

Supplementary Materials - Modeling Profitability in the Jamaican Coffee Industry

Supplementary File S1: Profitability Calculation Values

The formula used to calculate profitability:

$$Y_i = ((Yld_i - L_i) * P * SYld_i) - ((C_i * CT_i) * SC_i)$$

Where Y is the profit (or loss) in US dollars per unit area in area *i* at farm gate ; Yld is the coffee yield (in 60 lb. boxes) per unit area; L is the percentage crop loss (including loss due to pests and diseases) per unit area; P is the price paid per 60 lb. box of coffee cherry (price per box); SYld is a yield scale factor derived from the suitability model in Mighty (2015) and incorporates JACRA's yields estimations; C is the production costs (per unit area); CT is the contingency cost (accounting for various unforeseen expenses) per unit area; SC is the production scale factor derived from the suitability model in Mighty (2015).

All values are per unit area (per 0.222 acre or 0.09 hectare) and figures in tables below are in US (Jamaican) dollars. Price and cost data provided by JACRA.

Conversion to US dollars utilized the following exchange rates:

- 2016-2017 exchange rate: 1USD = 128.6 JMD
- 2018-2019 exchange rate: 1USD = 131.5 JMD

Income			Expenses		
Variables	Values for 2016/2017	Values for 2018/2019	Variables	Values for 2016/2017	Values for 2018/2019
Ideal mature tree count	193.58	193.58	Labor Cost	\$204.09 (J\$26,245.73)	\$201.98 (J\$26,560.86)
Coffee berry production (lbs.)	1258.27	1258.27	Insecticide Cost	\$6 (J\$771.29)	\$5.95 (J\$782.12)
Coffee berry production (60 lb. boxes)	20.97	20.97	Fungicide Cost	\$12.51 (J\$1,609.06)	\$12.24 (J\$1609.03)
Price per box	\$77.76 (J\$ 10,000) - JBM Region \$38.88 (J\$5,000) - NBM Region	\$38.02 (J\$5,000) - JBM Region \$26.62 (J\$3,500) - NBM Region	Fertilizer Cost	\$82.29 (J\$10,582.30)	\$81.65 (J\$10,736.59)
Percentage production loss	9.63% (JBM Region) 10% (NBM Region)	9.63% (JBM Region) 10% (NBM Region)	Herbicide Cost	\$5.94 (J\$764.12)	\$5.86 (J\$773.88)
Yield per box	Final yield values after accounting for production losses:	Final yield values after accounting for production losses:	Other Materials Cost	\$44.65 (J\$5,741.59)	\$44.23 (J\$5,816.28)

	18.95 (JBM Region) 18.87 (NBM Region)	18.95 (JBM Region) 18.87 (NBM Region)			
Income Total	Formula = Price per box * Yield per box Final value will vary based on the scenario: \$1,1473.56 (J\$189,500) - JBM Region; \$733.67 (J\$94,350) - NBM Region	Formula = Price per box * Yield per box Final value will vary based on the scenario: \$720.53 (\$94,750) - JBM Region; \$502.24 (J\$66,045) - NBM Region	Transportation Cost (fertilizer and other materials to the farm)	\$17.26 (J\$2,220)	\$16.88 (J\$2,220)
Yield scale factor	Based on coffee production suitability. Areas rated 7-9 = 1.0 (maximum level of production); areas rated 4-6 = 0.95 (95% of maximum yield); areas rated 1-3 = 0.9 (90% of maximum yield).	Based on coffee production suitability. Areas rated 7-9 = 1.0 (maximum level of production); areas rated 4-6 = 0.95 (95% of maximum yield); areas rated 1-3 = 0.9 (90% of maximum yield).	Equipment Rental Cost	\$14.67 (J\$1,887)	\$14.35 (J\$1,886.96)
Adjusted yield per box	Final value influenced by yield scale factor. Formula = Yield per box * Yield scale factor	Final value influenced by yield scale factor. Formula = Yield per box * Yield scale factor	Harvesting Cost	Cost = \$7.21 (J\$927) per box. Formula = Yield per box * \$7.21 (J\$927) → \$136.60 (J\$17,566.65) - JBM Region; \$136.02 (J\$17,492.49) - NBM Region	Cost = \$7.14 (J\$939) per box. Formula = Yield per box * \$7.14 (J\$939) → \$132.32 (J\$17,794.05) - JBM Region; \$134.74 (J\$17,718.93) - NBM Region
Adjusted Income	Final value influenced by yield scale factor. Formula = Adjusted yield per box * Price per box	Final value influenced by yield scale factor. Formula = Adjusted yield per box * Price per box	Contingency Cost	5% of the total above-mentioned cost Formula = Sum of all above costs * 0.05	10% of the total above-mentioned cost Formula = Sum of all above costs * 0.10
			Production Total	Total of above-mentioned costs (including the contingency costs)	Total of above-mentioned costs (including the contingency costs) Formula = sum of all above costs

				Formula = sum of all above costs	
			Production cost scale factor	Based on coffee production suitability. Areas rated 7-9 = 1.0 (base level production costs); areas rated 4-6 = 1.05 (5% increase in production costs); areas rated 1-3 = 1.1 (10% increase in production costs).	Based on coffee production suitability. Areas rated 7-9 = 1.0 (base level production costs); areas rated 4-6 = 1.05 (5% increase in production costs); areas rated 1-3 = 1.1 (10% increase in production costs).
			Adjusted harvesting cost	Final value influenced by production cost scale factor: Formula = Adjusted yield per box * \$7.21 (J\$927)	Final value influenced by production cost scale factor: Formula = Adjusted yield per box * \$7.14 (J\$939)
			Adjusted contingency cost	Final value influenced by production cost scale factor: 5% of the total above-mentioned cost but using <i>adjusted harvesting costs</i> instead of initial harvesting cost. Formula = Sum of all above costs (but using <i>adjusted harvesting costs</i>) * 0.05	Final value influenced by production cost scale factor: 10% of the total above-mentioned cost but using <i>adjusted harvesting costs</i> instead of initial harvesting cost. Formula = Sum of all above costs (but using <i>adjusted harvesting costs</i>) * 0.10
			Adjusted production cost	Total of above-mentioned costs but using <i>adjusted harvesting and contingency costs</i> instead of initial values. Formula = Total of above-mentioned costs (but using <i>adjusted harvesting and adjusted contingency costs</i>)	Total of above-mentioned costs but using <i>adjusted harvesting and contingency costs</i> instead of initial values. Formula = Total of above-mentioned costs (but using <i>adjusted harvesting and adjusted contingency costs</i>)

Revenue	Profit (Loss) based on net revenue. Formula = Income Total – Production Total	Profit (Loss) based on net revenue. Formula = Income Total – Production Total	Adjusted Revenue	Profit (Loss) based on adjusted net revenue. Formula= Adjusted income – Adjusted production costs.	Profit (Loss) based on adjusted net revenue. Formula= Adjusted income – Adjusted production costs.

Note: a complete excel table with even more production details can be obtained by contacting the Data Coordinator at JACRA (info@jacra.org).

Supplementary Table S1: Key Profitability Statistics for the 2016-2017 and 2018-2019 coffee years

All values are per unit area (per 0.222 acre or 0.09 hectare) and figures in tables below are in US dollars

2016-2017 Coffee Year									
Area / Region	Estimated Income per unit area: \$US			Estimated Production Costs per unit area: \$US			Estimated Profit per unit area: \$US		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Overall	723.31	660.46	1,473.72	580.32	549.64	605.25	142.99	55.86	923.49
JBM	1,418.27	1,326.35	1,473.72	570.93	550.23	605.25	847.35	721.10	923.49
NBM	692.32	660.46	733.84	580.74	549.64	604.60	111.58	55.86	184.20
Eastern	908.81	660.46	1,473.72	577.84	549.64	605.25	330.96	55.86	923.49
Northern	693.59	660.46	1,473.72	580.19	549.64	604.60	113.40	55.86	923.49
Central	690.12	660.46	733.84	582.39	549.64	604.60	107.73	55.86	184.20
Western	695.77	660.46	733.84	578.16	549.64	604.60	117.61	55.86	184.20

2018-2019 Coffee Year									
Area / Region	Estimated Income per unit area: \$US			Estimated Production Costs per unit area: \$US			Estimated Profit per unit area: \$US		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Overall	483.31	452.13	720.61	572.28	542.03	596.86	-88.91	-143.99	177.87
JBM	693.50	648.55	720.61	563.02	542.60	596.86	130.58	51.65	177.87
NBM	473.94	452.13	502.36	572.70	542.03	596.23	-98.69	-143.99	-39.63
Eastern	539.40	452.13	720.61	569.84	542.03	596.86	-30.42	-143.99	177.87
Northern	474.60	452.13	720.61	572.15	542.03	596.23	-97.48	-143.99	177.87
Central	472.43	452.13	502.36	574.32	542.03	596.23	-101.82	-143.99	-39.63
Western	476.30	452.13	502.36	570.15	542.03	596.23	-93.78	-143.99	-39.63

2016-2017 exchange rate: 1USD = 128.6 JMD

2018-2019 exchange rate: 1USD = 131.5 JMD