



### CASE STUDY 5.1

## A MULTISCALE SUSTAINABILITY ASSESSMENT OF PRODUCTIVE LANDSCAPES IN POST-CONFLICT REGIONS OF COLOMBIA

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For more than 50 years, Colombia's rural regions suffered from conflict with the FARC-EP, a revolutionary guerrilla movement, and other armed groups. The mediation and peace processes between the government and the FARC-EP led to the end of the armed conflict in 2016.<sup>131</sup> The conflict directly affected over nine million people, leaving behind deep-rooted challenges that have destabilized social structures and rural governance mechanisms, as well as unsustainable land use change. Cultivated lands have expanded to the detriment of previously wild areas, leading to diminishing native forests in post-conflict areas,<sup>132</sup> harming biodiversity, and causing an increase in CO<sub>2</sub> emissions<sup>133</sup> through unsustainable farming and forest loss.<sup>134</sup>

Post-conflict environmental and socioeconomic impact assessments were crucial to evaluating the state of the natural environment and to informing programming priorities. They were also used to strengthen the participation of vulnerable communities affected by the conflict in decision making processes.<sup>135</sup> These assessments recommended re-establishing the balance between the altered and natural environment through the restoration of ecosystem services and the implementation of sustainable agricultural practices, as well as by supporting the reintegration of ex-combatants through green jobs. Since then, more than 13,000 ex-combatants have benefited from the national government's peacebuilding and demobilization programs, which often rely on natural-resource based livelihoods.<sup>136</sup>

UNU-FLORES joined forces with United Nations and national peacekeeping forces in Colombia to scale up sustainable farming practices and increase trust between institutions and communities in conflict areas. The Colombian Ministry of Defense played a critical role, mediating between institutions and citizens thanks to its position as a trusted institution. The Eighteenth Brigade and the Fifth Division of the Colombian army collected environmental data and documented agro-environmental practices in post-conflict municipalities, which were later analyzed by UNU-Flores (FIGURE 5.2).

The collected field data was based on a questionnaire that examined agricultural practices, the impact of the COVID-19 pandemic on farmers, natural resources availability and access as well as gender and security perspectives. This data was georeferenced to feed geospatial models that analyzed regions and detected vulnerabilities, threats, and opportunities to improve the management of natural resources and sustainable food production in conflict-affected areas of Colombia.

The methodology used to determine priority areas was based on the analysis of a set of environmental and social vulnerabilities, combining field and Earth observation data. Satellite and climate-derived land-use typologies, combined with data at the food producer level were integrated to calculate vulnerabilities, which helped practitioners identify areas for priority action.

**FIGURE 5.2:** MOORLANDS ECOSYSTEM RECOVERY ACTIVITY AT THE NATIONAL NATURAL PARK CHINGAZA IN CUNDINAMARCA.



Source: Press Office, Eighteenth Brigade 2021.

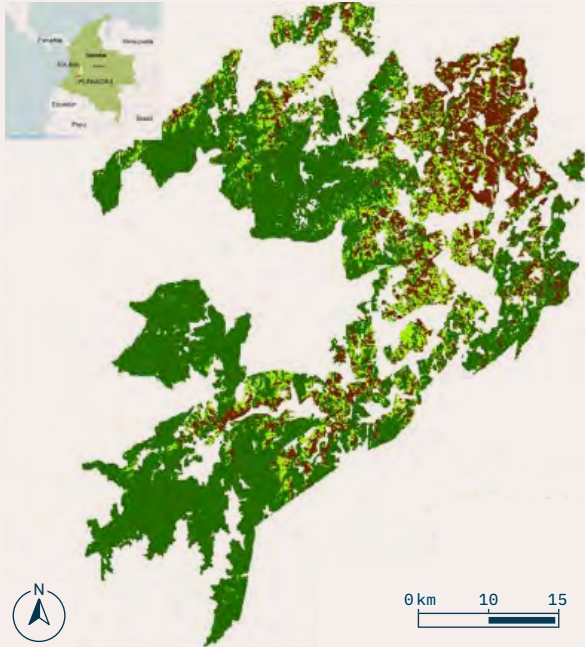
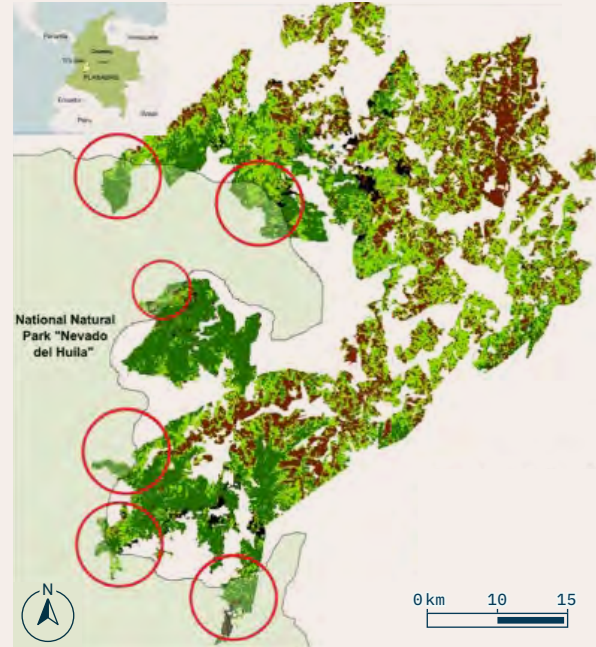
Once critical areas for intervention were identified, their ecosystem services, including soil maintenance, food production, and drinking water production, were examined in detail to determine the deterioration caused by climate change and natural resources exploitation (FIGURE 5.3). The outputs from the geospatial exercise were then discussed in community workshops with relevant stakeholders to find nature-based solutions to restore degraded ecosystem services and introduce more sustainable farming practices.

As a result of the cooperation between UNU-FLORES, local communities, the Colombian Ministry of Defense, and UN peacekeepers, a database with more than 280 entries has already been developed and shared with the interested communities. Additionally, more than 300 small food producers in Planadas are working in the framework of a pilot project on sustainable agricultural practices (FIGURE 5.4). With this programme, UNU-FLORES aims to establish a data- and community-driven knowledge platform that supports decision making processes by relying on natural resource management and cooperation, within a holistic approach to the care for degraded ecosystems at the community level.



**FIGURE 5.3: SPATIOTEMPORAL LAND COVER SCENARIOS FOR THE MUNICIPALITY OF PLANADAS-TOLIMA.**

(A) The land cover in 1985 was developed by a supervised classification method (Landsat-5 image).  
 (B) Land cover in 2020 (Landsat-8 image), supervised classification with a combination of bands 6-5-2.  
 Red circles mark the expansion of the agricultural border into the protected area of the Natural Park Nevado del Huila.

**A - LANDCOVER PLANADES 1985****B - LANDCOVER PLANADES 2020**

■ Agroecosystem, mosaic   ■ Andean Forest   ■ Subandean Forest

Source: UNU-FLORES 2021.

**FIGURE 5.4: CITIZEN SCIENCE PROJECT CARRIED OUT IN PLANADAS, TOLIMA REGION.**

Source: Astrid Rocio Gutierrez 2021.