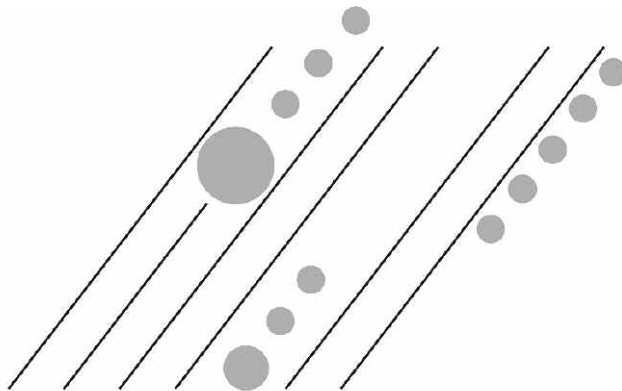


Extended abstract

*Use of Geomatic Techniques
and Participatory Mapping to
Determine the Territory under
Indigenous Peasant Management
(Province of the Gran Chaco, Argentina)*



***Federico Fernando Rivas, María Magdalena Abt
Giubergia, Analia del Valle Guzmán
Universidad Nacional de Santiago del Estero, Argentina***

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Highlights:

1. The relationship between forests and communities, expressed in the landscape, allows mapping territoriality.
2. The peasant-indigenous territoriality is responsible for the conservation of forests in the Chaco region of Argentina.
3. Participatory research enriches the arguments in favor of the protection of peasant-indigenous territories.

Abstract: There is plenty of evidence on the importance of peasant and indigenous communities in forest conservation in South America. However, the precarious tenure of their territories constitutes their main vulnerability to deforestation and land concentration processes. 22 % of the Gran Chaco Americano ecoregion has been transformed, affecting these communities. The combination geomatic techniques and participatory mapping proves to be innovative tools for the generation of knowledge about these territorialities. The objective of the work was to map the territory under management of peasant and indigenous communities in a province of the Chaco ecoregion and characterize the state of conservation of its forests. The resulting territory is 61,000 km², containing 81 % of the forests protected by law and preserving a stable and quality forest matrix. It constitutes evidence in favor of the land sharing strategy and the importance of community tenure. It is concluded that the indigenous peasant communities are relevant in the conservation of the forests protected by Law No. 26.331. That participatory geographic information systems allows the generation of public information on territories with precarious tenures, providing new tools for the defense of the territories.

Keywords: Chaco ecoregion, forest conservation, community tenure, participatory SIG.

Federico Fernando Rivas. <https://orcid.org/0000-0002-3945-8145>

E-mail: oikosfede@gmail.com

María Magdalena Abt Giubergia. <https://orcid.org/0000-0003-2175-8921>

E-mail: maguiabt@gmail.com

Analia del Valle Guzmán. <https://orcid.org/0000-0001-8206-3096>

E-mail: analiaguzman@gmail.com

1. Introduction and justification

Geospatial analyses show that indigenous peoples' lands intersect with 40 % of all terrestrial protected areas and ecologically intact landscapes, mostly forests. Recent studies have shown that one-third of the world's forests are managed by indigenous peoples and local communities and that their role is important in conserving ecosystem services. This aspect was also confirmed by several investigations in relation to the importance of peasant and indigenous communities in the conservation of the forests of South America. However, the precarious tenure of their territories constitutes their main vulnerability to the processes of deforestation and land concentration caused mainly by land use change.

The Gran Chaco Americano is considered by specialists within the priority areas of biodiversity conservation, although it is ecologically fragile. 22 % of the ecoregion has been transformed as a result of the advance of industrial agricultural activity, causing the displacement and uprooting of local communities, often through coercion and the use of violence. The limited official information and the lack of legal formalization of the ownership of the territory of the communities, create a knowledge vacuum that does not allow quantifying and visualizing the surface of provincial territory under indigenous peasant management, masking the importance of these local communities in terms of the management and use of ecosystems and their natural resources.

2. Objectives

The combination of geomatic techniques and participatory mapping prove to be innovative tools for the generation of knowledge about these territorialities. Through the combination of these techniques, the objective of the work was to map the territory under management of peasant and indigenous communities in a province of the Chaco ecoregion and characterize the conservation status of its forests.

3. Methodology and sources

The research design followed a quantitative and qualitative approach assembled in four successive stages, which are conceptualization, formalization, analysis,

and representation. The generated Geographic Information System (GIS) had different functions, integrating various sources of information. It served as a multi-scale analysis tool, was a collaborative object serving the purposes of capturing different visions and opinions of the actors involved and finally materialized the layer of territory under indigenous peasant management (TBMCI, by its acronym in Spanish).

First, a conceptual approach was made through a preliminary calculation to estimate the area of territory occupied by peasants and indigenous people, based on secondary information sources such as the National Agricultural Census, which shows data on farms with and without defined limits (EAPs), or data provided by previous research.

For the formalization phase, a coverage map of the study area was generated, through a supervised classification of a Modis 2017 satellite image of 250 meters of spatial resolution, using the QGIS software and the "SCP" plug-in. From the covers generated, the forest environments were vectorized, to then supervise the correspondence of this layer with the presence of indigenous peasant families, first detecting morphological patterns of houses, roads and bare soil sectors in the Google Earth Pro software, and later overlapping other vector layers such as that of small settlers of the National Geographic Institute or the one based on criterion 10 of the Territorial Planning of Native Forests (OTBN) of the year 2015.

With respect to non-forested environments such as salt flats, wetlands and shrubs, morphological principles of detection were also used, marking around the point (houses/homes) a buffer zone of five km following the methodological proposal of criterion 10 of the OTBN 2015, incorporating these surfaces to the area of the preliminary polygon. In addition, tabular data with spatial attributes corresponding to forest plans approved by the Provincial Directorate of Forests were incorporated. In the validation stage, the selection of the sample corresponded to a theoretical sampling, so that when incorporating typical cases and analysing them, it was decided whether or not to incorporate new cases.

During the period 2011-2015, the correlation between the presence of forests and peasant-indigenous communities was deepened through ethnographic techniques, from different perspectives. During 2017 to 2018, based on the knowledge obtained, the province was divided into three sectors previously defined as presenting distinctive environmental and social characteristics. 263 points of presence of peasant and indigenous communities were obtained through participatory workshops and surveys, allowing the validation process of the TBMCI vector layer.

4. Results

In these dynamics, the triangulation of the information collected in the three zones consisted of overlapping the rectified polygon of the TBMCI, with layers of geographic information at the provincial level, particularly the Territorial Survey of Indigenous Communities (Re.Na.Ci. - Re.Te.Ci.), which presents an overlap of 69 %. The layer of forest cover generated in the formalization stage presented a percentage of overlap greater than 90 % with respect to the rest of the layers considered as sources of contrast of indigenous peasant presence. The resulting TBMCI is 61,000 km², occupying 45.2 % of the provincial area and containing 81 % of the forests protected by Law. In this sense, it contains half of the Category I forests, and the associated biological corridors. In addition, it conserves 74 % of Category II forests. For its part, 93 % of the surface of the TBMCI is constituted by native forest ecosystems, which amounts to 5,762.773 ha.

5. Discussion

Although it was established that TBMCI predominantly preserves a stable and quality forest matrix, it was also detected that it presents a latitudinal gradient, containing quebracho forests to the north, gradually giving way to mixed forests to the south. It also presents other types of natural environments such as shrubs, grasslands, salt flats and wetlands, which do not present a significant percentage contribution when compared to forests. When considering Moran's statistic, I, we found that the environments are more grouped within TBMCI and therefore less dispersed than when compared with the rest of the province, indicating greater homogeneity and less fragmentation. All this constitutes solid evidence in favour of the land sharing strategy and the importance of community tenure as part of it.

6. Conclusions

It is concluded that indigenous peasant communities are relevant in the conservation of forests protected by Law No. 26.331 and consequently their associated biodiversity. Also, participatory GIS allows generating public information efficiently and accurately on territories with precarious tenures, providing new tools for the defence of territories.