Coffee & Climate: The Geometry of Change

A Rapid Field Diagnostic of Coffee Farmers' Production Challenges in Capelinha (MG), Brazil

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For the Initiative for Coffee & Climate

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coffee & climate

A Purpose

An appraisal visit to the Capelinha coffee district to meet with coffee experts from EMATER, visit coffee farms and talk to farmers about their main production problems.

B Background

There are four main coffee regions in Minas Gerais (MG) (Fig. 1). Until now the C&C project has been working exclusively in the SW zone. Now we wanted to visit a coffee district that is distinct from the Sul de Minas zone where we suspect that coffee production problems might be different and more directly related to climate change. We chose the north-east Jequitinhonha/Vale do Mucuri zone around Capelinha as potentially a marginal coffee area in MG.
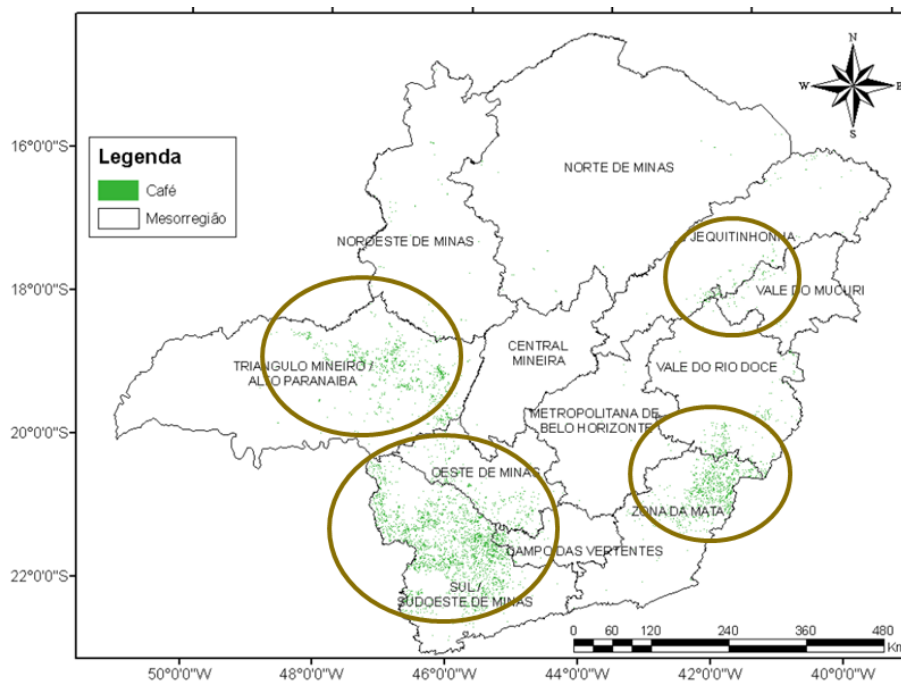

Figure 1 The four principal coffee zones of Minas Gerais.

Official data[1] suggests the Capelinha coffee zone has contracted over the past 20 years (Fig. 2.)

[1] Oliveira Souza V.C , et al. (2009) Analise espaco-temporal da cafeicultura mineira: 1990-2009. VI Simpósio de Pesq. dos Cafés do Brasil using data from Instituto Brasileiro de Geografia e Estatística
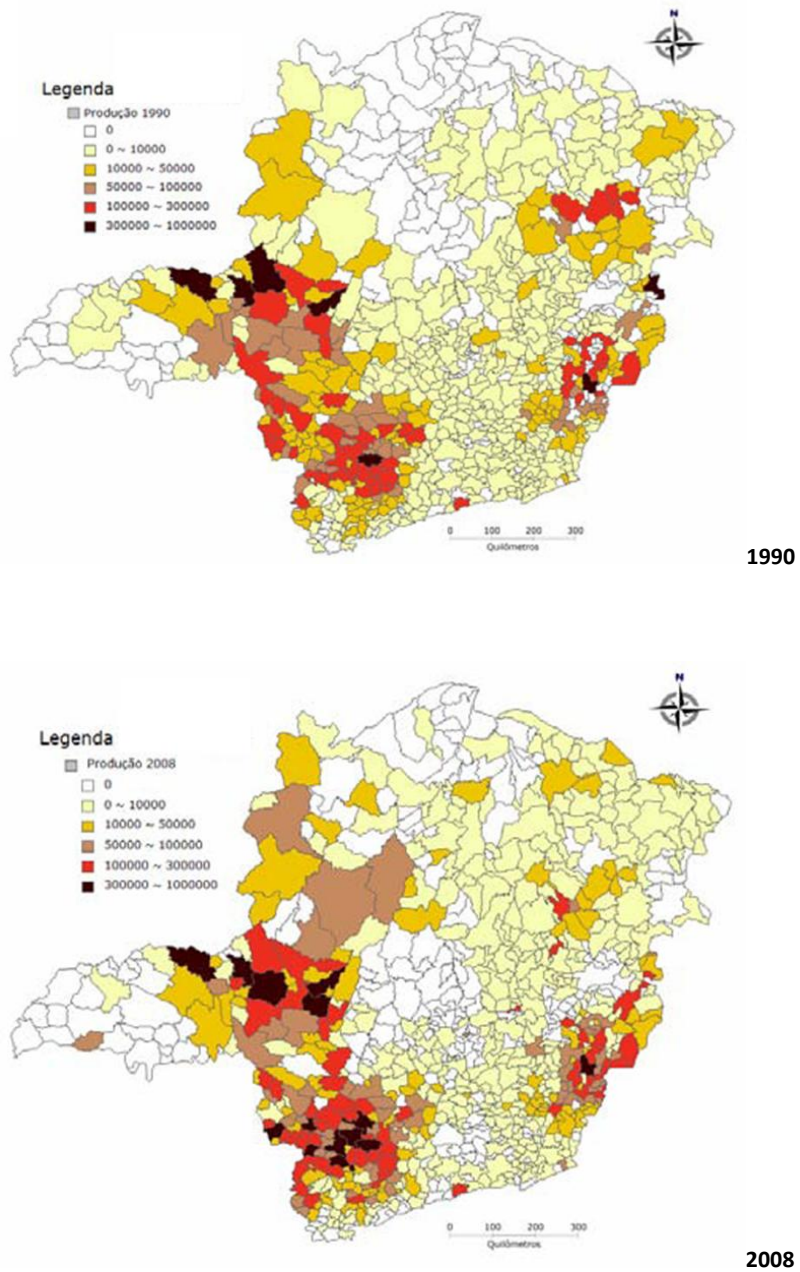
1990

2008

Figure 2. Area in coffee in MG (in 60 kg sacks) for 1990 and 2008.

We therefore visited the zone for a rapid appraisal of this area on 25th to 26th April 2012.

C Methodology

Our basic approach was a 'triangulation' method to evaluate different sources of information:

- local experts (in this case mostly agricultural extension experts from EMATER-MG[2])

- farmers (including farm visits to see with our own eyes the state of growing coffee)

- available scientific knowledge

If data collected from all these sources has a large degree of overlap (i.e. agreement), then we would have confidence that our findings reflect current reality, based upon the best possible evidence available (Fig. 3). If the various sources conflict, then we would need to dig deeper and discover the sources of any uncertainties.

Figure 3. Triangulation: we look for coherence of evidence from farmers, extensionists and scientists on the effects of climate change.
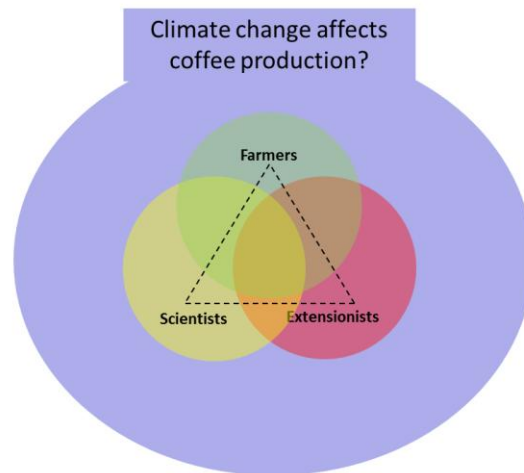
D Findings

I. Local Experts

Meeting with Marcos Antonio dos Reis Teixeira, director of Sebrae-MG, an agricultural machinery supplier.

Mr Teixeira has many years experience in the local coffee business and knows many farmers well. He told us that coffee in this area has a long history, starting in about 1870. He believes coffee farmers have been suffering from climate-related problems for many years. In 1998 he participated in a irrigation workshop with invited experts, whose considered opinion was that irrigation was not necessary in the zone. The following year 300,000 trees died of drought.

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[2] EMATER-MG: Empresa de Assistência Técnica e Extensão Rural do Estado de Minas Gerais

Meeting with EMATER-MG professionals

These experts told us that the Capelinha municipality used to have about 11,000 ha of coffee, but that has now declined to about 7,000 ha. Some farmers have planted eucalyptus instead of coffee, but some of these are going back to coffee, dissatisfied with the prices they can obtain for the wood.

EMATER professionals all agreed that climate change, especially drought, was a problem. This year has been particularly bad only 30 mm of rain in some parts, 70 mm in others. Average yearly rainfall is only 1000 to 1200 mm. The lack of rain is causing poor quality with many beans not filling; harvest is already starting in some areas. Only 15% of farmers have some irrigation and prospects for expansion are fairly limited, with availability and water quality as principal problems. The MG government however is starting to bore holes to look for more water.

A typical small farm would be 10 to 12 ha with 4 ha in coffee – they can live quite well from such a farm. They grow subsistence crops – beans, maize, banana, vegetables. They suffer from long dry periods and maize has to be planted in October now, because by November it is getting too dry. Farmers, they say, are worried about the climate, they talk about it a lot. Phoma (fungal disease) on coffee and lack of labour are other problems.

Farmers' associations are generally weak and they have difficulty accessing sources of agricultural credit. There are only two extensionists for thousands of farmers who feel starved of technical advice. The previous day there was a workshop, where farmers paid R$10 to attend, something that would not happen in Sul de Minas for example.

Despite the challenges facing farmers, these extensionists still believe that there must be a future for coffee, especially since so much infrastructure has been invested in it over the years and alternatives are few, with inadequate roads to market for perishable produce being a prominent difficulty.

II. Field visits

Five farms were visited, three in Chapadinha and two in Poço d'água, each about 15 to 20 km from Capelinha. As we walked around each farm, farmers were asked a number of questions based on a short questionnaire (see Appendix A). The idea was to make it as informal as possible and not to ask any leading questions about climate – the word was never mentioned.

Farmers ages ranged from 36 to 65 (average 49); yield differences between farmers were extreme. Mauro, a farmer with irrigation was expecting 33 bags/ha this year. His neighbour, Tertuliano, without irrigation was expecting 3 bags/ha.

Farmers were asked to name their principal problems in order of importance, followed by a number of supplimentary questions. Whilst walking around we looked carefully at the coffee plots and recorded our impressions (general health, soil conditions, pests and diseases etc.).

Main result: over the five farms, climate emerged clearly as the main problem, being stated first in four of the five farms. By giving 3 points for first-mentioned problem, 2 for second and 1 for third, we can graph responses in decending order of importance (Fig. 3). On subsequent questioning, all five farmers mentioned the word 'drought' and four mentioned 'high temperatures'.
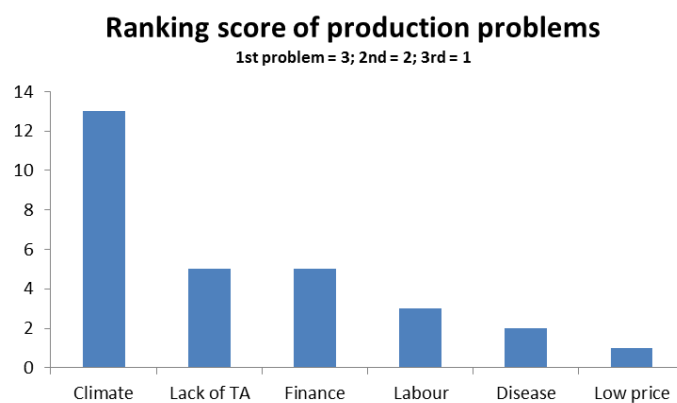
Ranking score of production problems
1st problem = 3; 2nd = 2; 3rd = 1

Figure 3. Farmers' ranking of coffee production problems (TA = technical assistance).

The strongest visual impression of the coffee trees we saw was the considerable number of branches with black 'empty' beans caused by die-back, caused in turn by lack of water. Coffee trees in one plot were visibly wilting, which was surprising for so early in the dry season.

Fig. 4. Empty black berries were common in Capelinha farms visited.

Other main points:

- soil cover was mostly poor with bare soil or weeds in four of the five farms (Fig. 5).

- there were two 'innovations' (things we were not expecting to see):

- One farmer had installed his own drip irrigation system at a cost of R50,000 (Fig. 5) but his production levels were 6 to 10 times that of the neighbouring farm.

- One farmer had excavated an infiltration system at the bottom of converging slopes to recharge the water supply to a bore-hole on his property and had employed some basic contouring across a steep access road to reduce erosion.

Figure 5. Left: uncovered and loose dry soil on a farm. Right: an element of a drip irrigation system.

III. Scientific knowledge

Climate maps from Assad et al[3] (Fig. 6, above) and Evangelista et al.[4] (Fig. 6, below) both suggest that this area is borderline or marginal.
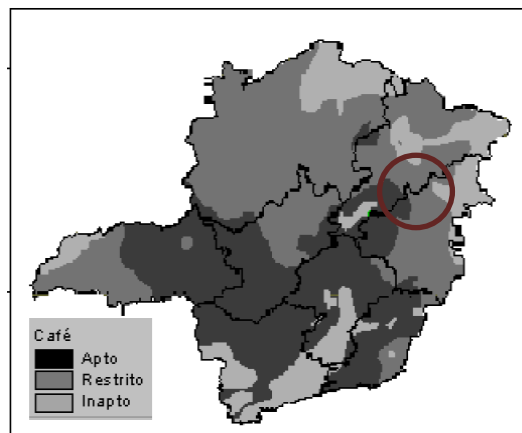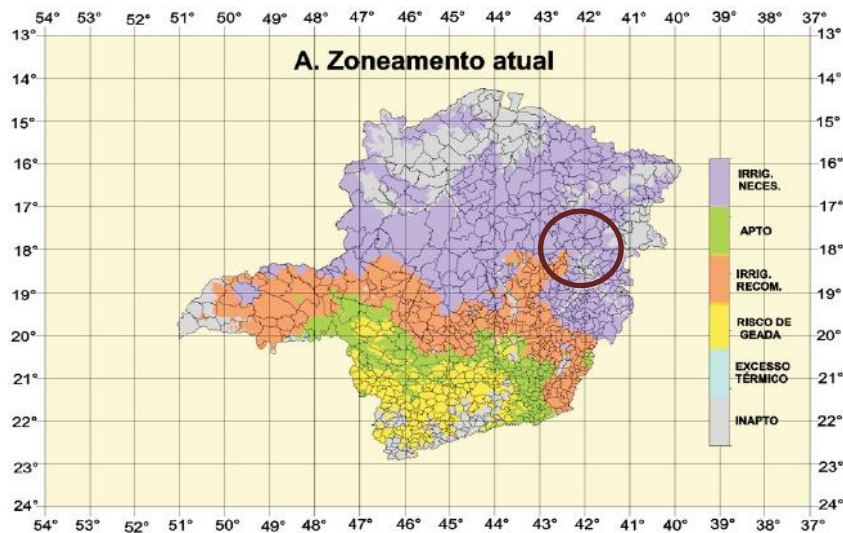

Figure 6. Aptitude for growing coffee in MG. Above: according to Assad et al. (2004) the area studied falls in the 'irrigation necessary' zone. Below: Evangelista et al. (2002) suggests the zone is borderline for coffee.

However, the maps are out of date by about 10 years and do not give enough coffee-relevant and specific information about the area, from which to make potentially very important decisions. Are

[3] Assad E. D., Pinto H.S., Zullo Junior J., Helminsk Ávila A.M. (2004) Impacto das mudanças climáticas no zoneamento agroclimático do café no Brasil. Pesq. agropec. bras., Brasília, 39: 1057-1064.

[4] Evangelista A.W.P., de Carvalho L.G. Sediyama G.C. (2002) Zoneamento climático associado ao potencial produtivo da cultura do café no Estado de Minas Gerais. Rev. Bras. de Eng. Agríc. e Amb., 6: 445-452.

present difficulties part of a general trend? Is the zone becoming drier? Are rains more sporadic? Are maximum temperatures more extreme?

We have discussed this with Dr Ruíz of University of Belo Horizonte who now has amassed what he believes is all available meteorological data for MG over the past 100 years from various sources and who could be able to provide more detailed and up-to-date information and maps.

E Conclusions

All the evidence we collected during this brief trip to Capelinha led us to the same conclusion – farmers are suffering substantially from the effects of climate change: local expert opinion, farmers experiences and our own visual inspection all confirmed this view. Scientific information too supports this, though we think further work is needed to provide more up-to-date, detailed and coffee-specific data.

How to help Capelinha farmers?

Although our sources agree that there is a problem in the Capelinha zone, there is less convergence on what to do:

- Despite the problems, EMATER technicians believe in a future for coffee in the zone and that strenuous efforts should be made to help farmers adapt

- Farmers seem less sure; some are trying other crops – though not necessarily with much success

- Climate maps are imprecise for this region but suggest that irrigation may be essential

This is a stark contrast with the farmers of Sul de Minas, where climate problems are less severe and where we feel confident that we can suggest some measures ('no regret' or 'low regret') that may be cost-effective and where there should be sufficient time to roll out scale-up activities.

On the contrary, with Capelinha farmers, the situation appears to be more urgent and it is quite possible that we are seeing an inevitable decline of coffee as the climate becomes too extreme.

We are faced with a dilemma: to what extent should farmers be helped to adapt to their climatic problems and to what extent should they be encouraged to find alternative crops? Is this coffee zone in terminal decline?

As the climate continues to change, it is inevitable that some areas will have to abandon coffee and we are going to need criteria to establish the specifics of where the zones are, why they are now marginal and how we help the farmers involved.

From the short visit we made, and the lack of actualized data, we cannot make a judgement in the case of Capelinha, but here at this stage merely pose these questions, which need quite urgent answers.

Appendix A. Farmer diagnostic format, first draft

Date		Location	District		Faz name	
			Municip		GPS	
			Soil type		Altitude	

Farmer	Name	
	Age	

Fazenda	Farm size (ha)	
	Main coffee var.	
	Tree density (apprx)	

tick boxes

Problems	Climate	Pest	Disease	Finance	Labour	Other	up to 5 key-word comments by farmer				
Principal current problem											
Second problem											
Third problem											

Visual (state of farm from 5 min walk)

tick boxes　　　　　　　　　　　　5 key-word comments (writer)

Soil cover	Bare	Crop	Mulch	Weedy					

Landslide	None	1 to 2	3+					

Erosion	None	Little	Medium	Heavy					

Coffee health	Poor	So-so	Good	Excellent					

Shade	None	Light	Medium	Heavy					

Global impression of farm　　[1 = very bad to 10 = exceptional]

Farmer innovation

Other comments (be brief)

Example of form filled out

[note this is a first draft of the questionnaire – it may be modified for future use.]

Date	25-Apr-12		Location	District	MG, Capelinha		Faz name	
				Municip	Chapadinha		GPS	
				Soil type	Latisol		Altitude	

Farmer	Name	Maria Aparecida Cordeiro
	Age	36 years

Fazenda	Farm size (ha)	12	7,5 ha of coffee
	Main coffee var.	Catuaí amarelo e vermelho	
	Tree density (apprx)	4000	

Problems	Climate	Pest	Disease	Finance	Labour	Other		5 key-word comments by farmer		
Principal current problem	x							drought	high temperature	low yield of coffee
Second problem				x				lack money for the harvesting		
Third problem					x			scarce	expensive	

Visual (state of farm from 5 min walk)

5 key-word comments (writer)
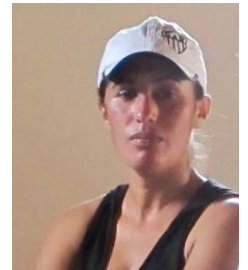
	Bare	Crop	Mulch	Weedy		it had some	few weedy		
Soil cover				x					

	None	1 to 2	3+					
Landslide	x							

	None	Little	Medium	Heavy		erosion starting	some holes on	water run fast on	
Erosion		x							

Coffee health	Poor	So-so	Good	Excellent		some minador	empty grains		
			x						

	None	Light	Medium	Heavy		just some few trees			
Shade	x								

Global impression of farm [1 = very bad to 10 = exceptional]
6 - the coffee health is ok, but there are a lot of empty grains/seeds

Farmer innovation
She used the manual harvest machine last year but she didn't like.
Maybe she didn't like because she is harvesting green coffee.

Other comments (be brief)
Other crops: maize, beans, cattle and eucalyptus.
30000 coffees tree - last harvest it was 85 bags of 60kg, and for the next harvest it will expecting 200 bags
Quality of coffee isn't good because she start in the wrong time of the harvest (green coffee)
she needs to sell something (like car, motorcycle) to pay the pickers.