Participatory landscape planning and sustainable community development: Methodological observations from a case study in rural Mexico

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Abstract
Most local authorities in rural Mexico lack relevant resource data at appropriate scales to develop community plans, even though planning and development decisions are made largely at this level of government. Many resource planning studies have been conducted in less developed areas of Mexico, but these are of limited applicability to economies in rapid transition facing tremendous internal developmental pressure, such as in the state of Jalisco. In order to assist such local rural communities in Mexico achieve a sustainable balance, a landscape planning process which includes community engagement, supplemented with landscape analyses, classification, mapping as well as various qualitative research methods, is described and analyzed. A site analysis across the case municipality of Tapalpa identified major landscape units, and environmental and socio-economic issues, which were grouped into major themes. Following interviews with community members, a participatory workshop charrette was conducted, where local and institutional stakeholders discussed issues uncovered during the interviews and landscape analysis. A final set of sustainable development recommendations and visualizations demonstrating potential outcomes was assembled for legislation and implementation. This study showed that community engagement through the use of participatory landscape planning is an effective means of informing and impacting local policy related to sustainable community development in rural Mexico. Furthermore, it demonstrates the lack of planning in landscapes outside of major population centers, and the limited utility of existing policies which lack appropriate scale and applicability to rural areas.

1. Introduction
In this paper, we demonstrate that a well conceived and executed participatory planning process can be used as a cost-effective means of assembling supporting data for sustainable community development in rural areas, land use planning, building local capacity for landscape analyses, and developing local-level policy recommendations that could be fairly effortlessly implemented by municipal and regional governments. The purpose of this ‘proof-of-concept’ paper is to demonstrate the methods that we used, using the rural Mexican community of Tapalpa as an illustrative case. It is hoped that the lessons learned from this research can be transferred to similar planning exercises in rural Mexico and elsewhere where rural communities are undergoing rapid transformation. Sustainable community development in the context of this study is meant to encompass a more balanced consideration of environmental, social, and economic values, as opposed to planning exercises in the past which have tended to favor economic and tourism growth at the expense of other community values.

2. Background
Patterns and processes of globalization are influencing contemporary land use trends and unknown challenges for sustaining land use systems are emerging (Currit and Easterling, 2009). According to Mas et al. (2004), Mexico is undergoing rapid processes of land use cover change, resulting in major implications for sustainable development and contributing to processes, such as global warming, a loss of biodiversity, and changes in the regional hydrology and biogeochemical cycles.

In order to address these challenges without compromising the environment and their local communities, land use planning and necessary supporting data are crucial, especially to developing countries under severe environmental and demographic strains (Food and Agriculture Organization, 1995). This is particularly important for Mexico, where national policies and globalization are rapidly changing patterns of land use. According to Bocco et
al. (2001), land use planning represents a reasonable compromise between environmental potential (measured in terms of the availability of natural resources) and social demand (measured in terms of the requirements of goods and services by specific human communities).

Land ownership in Mexico represents a unique pattern of land tenancy that facilitates both private and communal property. This property regime stems from the agrarian policies established subsequent to the Mexican Revolution (1910) that created a common form of governance for all of rural Mexico (Bray et al., 2006). The Mexican Constitution of the United States of Mexico 1917 (2006) established three forms of rural property: national lands, private property, and the agrarian reform sector comprised of two new forms of common property, comunidades and ejidos. Comunidades refer to indigenous communities with long established occupation of land, while ejidos which are communal groups that have been granted land redistributed through the agrarian reform process (Bray et al., 2006).

Comunidades and ejidal lands cover approximately half of the national territory of Mexico (Antinori and Bray, 2005), including as much as 80% of Mexican forest lands (Klooster, 2003). Each state comprises different proportions of common property. For example, 48.3% of the land tenancy in the state of Jalisco was attributed to common property in 2001, while other states have much higher proportions of ejidal and comunidades lands, including Oaxaca with 90.5%, Quintana Roo with 87.6%, and Chiapas with 88.8% (Warman, 2001).

Historically, the government of Mexico retained ultimate ownership on both comunidades and ejidal lands, with peasant possession being regarded as a long-term, stable, and usufruct right (Bray et al., 2006). However, in 1992, important changes related to the regulation of rural land tenures were made to the Mexican Constitution, and a new Agrarian Law that attempted to redraft property rights was enacted (Muñoz-Piña et al., 2003). Currently, ejidos are permitted to have their lands surveyed, divide their lands into private landholdings (to sell), and even dissolve the ejido if voted on by the majority (Ley Agraria, 2002). However, privatization of common forested property within ejidos is still prohibited (Antinori and Bray, 2005) and comunidades are not permitted to dissolve themselves (Bray et al., 2006).

This change in the agrarian law has transformed rural Mexico. The North American Free Trade Agreement (NAFTA) of 1992 has also been cited as another legislative change that has impacted rural communities (Bray et al., 2006); in particular, rural Mexican farmers with small land holdings have been identified as being particularly sensitive to the unequal and uneven distribution of the negative impacts of global economic integration and market liberalization (Leichenko and O’Brien, 2002). Market failures and inefficiencies in Mexican agriculture have also been compounded by the proximity of agricultural powers (the United States and Canada), as well as the absence of credit, insurance, and technical support for small land holders (Eakin, 2005). As a result, many rural Mexicans operating on agricultural and forested lands have largely been excluded from the new commercial opportunities presented by more open markets (Eakin, 2005).

3. Study context and objectives

Given current rural trends, it seems that the most viable adaptation strategies for rural communities in Mexico may reside outside of the agricultural sector, meaning that shifts in the meaning and purpose of rural land use are required (Eakin, 2005). This situation is further exacerbated by the fact that many rural communities in Mexico (and elsewhere in the world) are in the midst of rapid unplanned development, and rural areas are growing without much consideration of the transforming landscapes (Lopez et al., 2001).

The Mexican Constitution establishes areas of federal and state competency. However, in some areas – environmental regulation, for example – government jurisdictions overlap. According to the Organisation for Economic Co-operation and Development (2003), the federal requirement for coordination among governments with overlapping jurisdictions results in a complex and unclear distribution of environmental responsibilities across levels of government and in limited local authority to take action on the protection of natural resources. On the other hand, Article 124 from the Mexican Constitution (1917) states that municipal governments authorize and control land use within their municipal boundaries (or territorial jurisdictions), and have the rights – in accordance with federal and state laws – to participate in the creation and management of their own territorial reserves and regional plans. However, most communities in Mexico lack adequate information at appropriate scales to develop such plans (Bocco et al., 2001).

At present, some planning methodologies are being used broadly in Mexico, such as the Ordenamiento Ecológico Comunitario Participativo, a specific form of participatory land use planning at the local scale (Negrete and Bocco, 2007). However, these methodologies are used only at the individual community level, and not across entire municipalities, where most of the control over land resides.

Furthermore, in Mexico, like in many developing nations occurring in the tropics (where environmental conditions can oftentimes be considered fragile), relevant resource data is scarce, non-updated, or unavailable, monitoring and analyses of natural resources at fine-scales is often lacking (Bocco et al., 2001), accurate statistics on land use cover change are not available, and detailed GIS studies describing land use change are lacking (Ochoa-Gaona and González-Espinosa, 2000).

While considerable research exists regarding sustainable development and participatory planning in Mexico, it has mostly been conducted in the context of protected areas, environmental ‘hotspots’, areas of biodiversity conservation, and communal lands (see Brandon et al., 2005; Bray et al., 2003, 2004; Ericson, 2006; Klooster and Maera, 2000). Limited attention has been given to landscape change and its implications on local environments and communities outside of this context. For example, little in the way of research has been conducted in the state of Jalisco, where the majority of land is privately owned, and there subsequently exists a correspondingly unique diversity of stakeholders and socio-economic issues. There is a salient need to address this gap in planning research for many rural Mexican communities.

That said, it is critical to analyze rural land use and assess ways to facilitate development and landscape change without compromising local communities and environmental stability. According to Currit and Easterling (2009), understanding the structure and patterns of land use has the potential for enhancing human quality of life and improving management of environmental degradation. In order to assist local municipal governments throughout Mexico, there is an urgent need to have reliable data available for the management of natural resources at local scales, rather than relying on broad assumptions from coarse-scale information or from land use patterns under different ownership regimes.

This research attempts to address this need for participatory-based planning approaches throughout rural Mexico by evaluating the efficacy of such a process. The community under study – Tapalpa, Jalisco (described in the next section) – is currently facing intense development pressure, and thus, makes for an ideal study site. It must be noted, that this study is not a case study per se, describing the outcomes of this particular planning process. Rather, the intent of this study is to describe the planning process
itself, and more specifically, what went right, what went wrong, and what could be improved. Ideally, the lessons learned from this approach can be transferred to similar planning exercises in rural Mexico and other rapidly transitioning rural communities around the world.

The study itself involved a collaboration between the Municipality of Tapalpa, Jalisco, a local non-governmental organization (NGO) known as Consejo Coordinador de Jovenes Empresarios de Jalisco (CCJEJ), and the Ministry of Environment and Natural Resources of Mexico (SEMARNAT). The study was developed and conducted by researchers at the University of British Columbia (Canada) and adhered to a proposal that was approved by the Municipality of Tapalpa (the office of the Mayor) and funded by CCJEJ and SEMARNAT. During the research process, several other supporting institutional partnerships at the state-level were developed, providing current GIS and mapping datasets, expertise, existing documentation, and letters of support (i.e., Secretaría del Medio Ambiente para el Desarrollo Sustentable (SEMADES), Instituto de Información Territorial del Estado de Jalisco (IITT), Fideicomiso para la Producción del Desarrollo Forestal del Estado (FIPRODEFO), Secretaría de Desarrollo Urbano (SEDEUR), y Tecnológico de Monterrey).

4. Methods

To meet the objectives of evaluating the efficacy of participatory-based approaches in assisting local communities with diverse stakeholder interests in the creation and implementation of common, holistic, and sustainable visions for their municipalities, an exploratory case study approach was undertaken. The intent of this case study was to demonstrate that participatory planning could be used cost-effectively as a means of assembling supporting data for land use planning, building local capacity for landscape analyses, and developing local-level policy recommendations that could be fairly effortlessly implemented by municipal and regional governments.

The study site for this project is Tapalpa, a rural community in the state of Jalisco, Mexico (Fig. 1). There are no official numbers describing land tenancy in Tapalpa. However, it is believed by local residents and government authorities that approximately 50% of the land is under communal jurisdiction (ejidal), while 50% is privately owned. The Consejo Nacional de Población (2005) uses a marginalization index that measures the quality of life based on a variety of socio-economic indicators, and assigns Tapalpa a medium marginalization index level (CONAPO 2005). This is the same index level as many other municipalities within the country, such as San Cristobal de las Casas in Chiapas, another nationally recognized town with a strong tourism economy in transition from its rural roots.

Tapalpa is currently facing unprecedented change, not only due to globalization and recent changes in national policies (as discussed above), but also as tourists and newcomers come to discover the beauty and ambience of the region. Many rural communities in Mexico, especially those outside of major urban centers like Mexico City and Guadalajara, are facing similar pressures. However, the growth that Tapalpa is experiencing is very different from other Mexican tourist destinations like Puerto Vallarta and Cancun, which cater to large numbers of foreign tourists.

In Tapalpa, the key issue is an influx of land ownership by affluent Mexican private stakeholders, which has led to an increasing pressure on the existing local community, their natural resources, and the pastoral quality of life that makes it a unique and attractive place. This situation can lead to a marginalization of local populations, a dislocation of local residents from land occupied for generations in some cases (Wilson, 2008), and increased socio-economic disparities among inhabitants. Tapalpa is also facing what Holmes (2006) describes as forces contributing to multifunctionality and increased spatial heterogeneity in the use of its rural resources. This means that the rural space is increasingly being ‘consumed’ by market-driven urban interests, attracted to the region by residential, tourism, recreational, lifestyle, and/or investment opportunities.

In short, Tapalpa is growing rapidly with little consideration of social implications and landscape impacts. This is due, in part, to a lack of decision-support information and a limited capacity for development planning and implementation. As a result, unhealthy suburban-style development, strained water and ecosystem resources, environmental degradation, and poorly distributed benefits from development are widespread. At present, there is a pressing need for community planning that is common, inclusive, and sustainable.

At present, local authorities have few tools to address development in rural Mexico. Those that do exist seem to be inadequate or inappropriate for rapidly transitioning communities because they lack mechanisms to involve and engage local stakeholders. These include the Ordenamiento Ecológico Territorial del Estado (State land use regulation plan) (SEMADES, 2006) and the Reglamento Estatal de Zonificación (zoning law for the State).

Maass et al. (2005) state that, in order to encourage the construction of a common vision for sustainable regional development in Mexico, integrated socio-ecological research, together with a continuous dialog among stakeholders in collaboration with national, state, municipal, and local governing bodies is necessary. Furthermore, there is growing evidence that suggests that when people are engaged, and their knowledge is sought and incorporated into the planning and implementation of conservation and development activities, then such decisions are more likely to enable responsible stewardship and protection over the long-term (Pretty and Smith, 2004).

The need for inclusion of a variety of stakeholder interests points to the participatory-based approach as an appropriate means of community planning in Mexico. Participatory methods and techniques are fundamentally a response to highly centralized, top–down approaches that have traditionally occurred in
community research and planning (Ericson, 2006). Participatory methods were designed to empower local people in the development process through the incorporation of local knowledge and perspectives, priorities, and skills. They are widely being used to bridge science and policy, and to strengthen the resource management capabilities of rural communities, especially in developing countries currently seeking sustainable development strategies (Gobin et al., 2000; Bocco et al., 2001). By offering people a role in countries currently seeking sustainable development strategies for rural communities, especially in developing countries, participatory research methods can lead to more effective, locally based, and long-term solutions to complex community problems such as the development of integrated conservation and development programs (Ericson, 2006). Furthermore, such approaches increase the involvement of socially and economically marginalized people who are vested in the decision-making process (Guijt and Braden, 1999).

This study relied mainly on a participatory approach, but was supplemented with landscape classification and mapping as well as various qualitative research methods. This mixed-methodology strategy can be distilled into four categories (Fig. 2): (1) semi-structured interviews with key stakeholders; (2) landscape mapping and analysis; (3) a design charrette; and (4) visualizations. In the following section, we describe in detail the four steps that were undertaken to provide a sustainable development plan for the community of Tapalpa. We then discuss the outcomes of this participatory landscape planning exercise, followed by some observations and reflections of the process.

5. Description of the participatory landscape planning process

5.1. Semi-structured interviews

We designed and pre-tested an interview script with the aim of exploring issues occurring in Tapalpa in-depth and better understanding stakeholders' perceptions and concerns regarding the municipality. Recruitment of individuals for participation in the study followed procedures approved by the University of British Columbia’s Behavioral Research Ethics Board.

We employed qualitative methods – specifically semi-structured interviews – because our purpose was to elicit in-depth insights and to acquire robust information from a smaller set of participants (Creswell, 1998; Zikmund, 2000). The semi-structured interview script was designed for three different groups of stakeholders (local communities, developers, and tourists), and was designed in such a way that it elicited participants’ knowledge, views, understandings, interpretations, experiences, and interactions which were meaningful to their social reality (Mason, 2002). All of the interviews covered five major topics, and by using open-ended questions and probing techniques, we provided opportunities for participants to provide further insight to help us better understand the situation that is occurring in Tapalpa. These five topics included the following:

- perceptions about development, growth, and tourism in the municipality;
- concerns and preferences with respect to current trends in urban development, land use practices, and landscape change, and how these are impacting on the municipality’s visual and cultural character;
- opinions of the main problems occurring within the municipality;
- preferences for development based on photos taken of various developments throughout the municipality; and
- the roles of government, developers, and current policies in sustainable community planning for the municipality.

Using nonprobability sampling techniques, we selected interviewees who best represented the current land use activities occurring in the municipality (i.e., agriculture, forestry, tourism, development), as well as different landownership types (i.e., ejidal, private, and people who do not own land). An initial list of key stakeholders was provided by the Mayor of Tapalpa and municipal staff. Snowball sampling techniques were then used to expand on this initial listing. In the end, 40 individuals were contacted (in person). Each of these individuals was given a letter explaining the purpose of the study and their roles as interviewees in the research process. All potential participants agreed to be interviewed. The interviews themselves took an average of 40 min to complete and were recorded digitally.

As suggested by Seidman (1998), quotations that stood out by being repetitive, unique, interesting, told in a striking manner, or highlighting an important topic were transcribed. This dataset was reduced to a small set of emergent themes using an open-coding process (Creswell, 1998), with each theme being described by an exemplary quote that defined it clearly.

While a breadth of themes emerged from this analysis, we concentrated on six environmental and landscape-based themes that resonated among all of stakeholder groups and were deemed to be issues that needed to be urgently addressed by the municipality. These were: (1) water quality; (2) water scarcity; (3) open access to meaningful places; (4) cost of land; (5) visual quality and conservation; and (6) erosion.

5.2. Landscape mapping and analysis

Tapalpa is a large, rural municipality of 442.15 km². It consists of numerous small towns, a central town and downtown area known as Tapalpa. It is surrounded by pastoral countryside, forests, and mountains. In order to assemble complete coverage of the municipality and begin the process of landscape mapping and analysis, we obtained four 1:50,000 cartographic maps from the Mexican National Mapping Agency (INEGI). These cartographic maps contained 20 m elevation contour intervals, major roads, settlements, and distinguished between urban, forest, and agricultural land cover.

In order to compliment these maps, we also constructed digital maps using a geographic information system (GIS) with data made available by the Trust Fund for Forest Development in the State (FIPRODEFO). The data included atmospherically corrected a 28.5 m resolution 2004 Landsat TM satellite image, a forest cover classification map, a 50 m resolution Digital Elevation Model (DEM), as well as numerous biophysical mapping layers (e.g., precipitation, evapotranspiration, and soil type) in the form of GIS layers. We also accessed cadastral data on streams and roads through the State Institute for Territorial Information (IITEJ). Data was then mapped in 3D using ESRI ArcScene GIS software. Having this 3D terrain mapping in the field proved to be a very helpful tool, along with the paper maps, especially for identifying major landforms and viewsheds.

It is worth noting that considerable base mapping, including 3D landscape modeling and satellite image landscape mapping, can be accomplished using freely available data sets and map-
ping software. Prior to fostering these institutional partnerships for data sharing, we produced a prototype 3D landscape model for the municipality by downloading free, publicly available 90 m resolution DEMs from the NASA Shuttle Radar Topography Mission 2000 (SRTM) (NASA SRTM, 2002) and a non-georeferenced, non-atmospherically corrected 28.5 m resolution 2004 Landsat WRS2 ETM imagery (University of Maryland, 2008).

We spent several weeks in the field, surveying the municipality for signs of issues that were identified in the interviews. During this time, we also spatialized landscape features, patches of urban and rural development patterns, and other landscape health problems such as erosion, disrupted water flows, and deforested ecosystems. A final map drawn on trace paper over the INEGI base maps and was then digitized in GIS, forming the basis for a diagnosis of landscape issues by stakeholders during the design charrette process (described in the next section). We also produced a digital map of landscape units based on an analysis of recurring patterns of landscape forms, current land use, and their associated issues. This map was a critical tool for allowing residents to identify different areas that were in need of municipal planning, and for linking each area with their dominant environmental and socio-economic issues.

Mapping using landscape units is a common analytical tool and methods for describing landscape areas using aerial and on-site surveys based on visually consistent or homogeneous land cover elements for the purposes of landscape planning have been described by numerous authors, including seminal studies by Litton (1968, 1979). In these studies, unique landscape planning goals and design policies emphasizing visual quality were outlined for descriptive units or patches, but this approach can be employed to address other facets of landscape quality, including ecology, hydrology, and development (Dramstad et al., 1997). For this case study, the landscape units were delineated on the basis of the following criteria: (1) current land cover (e.g., vegetation type, crop type, built environment); (2) current land use (e.g., forest, agriculture, tourism, residential); (3) biophysical condition (e.g., evapotranspiration rates, seasonal precipitation, soil type); (4) visibility from major population centers; and (5) landscape character (e.g., settlement density, building form/style, forest condition, permanency versus periodic habitation).

Zones of relative homogeneity were defined by iteratively considering each of these criteria. Although resources were not available to allocate individual land parcels into their respective units, the scale of this unit mapping process was sufficient to distinguish larger landscape forms and groups of land parcels together (unit sizes varied from 78 ha to 22,256 ha). This allowed for common sets of problems to be diagnosed for all of the land within each unit.

We uncovered a series of unique environmental problems (e.g., soil erosion), socio-economic patterns (e.g., land ownership), or land cover (e.g., dominant tree species) during the field surveys which were seen to be indicative of a transition into a distinct landscape unit. Unit boundaries were consciously drawn in a blurry manner (i.e., with a level of imprecision) in order to prevent parcels near the edges of units from being misallocated. These edge parcels would fall in the transition zone between two units, requiring simple field verification. The end result was a mosaic of landscape units that was accurate for the vast majority of terrain in the municipality. Units were bundled into groups with similar assessments based on the above four criteria, resulting in five units with descriptive titles: (1) urban/urban periphery; (2) open landscape; (3) open agriculture; (4) visible hillsides; and (5) forests. Fig. 3 shows the recurring spatial pattern of landscape units that was noted for the municipality. Note that the ‘open landscapes’ and ‘open agriculture’ landscape units were combined into one category (‘open landscape/agriculture’) for the purposes of this study.

5.3. Design charrette

According to Beckley et al. (2005), design charrettes attempt to develop solutions to a particular design problem or issue. The process is a highly structured and carefully facilitated means of identifying and ranking the most critical issues after careful consultation with participants who represent a wide range of local interests. We facilitated a 4-h design charrette with 30 individuals from the municipality with the aim of providing stakeholders the opportunity to explore, discuss, and assess the landscape units and potential recommendations for each unit.

Prior to the design charrette workshop, we prepared a design brief for discussion purposes. Drawing in part from the Smart Growth on the Ground (2006) methodology, the design brief incorporated input from the public during the semi-structured interview phase (including results from a photo-rating exercise that they undertook), information on best management practices for sustainable development, and a listing of some of the more relevant policies occurring at all levels of government (federal, state, and municipal). The landscape units were introduced and described with photographs, along with development recommendations linked to each. These recommendations were a combination of ideas spawned from the semi-structured interview process, the expertise of the project researchers and research partners, and best management practices that had potential to be legislated and implemented.

The municipality was responsible for contacting and sending the invitations to candidates to participate in the design charrette workshop and the session was conducted in a space provided by a member of the local community. Participants in the design charrette process included municipal staff, state-level institutions, and key stakeholders from the community (e.g., ejidatarios, private landowners, developers, foresters, farmers). We used the same process for selecting participants as we did for semi-structured interviewees; however, not all participants were the same in both cases.

The mayor of Tapalpa commenced the workshop by giving a brief presentation of the project, introducing the research team, and presenting the main objectives of the project. Following this introduction, we made a brief presentation to introduce the main issues that were being considered in the municipality, describe the landscape units, and explain the methodology for the design charrette. Following this, participants identified the landscape units in which they lived or had interests, and consequently self-organized into four groups (tables); one for each landscape unit (the open landscape and open agriculture units were considered together).

Each table had a set of poster-sized maps and a collection of photos related to the group’s landscape unit. Each participant also had a concise version of the design brief which included material that was only relevant to the landscape unit being discussed at that table (i.e., major issues and design recommendations). Each table had a volunteer – with some connection with the project – who facilitated the discussion and took notes. Discussions revolved around solutions to the problems identified within the six major themes that emerged from the semi-structured interviews (e.g., building densities, water quality, potato plantations, overgrazing, developments, deforestation, erosion). At the end of the session, we evaluated the discussion notes and summarized the major conclusions from the workshop. We then adapted and added to the design charrette recommendations and summary and this modified document became the basis for the final project document.

5.4. Visualizations

Recent studies have shown that the use of digital mapping and/or visualizations in participatory community planning pro-
cesses can serve as very useful tools in communicating complex landscape management recommendations and technical information to rural communities, and thus, increasing their levels of engagement in the process (Lewis and Sheppard, 2006; Salter et al., 2009). Lewis and Sheppard (2006) have also found that visualizations encourage more in-depth and lively discussions, allow participants to more clearly articulate their preferences for landscape conditions, and are generally more meaningful when communicating landscape issues.

We produced a series of visualizations and diagrams that synthesized many of the critical findings and recommendations generated throughout the process using Adobe Photoshop. These simple 2D visualizations were produced by editing site photos and were constructed to visually communicate a multitude of design interventions within single, identifiable images (in general, we used environments which would be familiar to decision-makers and legislators). Each image was edited to demonstrate what design recommendations might look like if carried out as a landscape management plan (an example is seen in Fig. 4). These visualizations were used extensively in the final project report as a means of discussing recommendations and possible policy alternatives.

6. Outcomes of the participatory landscape planning process

The main outcome of our mixed-methodology approach was a sustainable community development plan, including the landscape unit mapping, place descriptions, photos, analyses, visualizations, final recommendations, and an appended summary of the interviews.

Over 100 specific recommendations were made to address the six themes identified as major problems in Tapalpa. General recommendations were also made to help guide authorities and the community to implement and monitor the development plan. Examples of the specific recommendations revolved around the following: appropriate building densities and mixes of uses according to each landscape unit; a cessation of road closures and gated communities; design recommendations for wall and fence construction; requirements for developers to make more efficient use of water by constructing small reservoirs and suggesting vegetation types with low-water requirements; and strategies for agricultural producers to use native vegetation in order to improve water quality and reduce erosion. The plan itself was delivered, in an official meeting, to both the funding NGO and the Municipality of Tapalpa. The meeting provided an opportunity for the NGO and the municipality to discuss the findings of the project with the research team, and to assess what was needed in order to implement the plan.

As a result of this meeting, a decision was made to discuss the plan with local legislators representing other towns within the municipality. The thinking behind this decision was to gain further input, increase the levels of awareness and political momentum, and ultimately, to initiate the legislation process; this was seen as a critical step because land use and community development decisions in Mexico are largely the domain of local governmental jurisdictions according to Article 124 of the Mexican Constitution (1917). We arranged a 4-h discussion with the Mayor of Tapalpa, most of the nine municipal legislators, and several members of the NGO. We discussed the sustainable community development plan and its recommendations at length, and no major changes to the document were deemed necessary (although some minor additions were made regarding water use and potato plantations). There was general consensus that the document addressed many of the critical issues facing the municipality, and that it could be used as a valuable tool for sustainable planning.

There was also broad support for continuing to usher the document through the legislative process. To that end, we were asked to present the final results to the other small towns and social leaders within the municipality. With the coordination of the municipality and the funding NGO, a series of sessions were arranged in rural communities outside of downtown Tapalpa, including Juanacatlan, San Antonio, Atacco, and Lagunillas. In total, over 400 people attended these sessions, which included a brief introduction by the Mayor and a brief presentation of the results by the research team. We discussed the landscape mapping and some
of the main social and environmental problems that emerged as themes. In order to center discussion around only the most relevant issues, we adapted each community presentation by providing specific local-level examples and discussing possible recommendations for solving them (usually by means of visualizations). Lastly, we left an illustrated brochure explaining the project with each of the community participants.

7. Observations from the participatory landscape planning process

Observations were made throughout the participatory landscape planning process to elucidate lessons which could serve to improve future sustainable community development processes, as well as further research in this area. Perspectives from community members, reactions to the process, and the experiences and insights of researchers are summarized below and can be used to assist other local groups in applying such a methodology in Mexico and elsewhere.

In general, the community members of Tapalpa seemed to be satisfied with the outcomes of this project, specifically the major environmental and socio-economic issues identified, and recommended remedial solutions. A key part of this methodology were the photos and visualizations, which were instrumental in communicating both impacts and solutions for the community. Visualizing simple design measures as a means of rehabilitation proved to be extremely valuable for locals, several of whom commented that the document was a useful tool which was badly needed for the community. For some, a more robust understanding of landscape issues and processes was achieved. For example, many members of the community thought that erosion was part of a natural landscape process, whereas our research and site analysis indicated that this was largely rooted in developmental causes like overgrazing, unhealthy agricultural practices, and deforestation.

Although some of the recommendations resulting from this study were similar to existing federal and state-level policies (e.g., Ley de Aguas Nacionales, the Ordenamiento Ecológico Territorial del Estado de Jalisco, and the Reglamento Estatal de Zonificación), guidelines for enacting these policies were not part of the general consciousness at the municipal level where much of the decision-making authority resides. Furthermore, the existing policy lacks the spatial scale and programmatic detail necessary for meaningful local-level land use decisions, and institutions generally lack the technical and financial capacity for implementing them. This was very much reflected in the landscape and perhaps explains why the state-level institutional partners felt that this study was urgently needed.

During the participatory landscape planning process, another interesting trend was noted among local residents, municipal staff, and legislators, namely the importance of perceiving the municipality as a whole and not only as the town proper (downtown area). Much of the municipal development legislation deals only with urban design issues in the downtown area. The planning process served to complement this legislation by considering the entire community landscape. In other words, while existing municipal policy is effective in perpetuating the touristic value of rustic architectural forms in the downtown area, this project aimed to place similar values on rural, agricultural, pastoral, and forested areas, as well as other natural features; amenities which have largely been ignored in all existing municipal, state, and federal planning policies.

A major benefit that was noted revolved around the interest that this sustainable landscape planning process seemed to generate in the community, largely as a result of engaging community members through participatory approaches. Our view is that these approaches were instrumental in terms of building awareness of the issues among community members, informing policy, and educating both locals and the research team.

The strategic partnerships formed throughout this process were also extremely beneficial and serve to demonstrate how effective partnerships between governmental, non-governmental, and academic groups can be fostered to make significant strides in community sustainability efforts by sharing resources and expertise. Other key factors undoubtedly assisted in gaining the attention, support, and funding necessary to conduct this study efficiently. For example, one of the researchers was from the region, and therefore, had a personal connection to, and interest in, the site. This researcher also had some initial contacts in Tapalpa to assist in developing the study, and was committed to coordinating the project, participating in the research, and contacting/building relationships with partnering institutions (this latter point involved assisting the NGO to fundraise for the project). Another key factor that led to a successful outcome was that several members of the NGO (as well as other partners) owned land in Tapalpa, again emphasizing the value of working with people that have a vested interest in the region.

While this participatory landscape planning process was, by all accounts, a success, there were several factors related to the process and methodology that could be improved upon for subsequent studies. For example, not all of the semi-structured interviews were conducted individually. However, we found that it was very useful to do so because it provided an opportunity for interviewees to express their opinions more openly and honestly. This allowed us to bring forth critical perspectives which informed the field research and landscape analysis, and provided us with insightful material to address at the design charrette.

At the charrette event, participants were allowed to select which workshop table (and therefore which landscape unit) they most identified with or resided in. Unfortunately, this meant that most participants ended up sitting either at the forests or the urban/urban periphery tables, with few at the open landscape/agriculture and visible hillside tables. Clearly, this reflects some level of confusion between similar landscape units or at their unit edges, such as the forests and visible hillside units, the latter being largely forested. We recommend, in instances like this, that it may be more effective to assign attendees to tables in order to achieve a more balanced representation of stakeholder interests. Furthermore, a dedicated facilitator is required to steer discussion at each table through the entire design brief (which provides a short, but very rich list of materials to consider), while being flexible enough to allow for the inclusion new materials brought forth by participants.

Another problem that we encountered revolved around the acquisition of GIS base mapping data. Although data for this study was freely available, it lacked complete coverage throughout the region, was concentrated in the downtown area, and was difficult to access and incorporate. One issue that we repeatedly faced was finding adequate data for the municipality as a whole, as most datasets only represented the central downtown area of Tapalpa. This underscores a general lack of planning for larger-scale landscapes and the need for fine-scale planning information for entire municipalities, including both urban and hinterland areas. Undoubtedly, the acquisition of detailed environmental and socio-economic data inputs will continue to be a limiting factor for landscape planning in sparsely populated rural areas.

Lastly, in terms of partnership arrangements, the funding NGO was newly established and perhaps lacked the organizational capacity and experience necessary to underwrite and facilitate a community project of this scale. It was consistently difficult to find reliable institutional support in terms of funds, expertise, and time commitment, partly because this was an unusual and unique manner.


NASA SRTM (National Aeronautics and Space Administration, Shuttle Radar Topography Mission), 2002.


8. Conclusions

There is a pressing need for clarity in understanding how rural communities (in Mexico and elsewhere) can achieve sustainability. This study shows that community engagement through the use of participatory landscape planning is an effective means of informing and impacting local policy related to sustainable community development. Working from the ground up by engaging local residents represents a significant departure from current planning methods in Mexico. This proof-of-concept study — conducted in less than 1 year with a limited budget and resources — relied heavily on volunteer participation and local expertise. However, it shows that such a process can result in community solutions that are sustainable, inclusive, meaningful, and cost-effective. Moreover, this work can bring needed change to local, regional, and possibly national policies, perhaps even informing sustainable development processes in other rapidly transitioning rural economies around the world.

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