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Ecuador



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Climate smart livestock production in Ecuador

A strategic partnership between FAO and the private sector

Summary and key figures

Since 2016, Ecuador, through the Ministry of Agriculture and Livestock (MAG) and the Ministry of the Environment (MAE), with technical support from the Food and Agriculture Organization of the United Nations (FAO) and financing from the Global Environment Facility (GEF), has implemented the *climatesmartlivestock* (CSL) approach. This approach, which is a pioneering initiative in Latin America, seeks to sustainably increase livestock productivity and the income of producers, improve the resilience of livestock systems to climate change, and reduce greenhouse gas (GHG) emissions. The preliminary results of the initiative are very encouraging: in less than four years, the income of the participating families of livestock producers has increased by 10.7 percent, and the efficiency of livestock production, measured in GHG emissions per unit of product (milk and meat), has increased by 17.7 percent. As part of this valuable process, the FAO Country Office in Ecuador has taken the important step of mobilizing private sector participation. In early 2019, FAO established a strategic alliance with El Ordeño, a major Ecuadorian food company. In the first stage, which is described in this document, FAO worked with the company on a pilot project to

adapt and validate participatory diagnostic tools, in order to identify good practices and measure GHG emissions in the field. The second stage, which will start soon with the participation of about 2 400 family livestock producers, will focus on the application and monitoring of technical solutions to improve the quality and sustainability of dairy farming. This collaboration forms part of a *win-win* logic since, for El Ordeño, the adoption of the CSL approach is one of the factors that has helped to strengthen its certification as a B Corporation that has generated a triple positive impact—economic, social and environmental—and allowed it to enter the market with a new generation of sustainable foods. For its part, the partnership of FAO with the private sector has contributed to greater sustainability and scaling up of the initiative. It has also facilitated knowledge creation and management regarding the CSL approach in Ecuador, which has generated a solid platform to promote the sustainability of the livestock chain in the country.

Implementation period:	February 2019 – August 2019.
Location:	Ayora Parish, Cayambe Canton, Pichincha Province, Ecuador.
No. of direct participants:	50 family livestock producers, 15 technicians.
No. of indirect participants:	1 000 suppliers of milk to the food company El Ordeño.
Executors:	FAO / El Ordeño.
Financing institutions:	El Ordeño / FAO.
Total investment:	USD 64 420
Financed by El Ordeño:	USD 20 152
Financed by FAO:	USD 44 268
Keywords:	Climate smart livestock (CSL), greenhouse gases (GHG), carbon footprint, climate change, dairy industry, inclusive model, sustainable development.



FAO and El Ordeño share a common interest in developing climate smart livestock systems

In Ecuador, cattle breeding systems tend to be extensive (5 million hectares dedicated to livestock with 4.1 million head of cattle), with low productivity (5.38 liters of milk per cow and a stocking rate of 0.68 animal units per hectare) and with poor use of pastures. There are about 300 000 livestock farms, of which 57 percent are less than 10 hectares in area. About 34 percent of national milk production comes from family farms with less than 20 hectares of land. This implies high CO₂eq emissions per unit of milk or meat produced, which is inversely proportional to the level of productivity. Livestock production is unsustainable in some provinces of the country, generating three main threats to the environment: i) soil losses and desertification risks; ii) increase in pollutants and GHG emissions; and iii) extension of the agricultural frontier.

In addition, climate change is a challenge for the development of countries and the well-being of ecosystems and societies. GHG emissions continue to rise, generating increases in the global average temperature, rising sea levels, changes in precipitation patterns and greater intensity and frequency of extreme climatic events. Thermal stress and decreased water availability impact livestock production and productivity, causing a reduction—in quantity and quality—of available forage, outbreaks of animal diseases and competition for natural resources with other sectors of the economy. In this scenario, family farmers face different barriers to implement more sustainable livestock management practices and to build more resilient production systems.

Considering these challenges, Ecuador, through the Ministry of Agriculture and Livestock (MAG) and the Ministry of the Environment of Ecuador (MAE), with the technical support of FAO and financing from the Global Environment Facility (GEF), has focused since 2016 on the implementation of the climate smart livestock (CSL) approach. In the framework of this project, technologies and practices have been implemented aimed at: i) sustainably increasing productivity and income from livestock production; ii) improving the resilience of livestock systems to climate change; and iii) reducing GHG emissions.

The initiative, which is the first of its kind in Latin America, seeks to develop tools and strengthen institutional capacities to incorporate the CSL approach in national and territorial policies. It has been implemented in seven provinces of the country (Guayas, Manabí, Santa Elena, Imbabura, Loja, Napo and Morona Santiago) and the preliminary results confirm the need for actions that improve the efficiency of production systems and reduce GHG emissions.

In this important process, the FAO Country Office in Ecuador has taken a significant step in promoting the participation of private companies in the CSL approach, through an active process of dialogue and knowledge exchange. As part of this effort, at the beginning of 2019 it established a strategic alliance with El Ordeño, an important Ecuadorian food company, to promote the development of local capacities of technicians and producers in areas related to this approach.

The first stage of this collaboration, which is described in this document, consisted in the development of a pilot project in the canton of Cayambe. In this territory, where there are about 92 500 head of cattle, participatory diagnostic tools were adapted and validated, good practices were identified, and GHG emissions were measured. The second stage, which will start soon with nearly 2 400 family livestock producers, will focus on implementation and monitoring of technical solutions for the improvement of the quality and sustainability of dairy farming.

This partnership is part of a *win-win* logic. For El Ordeño, replicating the CSL approach allows it to strengthen and differentiate itself as a B Corporation committed to society and the environment. For FAO, the involvement of the private sector contributes to greater sustainability and replicability of the CSL approach. It also makes it possible to scale up the process, led by FAO, of knowledge creation and management regarding the CSL approach in Ecuador, which constitutes a solid platform to promote the sustainability of the livestock chain in the country.



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The El Ordeño company Milestones and figures (2018)

El Ordeño is an Ecuadorian food company with a social mission that promotes sustainable development in its value chain through an associative and inclusive business model that improves the quality of life for thousands of producers and their families. The business, founded by members of the Association of Cattle Breeders of the Sierra and Eastern Ecuador (AGSO), began in 2003 with the production of dairy products at its Machachi plant. In 2012, one of the most modern plants in the country was inaugurated, with Tetra Pak technology for the processing of juices and UHT (Ultra High Temperature) milk. In 2015, it received the Food System Safety Certification (FSSC) 22000. In September 2019, it was certified as a B Corporation and launched its TRÜ brand on the market with attributes including: i) use of clean and renewable energy; ii) promotion of the CSL; iii) promotion of responsible consumption; and iv) promotion of fair, associative and inclusive trade.

- Annual revenue: USD 34.1 million.
- 1 plant with an annual production capacity of 86 million liters of milk.
- 72 milk collection centers located in 11 provinces.
- 6 000 dairy farmers.
- 254 workers.
- 252 suppliers (services, supplies, equipment).
- 1 225 000 children benefited daily through the school feeding program.
- 554 commercial clients.

Source: El Ordeño, 2019. Sustainability Report 2018.

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Challenges

Strengthening capacities and knowledge management related to the climate smart livestock approach

The project presented two main challenges that are interrelated:

- » Improve the capacities of small and medium-sized livestock producers and their technical teams to make dairy farming more productive and sustainable, and reduce GHG emissions.
- » Adopt, improve, and validate methods and practices that strengthen the climate smart livestock approach to promote the scaling up of the initiative at the national and international level.



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Participants

Small-scale livestock producers' associations and technical teams

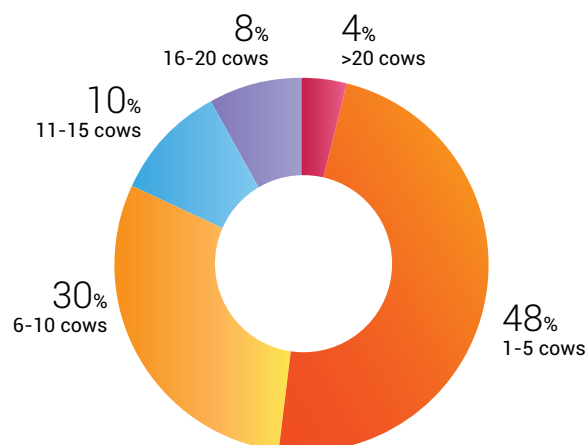
» N.º of direct participants:

- 50 family livestock producers located in the canton of Cayambe, with herds of between one and 22 lactating cows each.
- Seven farming communities: Turucucho, Pesillo, La Chimba, San Pablo Urco, Caucho Alto, Chaupi and Muyurku.
- 15 technicians from the El Ordeño company.

» N.º of indirect participants:

- 1 000 milk suppliers of the El Ordeño company in the Cayambe area.

No. of participating families according to number of cows in lactation (%)



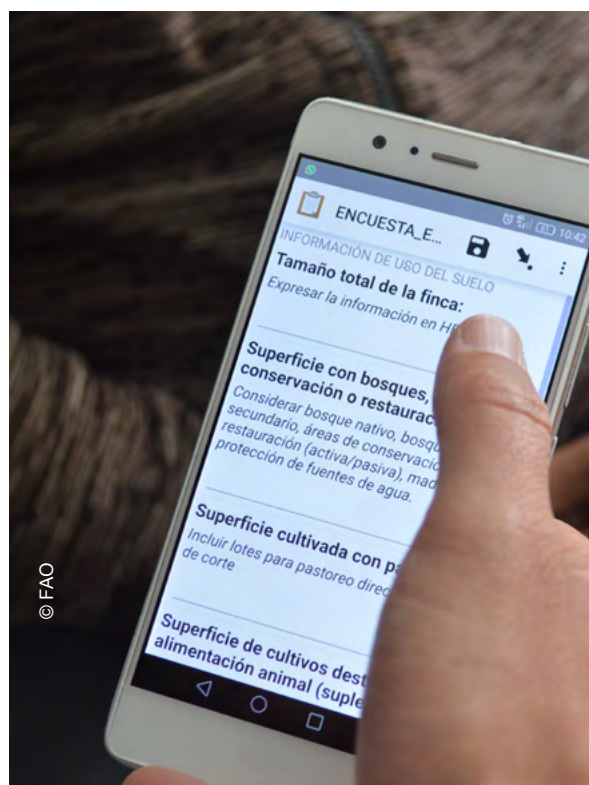
Source: Database of farms selected for the GHG measurement sample.

Develop, adapt and implement tools that enhance the climate smart livestock approach

Since 2016, FAO has worked in Ecuador on the development and adaptation of tools to help effectively face the country's livestock problem. In the framework of its partnership with El Ordeño, FAO focused on three types of tools to promote adaptation, socialization and capacity building:

- » **Tools that allow the participatory design** of capacity development proposals and solutions for the improvement of livestock systems for small and medium-sized producers according to the social, economic, productive, environmental and political situation in each area. These tools are based on the combination of two participatory methods:
 - **Participatory Rural Appraisal (PRA)**, where the participants themselves analyze their situation and assess different options to improve it.
 - **Community-based Risk Screening Tool - Adaptation and Livelihoods (CRiSTAL)**, which allows the analysis, together with producers, of climate threats in their territories.
- » **Tools that allow collecting and storing information in real time**, and that help team members (in this case, a network of field technicians) to generate collaborative databases in an open and user-friendly scheme. This facilitates timely decision-making and the reporting of result indicators of the work performed. FAO has used a tool developed by the University of Washington called the *Open Data Kit* (ODK), which is an Open Source system. This system also involves the use of an aggregator, in this case the free version of *Mobile Data Collection* (ONA), to generate databases and convert Excel forms to an ODK mobile application in order to facilitate the collection of information (Android system).
- » **Tools that allow estimating GHG emissions from livestock farms.** The methodology considered for the calculation of direct emissions uses as a reference the Global Livestock Environmental Assessment Model (GLEAM) developed by FAO and adapted to Ecuador. The technical team used the R programming language to automate the calculation of GHG emissions at the farm level.

The specific tools are applied according to the following sequence: i) farm map; ii) agricultural calendar; iii) preference matrix of bovine breeds and forage mixtures; iv) brainstorming for the identification of climatic and non-climatic threats (adapted from CRiSTAL); v) climate threat analysis matrix; vi) production problems prioritization matrix; vii) problem tree; and viii) solution prioritization matrix.



Main support actions

- 1 **Participatory design** of a proposal for capacity development and improvement of livestock systems for small and medium-sized producers in the Cayambe area.
 - » **Workshop** with 30 producers and 10 technicians.
 - » **Preparation of a technical report on Participatory Rural Appraisal and analysis of climate vulnerability.** Workshop methodology and results.
- 2 **Development of capacities** in using the tool for collecting and analyzing information on livestock farms (*Open Data Kit* - ODK).
 - » **Training workshop** for the network of technicians of the El Ordeño company, who provide technical assistance to small-scale farmers in the Cayambe canton.
 - » **Elaboration of a manual** for data collection and analysis.
- 3 **Strengthening knowledge for estimating GHG emissions** in livestock systems, through the use of the GLEAM-R tool.
 - » **Training workshop** for the network of technicians of the company El Ordeño, which provide technical assistance to small-scale farmers in the Cayambe canton.
 - » **Preparation of a technical report** with the methodology and results of the estimation of emissions by producer segment.



Technical solutions to improve livestock systems and baseline greenhouse gases emissions

Main results

Proposal for capacity development and improvement of livestock systems

- » **The main production problems** that affect the livestock systems of the Cayambe canton are: milk fever, soil compaction, low level of knowledge for raising calves, infertility and low pregnancy level, ectoparasites (flies), high cost of inputs and artificial insemination, food shortages in the dry season and the time to return to the paddocks.
- » **The main climatic threats** identified by farmers and technicians are: droughts, frosts, sudden changes in temperature and strong winds, which are common in the months of July to December (summertime in the study area).
- » **Good Livestock Practices.** In accordance with the climatic and non-climatic threats evaluated in the intervention area, a set of 124 Good Livestock Practices is proposed, aimed at reducing greenhouse gas emissions, improving adaptive capacity in the face of climate change and increasing the productivity of livestock systems.

Network of technicians trained in *Open Data Kit*

- » 15 technicians from El Ordeño feed the ODK database in real time with information about a network of 50 dairy farms.

Baseline GHG emissions

- » **Total contribution.** The total direct emissions of the 49 farms evaluated are 3 315.74 t CO₂eq.
- » **Contribution according to producer segment.** The productive systems that manage herds of between 16 to 25 cows, contribute 44 percent of the GHG emissions.
- » **Contribution according to source.** Since the main source of GHG emissions in the farms evaluated corresponds to the production of methane by enteric fermentation (86 percent), it is important to improve the quality of animal feed.
- » **Emissions intensity.** The average emissions intensity on the farms evaluated is 2.61 kg CO₂eq per liter of milk, which is lower than the national average (5.78 kg CO₂eq per liter of milk) but above the intensities found in the lowest range (10 percent) of a national study (1.7 kg CO₂eq per liter of milk).

Contribution of El Ordeño's certification as a B Corporation

In September 2019, El Ordeño was certified as a B Corporation and launched its TRÜ brand of sustainable foods on the market. The firm's adoption of the CSL approach is one of its four main commitments—together with the use of clean and renewable energy, the promotion of responsible consumption and the practice of fair, associative and inclusive trade—that helped it to obtain this certification.

Although it is still early to measure the effects of the work in the Cayambe canton, the CSL project, which has been implemented for the last four years in other territories of the country, shows clear evidence of having had a positive impact.



The impacts of the climate smart livestock Project in Ecuador

In 2016, the CSL Project was launched in Ecuador through the Ministry of Agriculture and Livestock (MAG) and the Ministry of the Environment (MAE), with technical support from FAO and financing from the Environment Fund Global Environment (GEF). The CSL Project "Integrating the Reversal of Land Degradation and Reducing the Risks of Desertification in Vulnerable Provinces" has been implemented in seven provinces of the country, with a network of 165 pilot farms, 37 field schools, and more than 1 000 small and medium-sized producers (33 percent are women) covering a total 40 000 hectares. To date, the following figures demonstrate the impact of the project:

- Reduction of direct emissions by 24 469.54 t CO₂eq.
- Reduction of vulnerability from moderate to low.
- Income of family livestock producers increased by 10.7 percent.
- Productivity increased by 12.6 percent.
- Efficiency (GHG emissions per liter of milk) increased by 17.73 percent.

Source: CSL Project Progress Report, 2019, Power Point presentation.

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Success factors

A company with a social conscience and a different business strategy

- » **Vision of the company's partners.** El Ordeño is the first dairy company in Ecuador to obtain the B Corporation certification, which is an international seal that endorses the highest socio-environmental standards of entities that believe success is measured by the well-being they generate in people, society and nature. It is the strength of this vision that explains the firm's commitment to the CSL approach promoted by FAO.
- » **Environmental sustainability as a marketing tool.** The company has incorporated its good environmental practices as a marketing tool. The positive reaction of consumers to these practices has helped the firm to increase its competitiveness.



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Sustainability

Private sector participation

The company engages with the CSL approach at all levels. Its financial contribution and the active participation of its network of technicians and suppliers are highlighted in all activities of the initiative. The involvement of the private sector has clearly contributed to the sustainability of the CSL project.



The second stage of the project

The results achieved in the first stage of this initiative have encouraged the continuity of collaboration between El Ordeño and FAO. The intervention strategy will be expanded to four provinces (Pichincha, Tungurahua, Chimborazo and Cotopaxi) and seven cantons (Pedro Moncayo, Cayambe, Latacunga, Salcedo, Quero and Alausi), linking more than 2 400 producers (40 percent of the company's total suppliers) and 34 collection centers that collect 69 percent of the daily milk production (81 220 liters). This second stage corresponds to the implementation and monitoring of the technical solutions identified. This stage will last 14 months with a budget of USD 112 000, of which the company will contribute 64 percent.



Three main recommendations

» **Show that research and development is useful for the private sector.**

Adapting, validating and delivering tools that allow companies to differentiate themselves as promoters of more sustainable livestock production helps to create a powerful collaboration platform. The generation of quantitative data in real time is an excellent tool, both for making timely technical decisions and for showing the positive effects of applied practices.

» **Show that research and development is useful for producers.** The increase in productivity and income that has been shown by participants in the CSL Project constitutes an important incentive for family livestock producers, and their network of suppliers, to adopt the proposed good practices. The monitoring, measurement and dissemination of these impacts is very important for CSL processes.

» **Balance the economic and environmental perspectives.** Medium and long-term solutions have been conceived and implemented that help to generate environmental sustainability and higher income for the company and their livestock family suppliers. As a result, economic development and environmental conservation go hand-in-hand.

Sustainable food products and the measurement of greenhouse gases emissions

- » **A new generation of sustainable food products.** El Ordeño's adoption of the CSL approach has contributed to the development of a new generation of sustainable food products. TRÜ milk has the first Tetra Pak packaging in the country that is made with more than 77 percent of materials from renewable sources, and a 100 percent recyclable sugarcane container and lid made with clean and renewable energy. This product is made with milk delivered by more than 6 000 small and medium-sized producers, with the aim of promoting the well-being of each actor in the value chain and aligning production with the company's triple impact business strategy: social, environmental and economic.
- » **A tool to measure GHG emissions in the field.** The GLEAM-R tool for estimating GHG emissions, coupled with the ODK-ONA platform for data collection and analysis, has been successfully applied in the field and represents a functional method for making measurements in real time and with collaborative databases.

Gender

- 33 percent of the participants are women.
- The role of women in the dairy farming chain is very important (see Study "Género y ganadería climáticamente inteligente").

Social inclusion

- 95 percent of the livestock families in Cayambe are indigenous.
- Building trust.

Social participation

- Participatory methods for the elaboration of studies, and the prioritization of problems and solutions.
- Field schools in Stage 2 (from farmer to farmer).

More information:

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- **Websites:** [Ganadería climáticamente inteligente; Empresa El Ordeño.](#)
- **Documents:** [MAG, MAE, FAO, 2018. Género y ganadería climáticamente inteligente](#)
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- **Press releases:** [Noticia 1](#); [Noticia 2](#); [Noticia 3](#)



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