

Can good coffee prices increase smallholder revenue?

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The global coffee market is currently plagued by 2 paradoxes, a coffee boom in consuming countries, and a coffee crisis in producing countries (over supply of low quality coffee and shortage of high quality coffee) which is actually driving the coffee market (Daviron and Ponte, 2005). After the termination of the International Coffee Agreement between producing and consuming countries in 1989, the coffee market has been in a flux, with market forces and over supply bringing down the coffee prices and hence income of farmers. According to ICO (2004), earnings by coffee producing countries (exports f.o.b) were some US\$10-12 billion 15 years ago which has changed to around US\$5 billion in 2003. Though the percentage share of the retail coffee price that goes to the farmer has gone above 10% in recent times, it hasn't offset the declining prices (Oxfam, 2001).

How has the global situation affected the smallholder coffee farmers? A recent survey of coffee farmers in India and Nicaragua has shown that the farmers consider the weather and coffee prices to be their biggest concerns (Lewin, Giovannucci and Varangis, 2004). Growers in regions such as Ethiopia, Guatemala, Mexico and Kenya are either, not harvesting coffee, using it for agricultural mulch or burning it as a source of fuel. Also, coffee producers and importers have made a number of attempts to establish cartels, to limit supply into the final market and to drive up prices (Fitter, Kaplinski, 2001). There has also been a trend in the global coffee consumption patterns, with arabica consistently taking up between 60% and 70% of the coffee exported (UNCTAD, 1995; ICO, 2004). And though approximately 2.25 billion cups of coffee are consumed everyday (Dicum and Luttinger, 1999), there is a shift towards consumption of specialty coffee in what is called the "latte revolution", where consumers can choose from combinations of coffee origin, processing methods, packaging, social content and ambience (Daviron and Ponte, 2005). This global trend is sure to affect all producing countries, specifically East Africa's coffee economy, as coffee is one of their main export crops. In response to this, for coffee in East Africa, liberalized markets might be best option for some countries, and regulated markets might be better for other countries (Ponte, 2002). But it is unclear what the best options are for the smallholder producers. One effect could be that this trends positively effects middle income and better off farmers as suggested by Seaman et al (2001) for Save the Children, which showed that the disposable income will increase for middle and better of farmers, by between 10 to 20% if farmers move to specialty coffee markets. To counter this global trend, one of the options available to farmers/farmer organizations are certification schemes like Utz Kapeh, FLO, Café Practices, Rainforest Alliance, and some farmers are seen to be taking up these schemes to counter the global price fluctuations.

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Given the context of the coffee market, and the lack of detailed information on smallholder coffee farmer responses to the same, specifically in East Africa, it was decided to carry out a study in specific pilot sites in East Africa. The objective of the study, is to better understand the small holder coffee farmer's local supply chain, production methods, the decision making matrix and understanding of and/or response to volatile global markets and changing market mechanisms. The attempt was also to understand the value chains under which these farmers function, merits and demerits of the same and current importance of coffee to the smallholder farmers. The study is being carried out in three pilot sites in East Africa to capture the different market structures and farmer profiles, through working with one representative farmer group in the Arabica growing areas. Within Uganda it is being carried out in Sironko district, on the slopes of Mt. Elgon, in partnership with a Kampala based farmer's organization NUCAFE (National Union of Coffee Agribusinesses and Farm Enterprises) and a programme called Agricultural Productivity Enhancement Programme (APEP). Both these agencies work with coffee farmers by first forming them in groups of between 15 and 20, and then assisting in production and sale of coffee. In Rwanda it is being carried out in Gisenyi, on the shores of Lake Kivu, in partnership with Gisenyi based cooperative COOPAC, which was started in 2000 and has more than 2000 farmers registered. COOPAC also comes under the fair trade label; FLO² certified since 2004. In Kenya it is being carried out in Nyeri district, on the slopes of Mt. Kenya, in partnership with the Barichu Coffee Cooperative, which has 4 wet processing factories and approximately 3000 farmers. The selection of these sites is based on common factors like type of coffee (arabica), availability of partners and buy-in from farmers.

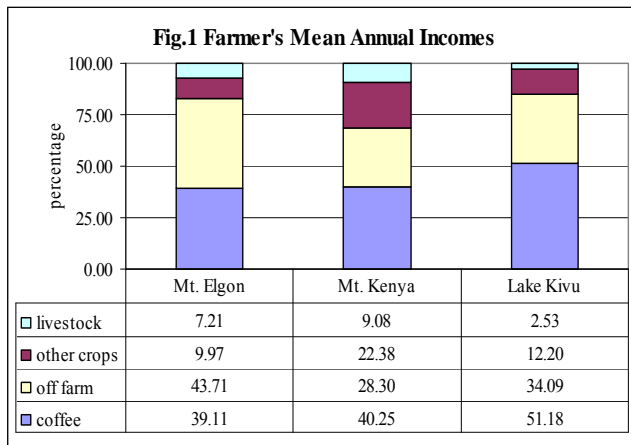
The attempt of this specific paper is to extract some of the results from the aforementioned study and look at specific linkages between the quality of coffee production, the price of coffee and the income of the coffee farmer. The idea is to understand the relationship between these factors, and the nature of the relationships. The organization of the paper is based on the hypothesis "Getting a good price for coffee produced is a necessary but not sufficient condition for making net profits from coffee" and involves discussions on farmer income profiles to understand the share of coffee in their income basket, smallholder market chains, to understand which systems provide mechanisms for the best price and coffee production systems, to understand the cost implications of producing coffee. The reason for choosing this line of investigation is based on qualitative information that farmers are not making profits from coffee, and some quantitative data on the fact the price is actually based on the quality of the coffee

² FLO-CERT GmbH is an independent International Certification Company offering Fairtrade Certification services to clients in more than 70 countries. As such a company we assist in the socio-economic Development of producers in the Global South and help to foster long-term relationships and good practice with traders of Certified Fairtrade products. Our Certification provides a guarantee to consumers of Certified Fairtrade products that they are contributing to the Social-Economic Development of people through their purchases.

produced. The attempt hence is to characterize these relationships through primary and secondary data collection and analysis³.

I - Income and expense

The average sizes of the households interviewed are 4.82 in Mt. Kenya, 8.11 in Mt. Elgon and 7.51 in Lake Kivu. In terms of land sizes⁴ within the sample frame, it is seen that farmers in Mt. Elgon have the highest land size, at 3.29 acres with farmers in Mt. Kenya region having the smallest land sizes in the sample frame at 1.69 acres. It was not possible to get accurate estimates of land sizes in Lake Kivu due to the scattered nature of farm plots and different scales of measurement.



In terms of farmer incomes⁵, Fig. 1 gives a break of share of farmer's income basket. Across the three sites, farmers get the highest part of their revenue from the farm which comes to around 60% of their annual incomes. The non-coffee income spread is different in the three sites. In Mt. Elgon, farmers' non coffee income is from sources outside the farm which include service, casual labour and small businesses. Income from other crops and livestock is

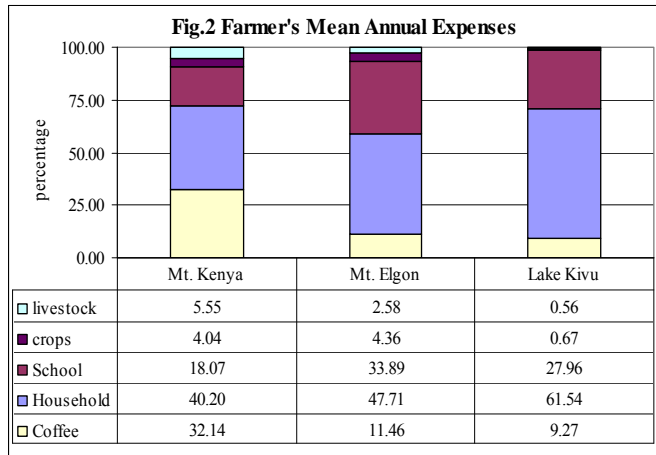
higher in Mt. Kenya as compared with the other two sites, as it is assumed that the market infrastructure for these products is better defined than at the other two sites. It can be said from the primary data collected that Kenyan farmers seem to have higher levels of on-farm diversification, getting about 1/5 of their revenue from crops other than coffee and approximately 1/10th of their revenue from livestock, equivalent to 1/3 of their total income.

³ Household size, land size, farmer incomes, coffee production from interviews in Mt. Elgon and Lake Kivu regions, based on farmer estimates and from sources in ministries of agriculture, coffee boards, private sector and focused discussion with key members of the coffee chain. The analysis involved basic statistics and regressions

⁴ Total farm size, including coffee plots and plots for other crops and trees

⁵ Is calculated based on income from coffee, which is calculated on coffee production and price received per kilo, as due to the length of production, farmers don't know the total amount earned through coffee in a season; income from crops, based on a total of all the crops that are produced and the amount of money earned from it. This does not include crops grown for subsistence, but includes sale of timber; livestock income; off farm income, calculated as a cumulative of all income which does not come from either coffee or from other cash crops, and includes income from govt. employment, other employment, business, etc

In terms of expenses⁶ of farmers as shown in Fig. 2, it is seen that in the 3 sites, farmers spend approximately 50% of their net expenses on household activities. Higher priority is accorded to coffee than other crops and livestock. The reasons for this are not clear, but it could be because coffee is historically their first cash crop, and because coffee as a crop is controlled by the men in the household, while women are responsible for the livestock and other crops.



The second most important type of expense differs with the location. In Elgon and Kivu, farmers spend more on school than on coffee, maybe due to the higher number of kids/farm or due to expensive school fees. It can also be assumed that the location of schools, which are not close to the farms, induce farmers to send their children to boarding schools, which adds to the cost. In Kenya, farmers spend a lot less on schools, as, from their

average household size, it can be assumed that they have fewer children, and hence lower costs. Also, the research site in the Mt. Kenya region is close to a big town and has access to transport infrastructure. It is seen though, that in all the 3 sites, coffee represents the main expense dedicated to cropping activities, indicating that in our sample, coffee remains the principal on farm activity.

Whether in Kivu, Kenya and Elgon, farmers spend the most part of their income on household items and the least on crops other than coffee. Coffee remains the first on farm income source, indicating that the sampled populations are true “coffee farmers” who use their farm to mainly produce coffee. It can also be said that income from coffee is not enough for the farmers, as all have diversified their sources of income. In Elgon, diversification mainly means off farm revenue, and this situation may have become the most important in this region. In Mt. Kenya, diversification on farm is most important, as they get more than 70% of their income from the farm. In Lake Kivu, an intermediate situation is seen, with a mix of off farm and on farm sources of income available to farmers.

⁶ Is based on their estimates of how much they spend per crop/animal per year for farm/livestock expenses, per week or month for household expenses and per year on school and other expenditures. It is important to note that farmers had no clear idea of their annual expenditure, but knew how much they spent on food every week. Attempt was made to ask the farmer what are the key products that the farmer purchases and it was seen that farmers mostly spend on sugar, soap, salt, paraffin and firewood. Expenditures that happen based on seasons and external factors are on maize, beans, loan repayment and health. The expenses that are not constantly recurring, but still happen are on meat products, clothes, house repairs and loans to family. Farmers with livestock were also able to estimate weekly expenditures. Net farmer household expenditure is calculated as a cumulative of all expense incurred by the family, on food, clothes, medicines, transport and alcohol for consumption.

II - Prices and yields

Given the break up of coffee farmer incomes and expenses, and having seen the importance of coffee in their livelihoods, we now look at two factors which affect their income from coffee, price from coffee⁷ and yield per tree⁸.

Table 1: Price per kilo and yield per tree

	Price per kilo of cherry (\$)	Mean Cherry Yield per tree (kgs)
Mt. Kenya	0.47*	3.13
Mt. Elgon	0.19**	2.86
Lake Kivu	0.14**	4.44

*: mean of 4 factories within the cooperative

** : \sum (price per kilo of cherry + price per kilo of parch/6)/2

Comparing the price received per kilo of cherry across the sites, it is seen that the farmers in Mt. Kenya get the most for their coffee and farmers in Lake Kivu get the least for their coffee, among the three sites. Conversely, farmers in Lake Kivu are able to access the most kilos of cherries per tree compared to farmers at the other two sites. Assuming that conditions are similar, for analysis purposes, this leads to two questions: why is there a price differential between the sites? Why is there a difference in the yield per tree across these sites? The attempt is also to find out if production affects the yield and price of coffee, and how.

To better understand the price mechanisms, we look at the different market chains under which price setting and allocation works. The attempt is to find out if there is a payment for quality, what other factors affect the price and importance of the type of market chains on the price of coffee. We look at the value chains in each of the three sites from the perspective of the farmer. Of the three sites, two sites, in Rwanda and Uganda follow the open market system, while the site in Kenya follows the old legally bound

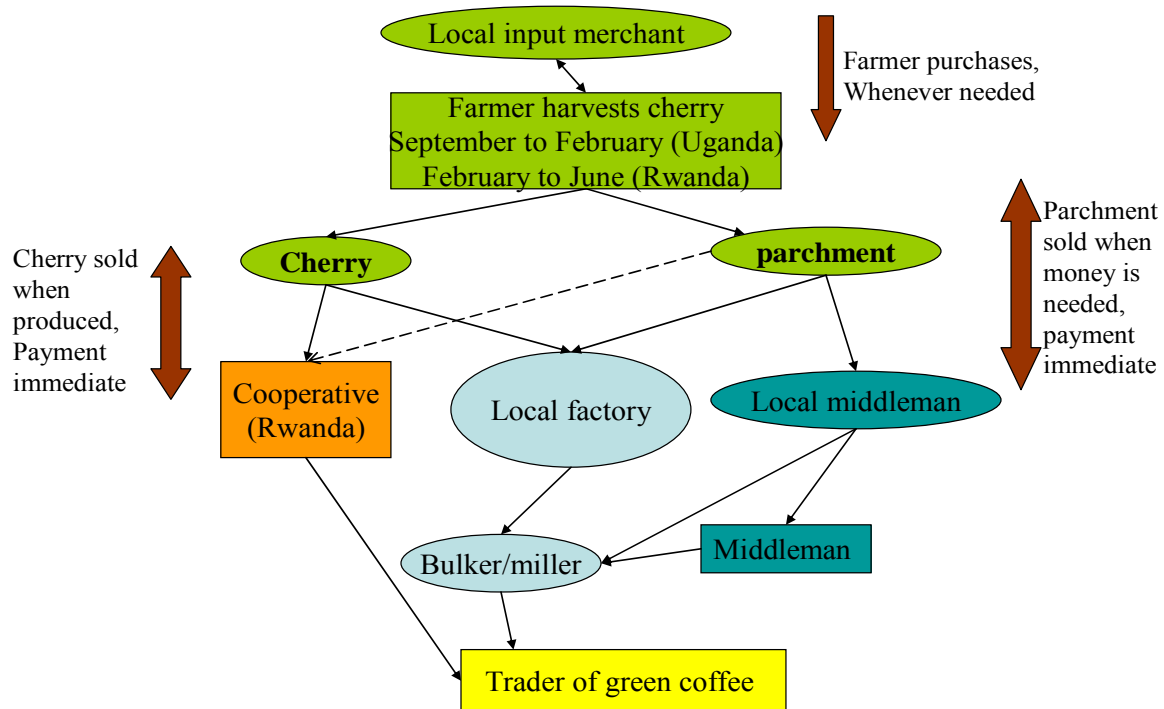
⁷ In terms of the results, the kilos produced are standardized to coffee cherry for cross site comparison. An assumption is in terms of the conversion rate from coffee cherry to parchment, which is assumed to be 6 kilos of cherry converts to 1 kilo of parchment. This assumption is made, as farmers are unable to assess how many kilos of cherry they use to make one kilo of parchment. The price is hence calculated as mean cherry price per farmer per site

⁸ Is a calculated based on kilos of cherry produced divided by number of trees. It is important to say here that most farmers have only an estimate of the trees on farm, especially for farmers who have many trees and scattered plots

Yield = {Sum (cherry) + sum (parchment*6)}/ no. of trees

cooperative/auction system. The description of the value chains is assessed based on farmer surveys and focused discussions with key informants.

Chart 1: Value chain in the open market system of Uganda/Rwanda



Looking at the open market systems of Uganda and Rwanda, as shown in Chart 1 below, which defines the value chains; the coffee value chains have the following links

- 1) Farmer: smallholder
- 2) Middlemen: in rural communities, middlemen act as bulkers for coffee companies. There are 2 types of middlemen
 - a) Middleman 1, who is actually sub contracted by milling companies and other bulkers of coffee, at a commission, mostly per kilo of parchment
 - b) Middleman 2, who acts as a collection agent, purchases the parchment coffee at her/his own costs, and then sells is to whichever bulker and/or milling company that wants to buy it.
- 3) Cooperatives/farmer groups: after 2000, many coffee cooperatives and farmer groups were set up on the encouragement from Govt. agencies. They decide to work in a specific area, get farmers to sign up with them and some even charge a certain annual fee from the farmers.
- 4) Millers/Bulkers: these are companies that usually function in towns and cities close to the coffee growing areas, and have the licenses required to set up milling units, to convert parchment coffee to green coffee, and then export the same to consuming countries. Some of these companies also having washing stations in

coffee growing areas to purchase cherry directly from farmers, though they also use middlemen to buy parchment coffee.

- 5) Governing Body: OCIR Café (Office des Cultures Industrielles du Rwanda) in Rwanda and UCDA (Uganda Coffee Development Authority) in Uganda, both govt agencies specifically set up to regulate the coffee sector. Their mandate includes data collection, trainings to farmers, provision of free inputs to farmers and regulating the export of coffee. They are the sole agency with the right to provide licenses for processing and sale of coffee, and these licenses are renewable periodically. They also certify the coffee before it is sold to buyers outside the country. They have the mandate to provide market information services on coffee prices, and may use different media to do it.
- 6) Importers/buyers: these are the agencies that buy the coffee, and come from consuming countries.

The coffee value chain is a short one in the arabica growing regions of Mt. Elgon and Lake Kivu and farmers sell both cherry and/or parchment coffee. Cherry is sold to factories in the vicinity and middlemen who can transport it to factories outside. Parchment can be sold to authorized middlemen, who have collection points in the vicinity, or to local middlemen, who are commission agents for big coffee miller and exporters. The cost of transporting coffee to the washing or milling stations rests with the buyers, not sellers. The supply systems employed by buyers is that they subcontract middlemen in districts, who in turn sub contract to shops and individuals in villages in the coffee growing areas to act as collection agents on a commission, which is normally between 2% to 7% per kilo of parch. There are benefits to farmers who sell parchment coffee to these collection shops, as they are able to negotiate prices and usually get some alcohol or other consumables from the agents. The farmers lose ownership of their coffee once it is sold to the middlemen. Farmers sell both cherry and parchment coffee, depending on either their financial constraints and/or based on what they are prefer. Comparing the two products gives us the following (Table 2)

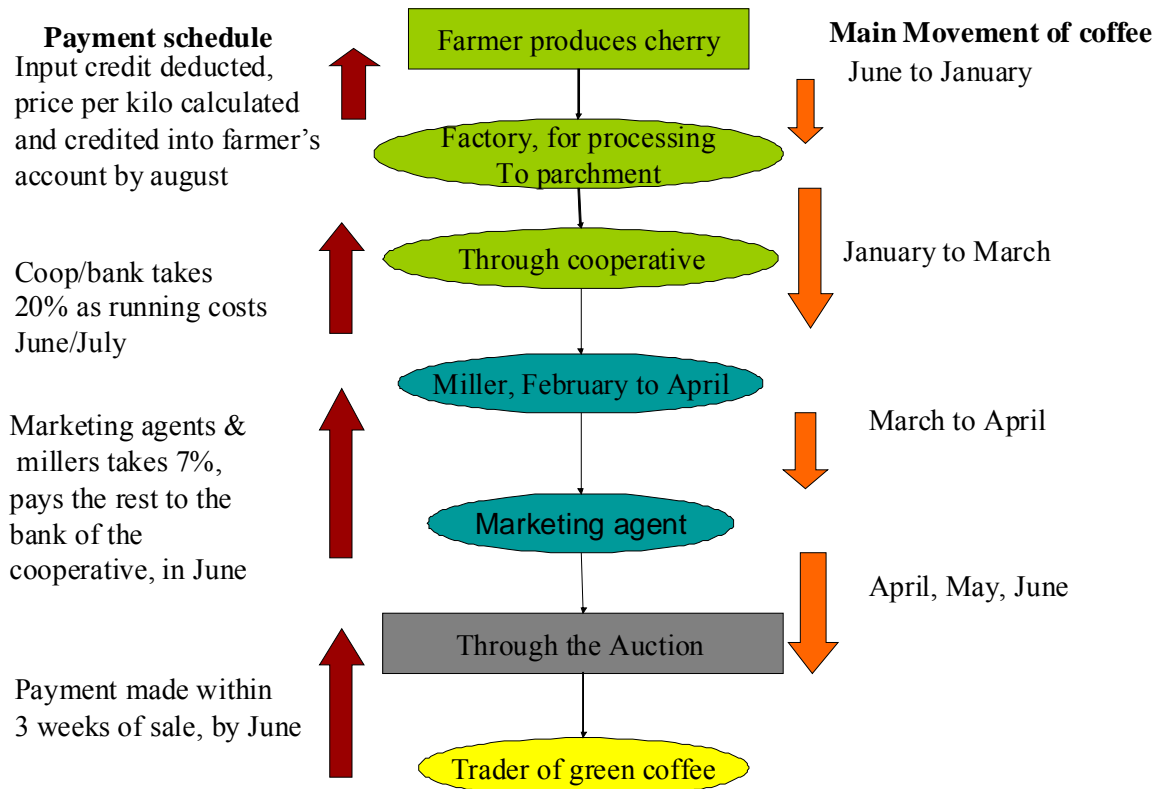
Table 2: Cherry versus Parchment in Uganda and Rwanda

Cherry	Parchment
fast treatment, less than 24h	More processing time (10-12 days of drying required)
immediate access to cash	represents a type of savings, as it can be stored till income is required
less work	more work and more expenses
price non negotiable, fixed by buyers	negotiable prices (more in Rwanda than in Uganda)

It is seen that this flexibility in choice of product is sometimes helpful to farmers, as they can sell based on their needs. Though, legislation was passed in 2006 in Rwanda, where in farmers are encouraged to sell coffee cherries on a daily basis, with a minimum price for the same established by OCIR Café. The implications of such regulations are being researched and hence are not yet available for analysis.

In Kenya, which follows the cooperative/auction system, the links in the chain, as seen by Chart 2 are:

Chart 2: The controlled auction/cooperative system of Kenya



- 1) Farmers: who produce only coffee cherry, a Kenyan characteristic
- 2) Cooperatives: who are the main links in the chain, and they substitute the role of Bulklers and processors. They have factories, which act as collection points for the cherry produced in the area, and also process cherry to parchment
- 3) Millers: In parallel to the cooperative system, there are several private/institutional millers in Kenya, who process the parchment to green coffee. Three of these millers, KPCU, Thika mills and SOCFINAF are the sole marketing agents of the coffee and have the license to auction the coffee on behalf of the cooperatives
- 4) Coffee Board of Kenya: set up to regulate the coffee, this agency is government run. They are mandated with controlling the coffee auctions, managing the coffee value chain and issuing licences to stakeholders.

- 5) Ministry of Cooperatives: is mandated with supporting and regulating the cooperatives, by ensuring that elections are held on time, and are fair, assisting in negotiations between cooperatives and its farmers and ensuring that the cooperative act is upheld
- 6) Ministry of Agriculture: is mandated with data collation on coffee, trainings for farmers and research on coffee.

Given the bimodal nature of rainfall precipitation around Mt. Kenya, there are two harvest seasons, the short season between May and July; and the long season, between October and January. During this time, the smallholder producer harvests coffee, takes it on a daily basis to the washing station close to the farm, the coffee cherries are weighed, and the farmer gets a receipt for the same. The washing stations process the cherries into parchment coffee and store it on site till the coffee harvest for the farmers is complete. Around Feb, The parchment coffee is sent to a miller for conversion to green coffee and grading. It is later send to one of the 3 milling agents. The miller makes a first quality assessment. Samples are sent to the Coffee Board and to traders to prepare the auction. It is important to note here that every factory in every cooperative is assigned a unique tag, and buyers and sellers both know exactly which coffee and from where is being traded. Once the coffee is purchased by the buyer, the money is transferred to the miller as soon as the coffee is shipped out. The miller then deducts 7%, for costs incurred in milling and marketing of the coffee, and within 14 days transfers the money into the bank account of the respective cooperatives. According to the cooperative act, not more than 20% of the income from the sale of coffee should be used to run the cooperative, so the cooperative deducts 20% of the total income received before transferring the rest of the money to the farmers. This 20% covers the cost of running both the cooperatives and the factories. The price per kilo of cherry produced is then decided at the factory level by simply dividing the total amount due per factory with the total kilos of cherries produced per factory. This unit price per kilo of cherry per factory is then multiplied by the kilos of cherries produced per farmer, and the net amount due per farmer is calculated. Now, while the processing and sale of coffee is on, the smallholder starts farming for the next harvest. For this, the farmer in Kenya uses an input intensive system. As the farmer is yet to be paid for the coffee, the cooperative purchases inputs for all the farmers within the cooperative, and uses the factories to distribute the same to the farmers and each farmer is given the amount requested. Also, each farmer gets a picking advance of Ksh 3-10 per kilo of cherry produced that year and an advance for school fees. This expenditure is then calculated per farmer to be deducted from the income from coffee. At the end of the season, the factory calculates amount due per farmer after deducting the advances for picking, school fees, cost of inputs, and outstanding loans, and transfers the remaining amount into the SACCO (SAVings and Credit COoperative) account of each farmer. The SACCO also deducts interest and a part of the principal of any outstanding loan the farmer may have, and the remaining money can then be accessed by the farmer for personal use⁹.

⁹ An important legislation was passed in 2006, allowing for a second window for cooperatives to bypass the auction and sell directly to buyers. The implications of these new legislations have not been captured in the study so far, as the cooperative which is part of the sample frame is yet to use the option of the second window

There seems to be better quality control in Kenya, as farmers only produce cherry, and the factories are at least able to control the processing to parchment. But, the payment for coffee is not immediate, and farmers have to wait for the completion of transactions across the chain before they get income from coffee. Also, the costs of running the factories, cooperatives, milling and marketing of coffee are borne by the farmer, and are deducted from the coffee price. The auction system though provides a mechanism for payment for quality, as different buyers bid for specific qualities and bring the price up. Conversely, the auction can also give a low price for coffee if there are not too many buyers on the day

Comparing the two systems, it is seen that both these systems have merits and demerits. The open market systems allow farmers the flexibility to sell the product they want, in terms of either cherries or parchment coffee, while the farmers in a legally bound cooperative system have to follow the system, and can only sell cherry, for which the net payment is made at the end of the season/beginning of the new season. This means that the farmers in the open market system have greater flexibility in terms of time of sale and product to sell, but lose ownership as soon as the transaction is made with the middleman/factory/cooperative, while farmers in Kenya own coffee till the coffee is sold at the auction. The Kenyan system though is long and takes a lot of time, during which time the farmer is not paid, and has to rely on other sources and/or loans to survive. But looking at only the price per kilo of cherry, it seems that farmers in Kenya benefit from the system, where as farmers in Lake Kivu and Mt. Elgon seem to be price takers.

III - Production's activities and costs

Having looked at how market systems determine the price that farmers get, we look at the production methods employed by the farmers and the cost implications of the same. The first step is to look at the mean number of trees per farm in each of these sites. It is seen that farmers in Mt. Kenya have 277 coffee trees per farm on an average, and use the varieties SL 28, SL 34 and in some cases Ruiru 11. In Mt. Elgon the average number of coffee trees per farm is calculated to be 730 having varieties SL 14 and SL 28, while in Lake Kivu, the varieties planted is "Bourbon" and farmers have an average of 735.5 trees per farm. Using this to look at trees per acre, at least for the two sites that we have land sizes for, it is seen that farmers in Mt. Kenya have 164 trees per acre and Mt. Elgon farmers have 222 trees per acre. In terms of the number of coffee trees per family member, it is seen that farmers in Mt. Kenya have half the number of trees to provide income per family member, at 57.5 trees per member, as compared with farmers in Mt. Elgon at 90 trees per member and Lake Kivu at 98 trees per member. Given this and the yield per tree calculated from the data, we now look at coffee production.

Table 3 below gives the production activities for coffee conducted by farmers at each of these sites. N is the number of farmers interviewed who carry out the activity and mean¹⁰ is the mean cost to conduct the activity per season

¹⁰ Corrected mean is the measurement calculated based on the grand total of a specific data set divided by the number of farmers that have given data on the same, while the sample mean is calculated based on the grand total divided by the total number of farmers interviewed. The example below further illustrates the point

Table 3: Production activities and costs

Activities	Mt Kenya		Mt. Elgon		Lake Kivu	
	N	Mean(\$)	N	Mean(\$)	N	Mean(\$)
fertilizer	42	137.43	13	212.01	0	0
harvest	41	123.78	35	28.05	39	51.12
Copper	41	73.52	9	29.20	0	0
insecticide	41	59.82	13	22.39	0	0
manure	5	33.33	0	0	0	0
input application	42	20.32	16	42.26	36	1.67
pruning	42	8.68	30	7.62	37	8.94
digging	31	7.46	0	0	0	0
weeding	39	5.97	35	21.90	39	8.74
slashing	0	0	3	8.52	0	0
Mulching	0	0	10	2.22	37	41.94
Egourmondage	0	0	0	0	37	1.22
pulping	0	0	29	16.52	0	0

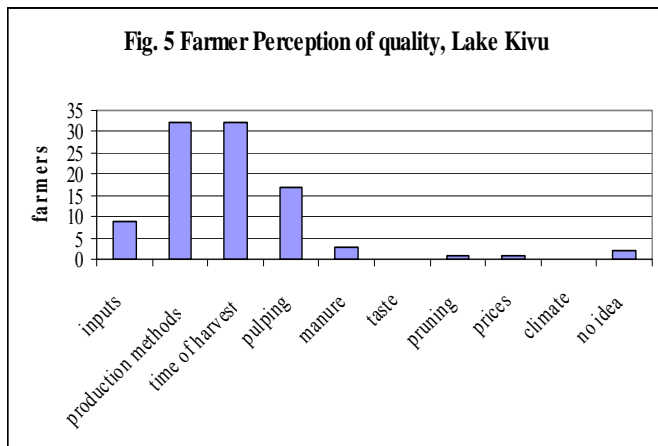
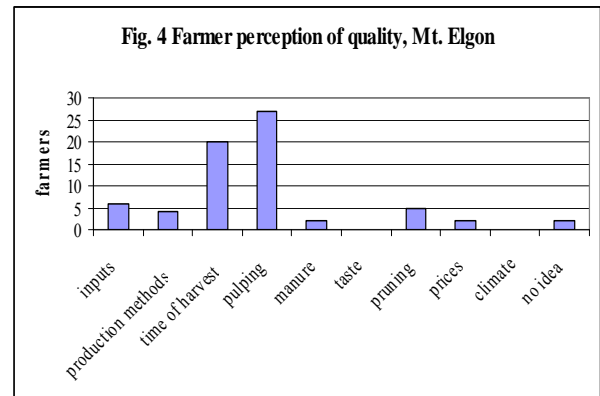
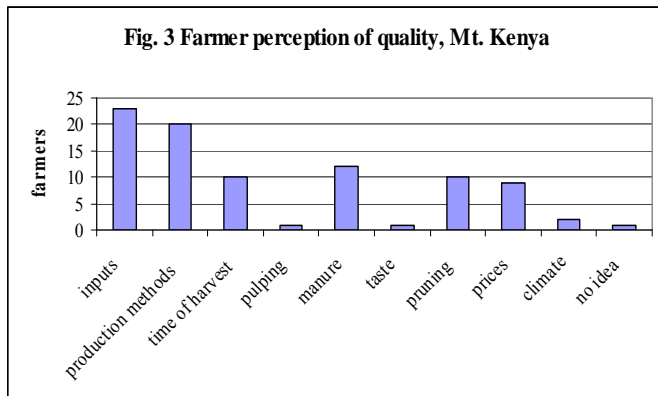
In Mt. Kenya, the sample population behaviour is rather homogeneous and all farmers are involved in the same manner to manage their farm. All spend a lot in harvest for casual workers, and fertilizer purchase. The second most important expense is related to chemical (copper, insecticide) or to labour cost of applying these inputs. Digging and weeding receive small but consistent support from experienced workers, while slashing and mulching appear to be done by farmers themselves. Farmers in the Mt. Kenya region get production support from their cooperatives in terms of inputs on credit and trainings on production methods. In Elgon, the farmer’s population sample appears heterogeneous. Most farmers spend on harvest, weeding pruning and pulping. They either hire support for time consuming activities or rent the pulping machine to prepare the parchment. Few of them are able to spend some extra – but little- money on labor force for mulching and slashing. The second most important source of expense for farmers relates to chemical purchase and application. Only 30 to 45% of the farmers are able to spend for these activities. Out of the 35 farmers interviewed, 13 farmers applied fertilizers and it is interesting to note that even within this group, few farmers spend a lot more than the others (median = 258.94). It is assumed that this expenditure is correlated to their

Example of Corrected mean vs. Sample mean

Mt. Elgon	Total (\$)	N	Corrected Mean (\$) = total/N	Sample size	Sample Mean (\$) = Total/sample size
fertilizer	2756.11	13	212.01	35	78.75

Here, it is seen that both means are different. We preferred to use the corrected mean, as it can then be said that if the farmers use, for example fertilizer to produce coffee, it would cost them an average of \$212.01 per season if all farmers used it. It also informs the researcher that out of 35 farmers surveyed, only 13 farmers use fertilizer, and this could lead to further research questions for agronomists, sociologists and economists alike.

incomes, and farmers who have access to revenue outside of their farms re-invest some of it back to coffee and other crops. Farmers who have access to inputs hire labour for application from outside the farm for its application activity. All other activities are conducted by farmers at no cost. In Lake Kivu, all farmers are committed in the same way to manage their farm where their main efforts go in to harvest and mulching followed by pruning (and egourmondage”) and weeding. They hire casual workers for the most time consuming activities or get support from hired specialists for pruning and egormondage. They all rent the spraying machines to apply pesticides and sometimes also the labour to spray it, but get pesticides free from OCIR Café. Some comments from farmers about this are that most of the times, the pesticides are provided after the time for application (October) has passed, and it affects their yield. The fact that many activities have no cost does not mean that they are not done. Manure is free for farmers with livestock, digging is done by the farmers using own labour and pulping is done on farm, with stones or old hand pulpers, at no extra cost. The different approaches by farmers on coffee production can be confirmed by how they perceive good quality coffee (Figures. 3, 4, 5).

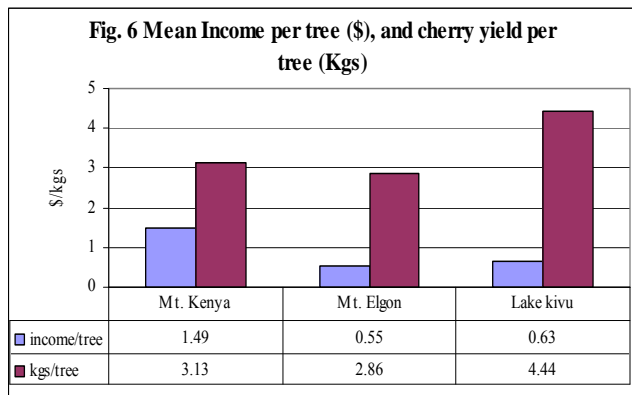


In Mt. Kenya, quality is Inputs + production methods. This could be because of the information provided by CRF, and due to the opportunity to purchase inputs on credit. In Lake Kivu quality is production method + time of harvest + pulping. This is interesting because it could mean that even though farmers prefer to sell cherry, they associate parchment to quality and are aware that parchment is better paid. In Mt. Elgon quality is time of harvest + pulping indicating

that quality is linked to parchment coffee. It is difficult to say if their productions methods are defined by the way they perceive quality or vice versa, but Figures 3, 4 and 5 reveal a positive correlation between the 2 sets of parameters.

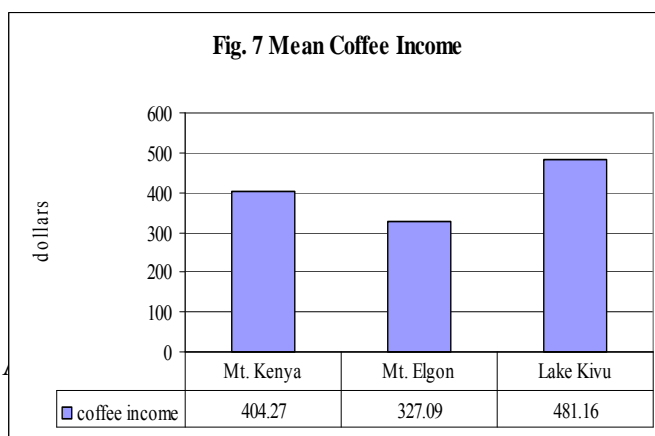
Comparing the three sites and production methods it is seen that Lake Kivu farmers have adopted a labour intensive approach to coffee production. This could be because of poor access to inputs and/or due to availability of labour in the area. As recommended by OCIR café, they pay lots of importance to mulching and to a smaller extend to pruning. Pulping and chemicals are not their priority. They sell mostly cherries and receive support from OCIR in the form of free fertilizer supplies. In Mt Elgon, farmers give more attention to pulping as they try to produce more parchment; they bear the cost for it. Attempts are made to purchase chemicals but not all of them can financially make the necessary effort. Mulching represents an intermediate priority for this farmer population. The strategy of Mt. Kenya farmers is quite different as they are restricted to selling only cherries and are trained, through the cooperatives and officials (Coffee Board, Coffee Research Foundation) to use a certain amount of chemicals. The process is facilitated by the credit facilities offered by the cooperative. The production analysis now gives a picture of how this affects the yield and cost of producing coffee per farmer per site.

IV - Profit from Coffee



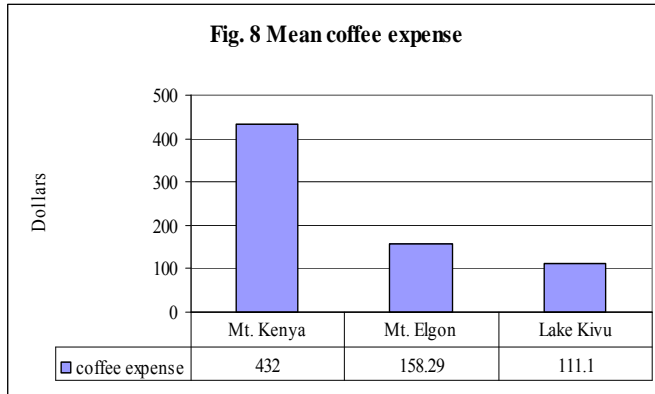
Having seen the price determining mechanisms and the cost of producing the same coffee, we now look at connecting the two factors to understand if a good price is enough for farmers to make a profit. The indicators used to characterize these trade offs is based on coffee income and expense per farm, coffee yield and number of coffee trees. In spite of having the highest yield per tree in Lake Kivu, the highest income per

tree is in Mt. Kenya (Fig. 6). Firstly, it is surprising to see that the yield is the highest in Lake Kivu, given that the production costs are the lowest at this site (Table 2). The reasons for this could be due to external factors like climate, coffee varieties, soil, etc. Secondly, the mean income per tree is a factor of price per kilo of cherry (Table 1), and hence Mt. Kenya has the highest income per tree which compensates for their lower level of production. The opposite situation is seen to exist on the other two sites, where higher yields don't translate to higher income per tree due to lower prices. It is seen that farmers in Mt. Kenya get prices more than 2 times that of Lake Kivu, and hence farmers in Mt. Kenya have incomes per tree which are almost 3 times that of farmers in Mt. Elgon and Lake Kivu.



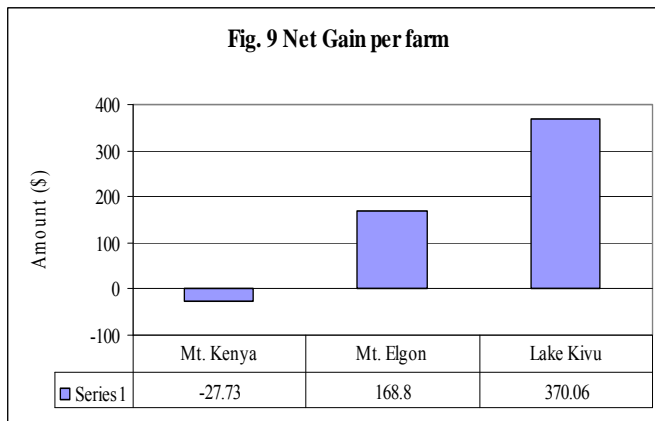
Farmers in Lake Kivu make the most money per farm on coffee due to the mean number of trees per farm being the highest on this site along with it having the highest yield per tree. Higher coffee prices in Mt. Kenya are

offset by lower number of trees (Fig. 7). Another way of looking at this is by calculating income per person per farm at each site. Income per person is highest in Kenya, at \$ 83.87, followed by Lake Kivu, at \$ 64.07 per person with each person on farm in Mt. Elgon earning \$ 40.33. This difference in ranking is based on the fact that the household size in Kenya is smaller than in the other two sites. Attempt is now made to look at the expense on coffee per farm per site, as shown in Fig. 8 below



Farmers in Mt. Kenya spend the most on producing coffee, inspite of the mean number of trees per farm, as compared with farmers at the other sites (Fig. 8). This is due to the intensive nature of their farming systems, as seen by table 3, compared with the farming systems of the other 2 sites.

How this affects the net balance per site is shown by Fig. 9. It is seen in Mt. Kenya that farmers make less per farm than those in Lake Kivu, who make the most. This is inspite of Rwandan coffee having the lowest price and Kenyan coffee getting the highest price. It can be assumed that this is due to the amount of money spent by farmers on growing coffee in each of these pilot sites, as seen in Table 3. The estimate that farmers in Lake Kivu make double that of farmers in Mt. Elgon, and farmers in Mt. Kenya receive very little income from coffee (if not negative). The reason for this difference in net gain could



be high expense on coffee production (Mt. Kenya), poor access to inputs, forcing farmers into labour intensive and less expensive farming, more number of trees on farm and lower cost of labour (Mt. Elgon and Lake Kivu).

It is seen that getting a good price for the coffee produced is not enough for farmers to make net profits. There are other factors that influence the farmer's ability to make money from growing coffee. This is reinforced by the fact that inspite of farmers at Mt. Kenya getting higher revenue per tree and per person in the household, they make much less per farm than the farmers of the other two sites. This raises more questions on the farmer's understanding of their production strategies, which is assumed to be geared towards increasing revenues.

V - Note on quality

Normally, cost of production and the price for the coffee produced should be linked together by quality; so we look at payment for quality across the three sites to see how this relationship is defined. In Kenya, it is seen that the auction system provides a mechanism for rewarding good quality coffee with high prices, though there are other factors involved in terms of time of auction and number of buyers present. In the open market systems, the farmer sells to the middleman/factory/cooperative based on the quantity, and price is determined by factors outside their control. It was found though there is some attempt at rewarding quality, and this can be elucidated through the following examples. In Mt. Elgon, quality-price linkages are being established by at least two agencies, that this research project had an opportunity to observe. First, an agency called MTL traders, which operates in the Mt. Elgon region has recently purchased a huge milling unit in Mbale, the town closest to Sironko district. This mill was owned by the Bugisu Cooperative Union, a part of the old cooperative system which existed in Uganda before the liberalization of the coffee industry. The model used by MTL is an interesting one, where based on their assessment of where good quality comes from, around the Mt. Elgon region, they set up small 3 to 5 ton capacity washing stations and purchase cherries from farmers close by. This helps them better control the coffee quality, and establish strong ties with the communities involved. The farmers also seem to prefer this, as then they don't have the added cost of renting mechanical pulping devices, and are still able to get good prices. Second, an organic certified coffee buyer called Gumutindo organic coffee association which was set up by a UK based buyer called Twin Network promotes fair trade coffee and purchases organically produced coffee. This agency has set up collection points in different areas, and purchase both cherries and parchment. They have agronomists on their payroll, who go out and certify the farmers on organic coffee, and there is a one time membership fee of US\$ 5000 (approx \$2.70) that the selected farmers have to pay. The farmers who are a part of this association say that they get better prices for both the cherries and parchment, compared with from middlemen. In Lake Kivu, the cooperative COOPAC in an attempt to control quality purchased cherries based on weight. Farmers took their cherries to COOPAC, where the cherries were put in water and only the heavier cherries were purchased. The farmer then had to take the remaining cherries to some other buyer, who would give them the same price as COOPAC. This led to farmers preferring to sell cherries to other buyers, and affected COOPAC's supply chain. This practice of quality control has hence been stopped by COOPAC.

Looking at the price per kilo of coffee, it can be seen that the cooperative/auction system of Kenya provides the highest price per kilo of coffee, compared with the other two regions. Assuming that the coffee in Kenya is better than the coffee produced in the other selected countries, the price difference is still significant. It seems like the auction system provides some incentive for quality, though other factors, like number of buyers at the auction at a given day also have an effect. But, the farmers have to wait till the auctions

are finished before they get revenue for the coffee produced. This takes time, sometimes up to 14 months from the start of the production, which limits farmer choices. It can be said that the cooperative/auction controlled value chain provides incentives for good quality coffee production. Within the open market systems in terms of premium for quality, some attempts are on to introduce these premiums. An example of this is seen in Mt. Elgon, where the Gumutindo pays a premium to farmers producing organic coffee, and in Lake Kivu, where attempt is on to screen the cherries purchased, with probable premiums for the same in the future. But these attempts are sporadic and farmer buy in for this is seen only if higher prices are assured. It can be said that within open market systems, the emphasis is on volume of production, as farmers have less ownership on the coffee; the farmer is subjected to the fluctuations of the open market and information asymmetry but has more flexibility on time of sale.

In the controlled system of Kenya, the coffee value chains are defined by the cooperative system, and the farmer functions under the same. The value chain allows for purchase of input on credit, and farmers seem to spend a lot more on production than seems profitable. The cost of production of coffee is high, which gives the mean coffee income for farmers in Kenya close to 0 (for 2005). A key question is whether Kenyan coffee farmers would be better off by reducing the level of inputs, and this can be understood by looking at the open markets systems of the other sites. In the open market systems, there is not much access to credit, as there is no support system like the Kenyan cooperative system, so farmers seem to purchase inputs if and when they can afford it. This seems to reduce their cost of production, but not affect their yield. It is seen that in the open market system, despite lower prices, more steps in the production process (at least for farmers producing parchment coffee) and information asymmetry in terms of price negotiations, farmers in both Lake Kivu and Mt. Elgon made net profits. Interestingly, these different production systems don't influence the yield, with farmers not applying inputs getting higher yields than farmers applying inputs. The reasons for the same need to be further investigated. It is seen though that regardless of the market chains on different sites, coffee is still the main on farm activity. It seems to be changing though, as farmers are diversifying into other crops, livestock and off farm sources of income.

Given the current status of research, the data available and the research conducted, it can be said that both open market systems and controlled market systems have merits and demerits, and it is difficult to say which one is a better system for farmers to receive incentives for producing good quality coffee. Also, coffee remains the main on farm source of income for farmers across the sites. On the other, hand farmers on different sites use different production strategies for coffee, based on influence of coffee research agencies and access to information/credit/availability of production material. Interestingly, it is also seen that producing coffee that fetches higher prices in the market is not enough to make profits from coffee. The same value chain that facilitates the payment mechanism also influences the cost of production. The other key issues for smallholder coffee farming in East Africa lies with land tenure, as farm lands are getting smaller in correspondence to increase in population. So far, it is seen that farmers are coping with it, using whatever means available to them to keep production up, and hence partially sustainable income from coffee.

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