

# Increasing the productivity of dual-purpose cattle in Nicaragua through use of appropriate breed types and application of best husbandry practices: 2015 annual progress report

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## Narrative summary

In Nicaragua, smallholder dual-purpose cattle production offers opportunities for poor cattle owners to improve their income, while the dairy and meat value chain provide employment opportunities. However, milk production per cow lactation, cow fertility and growth rates, are low. The “More milk and meat through better breeds” project seeks to identify factors constraining dual-purpose cattle production in Nicaragua and design and promote interventions that would sustainably improve their productivity. The **goal** of the project is to improve livelihoods, food, and nutritional security of the rural poor in Nicaragua by enhancing milk and beef production through the application of improved breeding and husbandry strategies.

The project objectives are:

- To assess systems constraints, research gaps in the Nicaragua smallholder dual-purpose cattle herds, opportunities for improvement gains, and the overall dairy & meat value chain development.
- To identify the priorities and best-bet technical (health, feeding, and breeding) and marketing interventions and the respective research needs that would benefit the different gender and actor groups in the Nicaraguan milk and meat value chain.
- To identify cattle breed-types that best match the existing and emerging smallholder production systems in Nicaragua.
- To build and strengthen the institutional, actors’ and farmers’ capacities to improve input and market service delivery, and technology applications that would enable sustainable animal and herd productivity improvements.
- To develop a university research program connected with the breeding monitoring and traceability programs for dual-purpose cattle in Nicaragua

# Activities and achievements

## Baseline study results

An in-depth analysis of the data collected through the baseline survey was carried out and information generated used to inform project activities in 2015. A total of 540 households participated in the baseline (279 from Camoapa and 261 from Matiguas). Forty percent of the households surveyed are headed by women, while the rest are headed by men. More than 70% of the cattle reared are owned by the men in the households, while women participate more in monitoring animals in the grazing areas, milking animals and producing artisan cheese from the milk available. Through the baseline study activities, 13 graduate students and 4 staff members from UNA were trained in the management and implementation of livestock information systems using ICT tools. Group discussion workshops were held with farmers and collaborators in the project sites through which information generated in the baseline study was shared and discussed for verification on its accuracy, and the implications presented for development of the dual purpose cattle value chain (<https://ilri-angr.wikispaces.com/file/view/Trip%20Report-Nicaragua-20150419.pdf/564174457/Trip%20Report-Nicaragua-20150419.pdf>). Results were also shared through institutional seminar presentations in Nicaragua, and at the Tropentag in Berlin, Germany.

## Longitudinal monitoring study

As the project sought to monitor the productivity of at least 2500 cows raised on medium to small scale farms, 250 households that participated in the baseline study were selected to participate in the longer term monitoring, recording and feedback study. Households had to own between 4 and 65 animals to qualify. In order to support longer term continuity of the registration and recording of animal performance, a partnership was established between the project and the National Traceability Program (NTP) attached to the Institute for Agricultural Protection and Health (IPSA) in Nicaragua, through which ear tags were obtained for identifying individual animals, and 14 students from UNA were trained in practical animal identification and traceability.

The project team developed protocols and tools for use in long term monitoring of animal management and productivity (<https://ilri-angr.wikispaces.com/Nicaragua+Longitudinal+Tools>) and adapted the “Open Data Kit” (ODK) information technology platform (<https://opendatakit.org/>) for paperless data collection into a central database at ILRI. The central database was designed to enable immediate feedback queries in data entry on individual animals using available information on the animals in the database. By the end of 2015, 1637 animals from farms in Camoapa and 1508 animals from farms in Matiguas were identified and registered in the database (<http://data.ilri.org/portal/dataset/adaniclong>). The longitudinal monitoring is of productivity by dual purpose cattle (2500 animals) both cows in milk and growing animals. Milk production per cow and growth traits of young animals, notably bull calves are being monitored in the project as a proxy to offtake for the beef industry. Thus far a total of 3145 animals were registered from the farms comprising 1818 mature female animals, 1220 calves, and 107 mature males.

In Camoapa, test-day milk production from cows registered in the database was collected in two rounds of animal monitoring. A total of 1063 test day milk records were taken on 684 crossbred animals comprising mainly Brown Swiss, Brahman, Holstein and mixed breeds. The overall average test-day milk production recorded is 4.04kg±1.74kg. Collection of growth performance and milk production data from Matiguas is underway.

## Gender studies and capacity development within Nicaragua

Actors in the dual purpose cattle production value chain were characterized from a gendered perspective, and the strength, opportunities and limitation faced by rural women in the value chain documented (report:

<http://livestockfish.cgiar.org/2015/01/21/characterizing-actors-nicaragua/>;

<https://cgspace.cgiar.org/handle/10568/52349>. Additionally, through the CGIAR program on Livestock & Fish, support was provided by the KIT gender team from The Netherlands to enable stronger integration of gender in field data collection, analyses and reporting by the project. The baseline statistical report that had been written on the project was reviewed by the gender team and additional analyses suggested in order to present a more gender informative document. This report will be published in the first quarter of 2016. In order to understand the gender dynamics in the dairy value chain of Nicaragua, a graduate student study supported through BOKU was undertaken (<http://hdl.handle.net/10568/74315>).

The study involved two cooperatives in Matiguas and their corresponding milk providers. Actors in the dairy value chain of Matiguas were mapped and the requisite gender dynamics analysed. It was noted the women at different levels of the value chain have limited access to information and resources. Women also tend to have less decision making power, resulting in an imbalance in the benefits accrued through the dairy sector.

Capacity development was emphasised in all activities of the project. Through Focus group discussions and participatory workshops involving farmers, producers were taught about cattle breeding and management practices, and the importance of the practice of collecting and using livestock performance information at a community level <https://ilri-angr.wikispaces.com/Stakeholder+group+activity+reports>.

Two students undertaking Masters studies related to animal breeding at UNA were supported to carry out their research within the project. One student project is on the use of biotechnology in animal breeding to determine frequency of gene and genotypic variants of kappa-casein and Beta-lactoglobulins in crossbred Holstein, Brown Swiss and Jersey sires available in Nicaragua. The student undertook additional coursework in molecular biology on the extraction of DNA from blood samples at the Molecular Biology Laboratory of National Institute of Agriculture Research in Venezuela. The second student project is on social and economic characteristics of dual-purpose livestock systems and their influence on the productivity of the predominant breed types raised. Information generated through the baseline and longitudinal monitoring in the project will be used for this project.

### Partnerships

As project activities are undertaken on farms, the farmers have been linked with cooperatives, local development organizations, and stronger ties are being made with the municipal governments in order to strengthen the dairy value chain. In Camoapa, Masiguito and San Francisco (also known as CAMOAPAN) cooperatives collect milk of at least 85% farmers involved in the project. In Matiguas the project team is establishing networks between the farmers and three cooperatives (NICACENTRO, PANCASAN and 24 de junio). Other organizations working in the sites and collaborating with the project team include, GRUMIC-ADM (Grupo de Mujeres para la Incidencia de Camoapa) in Camoapa, TECHNOSERVE, and a local development organization (ADM) linked to the municipal government in Matiguas.

The on-going monitoring of productivity of animals on farms will be used as a basis for training and adoption of technical interventions on farms to improve the efficiency of the systems. Through feedback and capacity building activities, breeding and management interventions to address

strictures in the systems will be addressed. Working with partners, the project team will also seek solutions to the delivery of improved animals for the farming systems. Data collated on farms will contribute to identifying the cattle breed-types that best match the existing and emerging smallholder production systems in Nicaragua, and in designing frameworks for best delivery of improved animals.

#### Planning for 2016

The activities planned for 2016 are listed in section 5 below and include a) longitudinal monitoring of performance of animals on small and medium scale farms, and provision of feedback to support change and adoption of different breeding technologies in order to improve livestock productivity; b) building the capacity of farmers, communities and the breeding service providers in the implementation of animal performance recording, feedback, and monitoring systems; c) Documenting and publishing information on dual purpose cattle production systems in Nicaragua for use by a wider audience; d) developing the capacity of UNA in animal breeding and genetics through supervision of graduate student projects; e) sharing information generated through workshops, reports and publications

# Management issues

In 2015, there was concerted efforts by all project partners to overcome the challenges in administration reported from 2014. The measures put in place at the beginning of 2015 by the project management to facilitate implementation were successful.

1. The administration of the National Agricultural University (UNA) put in place several measures to ease the administrative processes in order to support project activities and field work went on at a very good pace.
2. Key project equipment was purchased through CIAT in collaboration with UNA

# Research progress

Progress made in the research process is outlined below as it relates to the various project outputs:

**OUTPUT 1** *Key constraints and opportunities for immediate and long term interventions identified:*

Feedback on information generated through the baseline study was provided to livestock keepers and stakeholders within the country through participatory workshops and presentations in conferences (<https://ilri-anagr.wikispaces.com/file/view/Trip%20Report-Nicaragua-20150419.pdf/564174457/Trip%20Report-Nicaragua-20150419.pdf>).

The status of the dual purpose production systems was also shared at the Tropentag Conference in Berlin, Germany. Information from baseline study was used to identify 250 small and medium scale farms to participate in long term performance and management monitoring to enable identification and implementation of optimal technological interventions for the production systems. Data on the animals is accessible by project partners through the ILRI data portal (<http://data.ilri.org/portal/dataset/adaniclong>).

Strengths, opportunities and limitation faced by rural women in the dual purpose cattle value chain were also documented (<http://livestockfish.cgiar.org/2015/01/21/characterizing-actors-nicaragua/>; <https://cgspace.cgiar.org/handle/10568/52349>).

Master thesis on Governance and gender dynamics in global value chains, a case study of the industrial dairy value chain in Matiguás, Nicaragua (<http://hdl.handle.net/10568/74315>).

**OUTPUT 2** *Trait preferences and breeding objectives identified and availed to design sustainable dual purpose cattle improvement programs in Nicaragua and for similar systems in Latin America:*

From the baseline data, 250 households were identified to participate in long term monitoring, recording and feedback. A partnership was also established with the project and the National Traceability Program (NTP) attached to the Institute for Agricultural Protection and Health (IPSA), and 14 students from UNA were trained in practical animal identification and traceability.

Tools and protocols for data collection were developed (<https://ilri-anagr.wikispaces.com/Nicaragua+Longitudinal+Tools>) and a central database designed that enables immediate feedback queries in data entry. 1637 animals from farms in Camoapa and 1508 animals from farms in Matiguas were identified and registered in the database (<http://data.ilri.org/portal/dataset/adaniclong>).

**OUTPUT 3** *Capacity of local actors to implement livestock breeding programs enhanced:*

Capacity development involved training of stakeholders and actors at different levels of the value chain, and of graduate student using both participatory and formal learning methods. Farmers learnt about cattle breeding management and livestock performance data collection through participatory group discussions <https://ilri-anagr.wikispaces.com/Stakeholder+group+activity+reports>. Eighteen graduate students and staff members from UNA were trained in the management and implementation of livestock information systems using ICT tools, and in identification and monitoring of animal performance on farms. Two MSc student projects related to livestock breeding and improvement are underway by students from UNA in Nicaragua. One graduate student project on gender dynamics in the dual purpose cattle value chain was carried out by a student from Austria.

**OUTPUT 4** *Partnerships to implement long-term innovation of dual-purpose cattle production systems developed:* Farmers have been linked with cooperatives, local development organizations, and

stronger ties made with the municipal governments. In Camoapa, Masiguito and San Francisco (also known as CAMOAPAN) cooperatives collect milk of at least 85% farmers involved in the project. In Matiguás the project team is establishing networks between the farmers and three cooperatives (NICACENTRO, PANCASAN and 24 de junio). Additionally, a partnership was established with the National Traceability Program (NTP) attached to the Institute for Agricultural Protection and Health (IPSA) through which 14 students from UNA were trained in practical animal identification and traceability.

# Dissemination of outputs

Current published outputs from the project include;

- A. Tools and protocols for long term monitoring of productivity (<https://ilri-anagr.wikispaces.com/Nicaragua+Longitudinal+Tools>)
- B. A database with monthly performance data on animals in the two municipalities (<http://data.ilri.org/portal/dataset/adaniclong>).
- C. Report from focus group discussions and workshops; <https://ilri-anagr.wikispaces.com/Stakeholder+group+activity+reports>; Report on mapping actors in the dual purpose cattle value chain; <http://livestockfish.cgiar.org/2015/01/21/characterizing-actors-nicaragua/>; <https://cgspace.cgiar.org/handle/10568/52349>
- D. Presentation of results from the baseline at Tropentag; Wurzinger, M. Ojango, J., Corrales, R., Mena Urbina, M., van der Hoek, R., Quiros, C., Poole, E.J., Mwai Okeyo, A. 2015. Dual-purpose cattle production in Nicaragua: which breed fits best? Tropentag 2015, September 16-18, 2015, Berlin, Germany

# Project implementation

The main activities planned for 2016

- Continue with the longitudinal monitoring of performance on animals tagged on small and medium scale farms, and the associated economics of production within the existing systems.
- Generate feedback information and reports from data collected in longitudinal monitoring
- Through capacity building, support farmers, communities and the breeding service providers in the implementation of animal performance recording, feedback, and monitoring systems.
- Strengthen local capacity for the adaptation and adoption of improved dual-purpose cattle production systems using herd record summaries generated from farmer data through feedback and training sessions with participating farmers, dairy cooperatives within the sites and other national partners.
- It is evident that decision power of women involved in livestock production is limited. We will therefore target efforts to increase inclusivity of women.
- Document and publish information on dual purpose cattle production systems for use by a wider audience
- Develop capacity of UNA in animal breeding and genetics through supervision of graduate student projects
- Develop “best-bet” husbandry practices and breeding options for dual-purpose dairy cattle that enhance productivity within the existing production systems
- A study on factors that influence cattle fertility and reproduction parameters (by an intern from Wageningen University).