

Fish farming as a way for diversifying sources of income in the cocoa sector in Ivory Coast

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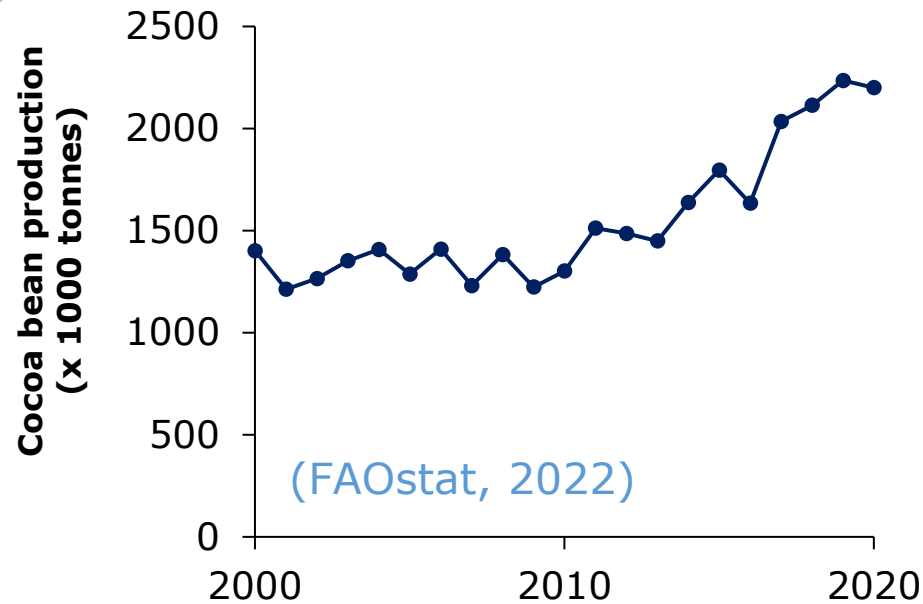
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Cocoa: a key sector for the Ivorian economy



- 1st producer country in the world since the 1970s (Kouassi, 2021)
- Over 2 million tonnes produced since 2017 (ICCO, 2021)
- Cocoa contributes to 12-15% of the GDP (World bank, 2019; Pany, 2020)
- 6 million people live from cocoa (FIRCA, 2010; Hewitt & Millard, 2010)





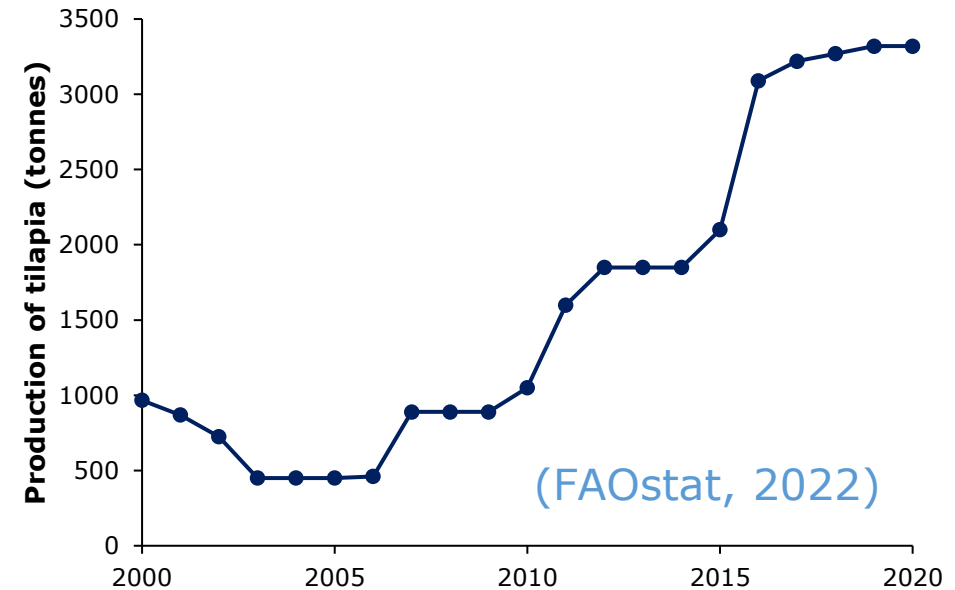
Cocoa: a sector beset by many difficulties

- 
- Ageing of plantations
 - Declining soil fertility
 - Pest pressure and plant protection treatments
 - Climate change
 - Land pressure
 - Price instability

(Ruf & Agkpo, 2008)



Fish farming: A lever for diversifying cocoa farmers' income



Why fish farming?

- High local fish demand

- The market exists

- Availability of lowland areas

- Possibility to build ponds

Significant development of fish farming in the cocoa-producing areas of the South and Central West (Niamien et al., 2017; Kouadio & Assi-Kaudjhis, 2018)





General objective

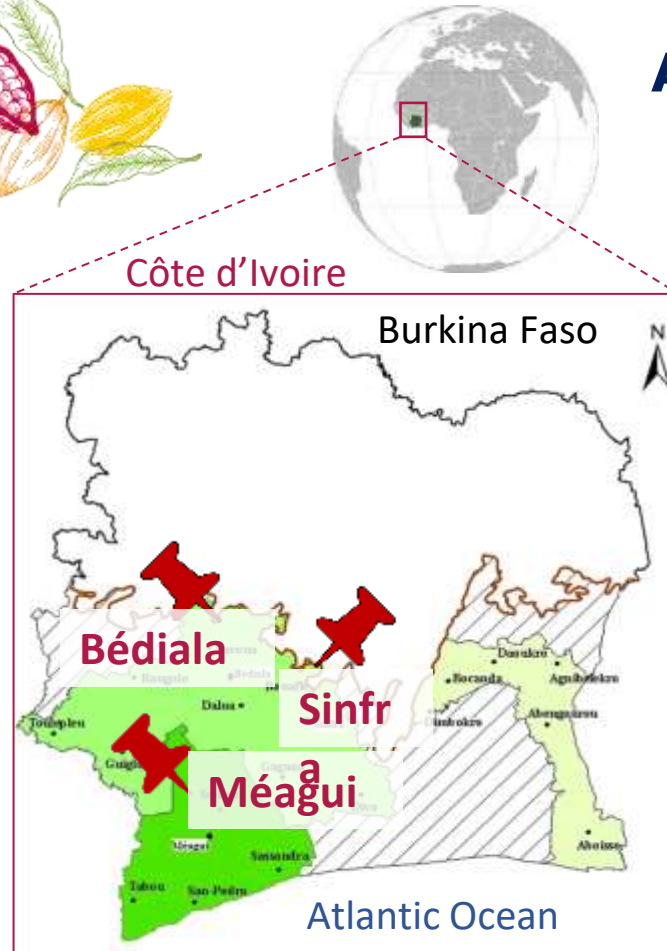
Assessment of fish farming practices as a means of diversification
diversification of cocoa production

Key steps:

- Describing cocoa production systems among cocoa farmers
- Characterise their fish production
- Identifying the contributions of fish farming to cocoa farms









Area selection criteria:



Source : BNETD, 2011

Réalisation :
Kadjo Niamien, 2016

-  Forest-savannah contact zone
-  Forest area
-  Savannah area
-  1st production area (<1960)
-  2nd production area(1960-1970)
-  3rd production area(1970-1980)

Agro-climatic gradient:

- Significant differences in rainfall

History of cocoa production:

- From an old loop to a new one

Development of fish farming:

- Fish production areas in ponds





Surveys of cocoa and fish farmers

● Two series of surveys :

From May to September 2021, 45 fish farmers interviewed
Direct and semi-structured interviews on each farm

● Two survey tools:

Questionnaire

Collection of quantitative
information on yields and incomes

Interview guide

Description of the systems
and technical itineraries



Two main systems of cocoa production among cocoa-fish farmers

Monoculture of cocoa



Localities	Occurrence
Bédiala	18%
Sinfra	18%
Méagui	100%

Cocoa-cashew trees association



Localities	Occurrence
Bédiala	85%
Sinfra	82%
Méagui	0%

Cocoa-cashew : Diversification of income sources
+ Mitigation of the effects of climate change on cocoa farms



Two major fish production systems based on polyculture of tilapia *Oreochromis niloticus*

Rice-fish farming



Localities	Occurrence
Bédiala	100%
Sinfra	75%
Méagui	58%

Fish farming



Localities	Occurrence
Bédiala	23%
Sinfra	100%
Méagui	58%

Rice-fish farming: Additional source of income (fish) + Improvement of food security (rice)

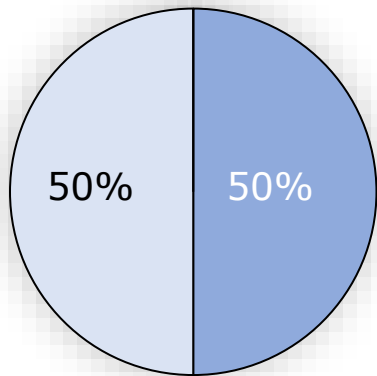


Contribution of fish farming to cocoa farming

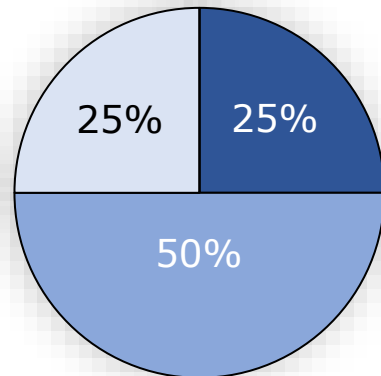
Yields of cocoa farms (kg/ha/year)

≤100 100-500 >500

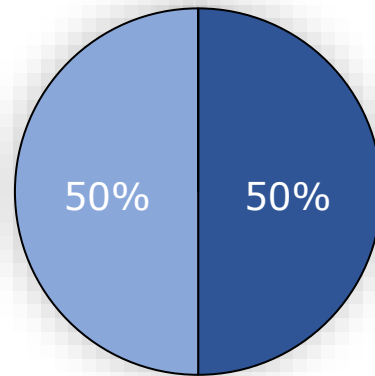
Bédiala



Sinfra



Méagui



% of farms surveyed

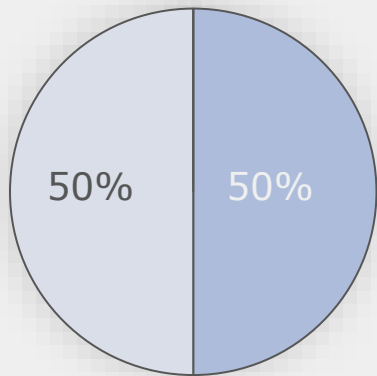
Contribution of fish farming to cocoa farming



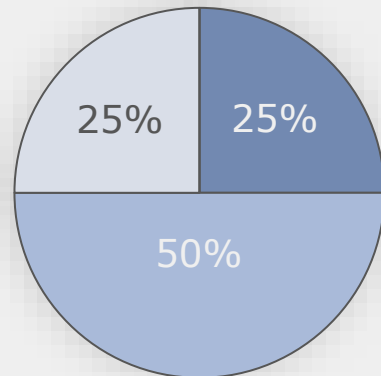
Yields of cocoa farms (kg/ha/year)

≤ 100
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 > 500

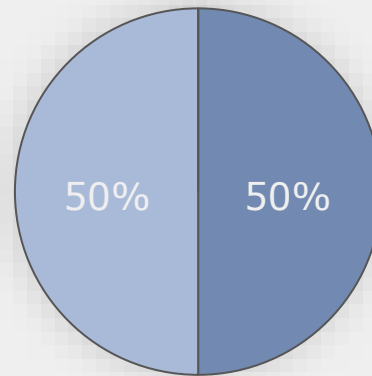
Bédiala



Sinfra



Méagui



% of farms surveyed

Fish farm yields (kg/ha/year)

Product	Bédiala	Sinfra	Méagui
Fish	~1000	~1500	~300
Rice	~3500	~3500	~2000





Contribution of fish farming to cocoa farming

Annual income from cocoa and fish farming (US\$)

Product	Bédiala	Sinfra	Méagui
Cocoa	100-1300	80-1300	260-3900
Fish	470-4740	240-4740	100-1300

Fish farming: main source of incomes for 30%, 40% and 5% of cocoa farmers in Bédiala, Sinfra and Méagui, respectively.

Contribution of fish farming to cocoa farming

Replanting of degraded cocoa farms

Cocoa nursery on the edge of a pond



Replanted nursery under cashew trees



Ecological barrier against fires

Limitation of spread

Ease of extinction



Roles of fish farming:

- 1 Important source of incomes for cocoa farmers
- 2 Contributes to food security in rural areas
- 3 Contributes to the sustainability of cocoa production

Perspective

Assessment of the impacts of pesticides used in cocoa production on fish and the aquatic environment





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