to formulate a viable research objective, carrying out the case studies, and drawing implications of findings for theory. They propose that in order to provide usable knowledge, the method of research must be 'structured' such that uniform, generalized questions adequately reflect research goals and are imposed upon case studies through a standardized process. Further, the research method must be 'focused' in that only particular facets of the historical phenomena being studied are included in the derivation of independent variables, providing for the necessarily narrow, contextual research that can be applied by policy-makers.

These concepts were applied to move through the phases by first following the five design tasks and thus identifying the research objective: given a participatory policy design process, how can sustainable development policy become equally effective in the environmental, economic, and social realms by examining the effects of policy design? The content analysis of the City of Flagstaff and Coconino County sustainable development plans and the two case studies were used to formulate the single case study used in this research. The implications drawn show that, once policy principles and goals are set, the operationalization of those principles can have a large impact on the successful implementation of policy. 'Successful' implementation in this context refers to the ability of planning to manifest projects that contribute equally to environmental, economic, and socio-economic sustainability. This usable knowledge can now be applied to the policy design process and contribute to the attainment of sustainable development goals.

The sustainable development of a community has become a multi-tiered process that arises from the development of goals using participatory inquiry, to the formation of policy relying on expert decision-makers, and finally to the evaluative process. The evaluative mechanism is imperative for effective government because of its special qualities. Sustainable development indicators as an evaluative mechanism can signal the need for policy change or a shift in policy, determine if current policy is progressing towards set goals, and signal the need for totally new policy. Following the recommendations of the National Neighborhood Indicator Partnership (NNIP), the Sustainability Institute, the United Nations Division for Sustainable Development (UNDSD), in addition to the lessons learned from the case studies on the City of Seattle and the Finnish region of Kymenlaakso, the ensuing indicators and associated models have been developed in order to operationalize policy goals and track progress towards attainment of those goals.

Results

The content analysis was performed by way of examining city and county plans looking particularly for verbiage articulating all three dimensions of sustainability and pertaining to the intersection among economic, environmental, and social goals. This is a 'structured, focused comparison' of city and county goals and policies seeking to uncover the dimensions of sustainability that are articulated in the community plans. The narrative inquiry was applied to ensure that the words articulated in policy were defined according to research assumptions. The analysis of city and county plans provided content validity for indicator development by evaluating policy goals and their respective dimensions of sustainability. The ensuing section first identifies the three dimensions of sustainability in which the indicators are categorized. The actual indicators developed for operationalization are then discussed with reference to the city and county policies that they measure.

Operationalizing policy goals in a holistic sense means that definitions of environmental, economic, and social sustainability are available and included in the text of current policy and associated goals. Environmental sustainability involves a policy design that emphasizes environmental preservation and conservation through science-based conservation principles above all other community goals. This is clearly a primary goal for both the city and county comprehensive plans as identified in the content analysis. Monitoring how a project contributes to the goal and policies of environmental sustainability is an essential step to achieving those goals.

In the context of this community, economic sustainability may be defined as economic development without growth. The 1987 Brundtland Report produced by the World Commission on Environment and Development titled *Our Common Future*, released a definition of sustainable development that maintains the place of the market as central to development decisions (WCED 1987). Thus, this definition has become widely applied by those favoring traditional economic development processes. Like the Brundtland definition, policy is looking to provide for its community by maintaining major economic functions. However, unlike the Brundtland definition, local policy aims to satisfy the needs of economic development through accessing livable wages, tax revenue, and environmental sustainability.

Including the desires of local residents in policy-making requires that community development plans incorporate a holistic approach rather than traditional single-factor oriented action plans for economic development. In Flagstaff and Coconino County, recruitment of environmentally friendly industries such as nutriceuticals and biofuels or biodiesels has recently become a priority for local government. In addition, marketing towards those industries that offer livable wages, minimal land use, and energy reduction operations combined with recycling programs, satisfies the aggregate needs of the community. Therefore, the definition of economic development has evolved out of a narrow and ambiguous definition prioritizing fiscal and physical growth and has become reembedded into the whole of community demands such that more than one factor is analyzed before committing city or county energies to the project. This facet of the social paradigm may be more appropriately called economic sustainability rather than economic development to better reflect the holistic nature of the concept and associated action plans.[4] The ultimate goal of aggregate increased community welfare is dependent upon mediated economic development, thus monitoring progress on economic sustainability is essential to the task of obtaining social equity goals.

Social sustainability, in this context, refers to the level of welfare experienced by the majority of community members. It may be defined as the ability of an individual or family to own a home, spend time with loved ones, and appreciate a clean environment. Essentially, this is the ability to meet one's financial needs while concomitantly meeting one's personal and physical needs. Having livable

wages means nothing if community members are overworked, with little time for family and recreation, and increasing environmental degradation occurs. Monitoring progress made towards goals that focus on the quality of life of community members is additionally essential to the task of obtaining goals of social equity.

Following the content analysis, a series of expert interviews throughout an 18-month period provided further construct validity to the indicators developed by identifying past, present, and future policy goals pertaining to all three dimensions of sustainability. Four governmental professionals, whose jobs apply directly to community development projects, were interviewed once at the beginning of research, once in the middle, and once at the end. The intent here was to examine the current process for project development, determine what would make the process more efficient and effective, and to gain feedback on the accessibility of the indicators and models. Here, efficiency is understood in terms of the time required for a project to be approved, and effectiveness is understood in terms of projects that reflect all three dimensions of sustainability that are vocalized in the city and county plans. The participants were the director of the County Community Development Department, the Community Reinvestment Coordinator, the Community Housing & Neighborhood Planner for Flagstaff, and the director of the Greater Flagstaff Economic Council (an entity subsidized and contracted by the city and county).

This research applied a series of structured, focused questions through each interview, while also opening the interview to narrative inquiry, looking to better understand the contextual meaning of policy and the development process itself. Although the language in both plans emphasizes environmental sustainability, social and economic dimensions of sustainability receive attention in the land use and growth management sections of policy. The social and economic dimensions were given ample mention throughout the series of expert interviews, signaling both the desire to focus on these goals and the need to improve the effectiveness of the current planning process. The interviewees each expressed the need to operationalize policy goals in order to weight each dimension of sustainability equally when developing a particular project. This would provide a tangible connection between city and county projects and community goals articulated in the comprehensive plans. Decision-makers have become increasingly aware of the need for social indicators given the high cost of living compared to median wages in the region, as all experts interviewed noted. For this reason, the definition of sustainability for the city and county has been expanded from a single environmental emphasis to include economic and social dimensions of sustainability as well. These interviews led to the design of all indicators presented in our models as a method to operationalize policy goals.

The set of indicators developed here establishes a more efficient project development process by answering the questions asked by the Development Review Boards, City Council and the Board of Supervisors when approving a plan prior to any meetings. Thus, with the application of this model, relevant policy questions are answered through data calculations prior to any council or board meeting and information may be dispersed first through the indicator results. Decisions on proposed projects can now be made in one or two council or board sessions, rather than combining the question and answer period into multiple sessions using essay formats for answers. The content analysis of city and county plans along with the information found through the series of expert interviews has resulted in the design of the ensuing indicator table, which satisfies the recommendations made by interviewees and the ten suggestions for indicator development made by the National Neighborhood Indicator Partnership (Kingsley 1998).

Having analyzed the emphasis of current policy and the associated long-term goals in the content analysis of city and county plans, we next introduce a mechanism to monitor and further evaluate progress towards attainment of social, economic, and environmental goals. Table 1 provides information pertaining to Land Use & Growth Management and Community Design elements of city and county comprehensive planning policy. Maintaining a small focus at the inception of such a model will help resolve any immediate conflicts and aid in achieving concrete results rapidly, which will, in turn, motivate increased participation from community members and government (Kingsley 1998).

The accompanying table (see Appendix which is available via the multimedia link on the online article webpage) includes a general description of the Coconino County and City of Flagstaff goals and policies, as well as project-specific sustainable development indicators for each goal and associated policy. The description of each goal in the first column also includes a reference to the dimension(s) of sustainability that it promotes. The complete table is accessible via on-line journal resources. The complete on-line table includes a listing of the dimension(s) of sustainability that the policy emphasizes, where to find that piece of policy in the respective city or county plan, the goal itself as articulated in the plans, and associated policies designed to help achieve that goal. Some policy goals have more than one indicator to evaluate progress towards that goal. The multiple indicator measures lend an iteritem validity to the indicators themselves, showing that you have multiple measures for the same concept.

During the first set of interviews regarding the project development process, the experts were asked how they would measure progress towards the goals in their specialty. From here, an initial set of indicators was developed. In the second set of interviews, the experts were given a template of the indicators and the model design. With their approval, we moved to proceed to construct the formal Policy-Indicator Model discussed in this study. The table is intended to display project-specific progress towards community goals. Project-specific indicators are a pro-active evaluative mechanism intended to analyze incoming projects. These are the operationalization of policy. The project-specific indicators will provide decision-makers with data on incoming projects to determine the feasibility of the

Table 1. Policy-indicator model.

Coconino county & City of Flagstaff policy (summarized according to major focus of policy prescription)	Sustainable development indicators (project-specific evaluative mechanism)
Environmental sustainability	
Preservation of open space, compact land-use pattern	Total square footage utilized per project: total amount of area remaining within UGB
	Amount of access points to pedestrian and bicycle routes per commercial or industrial development
Socio-economic sustainability	
Affordable housing	Deficiency in dollars of per month for a mortgage payment on a single-family home at the median wage of a company
	Deficiency in dollars per month for a mortgage payment on a median priced town-home at the median wage of a company
	Deficiency in dollars per month for a mortgage payment on a condominium at the median wage of a company
	Deficiency per month in dollars for a mortgage payment on a current affordable housing price for a single-family home
	Can this median wage make a mortgage payment on an affordable home?
	Amount of affordable housing per residential project
	Is this a mixed use development project?
Environmental, economic, and socio-economic sustainability	
Environmentally appropriate commercial and industrial design	Sustainability of water efficiency
	Sustainability of materials and resources
	Sustainability of energy and atmosphere
	The percentage of native species used in landscaping of the newly constructed retail building
	Total square footage of area within UGB utilized for the project
	Is this a 'big box' project?
Economic and socio-economic sustainability	
Livable wages	Deficiency in dollars of per month for a mortgage payment on a single-family home at the median wage of a company per annum
	Deficiency in dollars per month for a mortgage payment on a median priced town-home at the median wage of a company per annum
	Deficiency in dollars per month for a mortgage payment on a condominium at the median wage of a company per annum
	Type of labor needed for the company
Economic and environmental sustainability	
Infill development	Is this an infill project?
	Is this a Brownfield development?
	Is this a 'big box' project?
	Is this a mixed use development project?
Environmental and socio-economic sustainability	
Aesthetic neighborhood and commercial design	Sustainable site orientation: lighting, bicycle storage, topography preservation, reduced building and parking lot footprint
	The percentage of native species used in a new commercial, industrial, or residential site for landscaping
	Total square footage of area within UGB utilized for the project
	Is this a mixed use development project?

project in terms of aggregate community goals. This approach, utilizing indicator measures for pro-active project evaluation, reserves government resources for those projects that satisfy the definition of sustainable development according to this community, including environmental, economic, and social sustainability. The table is intended to be applied by local government officials in the Community Investment Divisions. These officials are the project planners and the Development Review Boards, the directors of the Economic Development and Community Development Departments, and the members of City Council and the Board of Supervisors. This model improves organization, accessibility, and accountability with regard to city and county government. The purpose is to provide a type of negative feedback loop whereby issues with projects can be addressed early on, and problems can be noted with appropriate changes made to policy or implementation plans.

Discussion

Our research produced an analysis of city and county plans that included evaluation of both the democratic process of policy design and the content of established policy. Initially, we wished to ascertain if a discursive democratic process

was applied. Next, we wanted to determine if the policies include all three dimensions of sustainability, and, finally, we considered how these policies could best be operationalized to serve as effective and efficient tools for governance. The analysis demonstrated that the city and county applied a participatory process to policy design that involved community feedback, although participation of the lower socio-economic levels was minimal due to resource constraints such as time and money. Second, research showed that the Land Use and Growth Management elements of policy articulated goals that contributed to environmental, economic, and socio-economic sustainability.

The results were used to generate the indicators derived from the six pieces of local policy that were analyzed for the purpose of operationalization. The content analysis of policy determined that there was an emphasis on policy that required a low environmental impact for developments, although economic and social sustainability principles were articulated but in a minimal fashion. Due to this focus, the design of the indicators intentionally measured all three dimensions equally to provide a realistic evaluation of any community development project's contribution to all community goals. In this light, it becomes easier to decipher the priorities of the project in terms of all three dimensions of sustainability. If the results of the indicators show a definite emphasis on one dimension over the others, then this data will provide the justification for a change in the current project design. The point being that in order to attain aggregate increased community welfare through sustainable development, community projects must contribute to all three dimensions of sustainability because they are all interdependent. This research thus determined that the design of a set of sustainable development indicators would effectively operationalize policy goals in a manner that would weight each dimension of sustainability in a more equal manner.

Finally, the indicators were tested on two local projects currently in the project development process of the city to evaluate their contribution to policy goals in all three dimensions of sustainability and to test the validity of the model. Using the Policy-Indicator Model designed in this study, we were able to provide results regarding each project's specific contribution to each of six policy goals. As expected, both projects showed the highest contribution to policy goals that related to environmental sustainability. Due to the environmental emphasis of local policy, these results appear favorable on the surface and thus both projects would be likely to be approved as presented. Both projects, however, scored poorly on the economic and social indicators and call for additional analysis in order to provide a comprehensive evaluation of both projects within the context of sustainability. Once these results are factored into the project development process, it is apparent that both projects will require changes in order to meet the goals of economic and social sustainability. Therefore, we conclude that these indicators should be applied to the current project development process for the purpose of maintaining accountability in the context of community goals and community development projects.

Operationalizing the policy goals that pertain to these dimensions of sustainability will help bring forth the analysis needed to provide the community with well-rounded projects. The existing project design process provides for environmental analysis; however, environmentally sustainable buildings and land use do not guarantee livable wages and affordable housing; those facets of human life which contribute to personal success and growth. At the same time, development is a permanent facet in communities, so environmental considerations become a necessity for the public good. This is a consideration that the community has demanded through the discursive democratic process of policy design. The constituency has also demanded that attention be given to goals of livable wages and affordable housing, which contribute to socio-economic well-being. The constituency has asked local government to attract and retain industries that provide for these goals. Given the lack of operationalized policy, little effort has been given towards these objectives. Currently, there is no method to evaluate contributions to these socio-economic sustainability goals. The Policy-Indicator Model introduced in this research is a viable addition to the current project design process, which will effectively measure a project's contribution to these goals. The Policy-Indicator Model may also be applied as a method for performance measurement to any agency or department looking to operationalize its policy. Once policy goals are determined, the indicators may be developed in order to gauge progress towards those goals. This method is an alternative to traditional cost–benefit forms of performance measuring and thus may be applied to non-monetary or intangible policy objectives.

Community development in a capitalist economy has traditionally applied cost–benefit methods of analysis to project design and approval. This has created a disembedded economy that dictates development rather than being a facet of development projects. Decisions concerning community development projects have been based solely upon projections of revenue and expenses, which have resulted in projects that negate intangible ramifications in the environmental and socio-economic realms. These realms of community life have become increasingly important, given the growing awareness of environmental degradation caused by industrial development and the increasing cost of goods that do not reflect trends in wages. Cost–benefit types of analysis clearly are not able to measure components of community life that are necessary for the attainment of aggregate increased welfare. Community life involves concepts that are immeasurable in monetary denominations. The progression of time and technology has brought forth a multitude of complex issues that require a deeper understanding of the problems facing communities. As a result, a new method for project evaluation is essential to include in the design of local policy. Policy should articulate community goals, while the new method of evaluation should operationalize the desire of the community to

attain an increase in all three dimensions of sustainability: the environmental, economic, and socio-economic.

Notes

1. Senior Community Planning Director for the City of Flagstaff.
2. County Community Development Director, Bill Towler.
3. The Sustainability Institute (Hartford, USA), World Council on Economic Development, United Nations Council on Sustainable Development.
4. The words 'action plan' refer to any implementation plan that includes steps to achieve policy goals.

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