

# THE IMPORTANCE OF AGROFORESTRY IN COLOMBIA'S COCOA ECONOMY

Oscar Dario Hincapié Echeverri  
Colombia's National Chocolate  
Company

ABIDJAN  
NOVEMBER 23, 2022





Iniciativa Cacao,  
Bosques & Paz  
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Nuestro compromiso

**SOSTENIBLE**  
con el sector cacaotero



*Compañía Nacional de Chocolates*

Grupo Empresarial Nutresa



# The importance of agroforestry in Colombia's cocoa economy



Yariguíes Experimental Farm  
Santander, Colombia



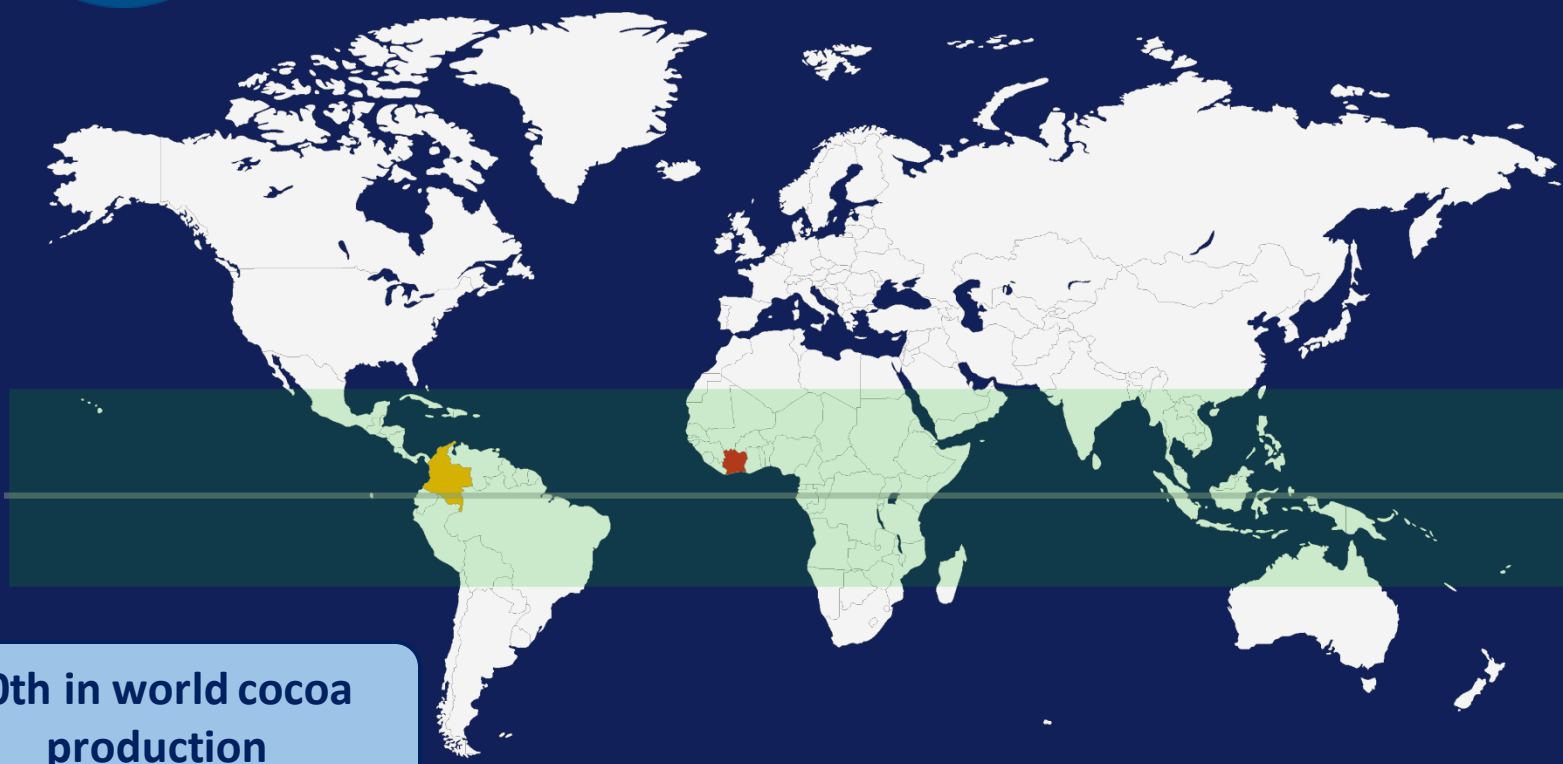
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# Colombia's position



10th in world cocoa production

Internal consumption 280 to 300 cups per capita per year

 Côte d'Ivoire

 Colombia



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**Cocoa farming families:**

**65,000**



**Planted hectares:**

**180,000**



**Average area/producer:**

**1.8 to 2.7 ha**



**Cocoa departments:**

**29 of 32 dep. in the country**

**Total population:**

**51,270,000 inhabitants**



**Cocoa production in Colombia:**

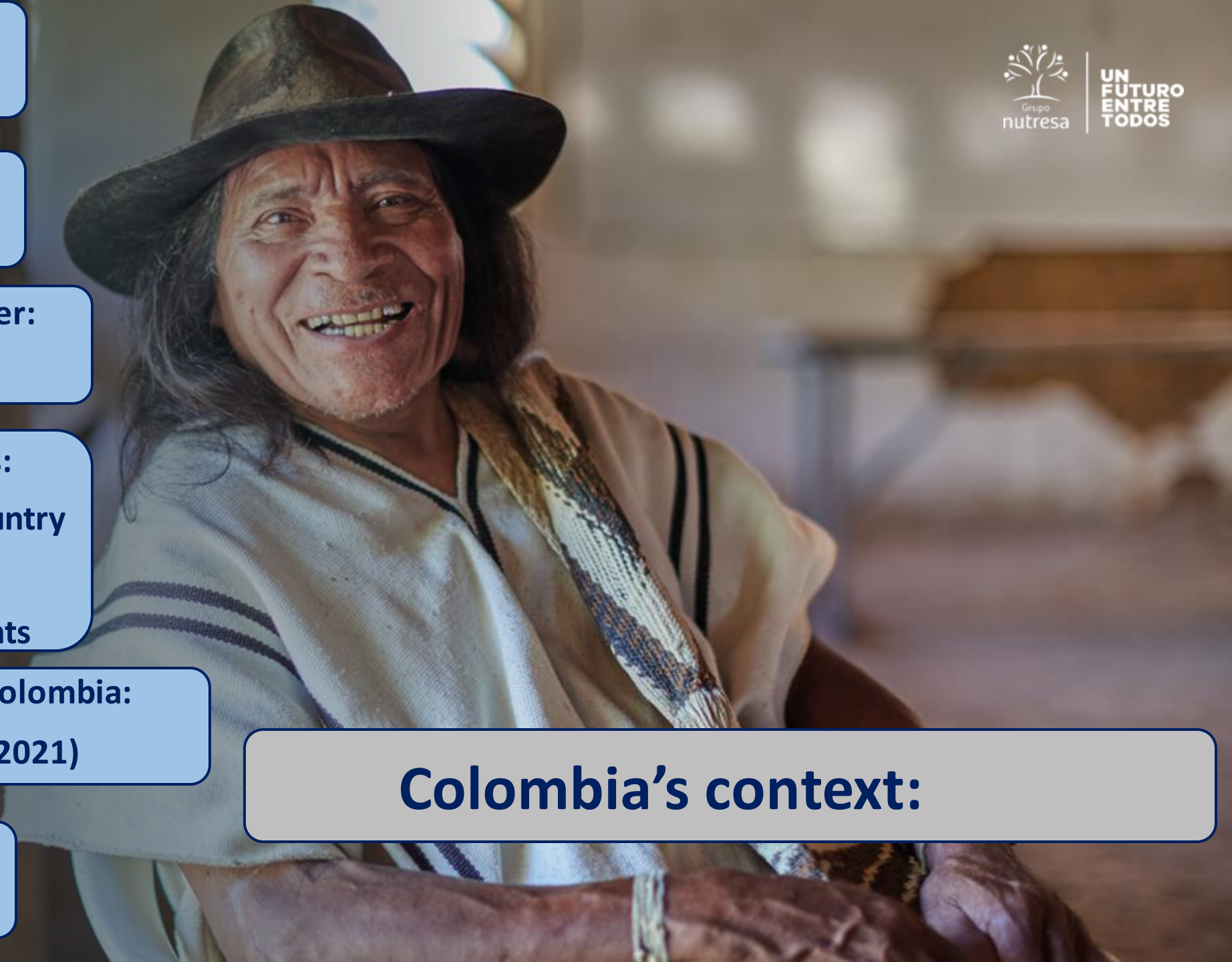
**69,040 t. (Fedecacao, 2021)**



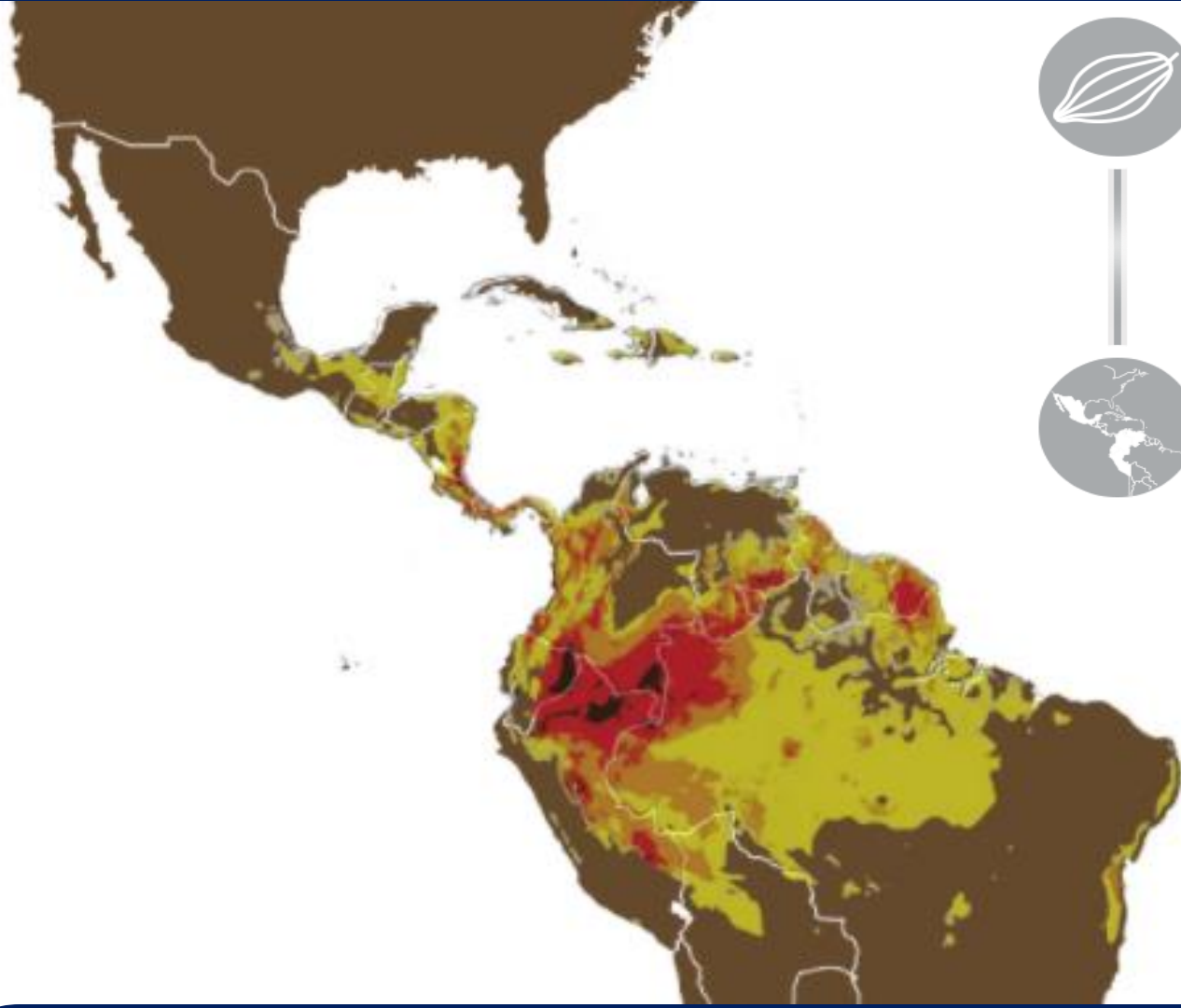
**Previous cocoa area:**

**25,000 ha**

**Colombia's context:**



## Origin of cocoa



Originally from the Amazon basin, cocoa is an understory crop.

In Colombia, cocoa is grown under agroforestry systems that mimic the natural conditions that gave rise to this species in the Amazon tropical rainforest.



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## Benefits of agroforestry systems



CO<sub>2</sub>

**Carbon sequestration**



**Biodiversity conservation**



**Retention of humidity**



**Increase of soil nutrients**

The importance of agroforestry systems (AFS) in cocoa farming is not only to provide shade in its initial and productive stages, but also the ability to mitigate climate change and improve soil productivity (Beenhouwer, 2013). Besides diversity AFS promote conservation of native flora and fauna, contributing to an ecosystem balance that boosts various patches of forest and link them together.



# What agroforestry system is mostly used in Colombia?

	El campo es de todos	Minagricultura
	El ambiente es de todos	Minambiente

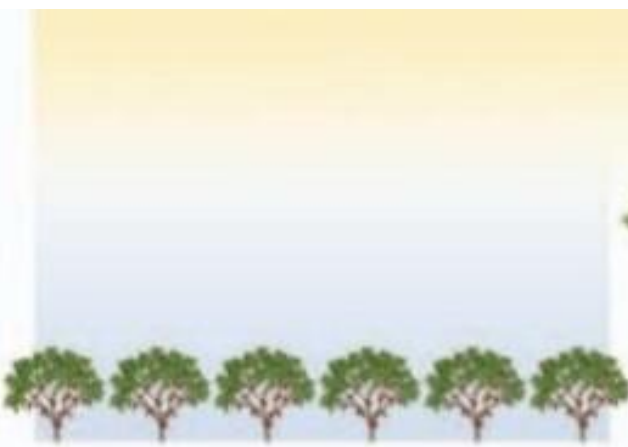
 **FEDERACION NACIONAL DE CACAOTEROS**

 **ICA**  
Instituto Colombiano Agropecuario

 **AGROSAVIA**  
Corporación colombiana de investigación agropecuaria

 **alisos**  
alianzas para la sostenibilidad

 **Iniciativa Cacao, Bosques & Paz Colombia**



1. Cocoa without shade



2. Cocoa with a species used exclusively for shade



3. Cocoa associated with other crops



4. Cocoa with various shadings



5. Rustic cocoa field



6. Agroforests

 **LUKER Chocolate**



Source: *The shadow of cocoa, Central American Cocoa Project - CATIE.*



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# Why have agroforestry systems?



- Food security
- Payment for environmental services (PES)
- Agritourism and conservation tourism
- Conservation of **water and soil** resources
- Income from other crops when not growing cocoa
- In some dry areas of the country, avoid using the irrigation system



# AVERAGE SIZE AND USE OF COCOA PLOTS

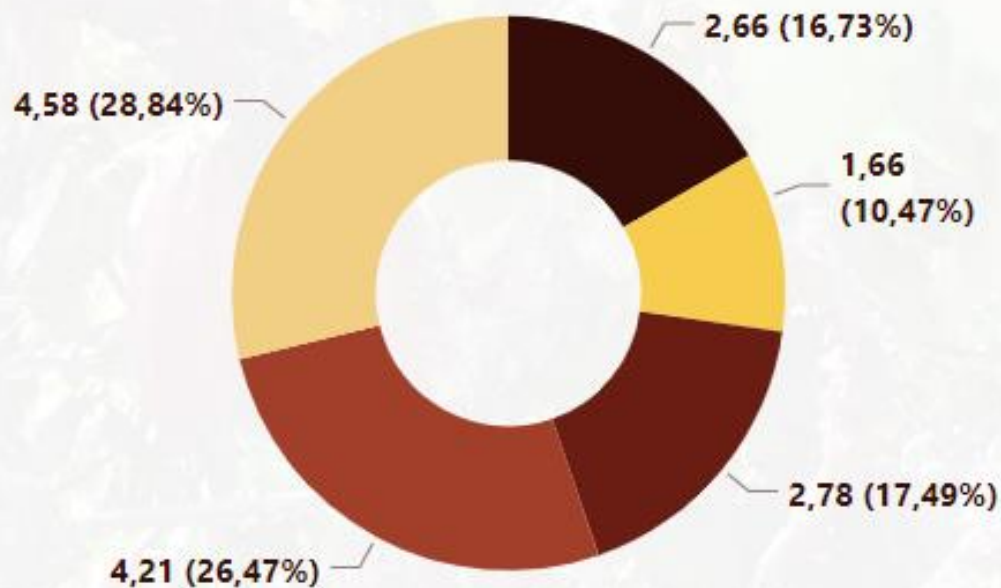
15,88

AVERAGE FARM AREA (HA)

2,66

AVERAGE COCOA AREA (HA)

## AREA DISTRIBUTION OF COCOA PLOTS (HA)



### DISTRIBUTION

- COCOA AREA
- FOREST AREA
- SHRUBLAND AREA
- OTHER CROPS AREA
- LIVESTOCK FARMING AREA



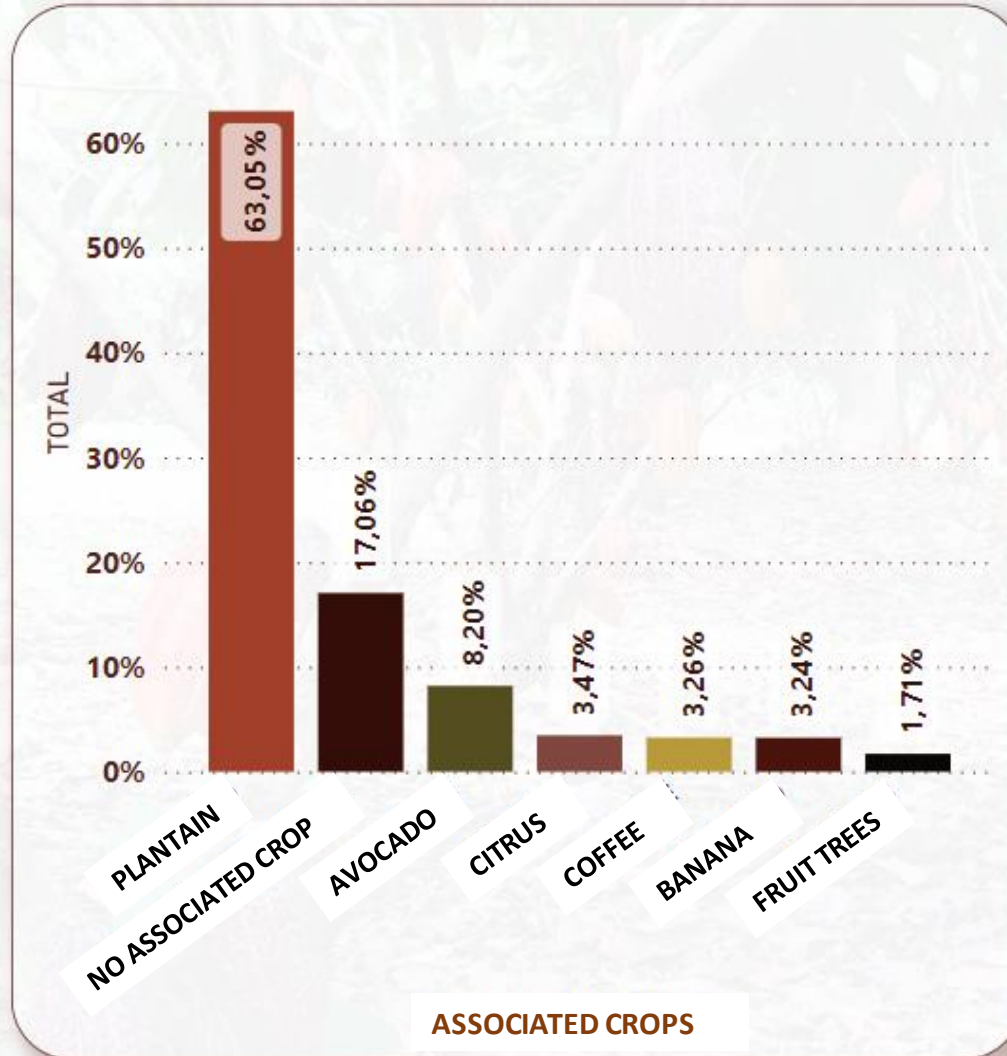
# SPECIES ASSOCIATED WITH COCOA AND OTHER CROPS IN THE FARM

## DEPARTMENTS

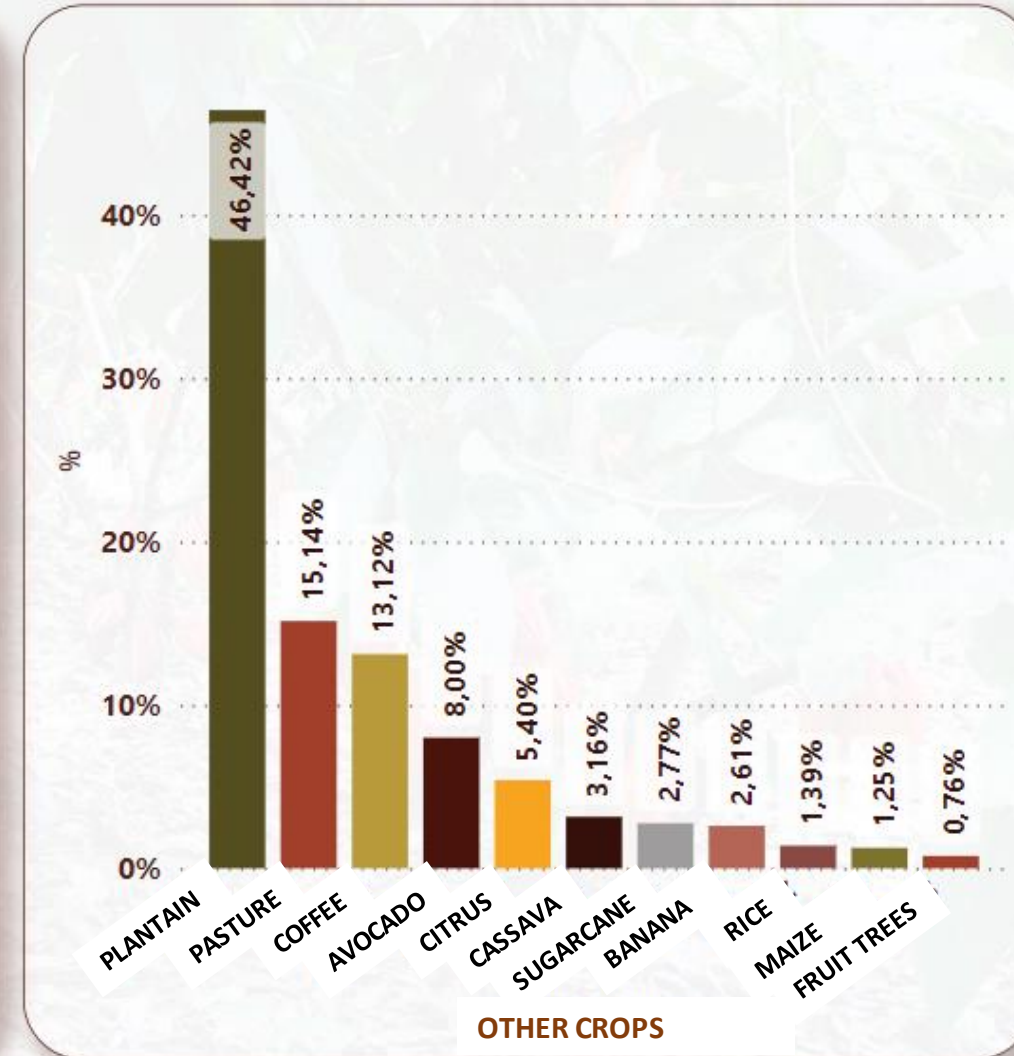
- ANTIOQUIA
- ARAUCA
- BOLÍVAR
- BOYACÁ
- CALDAS
- CAQUETÁ
- CASANARE
- CAUCA
- CESAR
- CHOCÓ
- CÓRDOBA
- CUNDINAMARCA

## MUNICIPALITY

- ÁBREGO
- ACACÍAS
- ACANDÍ
- ACEVEDO
- AGRADO
- AGUSTÍN CODAZZI
- AIPE
- ALBANIA
- ALCALÁ
- ALGECIRAS
- ALPUJARRA
- ALTAMIRA



Note 1: Crops within the cocoa fields



Note 2: Other crops in the farm but not within the cocoa fields



*The special cocoa farming model combined with fine tropical timber includes an agroforestry system that integrates more than one species in the same area. In this case, permanent shade species are integrated (abarco, cedar, salmwood, beechwood, choibá, mahogany) accompanied by other transient crops. It is important not to have one single model, but design each one according to the agroclimatic conditions of the area, native species, light and nutrient competition among others.*



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AFS provide productive, health, environmental and economic benefits, improve cash flow while cocoa farming begins its productive stage through transient species and, in the long term, provide benefits in terms of forestry timber.

- Regulates fruit species' flowering, pollination and maturation and, therefore, the harvests.
- Regulates soil moisture, increases absorption and infiltration capacity and reduces evaporation.
- Increases humus and availability of nutrients for cocoa due to the biomass provided by each of the species involved in the system.
- Extends the lifecycle of cocoa plantations, mitigating stress (drought, frost, hailstorms etc.).
- Reduces physiological disorders in cocoa fruits caused by different types of stress and maintains physicochemical and sensory characteristics of cocoa beans according to its genetic profile.
- Preserves the soil by reducing solar radiation and erosion caused by raindrops.
- Reduces losses due to diseases, especially monilinia, and facilitates integrated control.
- Optimal use of solar energy by means of geographical location of plants in such a way that all species benefit.
- Allows for multi-strata cropping systems that lead to better use of energy and land.
- Facilitates benefiting permanent shades.

# Success factors of high tree density models (shade species and planting distances).



Guacamayas Farm  
Gulf of Urabá, Colombia



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# Abarco (*Cariniana pyriformis* M)

In Colombia, there are populations in medium and lower Atrato regions in the department of Chocó, Córdoba, Norte de Santander, Santander, Bolívar, Sierra de Perijá and Magdalena Medio.

## Seedbed:

- Pregermination
- *Aspergillus*, *Fusarium*, *Penicillium* and *Spicaria*
- 2 to 3 months in nursery

## Planting distance:

- From 16 m between rows and 16 m between plants

## Pruning:

- Important formative pruning- Do not exceed 30%

## Pests and diseases:

- Natural enemies

## Economic relevance:

- Highly valued, used for interior and exterior construction, furniture, flooring, triplexes, boats, car bodies and structural lumber





# Abarco (*Cariniana pyriformis* M)







# Salmwood (*Cordia alliodora*)

It is native to Central and South America.

**Seedbed:** germination varies between 10 and 35 days. In the nursery the seedlings remain for 3 to 4 months. Stakes: 12-cm long

**Planting distance:** from 16 m between rows and 16 m between plants

**Pruning:** This is a species that only requires 10% pruning because it self-prunes.

**Economic relevance:** construction of furniture and boats. It is a very commercial wood

**Pests and diseases:** especially up to 2 years of age exposed to defoliating insects such as the atta ant (*Atta sp*) - lace bug (*Dictyla monotropidia*). In flooded areas trunk cancer can occur due to fungus infection (*Puccinia cordiae*) and in dry areas it is susceptible to boring and girdling insects





# Red cedar (*Cedrelela odorata*)

Deciduous tree 20 to 40 meters tall and 60 to 90 cm in diameter at breast height.

**Seedbed:** germination occurs from 6 to 10 days. Time spent in nursery is 3 to 4 months.

**Planting distance:** from 24 meters between rows and 16 meters between plants

**Pests and diseases:** during the first few years it is occasionally attacked by stem borers.

**Pruning:** formative and maintenance pruning during the first 4 years.

**Economic relevance:** timber used to manufacture furniture, boats, musical instruments and crafts.





# Mahogany (*Swietenia macrophylla* King)

Known as broadleaf mahogany or palo santo. Native to tropical America.

## Seedbed:

- Germination (10 to 20 days)
- Nursery (4 to 6 months)

## Planting distance:

- From 20 m between rows and 16 between plants

## Pruning:

- Important formative pruning (crucial up to 3-4 years)

## Pests and diseases:

- **Lepidoptera** *Hypsipyla grandella*, known as "mahogany shoot borer"

## Economic relevance:

- Highly prized wood for its finish and commercial properties.





# Choibá (*Dipteryx oleifera*)

Almond or palo de piedra. It is distributed from Central to South America. In Colombia it is found on the Pacific slope, Urabá region, part of the Atlantic coast and foothills of the central mountain range where the lower Cauca is located in Antioquia.

**Seedbed:** The fruits are washed and dried in the open air. 4 to 5 months in a nursery reaching about 40 cm

**Planting distance:** 16 m between plants by 24 meters between rows.

**Pruning:** formative pruning during the first years

**Pests and diseases:** Substrate disinfection and use of fungicides and insecticides to prevent adverse conditions

**Economic relevance:** It is a heavy and hard wood used for construction in general. The mesocarp is used to extract oil for toilet soaps and hair products





# Some recommended species

Short cycle	Transient	Permanent	Live fence, boundary, windbreaks, live barriers and double furrow
Corn Bean Pigeon pea	Plantain Quickstick Pigeon pea Leucaena Passion fruit Papaya	Abarco Mahogany cedar Red cedar Yellow cedar, nauno or igua Salmwood Black cedar	Teak Oak Acacia Avocado Sapote Yellow guayacán Beechwood Citrus Red cedar Mango Guava



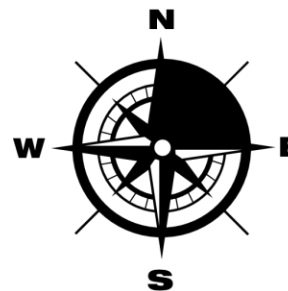
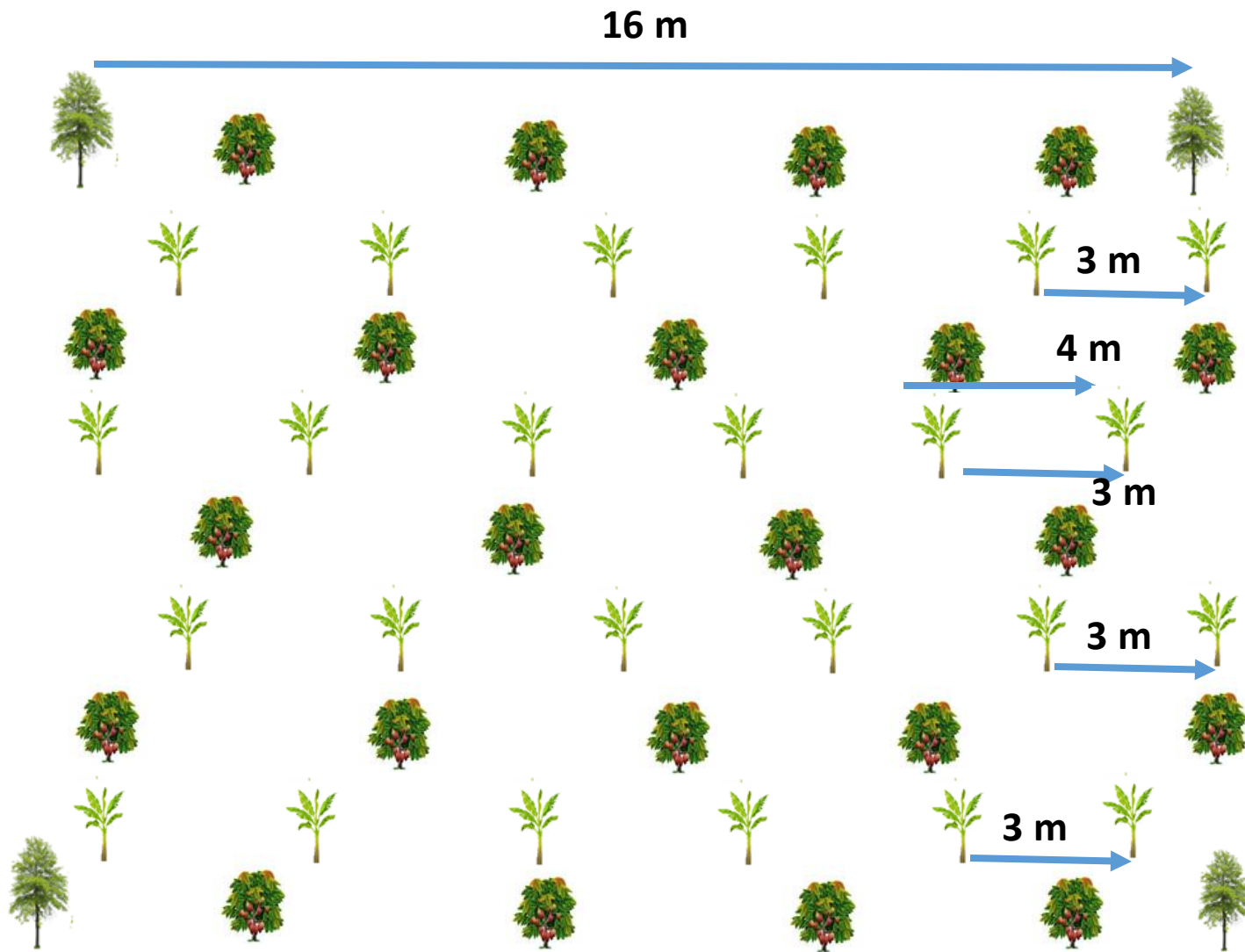
# Proposed agroforestry model

## Short cycle – Transient – Cocoa – Timber

Species	Transient	Permanent	Permanent
	Plantain	Cocoa	Abarco
Planting distance	4 x 4 triangle	4 x 4 triangle	16 x 16
	4,3 x 4,3 triangle	4,3 x 4,3 triangle	17,2 x 17,2
	4,5 x 4,5 triangle	4,5 x 4,5 triangle	18 x 18
Planting density / ha	721	721	51
	624	624	34
	570	570	31
<b>Other aspects to take into account</b>			
Planting of short-cycle crops	Beans, maize, pigeon peas combine with cocoa the first year		
NOTE	Short-cycle species are optional and should not be kept after one year of cocoa growth. The distances for abarcos can be between 16 to 24 meters between furrows depending on the zone.		
Recommendations	Furrows must be located 45 degrees in a North-South direction in areas of high luminosity. In areas of low luminosity, they can be positioned in an East-West direction or 45 degrees northeast, avoiding light competition.		



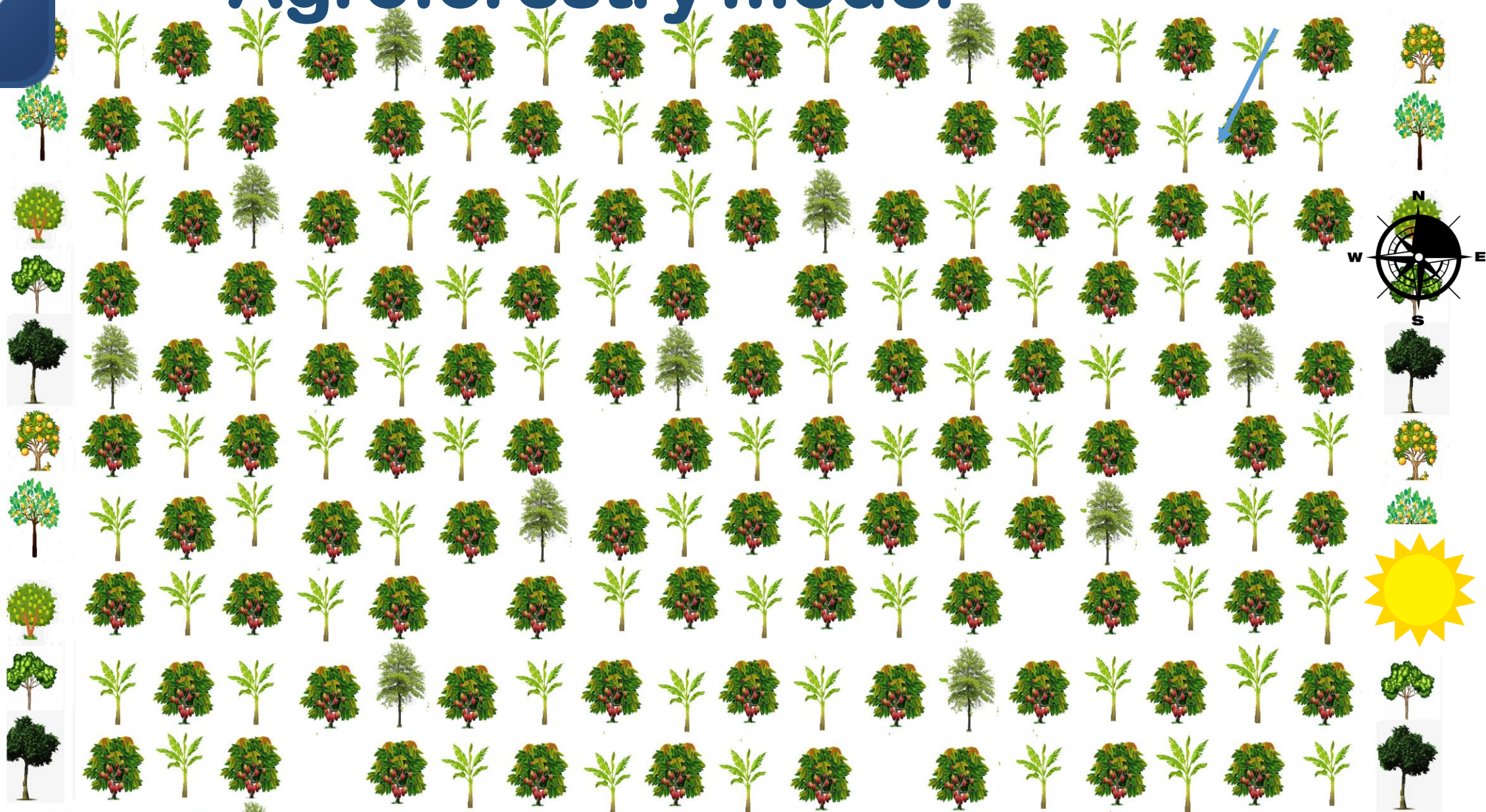
16 m



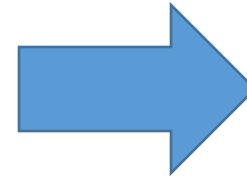
# Agroforestry model



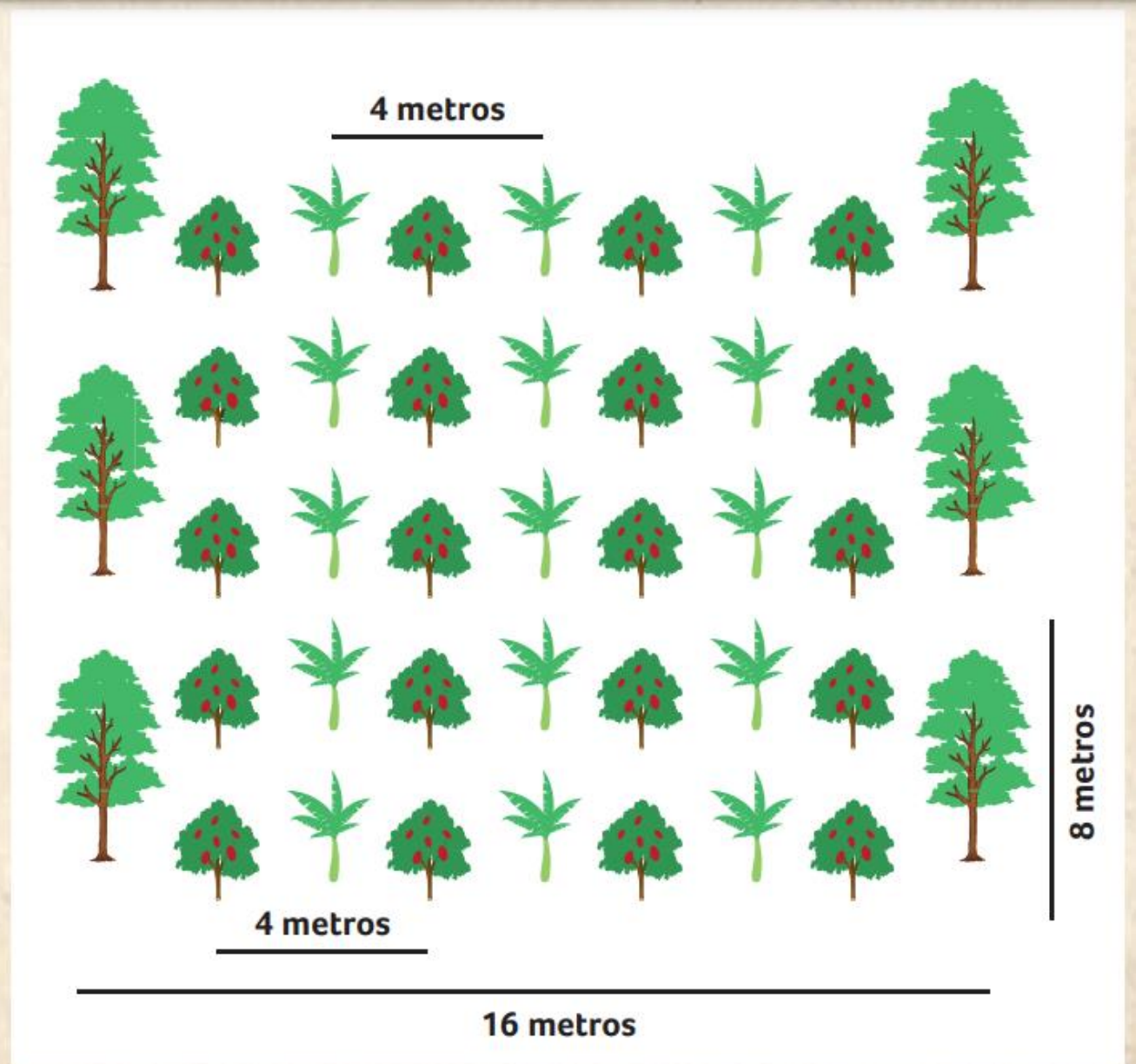
# Agroforestry model







<https://www.chocolates.com.co/fomento-cacaotero/>





Especie Forestal	Altura sobre el nivel del mar (asnm)	Distancia de siembra recomendada entre plantas (m)	Distancia de siembra recomendada entre surcos (m)	Orientación*	Topografía
Abarco	0-1.000	8 a 10	16 a 20	45°	Plano
		8 a 10	16 a 24	Norte-Sur	Plano
		10 a 12	20 a 24	45°	Ondulado
		10 a 12	20 a 24	Norte-Sur	Ondulado
Choibá	0-1.000	10 a 12	20 a 24	Norte-sur	Plano
Caoba	0-1.600	8 a 10	20 a 24	45°	Plano
		10 a 12	20 a 24	45°	Ondulado
		10 a 12	24 a 28	Norte-Sur	Plano
		10 a 12	24 a 28	Norte-Sur	Ondulado
Coco	0-400	12	20 a 24	Norte-Sur	Plano
Nogal cafetero	800-1.900	6 a 8	16 a 20	45°	Plano
		6 a 8	16 a 20	45°	Ondulado
Cedro Rojo	0-1.000	10 a 12	20 a 24	45°	Plano
		10 a 12	24 a 28	45°	Ondulado
		10 a 12	24 a 28	Norte-Sur	Plano
		10 a 12	24 a 28	Norte-Sur	Ondulado

\* La orientación está sujeta a la zona donde se establezca buscando disminuir la competencia por luz.

# Important



**Cocoa farming in forest developments promotes conservation of ecosystems and forest restoration. 40% of cocoa grown in Colombia is an alternative to replace illicit crops.**



**Agroforestry should not replace primary forests, nor can simplified agroforestry replace more diverse agroforestry systems. Instead, agroforestry systems should be used to strengthen the resilience of cocoa-growing regions and restore degraded lands.**





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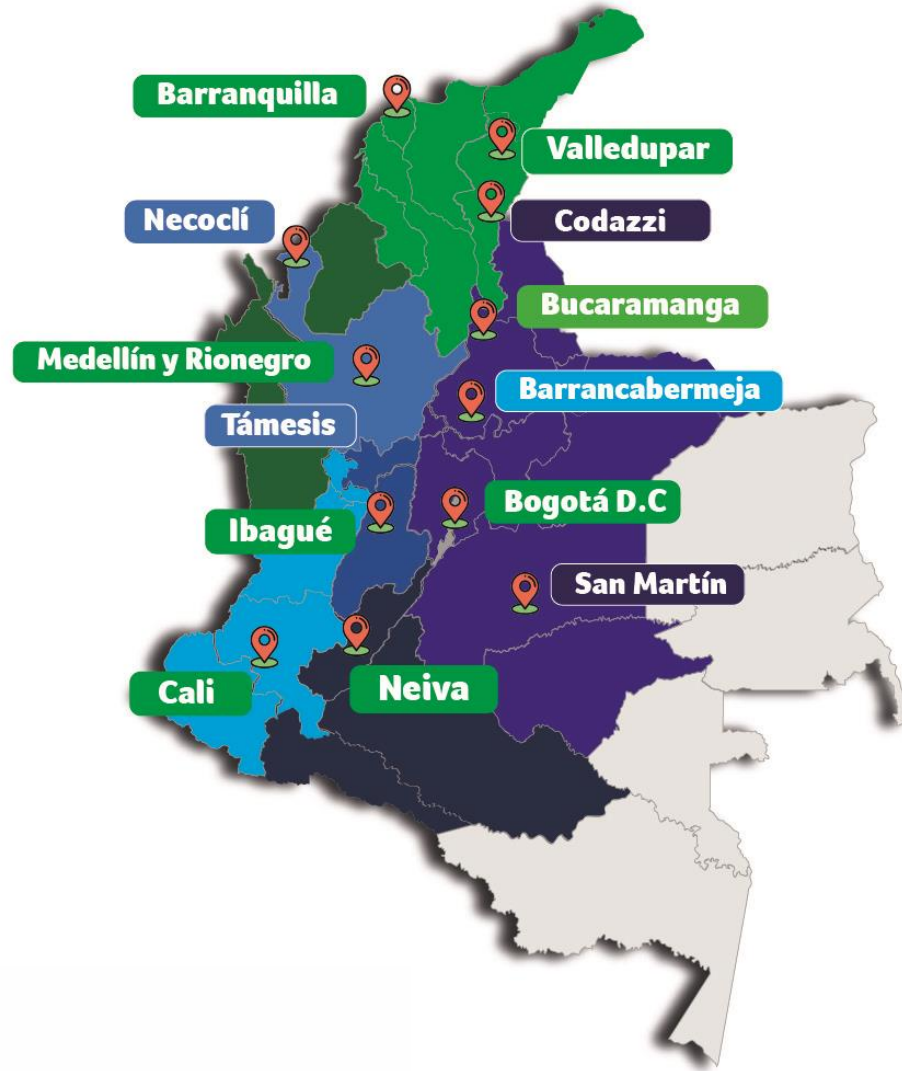


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# Estamos comprometidos — con el — ▶▶ desarrollo sostenible ◀◀ **del sector cacaotero** en Colombia

.....

# Presence in the country



**33 profesionales en territorios**  
**150 colaboradores en Granjas**



**3 Granjas**  
**(2 experimentales y 1 productora)**



**2 viveros para la propagación**



**9 regionales para la compra de cacao**



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# Sector pillars

Education and training for farmers and technicians



Articulation of sustainable projects



Applied research in cocoa



Dissemination and distribution of plant material



Cocoa bean marketing



Technology outreach in cocoa farming

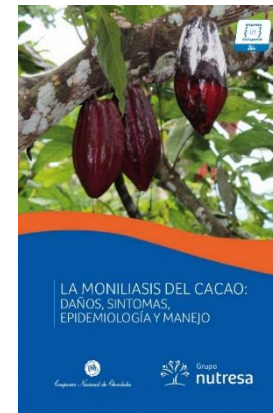
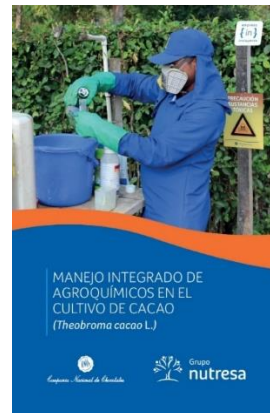
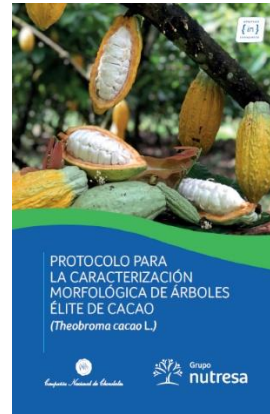
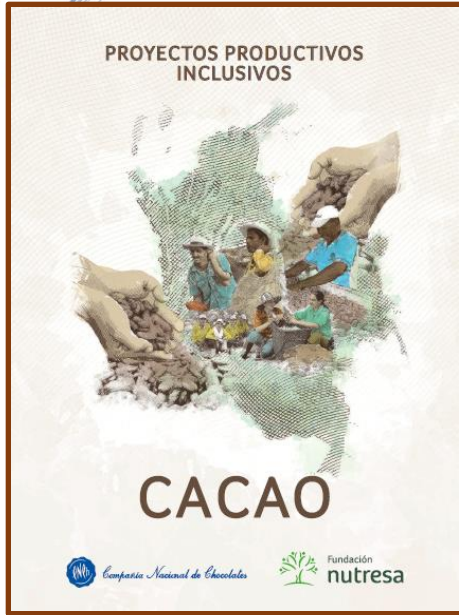


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# Dissemination material



QR code to download manuals



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# Mundo Cacao



The screenshot shows the YouTube channel for 'Mundo Cacao', which has 3.15K subscribers. The channel banner features the text: "CONECTÁNDONOS CON EL MUNDO DEL CACAO" and "Bienvenidos a nuestro canal oficial de YouTube". Below the banner are navigation tabs for HOME, VIDEOS, PLAYLISTS, COMMUNITY, CHANNELS, and ABOUT. Two sections of video uploads are visible:

- Popular uploads:**
  - Control de enfermedades (1:04:10)
  - Construcción de tanques artesanales tipo Australian... (1:00:00)
  - Estrategias de enmiendas y nutrición en el cultivo de cacao (59:19)
  - Análisis de los clones recomendados para la... (53:43)
  - El riego y su importancia en el cultivo de cacao | CNCH (52:26)
- Conferencias Virtuales:**
  - ¿Cuál es el material vegetal (1:08:30)
  - Construcción de tanques (1:00:00)
  - El riego y su importancia en (52:26)
  - Cacao orgánico: proceso y (55:25)
  - Importancia de la (1:08:11)



## Mundo Cacao



Mundo Cacao  
Cuenta de empresa de WhatsApp



### UN FUTURO ENTRE TODOS



# "CONECTÁNDONOS CON EL MUNDO DEL CACAO"





Noticias



Más sobre  
el cacao



Presencia en  
nuestras regionales



Granjas y  
Viveros



Próximos eventos  
del sector  
cacaotero



Consulta con  
nuestros expertos  
agrónomos



# Mass outreach campaign

## Infórmate sobre las mejores prácticas del cultivo de CACAO

Envía **gratis** un mensaje de texto desde tu celular al

**Código  
87703**  
con la  
palabra  
**CNCH**

## Infórmate sobre las mejores prácticas del cultivo de CACAO

Agrega el WhatsApp de Mundo Cacao

**311 6457408**



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# Estamos comprometidos

con el desarrollo sostenible del sector cacaoero



Alianzas para el Desarrollo Rural

2020  
2021

127  
120



Familias beneficiadas

17.586  
18,843



Hectáreas impactadas

27.833  
33,718



Cobertura en departamentos

23  
22



Número de personas capacitadas

2020  
2021

6.439  
4,533



SMS informativos sobre cultivo del cacao

2.113.442  
1,372,641



Distribución de material de cacao

3.560.674  
4,869,868



Divulgación a productores a través de SMS

14.779  
16,756



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Colombia



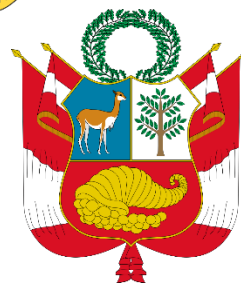
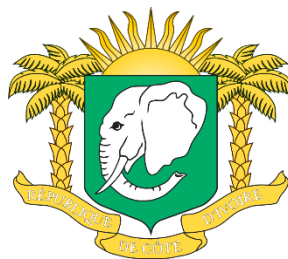
THE WORLD BANK



IMPACTUM  
Catalyseur de Durabilité - Catalyzing Sustainability



KINOMÉ



*Merci beaucoup*

*Muito obrigado*

*Thank you very much*

*Muchas gracias*



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