

**Extended abstract**

*Social innovation in rural communities:  
experience in the use of solid waste  
(Cauca, Colombia)*



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DOI: 10.4422/ager.2021.03

***ager***

Revista de Estudios sobre Despoblación y Desarrollo Rural  
Journal of Depopulation and Rural Development Studies

### *Highlights:*

1. Solid waste as an option for entrepreneurship in rural areas.
2. Environmental education, a key factor for sustainability.
3. Methodological mainstreaming for social innovation.
4. Sustainable rural development in the hands of women, children and youth.
5. Social innovation and human centered design, the key to change in rural areas.

*Abstract:* This paper presents the results of the project "Model of social innovation in the use of solid waste in the la Yunga and Río Hondo districts (Popayán, Cauca, Colombia)". Through the means of community identified problems, its main goal was to promote community associative capabilities and socioenvironmental appropriation of territories in order to generate alternative methods of sustainable and sustained development. Methods such as People-centered design, Participatory Action Research and Environmental Education were applied. Results showed that social actors managed to devise, drive and deliver innovative and feasible solutions which made it possible to contribute to the objective of sustainable development and overall pollution reduction in the area. The design applied herein allowed for a collective vision to be built in order to direct community potentials and propose new forms of governance, in relevant elements of economic, social and environmental development of the rural sector. The study concludes that community efforts and their organizational capacity permitted the implementation of a social innovation model focused around the use of solid waste. This model can be replicated in rural areas at the national level, thus contributing towards the mitigation of adverse effects related to anthropic activities. Finally, community actions can influence public policies and participate in the overall transformation of local environment and territories.

*Keywords:* Social innovation, rural community, human centered design, environmental education, solid waste.

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## *Extended abstract*

### **1. Introduction and background**

This article presents the results of the project "Social innovation model in using solid waste in the villages of Yunga and Río Hondo (Popayán, Cauca)" to reconsider the human-nature relationship in order to generate dynamics that help us to understand our responsibility for the adverse effects of our user activities.

By taking a social inclusion development paradigm, it is essential to identify the local problems that harm quality of life and the environmental services that nature provides to guide innovative actions to cushion and counteract them. Different rural and/or urban communities have made the effort to deal with these local problems from a systemic problem-solution-opportunity relational perspective.

In this context, a replicable and sustainable social innovation model was collectively built to use solid waste in a rural community, whose principle was to create local community development opportunities. As a starting point, a rural community's social innovation, appropriation and empowerment in relation to its socio-environmental problems were considered to possibly be mitigated by methodological mainstreaming based on People-Centred Design (PCD), Participative Research-Action (PRA) and Environmental Education (EE).

### **2. Objectives, methodology and sources**

The objective was to encourage associative capacities and the socio-environmental appropriation of territories to create sustainable and viable development alternatives centred around the problems that the community identified.

Methodologies like PCD, PRA and EE merged in the methodological design. While interacting from PRA, these methodologies were applied according to PCD guidelines in three phases: listening, creating and delivering (IDEO, 2011). The first phase was carried out by means of a workshop called 'local experiences', which consisted in a group

interview, immersions and interviews with experts, when the community was able to express advances and difficulties in using solid waste. The second phase involved three co-participative design workshops: i) creating areas of opportunity and brainstorming; ii) designing prototypes to validate ideas about managing organic solid waste; iii) designing and devising the obtained suprarecycling prototypes to use inorganic solid waste. The third phase was conducted by means of mini-tests of eco-environmental solutions and evaluating the results.

The results of the group interviews with experts and immersions were analysed by a networks method with the Atlas.ti programme. Descriptive statistics was also applied using the solid waste production values per home (Rustom, 2012), which allowed the production per family unit defined in the inclusive focus group to be estimated. On the whole, the acquired data allowed the social innovation model to be designed for the villages of La Yunga and Río Hondo, and they were piloted, fitted and delivered to the community.

### **3. Results**

During the census, 90% of the family units were georeferenced, and this information allowed social actors' specialisation by means of a map, which listed information about land use types, predominating production activity, number of inhabitants and land ownership. This map became a local management instrument. The discovered production activities were diagnosed as community development opportunities because organic waste was placed in a sanitary tip, and a few families used and transformed it. However, it was discovered that waste accumulated and led to environmental deterioration, and infectious vectors mainly proliferated and methane gas was released, which harm land quality and the local landscape.

The immersions or *in situ* experiences allowed the information supplied by the community, and the villages' local solid waste management chain, to be verified from separation at the source to its final supply. The compiled information was used to illustrate waste management and the community could evaluate its processes and rethink models about employing resources that are useful and not useful.

With the obtained and illustrated data, the creation phase was undertaken, which gave 130 alternatives for using solid waste, which were then grouped into six (6) areas of opportunities. They were prototyped, which allowed setting priorities by collective voting according to criteria like desirability, usefulness and feasibility. The

areas of opportunities permitted the co-design of the social innovation model to use solid waste, which contemplates actions linked with processing actions that consider economic profits. This model was graphically represented and socialised to the community. Its appropriation enabled new knowledge and methods to be developed to generate collective actions and social interaction.

With the ideas prioritised by the community, mini-tests were carried out, which consisted in validating on a small scale the solution put forward by the community to determine its feasibility and improvement aspects. Each proposal was made viable by the participants, and an action plan was agreed on with those responsible for each solution that the community decided to continue to ensure their implementation and feasibility.

#### **4. Discussion**

The acquired occupational/professional data were related to that set out in DANE (2018), which at that time reported a national rate of 10.7% in the first trimester of the year. The unemployment rate in the villages of La Yunga and Río Hondo is one of the main reasons why improving the level of schooling and quality of life is difficult and besides, job sources are characterised by unreliability. This situation falls in line with what the Development Bank of Latin America sets out (2019), which states that shortage of financial, human and technological resources is the main obstacle to manage waste and to implement innovative technologies.

This means that solid waste management in the two villages is related to level of education. Notwithstanding, the community has managed to implement new techniques to use and manage solid waste, which responds to the premise of Hernández (1991), who points out that communities co-existing with nature establish a relationship that goes beyond their balance with and respect of it, and ensures a reasonable use of the benefits it offers.

The stages defined by the cross-sectionally developed PCD, PRA and EE allowed co-participative work sessions to be held, which acted as adequate spaces to agree solutions to problems. This consideration is supported by Osterwalder and Pigneur (2010), who believe that thinking up ideas is key when seeking innovation. So having a considerable number of synthesised ideas is fundamental to be able to reduce the number of feasible options. This demonstrates that all ideas are welcome, and the key factor in the process is not to limit people's imagination.

Community narrations and data evidence that female participation and empowerment in social innovation and gender equality processes are incipient because internal power lines are pyramidal, where men make decisions. This agrees with different research works which have identified that lack of education, rural women's unequal access to jobs, poverty and violence against women are chief causes of female non-empowerment (CELAC, 2018). The main obstacles also include women not feeling capable of enterprising, which is coupled with an inequality that is passed down from one generation to the next like an inherited cultural factor (Corzo, 2019).

## **5. Conclusions**

The outcomes obtained by this project evidence the factors that impact the success of social innovation processes. One outcome is the trust between the research team and the community, and also between community actors and their self-management capacity. These outcomes influence processes, particularly when community business models are proposed, because this entails decided and active participation.

The methodological link among PCD, PRA and EE is necessary, adaptable and suitable to deal with rural problems because it allows the considered solutions to be proposed by the community itself based on their economic and socio-environmental contexts and it, therefore, ensures greater sustainability.

Solid waste in rural communities can become a enterprising opportunity for population groups like women and youths because they make innovation processes visible by mobilising community efforts and channelling governmental aid.

This project found that social actors thought up, steered and delivered innovative and feasible solutions that contributed towards the sustainable development objective to reduce pollution. The co-design allowed a collective vision to form to direct community potentialities and to contemplate new ways to govern, which are relevant elements in the socio-economic and environmental development of rural areas. We conclude that community efforts and their organisational capacity permitted a social innovation model that uses solid waste to be designed that can be replicated to rural areas nationwide, with which certain easily applied activities are contemplated. It allows outcomes to be obtained in short times, and also helps to cushion the adverse effects of anthropic actions and converges to transform the environment and territories.

## **6. Future observations**

Finally, it is important to perform and register follow-up after implementing co-created solutions given the importance of public and private institutions accompanying these initiatives in order to allow their sustainability and to take communities closer to consolidate their projects by materialising self-management capacities.