**ARACHIS PINTOI: POTENTIAL FOR RISK REDUCTION/PRODUCTIVITY INCREASE IN LIVESTOCK SYSTEMS OF THE COLOMBIAN ORINOQUÍA REGION**

Karen Enciso1, Álvaro Rincon2, Alejandro Ruden1, Stefan Burkart1.
1International Center for Tropical Agriculture (CIAT), Tropical Forages Program, Cali, Colombia. 2The Colombian Agricultural Research Corporation (Agrosavia), Villavicencio, Colombia. CONTACT: k.enciso@cgiar.org

**Introduction**

» In parts of Colombian Orinoquia region, cattle production takes place on poorly drained soils.

» Extensive grazing systems with *Brachiaira humidicola* cv. *Humidicola* dominate: high adaptation potential and biomass production but low nutritional quality.

» Feed shortage is a major constraint, particularly during dry season.

» According to climatic projections for the region, climate change (CC) will negatively affect quantity and quality of forages and increase heat stress risks for cattle.

» *Arachis pintoi* CIAT 22160 (*Arachis*) is a promising alternative for cattle production on soils with waterlogging problems, showed good agronomic behavior: nutritional quality, persistence and compatibility with *Humidicola*.

**Objective**

To assess milk profitability in the foothills of the Colombian Orinoquia. We compared two production systems: T1: Association of *Arachis* – *Humidicola* and T2: *Humidicola* as monoculture. The analysis considers changes in forage characteristics, resulting from variations in the projected climatic variables under CC scenarios (Representative Concentration Pathways - RCP 2.6 & 8.5).

**Methodology**

1. ANOVA was used for the identification of main climate variables and their effect on biomass production.
2. The LIFE-SIM model was used to simulate dairy production according to forage production, animal information and environmental characteristics.
3. The MaxEnt model was used for modeling future distribution.
4. A discounted cash flow model for the estimation of financial profitability indicators was developed and a quantitative risk analysis carried out by running a Monte Carlo simulation.

**Results**

Figure 1. Average milk production per treatment (at Arrayanes farm, municipality Castilla La Nueva).

Compared to T2, the inclusion of *Arachis* in T1 allows for:

» Average increase of daily milk production/cow by 24%, animal stocking rate/ha by 33%, and milk production/ha by 52%. 

» A higher content of crude protein (9.2% versus 6.6%) and less Acid Detergent Fiber (ADF) proportion (30% vs. 38%).

**Economic evaluation under the current scenario**

» Profitability indicators are highly sensitive to variations in milk production per cow (contribution to variance of NPV >90%) under both treatments.

**Conclusions**

» *A. pintoi* has potential to increase productivity and profitability, under different scenarios. This is conducive to sustainable intensification of milk production under grazing systems.

» The inclusion of *A. pintoi* comes along with a reduction of the risk of economic loss and less variance to changes in critical variables. Since farmers, being naturally rather risk adverse, will most likely favor technologies with a relatively lower variance.

» Under the tested CC scenarios, the impact of atmospheric variables on forage production is considerable: both total area and potential suitability areas for the legume (RCP 8.5).

» The adoption of more efficient production practices (e.g. the use of paddocks, protein banks, or efficient animal breeding) are important for improving resilience under CC scenarios.

**References**


**Acknowledgements**

This work was conducted as part of the CGIAR Research Program on Livestock, and is supported by contributors to the CGIAR Trust Fund. CGIAR is a global research partnership for a food-secure future. Its science is carried out by 15 Research Centers in close collaboration with hundreds of partners across the globe. This work was conducted as part of the Project “Evaluación de nuevas forras para pastoreo en suelos con drenaje deficiente” under the cooperation agreement between MAES, AGROSAVIA, Formentos CORPOICA and CIAT. Additionally, this work was part of the project “Diseño y evaluación de nuevas forras para pastoreo en suelos con drenaje deficiente” conducted under the cooperation agreement between MAES, AGROSAVIA, CIAT and the research projects “Evaluación multilocacional de nuevo Germoplasma Forrajero”, conducted under the cooperation agreement between AGROSAVIA and CIAT under the macroproject “Incremento de la oferta forrajera a través de la liberación de nuevos materiales y el establecimiento de estrategias integradas de manejo para aumentar la competitividad de la ganadería en Colombia” funded by MAES.