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## ABSTRACT

Our work explores the integration of different computational techniques consisting of text mining and network analysis procedures. With these tools, we characterize the environmental resource management and governance actors in a Colombian moorland.

We develop a comprehensive methodology for describing the topology of the perceived interactions among stakeholders and characterizing them with the content of their discourses about moorland conservation.

On one side, with this methodology we obtained:

- i. The networks or "ego-centered networks" based on the stakeholders or actors interviews.
- ii. A complete network by merging ego-centered networks.
- iii. Synergistic/antagonistic perceptions towards actors were represented in weighted networks.
- iv. The identification of leaders among the interviewees.

On the other, interviews were analyzed with text mining, providing social and semantic context about the moorland conservation discourses.

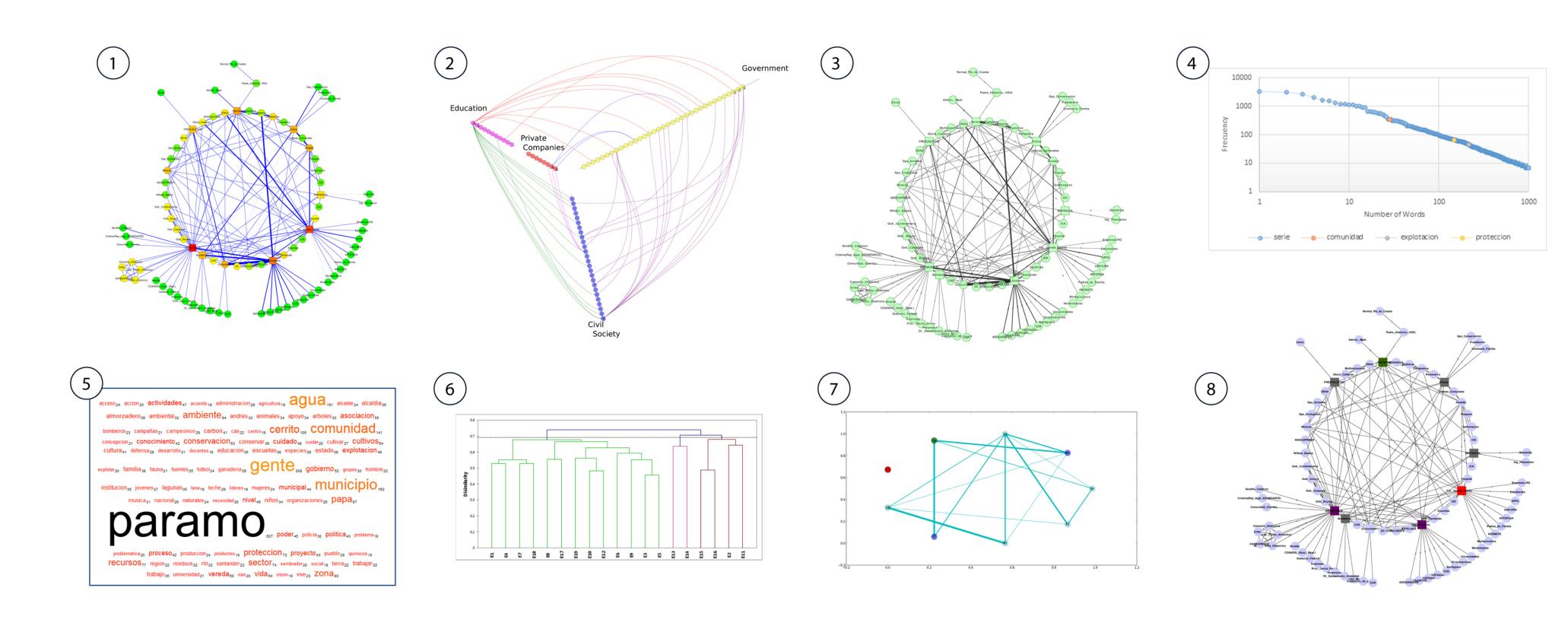
We finally integrated both approaches into a single framework. Results illustrate the social structure of the moorland's leaders, their cultural context and their perceptions about the importance of the moorland ecosystem. On this basis, decision and policy-making for institutional and stakeholder actors could be improved. Moreover, the studied social system could be described in terms for guided self-organization [2,3].

## 1 / METHODOLOGY 19 open-ended interviews and socio-demographic general surveys for three Colombian towns (El Cerrito, Concepción DATA COLLECTION and San Andrés) Read and manually mined the names of actors mentioned in each interview. Four categories classification: NETWORKS OF a) Government institutions; b) NGO and civil society; ACTORS c) Private companies, and d) Education institutions Profile vectors construction using: a) Dataset definition; TEXT MINING b) Histograms of words frequency, c) Bag of reference words. Similarity matrix calculation using Bray-Curtis distance and CLUSTER dendrogram construction using ANALYSIS UPGMA The result of connecting PROFILE interviewees in a network by degree NETWORKS of similarity of their profile vector.

## 2 / RESULTS

fig.1 El Cerrito general network-EGN. fig.2 El Cerrito general network hiveplot. fig.3 El Cerrito weighted network. fig.4 Zipf law. fig.5 Almorzadero word cloud.

fig.6 Bray-Curtis dissimirarity dendogram for interviewees. fig.7 Similarity network of Cerrito actors. fig.4 El Cerrito overlap similitud.



## 3 / DISCUSSION

Network theory has been used for characterizing the interaction between the components of complex systems [1]. Still, dealing with social, cultural, and socio-ecological systems is challenging. Interactions in such systems cannot be characterized solely as socio-ecological because they are also culturally and semantically loaded.

For the analysis, management, and decision-making regarding these kinds of systems, complementary and alternative analysis rooted in text mining is required.

In a text mining analysis, stakeholders' discourses are the basis for capturing additional information about context related properties of relevant interactions.

With a short number of interviews and unstructured data, it is possible to draw a sketch of a map of stakeholders. From our network differences between interviewees can be observed, especially in how much information each possesses.











