

STRENGTHENING GENETIC MATERIALS FOR CACAO SYSTEMS

LESSONS ON IMPROVING PRODUCTIVITY, RESILIENCE AND MARKET POTENTIAL IN LATIN AMERICA

Access to high-quality genetic materials is a critical foundation for improving productivity, resilience and market competitiveness in the cocoa sector. Across Latin America, many smallholder farmers have historically relied on aging or low-performing trees, limited access to improved planting material and weak systems for propagation and distribution.

Over the past several years, Lutheran World Relief, part of Corus International, has worked with partners across **Ecuador, El Salvador, Guatemala, Honduras, Nicaragua and Peru** to strengthen systems for developing, propagating and disseminating improved cacao genetic materials.

This work demonstrates that improving genetic materials requires more than introducing new varieties. Sustainable impact depends on **strong nursery systems, applied research, effective dissemination and alignment with market demand.**



Maria Luisa Tiul Ico from Tzalamtun, Guatemala

KEY FINDINGS



Access to high-quality planting material remains a key constraint.

Limited availability of **reliable, high-quality seedlings** has historically constrained productivity and slowed adoption of improved practices across cocoa systems.



Strengthening nursery systems increased availability and quality of planting material.

Across six countries, Lutheran World Relief strengthened **411 nurseries and clonal gardens** and facilitated the distribution of more than **665,000 cacao seedlings and budwood**. These investments expanded farmers' access to high-quality planting material while strengthening local systems for the long-term production and distribution of improved cacao varieties.



Improved propagation methods increased consistency and productivity.

Standardized practices in **grafting, seed propagation and nursery management** led to stronger, more uniform seedlings and improved farm-level performance.



KEY FINDINGS CONT.



Grafting enabled rapid renovation of aging farms.

The introduction and scaling of **grafting technologies** allowed farmers to rehabilitate unproductive plantations and replicate high-performing varieties, accelerating productivity gains.



Genetic diversity and cataloging strengthened resilience and selection.

National cacao catalogs and germplasm systems improved the ability to select varieties based on **disease resistance, environmental adaptability and flavor profiles**.



Stronger systems improved traceability and market compliance.

Improved documentation, record-keeping and biosecurity protocols **strengthened traceability and compliance with international market requirements**, including standards relevant for U.S. and other regulated markets.



Digital tools accelerated knowledge sharing and adoption.

Platforms such as Lutheran World Relief's Cacao Móvil expanded access to **propagation techniques and varietal information**, increasing farmer engagement with research and best practices.

Building a future through training: Jamileth del Carmen Jarquin, Nicaragua



For **Jamileth del Carmen Jarquin**, a cacao farmer in Río San Juan, Nicaragua, training helped transform both her farm and her family's outlook. Facing low prices, crop challenges and limited technical knowledge, her household struggled to make ends meet, and migration was being considered as a way to improve their situation.

After joining training activities supported by Lutheran World Relief and local partners, she learned practical skills in pruning, grafting, agroforestry systems and farm management. Applying these techniques allowed her to improve both the productivity and quality of her cacao.

Within two years, her production increased from **120 kilograms to 800 kilograms of dried cacao per year**, generating income of up to **\$4,800 annually**. With more stable earnings, her family has been able to invest in their farm, support their children's education and build a more secure future.



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LINKING RESEARCH TO FARMER ADOPTION

A major challenge in genetic materials systems is bridging the gap between research and on-farm adoption.

Lutheran World Relief worked to **connect research with practice**, ensuring that innovations reached farmers in usable forms.

This included:

- Demonstration plots to showcase improved varieties and propagation techniques
- Farmer-to-farmer exchanges to accelerate learning and adoption
- Dissemination of research through field days, technical briefs and digital tools

Digital platforms such as **Cacao Móvil** have played a critical role. The platform provides step-by-step guidance on propagation, nursery management and varietal selection, making research accessible to farmers and local promoters. More than **40,000 users** have engaged with the platform, with a significant share applying this information to farm management, strengthening the consistency and reliability of production systems required by buyers in international markets.

GENETIC MATERIALS AND MARKET OPPORTUNITY

Genetic materials are not only a productivity issue, they are also central to market access.

Varietal selection influences **flavor profiles, quality characteristics and suitability for premium markets**, as well as the ability to meet increasingly stringent requirements around traceability and consistency.

Lutheran World Relief supported efforts to align genetic materials with market demand, including:

- Integration of varietal data into tools such as the Cacao Flavor Map
- Promotion of varieties with recognized flavor attributes
- Alignment of propagation systems with buyer preferences and quality standards
- Strengthening documentation and traceability systems linked to varietal selection

These approaches help farmers produce cocoa that meets the expectations of specialty buyers and regulated international markets, including those in the United States.



A cacao producer in La Nueva Suiza, Chivana Omoa, Cortés, Honduras (Morgan Arnold for LWR)



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Sebastián Tiul Yaxcal from Tzalamtun, Guatemala

STRENGTHENING RESILIENCE AND SUSTAINABILITY

Climate variability, pests and disease continue to threaten cocoa production. Improved genetic materials play a key role in building resilience.

Lutheran World Relief supported the selection and dissemination of varieties with:

- **Greater tolerance** to drought and environmental stressors
- **Improved resistance** to pests and diseases
- **Strong performance** across different agroecological conditions

These efforts help ensure the long-term sustainability of cocoa systems while reducing risk for farmers and supporting more consistent supply for international buyers.

KEY LESSONS

Experience across Latin America highlights several lessons for strengthening cocoa genetic material systems:

- Improving access to **high-quality planting material requires coordinated investment** across research institutions, nursery systems and farmer adoption
- Strong nursery and propagation systems are essential for ensuring that improved varieties are **available, reliable and scalable**
- Linking research to practical application is critical so farmers and producer organizations can **access and apply information on varietal selection and propagation**
- Maintaining genetic diversity and proper documentation strengthens **resilience, productivity and quality over time**
- Aligning genetic materials with market demand and traceability systems enables farmers to **meet quality standards and participate in higher-value and more regulated markets**



Pedro Tiul Caal from Tzalamtun, Guatemala



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