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# New Information and Communication Technologies for Public Participation in Ecuadorian Land Management. Case Study Cuenca.

**Natalia Pacurucu, Lorena Vivanco, Boris Orellana,  
and Alfredo Ordóñez**

Facultad de Arquitectura y Urbanismo, Universidad de Cuenca, Cuenca, Av. 12 de Abril  
s/n, Ecuador

## ABSTRACT

Public participation in Ecuadorian land management has many challenges due to its effectiveness, since most of these processes have taken the form of social information meetings, where proposals are made, known as finished products, evidencing the lack of active citizen involvement. Added to this is the scarcity of tools and methods that lead to a compromise between democratic decision-making and expert scientific knowledge. In this context, these processes require a radical change in which new Information and Communication Technologies (ICT) are proposed as an alternative, valuing the knowledge and opinions of the population in relation to a given territory. New Information and Communication Technologies (ICT) recognize the existence of a new digital ecosystem in which the communication process is freed from the space-time factor, dissociating the experience from the physical space, and making virtual simultaneity and timeless fragmented space possible. This paper analyzes the advantages and disadvantages of using these technologies and their contribution to public participation in the land management processes in Cuenca, Ecuador, using Geographic Information Systems for Public Participation as a specific case.

**Keywords:** Land management, Public participation, ICT, PP GIS, Ecuador

## INTRODUCTION

Today, information, knowledge, and means of communication are increasingly available and growing at an accelerated rate. But exclusion from media, information, and specialized knowledge limits participation by the public.

New Information and Communication Technologies (NICT) are a tool that facilitates learning through mechanisms according to time and space, allowing for improvement of social, political, and public relations between subjects.

One of the alternatives to involve the public in this process is through the use of NICTs, which promote the commitment of citizens in decision-making and therefore favor representative democracy, consolidating the so-called Cyber-Democracy (Estevez and Janowski, 2014).

Web technology has proven to be a very useful tool for giving the public access to information and relevant data that until now were only available to certain privileged sectors of the population (Zambrano, 2011).

As a new tool, the implementation of online GIS products, such as PP GIS, provides an efficient and low-cost means for the distribution of cartographic products to users (Tripathi and Bhattarya, 2004), as well as strengthen the citizen participation processes altogether. However, due to technological divides, access to this type of tool is largely restricted to populations with limited economic resources or with higher levels of digital illiteracy.

In the case of Ecuador, specifically in Cuenca, NICTs are scarcely used within the processes of citizen participation in territorial planning, **thus** it is necessary to identify the advantages and disadvantages of these tools to promote greater participation of citizens to improve the inputs and results of land management plans.

## **LAND MANAGEMENT AND PUBLIC PARTICIPATION IN ECUADOR**

In 2007, the first National Plan for Good Living was formulated and strengthened with the powers established in the 2008 Ecuadorian Constitution, and later with the Organic Code of Territorial Organization, Autonomy, and Decentralization COOTAD – 2010. It established that it is the responsibility of the municipal governments to “plan cantonal development and formulate corresponding land use plans in coordination with national, regional, provincial, and parish planning, in order to regulate the use and occupation of urban and rural land” (Asamblea Nacional, 2013).

In 2016, the Law on Territorial Land Use and Management (LOTLUM) was issued, with which municipal governments must prepare their plan for land use and management in conjunction with their land management and development plan, something currently under development in the country.

The 2008 Ecuadorian Constitution, the Organic Law of Citizen Participation and Social Control, and the Organic Code of Planning and Public Finance – 2010, establishes citizen participation as a pillar of the planning process and a right of citizens, individually or collectively. However, in reality, the elaboration of Land Management Plans (LMP) has categorized citizen participation basically as socialization meetings, “evidencing a conceptual distortion that understands the return of information as a process of socialization of information” (Vivanco, 2013).

In the formulation of an LMP, it has been observed that there is infrequent use of tools to process the large volume of information collected in the diagnostic phase, generating documents that generally do not adapt to the changing reality of the territory, or to its sociocultural characteristics.

Both the deficient processes of citizen participation and analysis, and lack of information, make the adoption and implementation of the LMP difficult; likewise, the limited amount of debate and social consensus put the establishment of proposals at risk and give plans little to no realistic relevancy.

## NEW INFORMATION AND COMMUNICATION TECHNOLOGIES FOR PUBLIC PARTICIPATION

According to the Ibero-American Charter of Citizen Participation in Public Management, a strategy that considers a full democratic process is based on the rights of information, participation, association, and expression by the public, favoring development, inclusion, and social cohesion. (XI Conferencia Iberoamericana de Ministros de Administración, and Pública y Reforma del Estado, 2009).

Participation seeks to improve the quality of democratic systems by giving the population the ability to monitor and exercise functions of social control over government apparatuses (Fernández Muñoz, 2008). As such, the term “public participation” is known in Ecuador, and in Latin America in general, as “citizen participation” (Naciones Unidas & CEPAL, 2018).

Citizen participation is a key factor in the planning process; the information generated by local agents contributes to the success of land use plans. However, political and bureaucratic tendencies are often against it and, in some cases, community leaders tend to disagree with public authorities (Barndt, 1998), this causes participation to become a very fragile process with many challenges.

In addition, participation is not usually representative due to access limitations caused by the temporal and spatial nature of face-to-face processes. According to Mansourian et al. (2011), traditional participation practices have a vertical model that increases bureaucracy, highlighting one of the disadvantages of face-to-face public participation.

The scarcity of tools and methods that facilitate compromise between democratic decision-making and expert scientific knowledge (Crecente et al., 2014), requires a radical change in their process; as such, New Information and Communication Technologies (NICT) are proposed as an alternative to achieve a more participatory democracy.

NICTs recognize the existence of a new digital ecosystem in which the communication process is freed from the space-time factor, dissociating the experience of a physical space, making virtual simultaneity and timeless fragmented space possible. Communication has been transformed by the use of the Internet and Web 2.0, allowing greater intervention by citizens, which then supports social movements and alternative policies. (Castells, 2008).

Carver et al. (2001) suggests that some sectors of society have greater confidence in online information than that found in certain magazines or newspapers, which shows that NICTs may be more valued by citizens, which would lead to a greater interest in participatory processes.

Cyberspace introduces new habits and relationships through various electronic forums, and considers the creative potential of citizens, the improved organization of the overall social fabric, and the communication capacity of non-governmental organizations and sectors traditionally excluded from the modernization process, thereby creating community spaces for participation and meeting, for dialogue, and cooperation, which would undoubtedly contribute to the strengthening of the governance institutions of a given territory (Sierra and Moreno, 2011).

Currently, the integration of GIT (Geospatial Information Technologies), such as Web GIS solutions, provide an efficient and low-cost means of distributing cartographic products to the general population (Crecente et al., 2014). Its application to territorial planning processes, traditionally only available to experts and technicians, facilitates public participation, generating an effective means for overall involvement in the process (Yaakup et al., 2001).

NICTs have generated a new space for democracy so citizens can exercise their right to be involved in State decisions. These new trends have prompted the establishment of what is known as Cyberdemocracy or Digital Democracy.

### **THE PP GIS AS A TOOL FOR PUBLIC PARTICIPATION IN LAND MANAGEMENT**

The term Public Participation Geographic Information System (PP GIS) was conceived in 1996 at the National Center for Geographic Information and Analysis (NCGIA) meeting to describe a field of geographic information systems (GIS) which seeks to improve public participation and promote the empowerment of non-governmental organizations, grassroots groups, and local communities (Sieber, 2006). The evolution of the PP GIS stems from the investigation of social problems, among these the concern that all voices must be heard in a democracy (Obermeyer, 1998).

These systems help planners and decision makers to analyze, design, and visualize the multiple aspects of a territory, moving from traditional governance to a more technocratic one. The PP GIS promotes the inclusion of the public in the development and use of spatial information, since it allows for the specialized perception of a user, not an expert in GIS, about a certain place; this also generates new analytical and visualization possibilities for geographic information, all in real time.

The use of these systems contributes to the improvement of the quality and legitimacy of decisions, developing the capacity to participate in the political process, increasing the trust and understanding of all participants, and leading to better results for the territory and social objectives.

There are several PP GISs that have been developed around the world (Kingston et al., 2000; Engen et al., 2018; Tripathi & Bhattacharya, 2004) and although most have been used for environmental planning, they have also been developed as a contribution tool for urban and land use planning. (Han & Peng, 2003; Dragičević, 2009; Bugs et al., 2010; Poplin, 2012).

### **PUBLIC PARTICIPATION PROCESSES FOR TERRITORIAL PLANNING IN CUENCA**

Cuenca is the capital of the province of Azuay in Ecuador, with an area of 319,001.04 ha. According to the 2010 census, the population of the city is 505,585 inhabitants. Its economy is based on trade, services, and industry (INEC, 2010).

A first approach to the land management processes in the city is the Strategic Plan for Cuenca 2020 (PEC), which was prepared in 2001 and

subsequently published in June 2004. The PEC was prepared with the participation of citizens and key actors within the city in mind - from here we start with the conformation of the Territorial Information System (TIS) that has georeferenced information at the property level of the city of Cuenca.

Prior to the PEC 2020, the elaboration of the Ordinance Plan of the City of Cuenca was proposed from 2005 and 2007; with 2030 as the horizon year. In 2011, the Territorial Development and Management Plan (TDMP) of the City of Cuenca was also created. This had low social acceptance due to the absence of mechanisms that allowed citizens to be involved in the process (Maldonado Peralta and Orellana Cuzco, 2021).

For the preparation or updating of the TDMP of Cuenca, attempts have been made to involve citizen participation through workshops, assemblies, forums, and meetings as dictated by law. In the Preparatory Phase, meetings have been carried out with the presidents of the different Parish governments, as well as with the representatives of the neighborhoods that make up the urban parishes. For the Diagnostic Phase, a citizen forum is created in which experts and non-experts can participate. In the Proposal Phase, workshops are held where concerns, complaints, suggestions, etc., are collected (Parra, 2020 citado en Maldonado Peralta & Orellana Cuzco, 2021).

Due to the COVID 19 pandemic, face-to-face meetings have been reduced around the world, therefore face-to-face citizen participation processes have been limited which has led to the incorporation of new methods using virtual platforms. Cuenca is no exception to this reality and the municipality has carried out meetings through the Zoom platform, as well as the Mentimeter web application. In addition to this, the municipality has a geoportal which is updated weekly by citizens, including income and property information. This information received must be approved by the City Council for subsequent publication. The Geoportal Web platform allows for access and use of basic geographic information and is presented through a Web Map Service (Anon., 2022).

## **ADVANTAGES AND DISADVANTAGES OF THE USE OF PP GIS IN THE CUENCA LAND MANAGEMENT PLAN**

The data analyzed from both the interviews and the surveys carried out by Maldonado Peralta & Orellana Cuzco (2021) show that in Cuenca, tools such as the PP GIS that allow for public participation have not been implemented, evidencing the inexperience in the management of participatory methodologies by digital means.

Platforms such as Zoom have made it possible to hold socialization meetings, in which an increased number of the population have participated; however, digital illiteracy, especially in vulnerable groups such as the elderly or those who can't read or write, who, due to their lower level of educational instruction, do not know how to manage social networks or the Internet in general. This clearly makes public participation difficult.

Furthermore, internet access is a major limitation for the population, in general. Because of this, there is the lack of knowledge by the population about the processes of territorial planning. According to those surveyed, 80.1% said they were unaware of said processes, and those who were aware said this was mostly due to the formulation of city and parish LMPs, among others.

In addition to these problems, georeferenced information is often outdated and there are high costs involved in its production. The municipality does not have a single integrated territorial system; rather, each department generates its own information, and it is not always shared. In summary, the limitations are as follows:

- a. The lack of knowledge about land management processes
- b. Digital illiteracy
- c. Limited internet access
- d. The social and economic priorities that limit investment to access these tools
- e. The resistance of authorities and/or technicians to use them
- f. Outdated information
- g. The high cost of producing information and georeferencing it

Regarding the advantages, as has already been mentioned in the description of these systems, it can be said that the implementation of a PP GIS would:

- a. Incorporate the public as an active member of its own development
- b. Capture information and needs of the public
- c. Have updated georeferenced information
- d. Generate inputs for better decision making
- e. Democratize information for better use
- f. Democratize public participation processes

## **CONCLUSION**

The challenges that Ecuador faces with respect to public participation are important; among these are the mechanisms, and access to information and its homogenization. The city of Cuenca is no stranger to this reality and has encountered some difficulties in the development of planning instruments, mainly due to the population not participating because of a lack of awareness of the processes themselves.

NICTs are presented as an alternative to support planners in the generation and presentation of information. The PP GIS are tools that contribute to these activities, diversifying perspectives in the planning process. In addition, they attempt to incorporate the empirical data of the population, serving as input for territorial planning.

In Ecuador, and in the specific case of Cuenca, despite the increase in internet use due to the pandemic, tools of this type have not yet been implemented, and considering their advantages, PP GIS could be an alternative to increase the participation of the public, as well as improve overall effectiveness and inclusiveness.

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## REFERENCES

- Anon. (2022). Geoportals web. [online] Available at: <<http://ide.cuenca.gob.ec/geoportals-web/viewer.jsf>> [Accessed 10 February 2022].
- Barndt, M., (1998). Public Participation GIS—Barriers to Implementation. *Cartography and Geographic Information Systems*, 25(2), pp.105–112. <https://doi.org/10.1559/152304098782594607>.
- Bugs, G., Granell, C., Fonts, O., Huerta, J. and Painho, M., (2010). An assessment of Public Participation GIS and Web 2.0 technologies in urban planning practice in Canela, Brazil. *Cities*, 27(3), pp.172–181. <https://doi.org/10.1016/j.cities.2009.11.008>.
- Carver, S., Evans, A., Kingston, R. and Turton, I., (2001). Public Participation, GIS, and Cyberdemocracy: Evaluating on-Line Spatial Decision Support Systems. *Environment and Planning B: Planning and Design*, 28(6), pp.907–921. <https://doi.org/10.1068/b2751t>.
- Castells, M., 2008. Comunicación, poder y contrapoder en la sociedad red (II): los nuevos espacios de la comunicación. *Telos: Cuadernos de comunicación e innovación*, (75), pp.11–23.
- Asamblea Nacional Constituyente (2013). <http://es.slideshare.net/roxanasilvach/cotad-17381122>
- Crecente, M.R., Santé, I., Sánchez, J., Reyes, F. and Delgado, O., (2014). INFORMACIÓN, TIG, PARTICIPACIÓN, METODOLOGÍAS Y HERRAMIENTAS: SIXOT UNA PROPUESTA DE INTEGRACIÓN. [online] Available at: <[http://www.sndu.org/ponencias/mesa3/R\\_Crecente-Otros.pdf](http://www.sndu.org/ponencias/mesa3/R_Crecente-Otros.pdf)> [Accessed 21 March 2017].
- Dragičević, S., (2009). Collaborative geographic information systems.
- Engen, S., Runge, C., Brown, G., Fauchald, P., Nilsen, L. and Hausner, V., 2018. Assessing local acceptance of protected area management using public participation GIS (PPGIS). *Journal for Nature Conservation*, 43, pp.27–34. <https://doi.org/10.1016/j.jnc.2017.12.002>.
- Estevez, E. and Janowski, T., (2014). Entrevista con Elsa Estevez y Tomasz Janowski, Centro para la Gobernanza Electrónica de la Universidad de las Naciones Unidas; Macao, China. [online] Available at: <<http://webcache.googleusercontent.com/search?q=cache:ZPjXt2kRXPEJ:portal.oas.org/LinkClick.aspx%3Ffileticket%3DktzdEmBLbW4%253D%26tabid%3D1729\protect%24relax+%24&cd=12&chl=es&ct=clnk&gl=ec>>.
- Han, S.S. and Peng, Z., 2003. Public participation GIS (PPGIS) for town council management in Singapore. *Environment and Planning B: Planning and Design*, 30(1), pp.89–111. <https://doi.org/10.1068/b12938>.
- INEC, (2010). Redatam::ECLAC/CELADE - R+SP WebServer. [online] CENSO DE POBLACIÓN Y VIVIENDA 2010. Available at: <<http://redatam.inec.gob.ec/cgibin/RpWebEngine.exe/PortalAction?&MODE=MAIN&BASE=CPV2010&MAIN=WebServerMain.inl>> [Accessed 14 March 2017].
- Kingston, R., Carver, S., Evans, A. and Turton, I., (2000). Web-based public participation geographical information systems: an aid to local environmental decision-making. *Computers, Environment and Urban Systems*, 24(2), pp.109–125. [https://doi.org/10.1016/S0198-9715\(99\)00049-6](https://doi.org/10.1016/S0198-9715(99)00049-6).

- Maldonado Peralta, G.S. and Orellana Cuzco, D.E., (2021). El uso de los sistemas de información geográfica de participación pública: una propuesta para su incorporación en la planificación territorial. Caso de estudio ciudad de Cuenca. [online] Available at: <<http://dspace.ucuenca.edu.ec/handle/123456789/36319>> [Accessed 9 February 2022].
- Mansourian, A., Taleai, M. and Fasihi, A., (2011). A web-based spatial decision support system to enhance public participation in urban planning processes. 2, pp.269–282.
- Obermeyer, N.J., (1998). The Evolution of Public Participation GIS. *Cartography and Geographic Information Systems*, 25(2), pp.65–66. <https://doi.org/10.1559/152304098782594599>.
- Sieber, R., (2006). Public Participation Geographic Information Systems: A Literature Review and Framework. *Annals of the Association of American Geographers*, 96(3), pp.491–507. <https://doi.org/10.1111/j.~1467--8306.2006.00702.x>.
- Sierra, F. and Moreno, J., (2011). Nuevas tecnologías de la información para la democracia participativa y la ciudadanía digital. La propuesta de los telecentros. In: *Democracia Participativa y Presupuestos Participativos: acercamiento y profundización sobre el debate actual Manual de Escuela de Políticas de Participación Local*. España: CEDMA. pp.215–234.
- Tripathi, N. and Bhattarya, S., (2004). Integrating Indigenous Knowledge and GIS for Participatory Natural Resource Management: State of the Practice. *The Electronic Journal of Information Systems in Developing Countries*, [online] 17(0). Available at: <<http://ejisd.org/ojs2/index.php/ejisd/article/view/105>> [Accessed 16 September 2015].
- Vivanco, L., (2013). La participación en la formulación de los planes de desarrollo y ordenamiento territorial: hacia un modelo de participación ciudadana en el caso del Plan Cantonal de Cuenca. [online] Available at: <<http://dspace.ucuenca.edu.ec/handle/123456789/4755>> [Accessed 1 October 2015].
- Yaakup, A., Jama'an, J., Bakar, Y.A. and Sulaiman, S., (2001). Web-based GIS for public participation in urban planning and management. *ASIA GIS*, pp.20–22.
- Zambrano, R., (2011). NUEVAS TECNOLOGÍAS Y GOBERNABILIDAD DEMOCRÁTICA: HACIA UNA PARTICIPACIÓN MÁS INCLUSIVA? In: *Tecnología y participación ciudadana en la construcción democrática*. México: Instituto Electoral y de Participación Ciudadana de Jalisco.