Analysis of Gedeo Zone Wet Mills: Processing Defects and Economic Impact

USDA: FOOD FOR PROGRESS – REGROW YIRGA PROJECT

Funded by the US Department of Agriculture's Food for Progress Program, JDE and Peet's Coffee

This document synthesizes data from 66 coffee wet mills in Gedeo Zone of the Southern Regional Ethiopia State, collected between 2022 and 2024. It highlights three principal sources of yield and quality losses including immature cherry delivery, primary and secondary coffee defects, and over-drying. Data was collected from coffee samples that were regularly delivered to a TechnoServe lab in Dilla, Ethiopia where green and sensory analyses were completed. By emphasizing the financial impact of defects and processing errors, we hope to inform managers and local authorities and underscore the need for improved operational practices.

LOSSES DUE TO IMMATURE CHERRY PURCHASES

Purchasing immature coffee cherries affects wet mills in two keyways: 1.) it diminishes cup quality and 2.) reduces overall yield. A 2021 TechnoServe study revealed that immature cherries made up about 20% of wet mill cherry deliveries and weighed 19% less than ripe cherry. Further analysis at the TechnoServe lab in Dilla found that immature green beans (0.11g) weigh roughly 30% less than mature beans (0.16g). Although wet mills typically pay 19% less for these cherries, the 30% reduction in yield results in an 8.7% net loss** when factoring in cherry-to-green conversion rates. In the Gedeo Zone, this translates to an estimated $10,493.77USD in losses per 450 Metric Tons (MT) of coffee cherry purchased.

Table 1. Average yield loss and profit loss realized per 450MT of immature cherry purchased at coffee wet mills in the Gedeo Zone of Ethiopia.

Conversions	%	per 450MT of cherry
Avg. % immature cherry delivery*	20%	90,000.0
Green coffee mass assuming ripe cherry (Kg)	16.7%	14,400.0
Green coffee mass assuming immature cherry (Kg)	14.1%	12,789.8
Loss in green coffee mass (Kg)**	8.7%	1,252.6
Avg. profit loss (USD)* **		**$10,493.77**

***Note:** *Based on TechnoServe survey of cherry delivery composition to wet mills in Sidama, Ethiopia; **calculated assuming that from the 20% of immature cherry delivered to the wet mill, 5% remains in the final product after processing and cleaning; ***calculated assuming Grade 1 price of $4.00(USD)/lb. and Grade 2 price of 3.20(USD)/lb. at a sales ratio of 75:25 Grade 1 and Grade 2 respectively.*

LOSSES DUE TO OVER-DRYING

Over-drying coffee can significantly affect wet mill profitability. When moisture levels drop below the Specialty Coffee Association (SCA) recommended range of 10–12%, beans may develop undesirable woody and past-crop flavors, lowering their overall quality and market value.

Furthermore, excessive drying leads to reduced coffee mass and sellable product. Although multiple moisture benchmarks exist, this report uses 11%, the midpoint of the SCA range, as a practical reference point for balancing quality and yield.

Before the Regrow Yirga Project interventions, coffee samples delivered to the TechnoServe lab in Dilla averaged 9.6% moisture (SD 0.81), below the SCA minimum. This resulted in an average loss of 1,012.5kg (2,232.15lbs.) of green coffee per 450MT of cherry processed, equating to $8,482.20USD in lost revenue. After implementing project interventions, average moisture content rose to 10.9%, which corresponds to a significantly smaller loss of just 75kg (165.3lbs.) per 450MT of cherry processed, or about $628.31USD. Overall, this amounts to a 93% decrease in losses attributable to over-drying.

Table 2. Average profit loss attributed to over drying per 450MT of coffee cherry processed by wet mills in Gedeo Zone, Ethiopia.

	Pre-intervention	Post-intervention
% Moisture	9.65%	10.9%
Associated coffee mass per 450MT of cherry (kg)	92,762.5	89,100.0
Ideal coffee mass per 100MT with 11% moisture (kg)*	91,750.0	89,000.0
Coffee mass lost (kg)	1,012.5	100.0
Profit lost (USD)**	$8,482.20	$628.31

Note: **assumption made by taking the mean acceptable % moisture content as defined by the SCA; **calculated assuming Grade 1 price of $4.00(USD)/lb. and Grade 2 price of 3.20(USD)/lb. at a sales ratio of 75:25 Grade 1 and Grade 2 respectively.*

ANALYSIS OF LOSSES DUE TO PRIMARY AND SECONDARY DEFECTS

Coffee defects can have a significant impact on wet mill profitability, as they directly reduce both the volume and market value of the final product. Common defects such as insect damage, nipped or cut beans, and floaters can diminish cup quality and necessitate extra sorting and disposal, driving up operational costs. By identifying the defects present at wetmills, understanding their root causes and addressing them proactively, wet mills can preserve coffee quality, enhance market returns, and strengthen their overall financial position.

Prior to the Regrow Yirga project, defects made up 10.14% of all coffee samples evaluated at the Dilla lab, amounting to an estimated 6,736.7kgs* of coffee and $23,830.98USD** lost per 450MT of coffee cherry processed. Following project interventions, defects fell to 7.1% of the sample mass, yielding a reduced loss of 4,694.0kgs* and $16,604.84 per 450MT of coffee cherry. Overall, this improvement represents a 30% decrease in profit losses attributable to reject coffee.

Note: **volume was not calculated at 100% removal of reject coffee, instead volume lost was calculated at 100% removal of primary defects and 95% removal of secondary defects to make estimated losses more realistic; **calculated assuming Grade 1 price of $4.00(USD)/lb. and Grade 2 price of 3.20(USD)/lb. at a sales ratio of 75:25 Grade 1 and Grade 2 respectively.*

Table 3. Mass and composition of coffee defects observed in the samples of 60 wet mills in the Gedio Zone, Ethiopia from 2022 through 2024.		**Pre-intervention (2022)**		**Post-intervention (2023-2024)**	
		Mass (g)	**% sample composition (350g)**	**Mass (g)**	**% sample composition (350g)**
Primary Defects	Full Black	0.00	0.00%	0.01	0.00%
	Full Sour	0.03	0.01%	0.11	0.03%
	Fungus Damage	0.01	0.00%	0.13	0.04%
	Sever Insect Damage	2.33	0.66%	1.44	0.41%
	Dried Pod	0.02	0.01%	0.09	0.03%
	Foreign Matter	0.02	0.00%	0.00	0.00%
Secondary Defects	Partial Black	0.03	0.01%	0.03	0.01%
	Partial Sour	0.26	0.07%	0.46	0.13%
	Parchment	0.00	0.00%	0.00	0.00%
	Floater	**7.87**	**2.25%**	**1.65**	**0.47%**
	Immature	**1.84**	**0.53%**	**2.94**	**0.84%**
	Withered	1.15	0.33%	0.93	0.26%
	Shell	1.42	0.41%	1.54	0.44%
	Broken/Nipped	**10.22**	**2.92%**	**3.43**	**0.98%**
	Hull	0.04	0.01%	0.00	0.00%
	Slight Insect Damage	**10.16**	**2.90%**	**10.74**	**3.07%**
	Faded	0.09	0.03%	1.35	0.39%
Total Primary Defects		**2.40**	**0.69%**	**1.78**	**0.51%**
Total Secondary Defects		**33.09**	**9.46%**	**23.06**	**6.59%**
Total All Defects		**35.49**	**10.14%**	**24.84**	**7.10%**

Note: *Highlighted cells represent major defects present in coffee samples submitted to the Dilla office.*