

Participatory approaches conducted in Ecuador, Trinidad and Costa Rica using simple and cost effective methods to enhance the cocoa bean quality substantially



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Background

German Fine and Flavour Cocoa Chocolates Producer from
„Tree to Door“

„Direct Trade“:

- It stands for **direct partnerships** with cocoa farmers (cocoa producer, cooperative or cocoa board)
- Its **primary focus is cocoa quality and efficient production management**. Including also a combination of ecologic, economic and social aspects
- It includes **regular visits, on farm workshops and trainings** aiming to achieve the needs of **both sides** of the partnership: **cost effective, profitable production at high cocoa quality levels with satisfying prizes**

Introduction

Capacity building, implementation...

Definition of Participatory Research:

Participatory research is a form of applied research, where the researcher becomes a facilitator in helping those being studied to also become actively engaged in the quest for information and ideas to guide future efforts (adapted from Whyte, 1991).

Participants and Locations

	Costa Rica	Trinidad	Ecuador
Plantation	40 ha	Ca. 400 ha	Average 4 ha
Form	Family owned	Family owned	Association with 12 Cooperatives (~770 small scale farmers)
Fermentation stations	1	1	12
Fermentation boxes	24	4	At least 8 per fermentation station



Methods: Different Questionnaires and Evaluations

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Ecuador: Quantity and Capacity Calculation

Evaluación de la post cosecha 2015

Resumen:

I. Cantidad				
Producción de cacao seco: 1200 qt / a (= 54 t/a) 103 qt semanal max. (=4,65 t/s)				
II. Resumen:				
	Capacidad actual	unidad	Demanda	Costos para la renovacion
	qt / sem.	existente ³	adicional	[US\$]
F: ferm. Cajas	90 qt	45	6 cajas (3qt)	1.300
M: marquesinas	-	-	2 M	10.000
T: tendal	60 qt	1	-	-
AT: secadora artificial	210 qt	1	Cambio a Diesel	8.000
B: Bodega	150 qt	1	-	-
Costos Total				19.300

III. Las dimensiones y el estado

Area de post cosecha:

Secado: Marquesinas – Status: situación actual

Status	Marquesinas	Cantidad	Dimensión	Duration	Capacidad actual	
			A x L x P [m]	Ritmo	por M /	Semanal
	Total existente					
	Del que utilizable					
	En mal estado					
				Costos ud.	Costos total	Cap. semanal
Demanda	Establecer	3	5 m x 20 m	5.000 \$	15.000 \$	150 qt

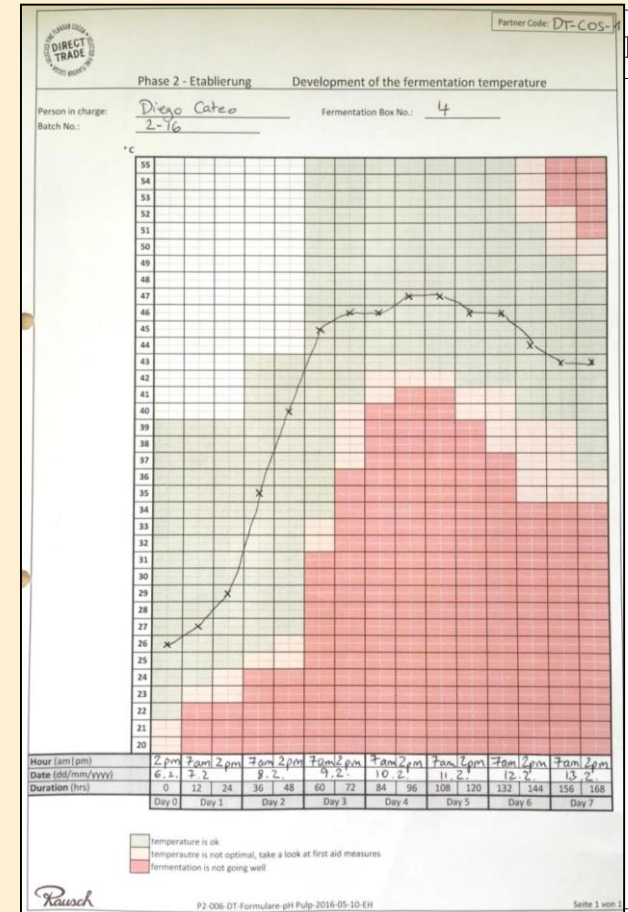
Secado: Tendal – Status: situación actual

Status	Tendal	Cantidad	Dimensión	Duración	Capacidad	
			A x L x P [m]	Ritmo	por T /	semanal
	T 1	1	12 m x 20 m	72 h	20 qt	28 qt
	T 2	1	6 m x 20 m	72 h	15 qt	21 qt
	Total existente	2			35 qt	50 qt
	Del que utilizable	2		72 h		50 qt
	En mal estado					

Results of the evaluation of 12 fermentary centers

- clearly showed a discrepancy between quantities of cocoa coming in and capacity per processing unit
- First approaches to tackle this problem came up during the workshop
- Leading us to jointly conduct fermentations in order to understand why quality losses occur and where quality definitions need to be specified...

Tools to evaluate quality status



Evaluation documents

Thermometer

Cut-Test: Knife / Guillotine

Aroma Test: Roasting oven or Microwave, Milling Maschine (coffee milling machine)



2017 International Symposium on Cocoa Research (ISCR), Lima, Peru
Dr. Christina Rohsius, Dr. Elsa Hegmann Rausch GmbH

13.-17. November, 2017

Ecuador: Conditions during the Fermentation process

Quality losses:

Field material 0-10%



Percentage of defects delivered from farmers differ from 0-10%

Ecuador: Conditions during the Fermentation process

Quality losses:

Field material 0-10%



Percentage of defects delivered from farmers differ from 0-10%

Ecuador: Conditions during the Fermentation process

Quality losses:

Field material: 0-10%

1. Day: ~5-10%



**1. Day of Fermentation: edges show dry seeds:
no acetic acid + air = danger of mold! Amount of seeds affected: ~10%**

Ecuador: Conditions during the Fermentation process

Quality losses:

Field material: 0-10%

1. Day: ~5-10%

3. Day: ~5-10%



**3. Day before 1. Mixing: dry seeds are severely affected from mould:
no acetic acid + air = mold! Amount of seeds affected: ~10%**

Ecuador: Conditions during the Fermentation process

Quality losses:

Field material: 0-10%

1. Day: ~5-10%

3. Day: ~5-10%

4.-6. Day: ~5-10%



**4.-6. Day of Fermentation: dry seeds are severely affected from mould:
no acetic acid + air = mold! Amount of seeds affected: ~10%**

Ecuador: Conditions during the Fermentation process

Quality losses:

Field material: 0-10%

1. Day: ~5-10%

3. Day: ~5-10%

4-6. Day: ~5-10%

Drying: ~10%



Drying of mouldy seeds infect surrounding seeds.

Thus multiplying the damage. Bad weather or shipping conditions facilitate another growth phase of these already mould infected seeds.

Ecuador: What did we do?



Material was grouped into dried material from edges and inner material



Ecuador: Fermentation experiment



Separatly fermented,



dried and



it's aroma tested



Ecuador: What was found to be a short term solution?



**Mould was avoided
nearly 100%!
It was obvious: where
air came in, mould
grew and gave a
different smell**



Ecuador: Workshop ended with a summary and introduction of first short-term solutions



Perdida:

Campesino:	5-10%
Fermentation:	10-20%
Secador:	10%
<hr/>	
Total:	40%

Causa:

Falta de Limpieza
Manejo y construcción
Manejo y construcción



Cuide las escinas: toda la
area necesita ser cubierta



Con algunas tablas pequenas en las escinas de las cajones y algunas hojas de banana en los bordes se puede arreglar por lo menos 10% de perdida!

Estos 10-20% semillas mal fermentadas cambian el aroma en una manera que impiden la compra de algunas productores de chocolate – tienen un sabor desagradable

Results Trinidad: Fermentation

Situation before



Situation after



Results Costa Rica: Drying speed



Findings

	aspect	new approaches	costs
Trinidad	time between opening of the fruits and fill in to the boxes	Reorganisation of purchase/collection of seeds	none
		purchasement of sufficient plastic boxes	10 US/ box
	overfermentation and mould due to long drying	reorganisation of fermentation and drying procedure	2-3 days managment work
		greater capacity of drying beds, new solar dryer	a lot
Ecuador	Capacity of boxes or drying beds	reorganisation of e.g. buying dates / start of fermentation	2-3 days managment work, implemantation
		new fermentation boxes / new drying beds	
	Fermentation quality	Insulation + avoidance of air-influx through banana leaves	minor costs (if farmer provide 3-4 leaves)
		new fermentation boxes	a lot
Costa Rica	Washing	washing after Fermentation	Work effort: 10 min per box
		less fast and less hot drying procedure	none to minor, if drying regime is well adapted
	Drying	facilitation of airflux through opening the drying process	none to minor, if drying regime is well adapted

Summary and Conclusion

- Quality of cocoa was improved with relatively small effort
- Only tailor made, on spot and easy to establish solutions are more likely to be implemented

Knowledge and Knowledge transfer / implementation are one part, but:

- Cultural differences and personnell / organisational situations also play mayor roles
- Communication and understanding of the needs (from each side) is crucial!!

Quality - Toolbox

Plantation management							Fermentation							Quality Deficit
Soil conditions	Agrochemical application	Variety/mix of variety	Yield (timing, sorting)	Deseased Material	Time lag: opening up to start of fermentation in box	contact to animals / left overs of animals	underfermentation	overfermentation	Fermentation	Drying	Grading	Storage	Shipping	Quality-Deficit
		x					x		x					slaty
							x		x	x				violets
					x		x	x	x	x		x	x	mouldy beans
										x		x	x	insect infested
								x		x				overfermented
											x			doubles
			x											germinated
		x									x			different bean sizes

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- Petra Heid, Halba Chocolats
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Trinidad: Drying speed

