



# Yemen's Traditional and Resilient Coffee Sector: Production Totals Steady from 1690 to Present

## Citation

Greeney, Anda. 2022. Yemen's Traditional and Resilient Coffee Sector: Production Totals Steady from 1690 to Present. Master's thesis, Harvard University Division of Continuing Education.

## Permanent link

<https://nrs.harvard.edu/URN-3:HUL.INSTREPOS:37370751>

## Terms of Use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at <http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA>

## Share Your Story

The Harvard community has made this article openly available.  
Please share how this access benefits you. [Submit a story](#).

[Accessibility](#)

Yemen's Traditional and Resilient Coffee Sector:  
Production Totals Steady from 1690 to Present

Anda Greeney

A Thesis in the Field of Foreign Literature, Language & Culture  
for the Degree of Master of Liberal Arts in Extension Studies

Harvard University

March 2022



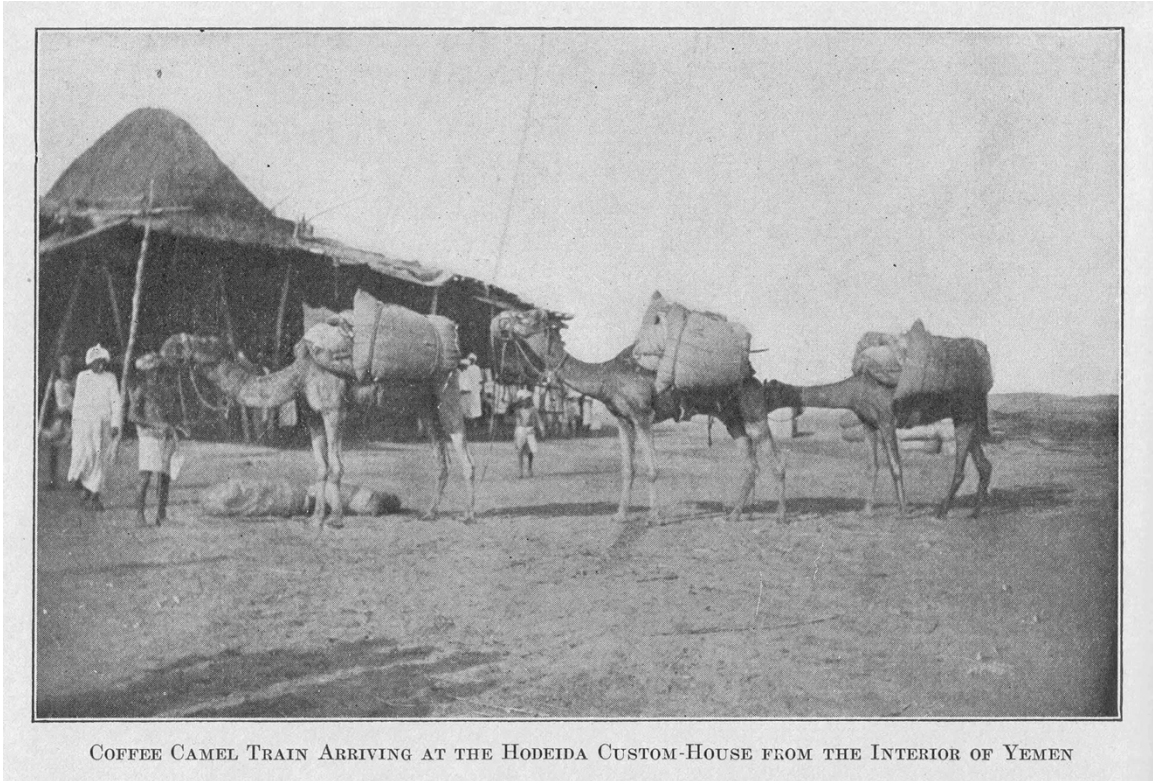
## Abstract

Yemen's total coffee production has remained relatively stable over more than four centuries—1690 to present— and averages about 10,000 metric tonnes per year, plus or minus about 5,000 metric tonnes. The uncertainty in total output—5,000 to 15,000 metric tonnes—is uncertainty not just in the historical record, but uncertainty that exists even today. In 2019, the latest year in which the Food and Agriculture Organization (FAO) and International Coffee Organization (ICO) publish coffee output totals for Yemen, the estimates differ nearly fourfold.

For the twentieth and twenty-first century I interrogate FAO and ICO coffee production data and find that production totals are deeply imprecise over the last one-hundred years but do seem within the range given. This contrasts with claims of Yemen's declining production and faltering industry, often noted in international development reports and casual Yemen coffee news articles.

For the historic record—eighteenth and nineteenth centuries—I refine definitions of pre-colonial coffee trading terms such as bahar, bale, farda and himl, and I apply these more precise definitions to historic records. I find production totals of about 10,000 metric tonnes in both centuries.

## Frontispiece



Three camel loads or three *himl* of green coffee. Theoretically, a *himl* or camel load is two bales or two *farda*, each weighing about 100–150 kilograms. A camel carries 200–300 kilograms.<sup>1</sup>

---

<sup>1</sup> William Ukers, *All about Coffee*, 2nd ed. (The Tea and Coffee Trade Journal Company, 1935), 342. Photograph pre-dates 1922, the year the first edition was published.

## Author's Biographical Sketch

In 2013 the author—in his first semester of what became an eight-year Master's program—wrote a final paper about encouraging economic growth of Yemen's coffee sector. He has been thinking critically about Yemen's coffee since then.

But that is not all. In that same semester, a serendipitous email gave the author a chance to put ideas into practice. There was an entrepreneurship competition, the Harvard President's Challenge—and a company specializing exclusively in Yemeni coffee was born. The author has been building the company ever since.

This master's thesis is the culmination of eight years of research and reflection, and eight years of business experience.

The author has a bachelor's degree from Wesleyan University, and he is an Air Force veteran.

## Dedication

This thesis is dedicated to a growing and thriving coffee economy in Yemen and improved livelihoods for Yemeni people.

## Acknowledgments

I would like to thank these individuals: Professor Steven J. Harris who oversaw my 2013 final paper on Yemen's coffee sector, and who sent me an email about the Harvard President's Challenge; Dr. Shoemaker for his patience and guidance as he ushered my thesis proposal forward over two semesters and multiple delays; and my thesis director Professor Steven Caton who in 2014 responded to an email asking Yemen coffee questions, and then six years later he agreed to direct my Master's thesis, despite never having me as a student.

And most important, I would like to thank the coffee traders, coffee drinkers, and coffee lovers of all things Yemen, who have only grown my passion for this topic.

I hope this thesis will form one part of a doctoral dissertation, perhaps titled, *Traditionally Excellent and Fading to Obscurity: A Counter-Narrative of Yemen's Coffee Sector in Four Parts*. In completing this first portion, I have never enjoyed writing anything so much.



## Table of Contents

|   |     |
|---|-----|
| Frontispiece.....   | iv  |
| Author’s Biographical Sketch.....   | v   |
| Dedication.....   | vi  |
| Acknowledgments.....  | vii |
| List of Tables .....  | x   |
| List of Figures.....  | xi  |
| Definition of Terms.....  | xii |
| Chapter I. Introduction.....  | 1   |
| Chapter II. Twentieth Century Coffee Production.....                          | 5   |
| FAO Dataset 1961–2019.....  | 6   |
| ICO Dataset 1991-2020 .....   | 9   |
| ICO Dataset 1965–1989.....  | 14  |
| FAO Dataset 1929–1960.....  | 15  |
| Chapter III. Units of Weight Used in Pre-Colonial Yemen Coffee Logistics..... | 17  |
| Historic Coffee Trading Units: Three Types .....                              | 20  |
| Traditional Units .....   | 23  |
| Bahar.....  | 23  |
| Bale .....  | 26  |
| Farda .....   | 28  |
| Himl .....  | 30  |
| Weight Units.....   | 31  |

|  |    |
|--|----|
| Mann .....   | 31 |
| Ratl .....   | 32 |
| Okka .....   | 34 |
| Qintar .....   | 34 |
| Volumetric Units.....  | 35 |
| Rub.....   | 36 |
| Farq .....   | 36 |
| Liter of Green Coffee by Weight .....  | 38 |
| Chapter IV.    Late-Seventeenth through Nineteenth Century Coffee Production ..... | 40 |
| Michel Tuchscherer Book Chapter, circa 1690–1800 .....                             | 41 |
| Michel Tuchscherer Book Chapter, 1800–1900 .....                                   | 52 |
| Chapter V.    Summary and Conclusions .....  | 57 |
| Appendix 1.    Production Datasets .....   | 59 |
| Works Cited .....  | 63 |

## List of Tables

|          |   |    |
|----------|---|----|
| Table 1. | Units of Weight Used in Pre-Colonial Yemen Coffee Logistics ..... | 22 |
| Table 2: | Importation of Yemeni Coffee into Cairo, 1660–1798.....           | 49 |
| Table 3. | FAO Data: Yemen Green Coffee Industry, 1961–2019 .....            | 59 |
| Table 4. | ICO Data: Yemen Green Coffee Industry, 1991–2020 .....            | 61 |
| Table 5. | FAO Data: Yemen Coffee Exports, 1929–1960 .....                   | 62 |

## List of Figures

|           |   |    |
|-----------|---|----|
| Figure 1. | FAO Data: Yemen Green Coffee Industry, 1961–2019 .....              | 6  |
| Figure 2. | Coffee Yields per Hectare (FAO data) .....                          | 8  |
| Figure 3. | ICO Data: Yemen Green Coffee Industry, 1991–2020 .....              | 10 |
| Figure 4. | ICO Data: Comparing 2012 Published Data vs 2020 Published Data..... | 12 |
| Figure 5. | Yemen’s Green Coffee Production and Exports, 1961–2020.....         | 13 |
| Figure 6. | FAO Data: Annual Exports of Yemeni Coffee, 1929–1960.....           | 15 |

## Definition of Terms

A note on coffee: a coffee shrub has coffee fruit, which is often called coffee cherries. The cherries have an outer flesh that when dried becomes qishr; and nestled within are two seeds or coffee beans.

**Coffee:** It can be a fresh cherry, a raw green bean, a roasted bean, or a brewed beverage.

**Coffee Quality:** Good is what consumers prefer generally.

**Qishr** (qisher, geshr, gesher, kishr, kisher): The dried husk of the coffee cherry, which is often used to brew qishr tea.

**Roast Level:** Coffee beans can be roasted as a lighter or darker roast, which correspond with the temperature to which the bean is roasted, e.g 400–460 degrees Fahrenheit, for light to dark roast respectively. Lighter roasts show more origin characteristics and darker roasts taste more burnt or carbonized.

**Tonne:** A metric ton of 1000 kilograms.

## Chapter I.

### Introduction

Yemen holds a special place in coffee history. While the coffee plant, *Coffea Arabica*, was indigenous to Ethiopia, the cultivation and drinking of the brewed beverage started in Yemen, circa 1450. For the next 250 years Yemen monopolized coffee production as consumption of the beverage spread abroad. If one drank coffee in 1550 Aleppo or 1650 London, it came via Yemen. Yemen's production monopoly ended, however, in the first half of the eighteenth century as Javanese and then new world coffee production began. By 1840 Yemen produced just two to three percent of global supply<sup>2</sup> and today Yemen produces less than one percent. Why has Yemen been left behind as other origins have grown and thrived? One explanation frequently given today—in international development literature and in reference to the twentieth century—is that Yemen's production totals have fallen, and Yemen has become forgotten.

In this thesis I hypothesize in fact that Yemen's production volume peaked in the first quarter of the eighteenth century, and that *production volumes have remained relatively constant over the last 400 years*, averaging about 10,000 metric tonnes annually, plus or minus 5,000 tonnes. In short, Yemeni coffee production has been remarkably consistent.

Notably, the pitfalls in this study too seem remarkably consistent. In every century there is a sense that Yemeni coffee was better before. In the twenty-first century,

---

<sup>2</sup> W. G. Clarence-Smith and Steven Topik, eds., *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989* (Cambridge, UK ; New York: Cambridge University Press, 2003), 55.

development reports and casual coffee literature speak of better Yemeni coffee in the mid-twentieth century. This is paralleled by nearly identical reports made two-and-a-half centuries before. In 1750 Cairo, consuls and voyagers there observed Yemeni coffee imports and tended to consider that the situation earlier in the century was better than what they saw by their own eyes.<sup>3</sup> And for the nineteenth century, the scholar Tuchscherer writing in the present day, forms a similar narrative of better days in the early part of the century.<sup>4</sup>

All these anecdotes hint at declining production. But is production actually declining or does it remain constant?

To answer this question, for the twentieth century I investigate datasets of Yemen's coffee production by the Food and Agriculture Organization and International Coffee Organization. This is chapter II.

For the eighteenth and nineteenth century I rely on a book chapter by Tuchscherer<sup>5</sup> in which he summarizes Yemen coffee findings and production totals of those two centuries. That is chapter IV.

For chapter III—the intervening chapter—I tackle a lacuna in the scholarly literature in which many coffee trading terms such as bahar, bale, fard, and farq are poorly defined. To better define them, I systematically analyze every mention of every trading term found in the edited work, *The Commerce of Coffee Before the Colonial*

---

<sup>3</sup> André Raymond, *Artisans et Commerçants Au Caire Au XVIIIe Siècle* (Damas: Institut français de Damas, 1973), 129.

<sup>4</sup> Michel Tuchscherer, “Coffee in the Red Sea Area from the Sixteenth to the Nineteenth Century,” in *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989*, ed. W. G. Clarence-Smith and Steven Topik (Cambridge, UK ; New York: Cambridge University Press, 2003), 50–66.

<sup>5</sup> Tuchscherer, “Coffee in the Red Sea Area.”

Plantation Era.<sup>6</sup> In doing so, I build *Table 1. Units of Weight Used in Pre-Colonial Yemen Coffee Logistics*. With these better-defined trading terms, I probe, question, and refine Tuchscherer's scholarship, for more robust conclusions of production totals.

There are several caveats about production data, many of which are raised by Samper and Fernando in their summary of Coffee Production and Trade from 1700 to 1960.<sup>7</sup> Here are my concerns, which are also a subsection of their concerns.

Yemen is often considered a producing country, and within this thesis and in sources elsewhere, total exports and total production are considered to be the same. I use these terms interchangeably, reflecting their use in the sources from which I work. An unanswered question is what portion of Yemen's total production is consumed domestically and what portion is exported, both today and in the historic record.

Regarding coffee exports and imports, volumes smuggled is unknown.

Finally, Samper cautions that their dataset is useful "...to perceive approximate magnitudes and general trends."<sup>8</sup> I would underscore this sentiment: Yemen's production has likely been 5,000–15,000 tonnes over the last 400 years. Greater precision than this requires an increasing number of caveats. I view this thesis not as the final word on Yemen's total coffee production; rather, it is just a starting point of inquiry. There is much to refine.

---

<sup>6</sup> Michel Tuchscherer, ed., *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)* (Le Caire: Institut Français d'Archéologie Orientale, 2001).

<sup>7</sup> Mario Samper and Radin Fernando, "Historical Statistics of Coffee Production and Trade from 1700 to 1960," in *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989*, 2003, 411–62.

<sup>8</sup> Samper and Fernando, "Historical Statistics of Coffee Production," 418.



I will close with this quote by the historian Fernand Braudel:

*“There is a danger that the history of coffee may lead us astray. The anecdotal, the picturesque and the unreliable play an enormous part in it.”<sup>9</sup>*

My caution to scholars of Yemeni coffee is that the meta-narrative of Yemen’s declining production may only reflect a wish for the undefined yet omnipresent “good old days”.

---

<sup>9</sup> Fernand Braudel, *Civilization and Capitalism, 15th-18th Century*, 1st U.S. ed (New York: Harper & Row, 1982), 256.

## Chapter II.

### Twentieth Century Coffee Production

For insight into coffee production in Yemen 1960 to present, there are two important datasets to consult—FAO and ICO—which collectively tell an ambiguous story of Yemen’s coffee productivity: Is total production increasing and 20,000 tonnes per year? Or is it decreasing and 5,000 tonnes annually? These datasets, compiled by the Food and Agriculture Organization (FAO) and International Coffee Organization (ICO), are frequently cited in international development reports. And this story of ambiguous total production is found in the data twofold, both by *comparing* the datasets vis-à-vis the other *and* by investigating *within* the dataset, specifically revisions to the dataset after first publication. Such revisions reflect the imprecision of the data.

Broadly, and for the last fifteen years, the FAO dataset tells a story of *increasing* production, whereas the ICO dataset tells a story of *declining* production. In 2019, production totals are about 20,000 and 5,000 tonnes respectively (see figure 5).

These datasets were chosen because they are the only ones referenced in a range of development reports, and it seems they are the only datasets of this nature. That said, Yemen’s Ministry of Agriculture and Irrigation may publish data used by one or both organizations, and that raw data could reveal additional insights.

In the next two sections I explore these two datasets.

## FAO Dataset 1961–2019

The Food and Agriculture Organization (FAO) of the United Nations compiles agricultural data, including coffee production and trade figures for Yemen, from 1961 to present. Data include total production, green coffee exported and imported, hectares harvested, yields per hectare, and more. This dataset provides one viewpoint of Yemen’s coffee production over the last sixty years. More broadly, this FAOSTAT database provides (in their own words) “food and agriculture statistics for over 245 countries and territories...from 1961 to the most recent year available.”

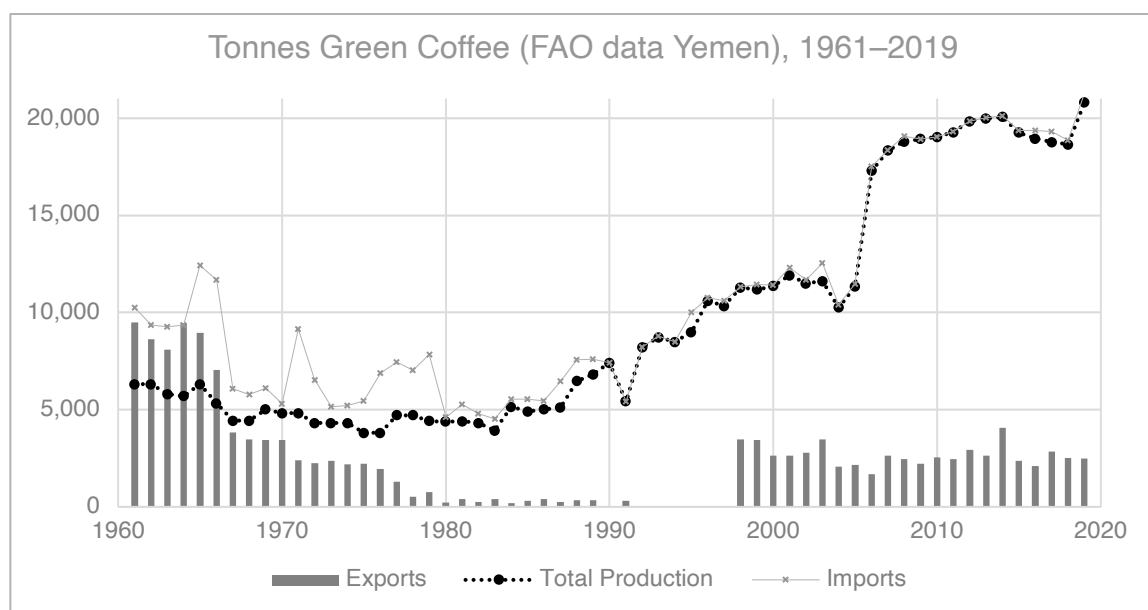


Figure 1. FAO Data: Yemen Green Coffee Industry, 1961–2019<sup>10</sup>

*Total production has odd, large increase 2005–2006. Imports are depicted as stacked line graph. That stacked line always exceeds exports. See raw data in appendix 1.*

<sup>10</sup> FAO, “FAOSTAT Statistical Database / Yemen Coffee Data,” Database, 2021, <https://www.fao.org/faostat/en/#home>.

In this figure, Yemen's **total production** averages about 5000 metric tonnes from 1961–1991. From 1991–2020 production increases to 20,000 tonnes. In 2005–2006, production oddly increases rapidly.

**Exports** decrease 1961–1980, are nearly zero 1980–1997, and average about 3000 tonnes 1997–2019.

**Imports** are graphed as a stacked line graph, in which annual imports vary 1961–1980 from about zero to 6000 tonnes. In contrast, 1981–2019, annual imports are close to zero and never exceed about 1000 tonnes.

In this dataset, there are many oddities. In the 1960s, how are exports so much greater than total production? There are limited imports. In 1997/1998, why do exports rocket from zero to about 4000 tonnes? In 2005/2006, why does total production jump about 7000 metric tonnes? Since 1980, why does total production exceed exports by so much? In Yemen is 60–90% of coffee consumed domestically? I raise these questions not because I have answers, but because they highlight the *deep* ways in which the dataset is limited and flawed. International development reports citing this data are unable to make sense of these quirks, including reports in 2005,<sup>11</sup> March 2008,<sup>12</sup> April 2008,<sup>13</sup> and 2013.<sup>14</sup> Paulsen in particular notes the 2005/2006 jump and states that "...there is no

---

<sup>11</sup> USAID, "Moving Yemen Coffee Forward: Assessment of the Coffee Industry in Yemen to Sustainably Improve Incomes and Expand Trade" (US Agency for International Development, December 2005).

<sup>12</sup> USAID, "Expanding Yemen's Specialty Coffee Industry: Strengthening the Role and Capacity of the Yemen Coffee Association and Coffee Producer Associations," March 2008.

<sup>13</sup> USAID, "Yemen Agricultural Support Program: Final Report October 2005 - April 2008," 2008.

<sup>14</sup> USAID, "Rediscovering Coffee in Yemen: Updating the Coffee Value Chain and a Marketing Strategy to Reposition Yemen in the International Coffee Markets," 2013.

clear explanation for this increase...”<sup>15</sup> In a REACH/ACTED report, consumption patterns of farmers and their associates are far lower than what this data would indicate.<sup>16</sup>

To better understand and probe this data, we can graph coffee yields per hectare (figure 2). In doing so, we can further illuminate the problems with this dataset.

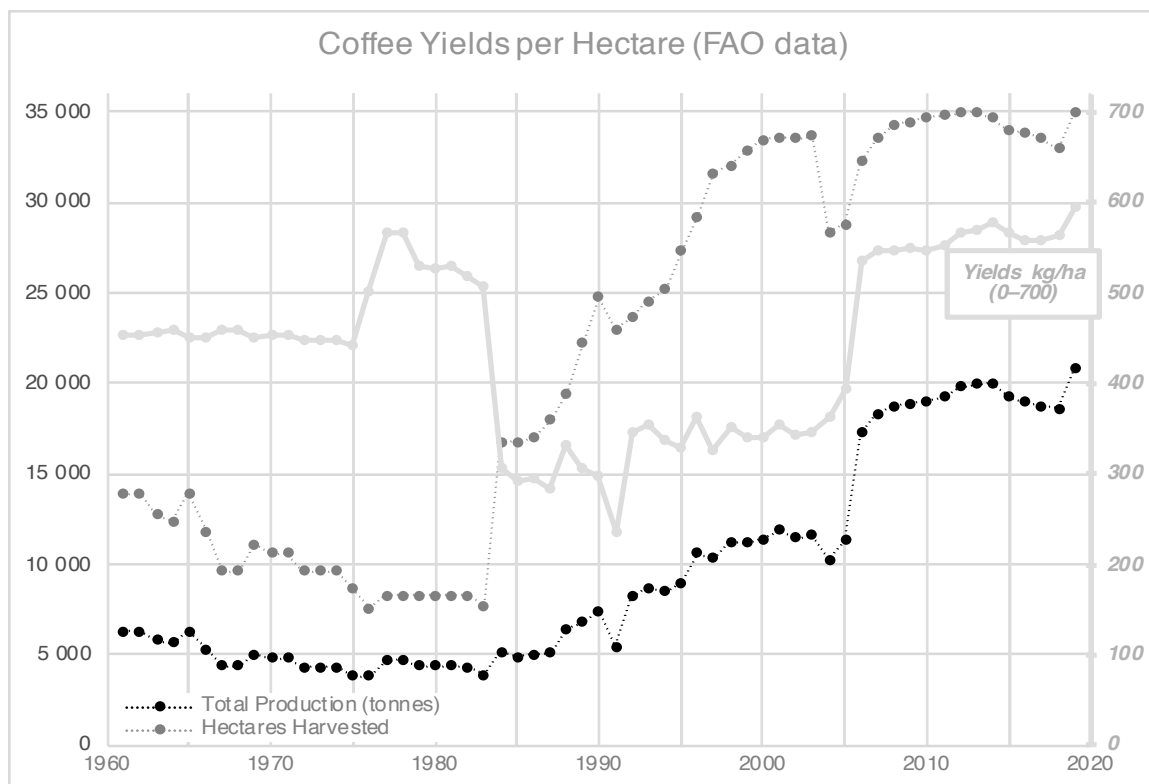


Figure 2. Coffee Yields per Hectare (FAO data)<sup>17</sup>

*The dotted lines use the left-hand axis (tonnes), and the solid gray line uses the right-hand axis (kg/hectare).*

<sup>15</sup> Olaf Paulsen, “Breaking the Vicious Cycle in Coffee: Results from a Value Chain Analyses of the Coffee Industry in Yemen” (German Technical Cooperation (GTZ) and Small and Micro Enterprise Promotion Service (SMEPS), 2008), 8.

<sup>16</sup> REACH, ACTED, IMPACT., “Coffee Production Assessment in Raymah Governorate, Yemen – Preliminary Findings,” June 2014, 16.

<sup>17</sup> FAO, “FAOSTAT Statistical Database.”

In figure 2 we see rapid fluctuations in yields per hectare (solid gray line, right-hand axis) between 1975 and 2006. This indicates either that total production *or* hectares harvested are changing drastically, but not in tandem with the other. In contrast, we would expect yields per hectare to remain relatively constant or change incrementally, like 1960 to 1975. If innovations improved yields, we would see a steady increase. If a natural disaster destroyed coffee, we would see hectares harvested remain steady while yields dropped. But instead we see an odd increase 1983/1984 in which hectares harvested nearly doubled but total production stayed steady. Or in 2005/2006 yields jumped and total production jumped. Nothing in Yemen can explain this this jump.

The simple explanation for all of this, is this data is of very poor quality. And in the six referenced international development reports, the authors are unable to make sense of it.

This aside, what can we learn from this data? It appears that exports are 3000 metric tonnes or more, and that production is above that—albeit with much uncertainty.

An avenue for future research is looking at import data for Yemeni coffee. If importing nations combined have relatively robust data, those totals would indicate a value above which is Yemen's total coffee production.

#### ICO Dataset 1991-2020

The International Coffee Organization (ICO) maintains historical data 1965–present of a variety of coffee metrics including total production, exports, domestic consumption, and more. The organization itself was established in 1963 under UN auspices, and is (according to their website) “...the main intergovernmental organization

for coffee...Its Member Governments represent 98% of world coffee production and 67% of world consumption.”

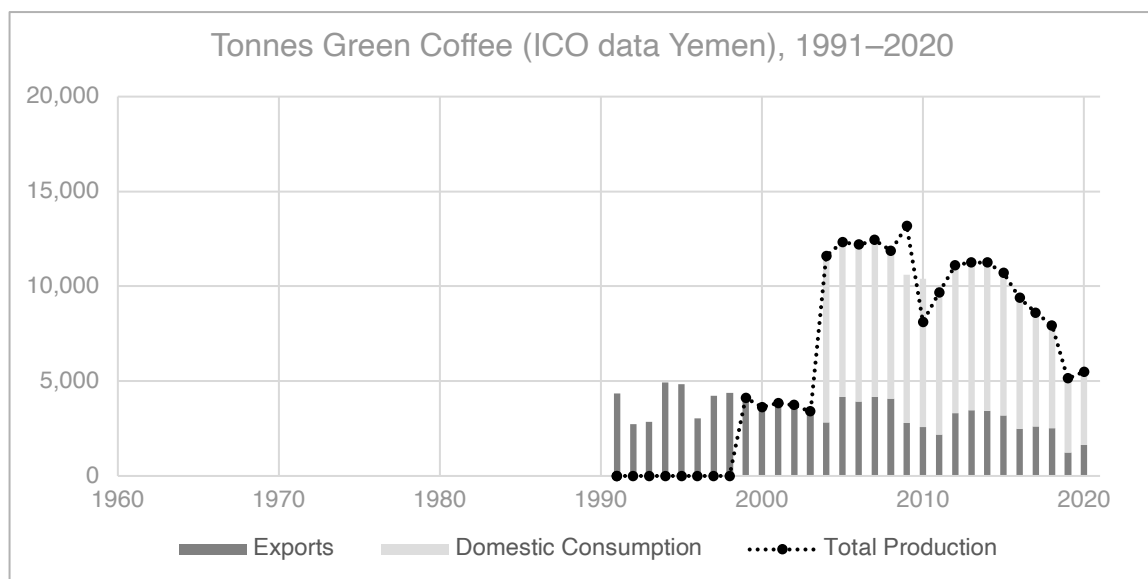


Figure 3. ICO Data: Yemen Green Coffee Industry, 1991–2020<sup>18</sup>

*Numerous oddities with this data, such as exports exceeding total production of zero; domestic consumption going from zero to about 60–70%; and total production dropping rapidly over the last decade. See raw data in Appendix 1.*

In this figure **total production** is zero in 1991–1998, increases and peaks in 2009, and declines 2009–2020. Oddly, in 2003–2004, production increases rapidly, whereas it is nearly unchanged four years before and four years after.

<sup>18</sup> International Coffee Organization, “Historical Data on the Global Coffee Trade / Yemen Coffee Data,” Database, 2020, [https://www.ico.org/new\\_historical.asp](https://www.ico.org/new_historical.asp).

ICO Yemen data is based on an October crop year, which runs from Oct 1–Sept 30 the following year. As such, the 2020 data point is plotted as September 30, 2020, and reflects coffee production from Oct 01, 2019–Sept 30, 2020. An October crop year makes sense for Yemen, in which the main crop is harvested approximately November–February, with a smaller harvest in the late Spring.

**Exports** slowly decline 1990–2020. Oddly, 1991–1998 exports exceed total production (of zero) whereas 1999–2003, exports and total production are identical. Notably, the ICO dataset does not include coffee imports at all.

**Domestic consumption** is depicted as a stacked bar graph (light gray) on top of exports. Such consumption largely closes the gap between exports and total production.

The ICO data appears to work from a formula or relationship as such: Total Production = Exports + Domestic Consumption.

The way these data are compiled underscores the imprecise way in which it is assembled, and the variety of assumptions. During the 17-year period of 2005–2020, exports plus domestic consumption generally equals total production. There is an exception in 2009–2011 when it appears there was some estimation occurring; namely, from 2008 to 2014 domestic consumption is estimated as 7,800 tonnes. However, during this seven-year estimation period, only three years do not add up perfectly. Taken together, we can draw a few conclusions:

- First, the ICO is working from the assumption that in any given year, Yemen's production is *either* exported or consumed domestically. Their formula is such: production = exports + domestic consumption The assumption is Yemen imports no coffee. This assumption may be reasonable.
- Second, the ICO appears to estimate either total production, exports, or domestic consumption, per the formula above. From 2004 to 2020, the numbers add up perfectly, except for three years.

Quite simple, the ICO data are noisy and have many unexplained quirks. It mirrors the FAO data in this way.



The ICO dataset also varies internally, as it is revised. In figure 4, compare 2012 published data to that published in 2020.

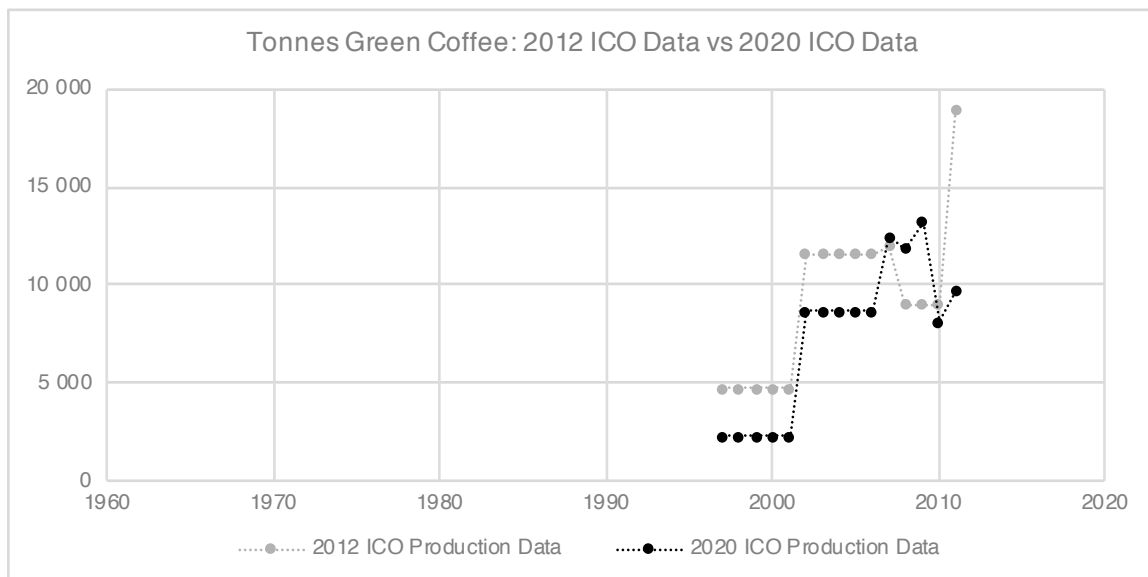


Figure 4. ICO Data: Comparing 2012 Published Data<sup>19</sup> vs 2020 Published Data<sup>20</sup>

*Following a data revision in 2020 vs 2012, for a 1997–2011 time period, total production drops about 2,500 tonnes, and for the years 1997–2001, this amounts to a halving of total production.*

In this figure, we can see the imprecision of the ICO data. Between 2012 and 2020, the dataset was revised, and total production dropped by about 2,500 tonnes over the entire time period. For the years 1997–2001, this amounts to a halving of total production. Even worse, these 2020 data do not match the full 2020 dataset given by ICO in a separate report, and graphed in figure 3. Clearly, the ICO data—like the FAO data—come with many caveats.

<sup>19</sup> International Trade Centre, *The Coffee Exporter's Guide*, 3rd ed., 2012, 13.

<sup>20</sup> International Coffee Organization, "Historical Data on the Global Coffee Trade."

In figure 5, I graph both the FAO data<sup>21</sup> and the ICO<sup>22</sup> data together.

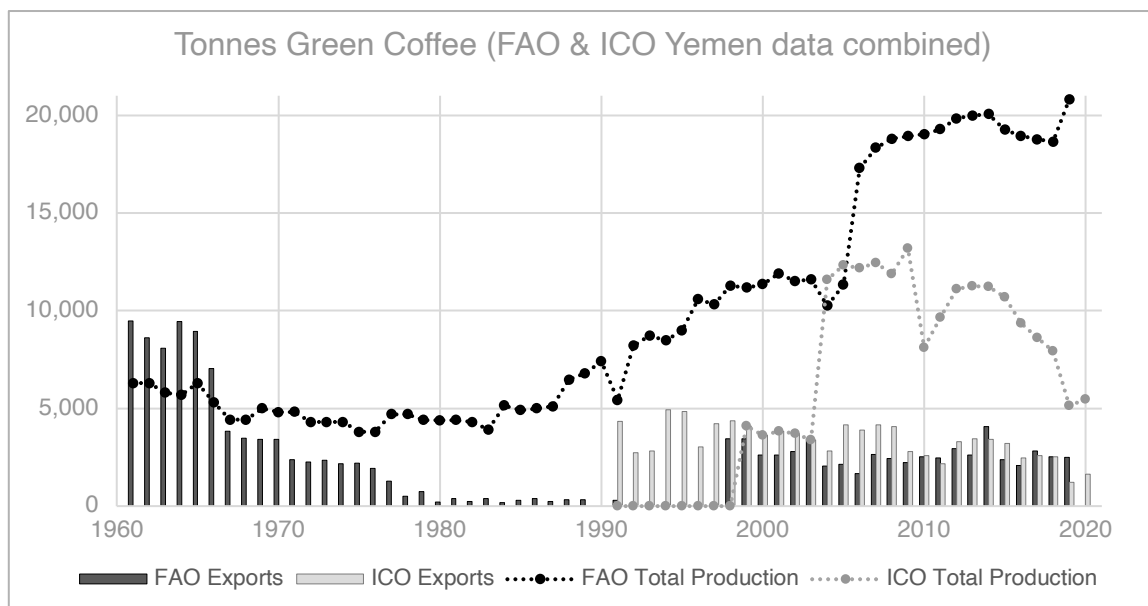


Figure 5. Yemen's Green Coffee Production and Exports, 1961–2020

*Over the last fifteen years, FAO data shows increasing production whereas ICO data shows declining production. Since 1998, export totals in both datasets are similar. See raw data in appendix 1.*

In graphing these two datasets, we can draw two obvious conclusions. First, total production is deeply ambiguous for the last fifteen years. FAO data shows increasing production whereas ICO data shows declining production. In contrast, exports in the two datasets are remarkably similar, averaging about 2,500 to 4,000 tonnes.

So what can we learn from these datasets? First, Yemen is producing and exporting coffee. And in all instances, the totals are greater than 2,000 tonnes and less

<sup>21</sup> FAO, "FAOSTAT Statistical Database."

<sup>22</sup> International Coffee Organization, "Historical Data on the Global Coffee Trade."

than about 20,000 tonnes. This is an order of magnitude. Within this range sits Yemen's historic seventeenth and eighteenth century production totals of about 10,000 tonnes.

#### ICO Dataset 1965–1989

In a November 2021 email request to the statistical division of the ICO I requested any data pertaining to Yemen's coffee trade and production, 1965-1989, and prior to 1965. Unfortunately, they do not have data for this time period. Their response: "The Secretariat of the ICO is unable to assist you. The [Yemen] data available within the coffee database of the ICO is limited to 1988 onwards. Furthermore, we are unable to provide an alternative source of information for our study."

The lack of data is not entirely unexpected as Yemen was not part of the ICO for many years, and only joined circa the late 1980's.

### FAO Dataset 1929–1960

FAO published this dataset in 1961, covering the 1929–1960 time period. It is graphed below.

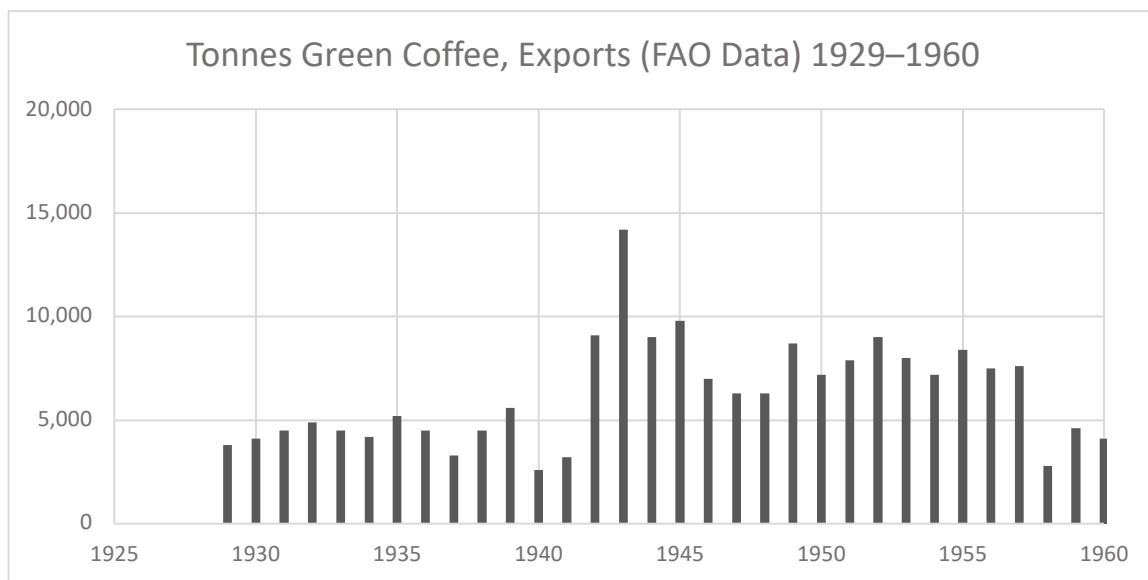


Figure 6. FAO Data: Annual Exports of Yemeni Coffee, 1929–1960<sup>23</sup>

*During this time period, we see that Yemen's total exports averaged about 5,000 metric tonnes. The increase in 1942–1957 is odd. See raw data in appendix 1.*

In Figure 6, we see FAO data for 1929–1960. It seems that exports are around 5,000 tonnes. It is unclear if the increase in exports in 1942–1957 reflects an increase in production, reexports of coffee from other origins, a decrease in domestic consumption, or simply inaccurate data. Additionally, if we compare the latter half of this dataset to the first five years (i.e. 1961–1965) of the follow-on FAO dataset, we see similar export

<sup>23</sup> FAO, *The World Coffee Economy*, vol. 33, Commodity Bulletin Series (Rome, 1961), 55–56.

figures of about 8,000–9,000 tonnes. For whatever reason, for the 1957–1960 period exports are halved.

From these FAO and ICO datasets, all may seem inconclusive. The only conclusion that is abundantly clear, is that Yemen's total coffee exports and production over the last century are little known. Further, Yemen's coffee production and exports today are little known. But we can add some precision to this. Nearly all data indicate these production and export figures to be between 2,000 and 20,000 tonnes. This is a baseline, and this is consistent with historic production totals. Further, production totals are likely somewhat in the middle of these figures, perhaps in the 5,000–10,000 tonnes range.

The next steps for research on Yemen's contemporary coffee production is clear—add precision to these figures. There are many creative ways to estimate Yemen's production totals, such as speaking with major exporters in Yemen, to researching import data of consuming countries, to speaking with farmers and local traders in Yemen in order to estimate domestic consumption vs export sales. Pending better estimates, in the meantime, do not rely on this data for anything more than an order of magnitude estimate.

### Chapter III.

#### Units of Weight Used in Pre-Colonial Yemen Coffee Logistics

The scholarship exploring Yemen's coffee production and coffee trade in the early modern period is varied and rich, and it brings together a broad variety of primary and secondary sources. A 1997 colloquium in Montpellier, France and its follow-on 2001 edited volume<sup>24</sup>, gathers much together illustrating this. Twenty-three authors in twenty-three chapters explore the pulse of the coffee trade from many vantage points, writing in both French and English.

While the research is lively, the ebb and flow of coffee is blunted and obfuscated in difficult to define weight and volumetric units. What is a load, bahar, bale, farda, or farq, and what is its weight? Many authors in this book and elsewhere struggle to define these terms. In order to quantify the pulse of trade, more precision is needed. Such precision will facilitate estimates of total coffee trade volumes and production. But not only that, definitions of units as small as ten or one kilogram or less, gives nuance to personal accounts of coffee consumption, and helps the researcher build perspective and intuition on coffee consumption habits. Estimating overall production can benefit from a nuanced understanding down to the smallest unit of consumption.

What this 2001 edited work lacks—to put it bluntly—is a cheat sheet of sorts. Here are the weights and measures, here are their definitions in context. This chapter here, including my *Table 1: Units of Weight Used in Pre-Colonial Yemen Coffee*

---

<sup>24</sup> Tuchscherer, *Le commerce du café*.

*Logistics* is this needed analysis. The next 20 pages could form the basis for a chapter in any future such edited work.

For additional perspective, here is the scholar Nancy Um writing about this lacuna, and the difficulty facing contemporary researchers when working with historic weights and measures. Simply, there is much confusion. "...the system of weights in use in Yemen's main markets...was quite complicated judging from the many accounts and reports that attempt to gloss and convert them." It is no surprise that a historical analysis will have difficulty finding clarity.<sup>25</sup>

In order to define these terms, I focus mainly on citations within this 2001 edited work. I focus on this work because it arguably captures the current state of scholarship, and how people in the field are using and defining these units. I additionally draw on the work of Um, Raymond, and Brouwer, where appropriate.

Additionally, I draw on the work of Hinz who defines many of these terms in a more general sense in his metrological analysis. He does not, however, focus specifically on Yemen or its coffee trade.

To compile my analysis, methodologically, I started with the 2001 edited volume and I worked from its very precise index. I investigated and noted *every* mention of weight units, and show that dataset below, broken down by unit type in bulleted lists. In doing so, I can better understand the units, and I can see where there is consensus and disagreement in the field. Where there was consensus I abridged my search for additional sources; and where there was disagreement, I included additional sources beyond the 2001 edited work, in order to add perspective and clarity.

---

<sup>25</sup> Nancy Um, *Shipped but Not Sold: Material Culture and the Social Protocols of Trade during Yemen's Age of Coffee*, Perspectives on the Global Past (Honolulu: University of Hawai'i Press, 2017), 125–28.

The summary of this entire analysis is Table 1. I will note that the intent is not to be an authoritative conversion of unit to kilograms, but rather to highlight where there is agreement and disagreement among scholars, and to provide *a range of likely kilogram conversions of various weight units*.

Additionally, “coffee” can take several forms in the supply chain, and one should not immediately assume green, milled beans. Coffee can also come in a dried, unmilled form in which the qishr husk is still intact and surrounding the two beans ensconced within.

As a brief digression, and to situate this discussion of historic terms, it is illustrative to quickly consider modern day production and export/import of Yemeni coffee. This can highlight some of the complexity and possible pitfalls in using any units. Even today, nearly all trading units have a range of known weights, rather than one true kilogram conversion.

If there is a discrete unit of coffee logistics today, it would be the burlap/jute<sup>26</sup> sack. In export of Yemeni coffee, the sacks typically weigh 60 kg or 64 kg, or occasionally a half size sack of 30 or 32 kg. Worldwide, green coffee is usually shipped in 60, 69, or 70 kilograms sacks.<sup>27</sup> The sacks are often loaded into shipping containers for international transport. A standard, 20-foot shipping container can carry about 19 to 21 tons of coffee<sup>28</sup>, or approximately 350 jute sacks of coffee. Further complicating matters,

---

<sup>26</sup> Various described as sisal or hessian, as well.

<sup>27</sup> Jean Nicolas Wintgens, ed., *Coffee: Growing, Processing, Sustainable Production: A Guidebook for Growers, Processors, Traders, and Researchers*, Second, updated edition (Weinheim, Germany: Wiley-VCH Verlag GmbH & Co. KGaA, 2012), 759.

<sup>28</sup> International Trade Centre, *The Coffee Exporter's Guide*, 90.



while the 19 to 21 tons is presumably metric tons of 1000 kg, a ton in the imperial system can be either 2000 lbs or 2240 lbs.

Once at the destinations port and warehouse, the sacks can assume a new configuration, the pallet load. The sacks can be stacked 10 to 12 per pallet and be manipulated by a forklift. In this format they can be wrapped and strapped in plastic and shipped to regional coffee roasters as an LTL or Less-Than-Truckload shipment, in which the pallet ships with miscellaneous other pallet loads. A full pallet of 10 sacks of coffee could consist of 10 x 60 kg sacks from Yemen or 12 x 70 kg sacks from Colombia.

These units could be broken into three categories—much like I do for historic units:

1. Traditional Units: A sack is weight-defined (with multiple defined weights), but the unit is a sack.
2. Weight Units: A kilogram is 1000 grams
3. Volumetric units: A shipping container is a known volume that when fully loaded holds a known weight-range of beans.

Finally, to further complicate matters, at coffee origin, coffee weights and volumes can be as loosely defined as a basket, bag, pickup truck, or pack animal load. And within these volumes, the coffee can be fresh cherries, dried cherries, or milled coffee beans.

#### Historic Coffee Trading Units: Three Types

In Yemen's history of coffee trade, there are many trade units used. In my analysis, I have broken them into three broad categories: traditional units, weight units, and volumetric units. Each can have a defined kilogram weight, but only for weight units

is weight the defining feature. While a traditional unit like a camel load or a bale can have a defined or known weight, the defining feature is not the weight itself but rather the unit. My breakdown of these units into these three categories, seems to be a new approach to scholarly analysis of these units. I have not seen this approach used elsewhere.

Table 1. Units of Weight Used in Pre-Colonial Yemen Coffee Logistics

| UNIT                         | WEIGHT (RANGE)        | NOTES   |
|------------------------------|-----------------------|---|
| <b>TRADITIONAL UNITS</b>     |                       |   |
| Bahar (Mocha)                | 195 kg (185–195 kg)   | Perhaps up to 205 kg. Mocha bahar and VOC bahar frequently confused     |
| Bahar (VOC)                  | 185 kg                | Frequently confused with Mocha bahar of 195 kg                          |
| Bahar (Bayt al-Faqih)        | 333 kg (333–370 kg)   |   |
| Bale                         | 60–160 kg             | Within Yemen, perhaps 100–150 kg. A camel carries two bales.            |
| Farda                        | 90–160 kg             | A camel carries two farda   |
| Himl or camel load           | 200–300 kg            | Theoretically, a himl is two bales or two farda                         |
| <b>WEIGHT UNITS</b>          |                       |   |
| Mann                         | 812 g to 33 kg        | Varies greatly across time and space                                    |
| Ratl                         | ~450 g (300 g – 7 kg) | Many ratl are in the 400–600 g range                                    |
| Okka                         | 1.28 kg               | Possibly weighs 0.925 kg or another weight                              |
| Qintar                       | 44–45 kg (44.33 kg)   | Could be 100–200 kg, or even up to 300 kg, depending on region          |
| <b>VOLUMETRIC UNITS</b>      |                       |   |
| Rub                          | 1.8-1.875 kg?         | Volume of rub varies widely. Does not agree with this suggested weight. |
| Farq (Al Medinah)            | 7–8 kg                | Volumetric unit of 12.617 liters. Green coffee weight given.            |
| Liter of Yemeni green coffee | 556–656 g/L           | Weight of Yemeni green coffee, present day                              |

*The intent of this table is not to be an authoritative guide, but to provide a range of likely kilogram conversions. Refer to the corresponding section below for more details on an individual unit and for examples of scholarly usage.*

### Traditional Units

These are the units that scholars of Yemeni coffee seem to struggle with the most. All have a range of weight that can vary nearly two-fold. While I resolve some inconsistencies, the defining feature of these units seems to be that they had a known or defined weight at points in time, but that definition may have shifted over time or by trading nation using the term. When encountering the term, it is best to be flexible and to consult the given section for additional insight.

Bahar (also spelled baar, baer, bahār, bar, bhaar, bhaer, bhar)

The bahar seems to be a traditional unit for selling commodity goods, in which the weight of a bahar varies per commodity, but it is about 200 kg  $\pm$ 50 kg. More specifically, the Mocha bahar of coffee weighs about 195 kg. In contrast, the VOC bahar of coffee weighs about 185 kg. However, at times these two units seem to be used interchangeably, with an ambiguous weight of 185–195 kg. Perhaps, the 10 kg difference is explained by evaporative loss of water in green coffee and traditional sales practices in which net weight and billed weight differed (see below). Finally, there is an exception to these two bahars—namely, the Bayt al Faqih bahar, weighing about 333 kg (or perhaps 370 kg). This bahar could be a so-called big bahar versus a small bahar (see below). This bahar is named for the inland coffee entrepot of the same name. The bahar may have origins in taxation and customs fees.

The following bulleted list is every textual mention that numerically defines bahar, in the Tuchscherer edited word.

- C.G. Brouwer writing about the VOC trading operations in Al Mokha, estimates that the **Mokha bahar** weighed approximately **195 kilograms**. In contrast, he notes that the **VOC bahar** was “375 Dutch pounds, *i.e.* **185.28 kg.**,” or 10 kg less. Brouwer, in a page exploring this topic, appears diligent in his analysis.<sup>29</sup> He does not mention the Bayt al-Faqih, bahar.
- Gopal writes, “In 1628, the VOC first bought 40 bahars (15,000 pounds) of coffee in Mokha...”<sup>30</sup> At this ratio, a bahar is 375 lb., which are likely Dutch pounds, as this would match Brouwer exactly. As such, a **bahar is 185.28 kg**, and seems to reference the **VOC bahar**.
- Gopal further writes: “*Bahar* has been described as ‘A weight used in large trading transactions; it varied much in different localities,... In the Indian Islands the bahar is’...400 [lbs.] avoir du poids.’ H. Yule, A. Burnell, 1990, p. 48.”<sup>32</sup> Thus, an **Indian Islands bahar is about 182 kg** ( $400/2.2 = 181.8$ ).
- Khan has a detailed footnote exploring the weight of the *bhara* [sic], and he cites six varied sources. “*Bhara* which means load was the weight used at Mokha and Bayt al-Faqih for weighing coffee...In the early 17<sup>th</sup> century as in the 18<sup>th</sup> a *bahar* was equal to 15 frazil (1 *frazil* = 27 lbs.) and each *frazil* of 10 *maunds* (or *manns*). One could find variation in the weight of a Mokha *bahar* and that of a Bayt al-

---

<sup>29</sup> C. G. Brouwer, “Al-Mukhā as a Coffee Port in the Early Decades of the Seventeenth Century According to Dutch Sources,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 279.

<sup>30</sup> Surendra Gopal, “Coffee Trade of Western India in the Seventeenth Century,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 305.

<sup>31</sup> Gopal is citing Matthee (Rudi), 1994, “Coffee in Safavid Iran: Commerce and Consumption”, *JESHO*, XXXVII, 7.

<sup>32</sup> Gopal, “Coffee Trade of Western India,” 315.

Faqih *bahar*.” Per the 27 lb *frazil* definition, a ***bahar* is 184 kg** (405 lbs). Khan further cites Ovington who estimates a ***bahar* as 420 lbs [191 kg]**. Khan also cites W. Crooke and J. Murray who describe a ***bahar* as universally 400 lbs [182 kg]**. Khan cites Chaudhuri who states a **Mokha *bahar* is 450 lbs [205 kg]**, and a **Bayt al-Faqih *bahar* is 814 lbs [370 kg]**.<sup>33</sup>

Nancy Um describes a **Bayt al-Faqih *bahar* of 735 lbs (333 kg)**, based on research by Kristoff Glamman. She also describes a **Mocha *bahar* of 405 lbs (184 kg)**<sup>34,35</sup>.

Hinz—in his study of weights in the Islamic world—notes this of the *bahar*: “The extraordinary fluctuations which we encounter regarding the fixing of the *bahār* weight are the result of locally differing extra charges, which had been added to the net weight, based on old customs. This extra charge...represented a substitute for natural dwindling processes in favour of the buyer.”<sup>36</sup>

As it pertains to coffee, this natural dwindling process occurs as water evaporates from green beans and there is a subsequent loss of weight. Green coffee with up to approximately 11.5–12% moisture content is stable for storage. But that moisture content can drop to 7-10% or even lower. For something sold per unit weight, the loss of water content favors the buyer. *Perhaps*, the 185 kg VOC *bahar* represented the net weight of a

---

<sup>33</sup> Iftikhar Ahmad Khan, “Coffee Trade of the Red Sea First Half of the 18th Century,” in *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d'Archéologie Orientale, 2001), 319–320.

<sup>34</sup> Nancy Um, *The Merchant Houses of Mocha: Trade and Architecture in an Indian Ocean Port*, Publications on the Near East (Seattle: University of Washington Press, 2009), 209.

<sup>35</sup> Nancy Um bases her 735 lb and 405 lb calculation on the work of Glamann, Kristof. *Dutch Asiatic Trade, 1620–1740*. Copenhagen: Danish Science Press, 1958, 303–306.

<sup>36</sup> Walther Hinz, *Measures and Weights in the Islamic World an English translation of Walther Hinz's handbook Islamische Maße und Gewichte*, trans. M. Ismail Marcinkowski (Kuala Lumpur: International institute of islamic thought and civilization, 2003), 12.

coffee bahar in Mocha. But, that bahar was sold as if it weighed 195 kg, or a Mocha bahar. The 10 kg difference *could* capture the incentive of a seller for a higher moisture content and the incentive of the buyer for a lower moisture content.

The coffee bahar is consistent with what Hinz describes. He mentions bahar weights ranging from 151 kg to 250 kg, within which falls the Mocha and VOC bahars of 195 kg and 185 kg respectively. In Hormuz, he notes the bahar weight of a variety of commodities, including these: cloves/210 kg, cinnamon/218 kg, sugar/227 kg, pepper/250 kg. He also describes a so-called small bahar of 220 kg and 246.4 kg, and a so-called big bahar of 422 kg. At these sizes, the big bahar is 1.92 and 1.71 times bigger than the small bahar.

This so-called big bahar could be the basis of the Bayt al-Faqih bahar, vis-à-vis the Mocha bahar. Um describes these two bahars as 333 kg and 184 kg, respectively. That is a ratio of 1.81. Chaudhuri describes these two bahars as 370 kg and 205 kg, respectively. That is a ratio of 1.80. Hinz does not give reason for a small and big bahar, but we can note that these two coffee bahars with a ratio of about 1.80, fall easily between the calculated range of 1.71 and 1.92.

### Bale (balle)

The bale is a volume of coffee that is secured in “bale” form, which is presumably “a large bundle or package of merchandise”<sup>37</sup>. The bale varies in weight over time and geographic range, and if there was a standard weight, it varied widely from about 60 kg to 160 kg. In Yemen’s coffee trade, the bale may have been simply one-half of a camel

---

<sup>37</sup> Oxford English Dictionary, “bale, n.3’,” n.d., <https://www.oed.com/view/Entry/14855?rskey=V8ESvU&result=3&isAdvanced=false>.

load, with two bales per camel. And as coffee moved through the supply chain, it may have been repackaged into different bale sizes/weights. In Tunisia the bale may have been 68 kg or 81 kg; in France 160 kg or 142 kg; in Surat 62 kg; and in Yemen in the hands of the VOC 114 kg or 126 kg. These are all estimates.

- In a chapter on Tunisia, Larguèche in table #3 (coffee trading from Tunis to Livourne) uses a **balle of 80.7 kg** in 1699–1705.<sup>38</sup> In contrast and in reference to 1844–1845, she states that 1 balle is 1.5 qintar,<sup>39</sup> which means a **balle is 67.5 kg**.
- In a chapter on Marseille, Buti states the balle is equivalent to about 4 quintaux of 40 kg each.<sup>40</sup> Thus, a **balle is 160 kg**.
- Brouwer notes that in 1629, “**one bael** of coffee weighed in Surat one Chinese *picol*, *i.e.* **61.76 kg**”.<sup>41</sup>
- Khan describes “one camel load = 2 bales”.<sup>42</sup>
- Carreira, describing the French coffee trade supplying their own court, writes that 50 bales of coffee converts to approximately 14500 *livres-poids*.<sup>43</sup> With one *livre-poid* 489.5 grams, this means **one balle is 142 kg**.

---

<sup>38</sup> Dalenda Larguèche, “Le café à Tunis du XVIII au XIX siècle: Produit de commerce et espace de sociabilité,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 191.

<sup>39</sup> Larguèche, “Le café à Tunis du XVIII au XIX siècle: Produit de commerce et espace de sociabilité,” 192.

<sup>40</sup> Gilbert Buti, “Marseille entre Moka et café des îles: espaces, flux, réseaux (xvii–xviii siècles),” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 215.

<sup>41</sup> Brouwer, “Al-Mukhā as a Coffee Port in the Early Decades of the Seventeenth Century According to Dutch Sources,” 279.

<sup>42</sup> Khan, “Coffee Trade of the Red Sea First Half of the 18th Century,” 323.

<sup>43</sup> Ernestine Carreira, “Les Français et le commerce du café dans l’océan Indien au xviii siècle,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 348.



Um does not define a bale but does write this: "...in 1719 the VOC sent 1,626,748 pounds of coffee (6,461 bales) to Batavia on two ships".<sup>44</sup> This indicates that a **bale is 114 kg.**

Um in a journal article, and writing about VOC documents from 1724, says this: "Each bale is calculated at 277 pounds, which is the average gross weight that Glamann gives."<sup>45</sup> Thus, a **bale is 126 kg.**

Hinz does not define the term bale.

### Farda (farde)

The farda may be a closely related to the bale—or nearly a synonym—though no scholar explores either term vis-a-vis the other or uses them interchangeably. Nevertheless, they are used in similar ways. A bale is just that. And a farde perhaps best translates into modern English as a load or bundle. According to the Oxford English Dictionary, fardel is a diminutive of farde burden. Fardel is "a bundle, a little pack; a parcel." Fardel also means to make into a bundle. The farda ranges in weight from about 90 kg to 160 kg, which is the approximate weight range of the bale. Moreover, Khan defines a camel load as two bales. And Kawatoko describes a farda as half a camel load. The units in reference to a camel are the same. Perhaps the only differences is that the bale may refer directly to a type of bundle or coffee enclosure, whereas farda may reference the bundle more generally, in the sense of a load of coffee.

---

<sup>44</sup> Um, *Shipped but Not Sold*, 161.

<sup>45</sup> Nancy Um, "Order in the 'Arbitrary': The Distribution, Content, and Temporal Cycles of English Merchant Tribute in Eighteenth-Century Yemen," *Journal of Early Modern History* 18, no. 3 (March 21, 2014): 232, <https://doi.org/10.1163/15700658-12342413>.

- Kawatoko writes, “Farda means a half camel load...1 *farda* of *qishr*...was equivalent to 50 rub, or about 90 kg.” With a rub as 1.875 kg, 50 rub is 93.75 kg.

**A Farda is about 90 to 94 kg.**<sup>46</sup>

I will note that a farda of *qishr* could have a different weight than a farda of green coffee. To assess the density of *qishr*, on October 19, 2021, I compared equal volumes of Khulani green coffee and Haraazi *qishr*. The *qishr* was about 38% to 40% the density of the green coffee. More broadly, I would estimate that *qishr* has a density of about 30% to 50% that of Yemeni green coffee, dependent on the particular *qishr* and coffee. As the volume of a camel load increases, the burden likely becomes more unstable and difficult to transport. Perhaps a farda of *qishr* is a compromise between the weight-bearing capacity of a camel and what is volumetrically unwieldy. Comparing a 90 kg farda of *qishr* against a 150 kg farda of green coffee, the *qishr* is nevertheless 50% larger in volume, despite the lower weight.

- Bostan states that at the beginning of the eighteenth century in Ottoman trade a **farde was 128 kg**. Bostan further notes that a farde is equivalent to 150-180 *kiyye* pounds of Cairo, which equals 100 *kiyye* pounds in Istanbul.<sup>47</sup>

---

<sup>46</sup> Mutsuo Kawatoko, “Coffee Trade in the al-Tūr Port, South Sudan,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 53.

<sup>47</sup> Idris Bostan, “Acheminement du café yéménite de l’Égypte vers Istanbul et quelques ports de la mer Égée au xviii siècle,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 153.

- Genç, citing Raymond, states that the farde does not have a fixed value but corresponds on average to approximately 3.5 qintar, making a **farde approximately 157.5 kg**.<sup>48</sup>
- Larguèche states the farde is equivalent to 3 qintar,<sup>49</sup> meaning a **farde is 135 kg**. Um does not use the term and Hinz does not define it.

### Himl (Camel load, load, or ahmāl)

The himl or camel load is theoretically—and likely in practice—two bales or two farda. With both these units weighing about 100 kg to 150 kg, a camel load is 200 kg to 300 kg. This matches the sources explored below.

- Rafeq, in reference to coffee in Syria in 1842, describes a load as “...weighing 100 *ratls* (total of 200 kg);”.<sup>50</sup> His calculation seems to be based on a Damascene *ratl* of 2 kg, which is consistent with the research of Hinz.<sup>51</sup> **A load is 200 kg**.
- Khan, writing about the English EIC in 1733 and 1752, describes a load as such: “...one camel load = 2 bales...”<sup>52</sup>

Hinz cites a range of weight for a camel load, with most loads weighing between 200 kg to 300 kg, with 250 kg the average. He also notes that in mountainous areas of

---

<sup>48</sup> Mehmet Genç, “Contrôle et taxation du commerce du café dans l’Empire ottoman,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 164.

<sup>49</sup> Larguèche, “Le café à Tunis du XVIII au XIX siècle: Produit de commerce et espace de sociabilité,” 192.

<sup>50</sup> Abdul-Karim Rafeq, “The Socioeconomic and Political Implications of the Introduction of Coffee into Syria. 16th–18th Centuries,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d’Archéologie Orientale, 2001), 141.

<sup>51</sup> Hinz, *Measures and Weights in the Islamic World*, 43–44.

<sup>52</sup> Khan, “Coffee Trade of the Red Sea First Half of the 18th Century,” 323.

Asia Minor a camel load was 300 kg, whereas in the plains it could even be up to 735 kg.<sup>53</sup>

Brouwer, writing about the use of camels as pack animals, notes both their central importance, and the variable weight of a “camel load”.

“The outstanding pack animal in the whole of Yemen and, as a consequence, in al-Mukhā too, was the camel. The use of it in interlocal and interregional traffic was so universal that distances between cities or parts of the country were generally expressed in ‘days journey by camel’. Even when the mere indication of ‘days journey’ is met with, usually ‘camel day’ was really meant. As a unit of freightage the ‘camel’s cargo’ was universally applied, changing in weight or dimension, of course, according to the specific article weighed.”<sup>54</sup>

With this additional insight, the frequent occurrence of bales, farda, and camel loads in the primary and secondary literature, makes even more sense. When transporting coffee from the interior to the port of export, the camel and its two bales or two farda literally defined coffee logistics.

### Weight Units

These first four units (bahar, bale, farda, himl) appear to be defined by tradition, with an actual weight secondary and frequently variable. In contrast, the following units are literal weight units; however, at times, they vary by region.

#### Mann (man, maund, maune)

The mann varies in weight from a low of 812 grams to a high of about 33 kilograms, depending on region and time period. The unit does not appear standardized in

<sup>53</sup> Hinz, *Measures and Weights in the Islamic World*, 18–19.

<sup>54</sup> C. G. Brouwer, *Al-Mukhā: Profile of a Yemeni Seaport as Sketched by Servants of the Dutch East India Company (VOC) 1614-1640*. (Amsterdam: D’Fluyte Rarob, 1997), 221–22.

the coffee trade, and any mention of the mann should be investigated further to determine its likely weight.

Here is the definition given in the Shorter Oxford English Dictionary: “A unit of weight in the Indian subcontinent and western Asia, varying greatly in value according to locality.”<sup>55</sup>

- Gopal writes that, “The *man* was a measure of weight and was also spelt *maund*, *maune*, etc. Its value varied immensely, depending on time and place, from as little as 2 lbs to 82 lbs.” In a later mention he notes that, “In 1621 the English factor Kerridge at Mokha sent 100 mans...of coffee...Since the nature of man has not been specified, it difficult to compute the quantity of the imported coffee.”<sup>56</sup>

Later he writes about a **Gombroon maund of 33 lbs** [15 kg]<sup>57</sup> and a **Surat maund of 12.712 kg**<sup>58</sup>.

- Khan, describing coffee trade in the Red Sea early 18th century, states that a *frazil* is 27 lbs, and has 10 *maunds/manns*.<sup>59</sup> This means a **maund is 1.23 kg** (2.7 lbs).

Hinz, in the longest entry in his handbook, notes the complexity of the mann, and the wide range of weights it could be over time and region. The mann ranges from a low of 812.5 grams, which is based on a mann weight of 2 ratl at 130 dirham per ratl. The highest weight given is 33.4 kg, found in India.<sup>60</sup>

### Ratl (ritl, rotl, rotolo)

---

<sup>55</sup> William R. Trumble, Angus Stevenson, and Lesley Brown, eds., *Shorter Oxford English Dictionary on Historical Principles*, 5th ed (Oxford ; New York: Oxford University Press, 2002), 1723.

<sup>56</sup> Gopal, “Coffee Trade of Western India,” 300–302.

<sup>57</sup> Gopal, “Coffee Trade of Western India,” 307.

<sup>58</sup> Gopal, “Coffee Trade of Western India,” 314.

<sup>59</sup> Khan, “Coffee Trade of the Red Sea First Half of the 18th Century,” 319.

<sup>60</sup> Hinz, *Measures and Weights in the Islamic World*, 22–32.

Depending on location and time period, the *Ratl* varies in weight from about 300 grams to 7 kilograms; however, it seems the majority of *ratl* are 400 to 1000 grams, and many *ratl* are 400–600 grams—and most specifically, in the Mocha coffee trade, a *ratl* weight of about one pound, ½ kilogram, or 450 grams seems a safe starting point, though each reference should be investigated further within its context.

- Kawatoko writes that one rub is equivalent to four *ratl*, and one *qintar* is 100 *ratl*.<sup>61</sup> He later enumerates that **one *ratl* is about 450 grams**.<sup>62</sup>
- Hanna describes a ***ratl*** as “a little less than half a kilo”.<sup>63</sup>
- Establet and Pascual, writing about hajj pilgrims in 1700 Damascus, state that a ***ratl* is 1.85 kg** (bolding added).<sup>64</sup> This value, while higher than the aforementioned examples, is consistent with the Damascene *ratl* as described by Walter Hines: “1.85 kg for the *ratl* of Damascus”.<sup>65</sup>

Hinz describes the *ratl* as “...the preminent weight unit throughout the Arabic dominated countries of the Orient...one *ratl* equaled generally 12 *ūqiyah* (ounces) and also 1/100 *qintār*...” He describes a variety of *ratl* that weigh from about 300 grams to 7 kilograms. However, it seems the majority of *ratl* are in the 400–1000 g range, and many *ratl* are 400–600 grams.<sup>66</sup> The findings of Kawatoko and Hanna are consistent with Hinz, with a *ratl* in Yemen of about 450 grams.

---

<sup>61</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 53.

<sup>62</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 59.

<sup>63</sup> Nelly Hanna, “Coffee and Coffee Merchants in Cairo, 1580–1630,” in *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d'Archéologie Orientale, 2001), 95.

<sup>64</sup> Colette Establet and Jean-Paul Pascual, “Café et objets du café dans les inventaires de pèlerins musulmans vers 1700,” in *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer (Le Caire: Institut Français d'Archéologie Orientale, 2001), 145–46.

<sup>65</sup> Hinz, *Measures and Weights in the Islamic World*, 43.

<sup>66</sup> Hinz, *Measures and Weights in the Islamic World*, 40–47.

### Okka (oqqa, uqqa, ocque)

The okka is an Ottoman weight unit and most likely weighs 1.28 kg.

- Establet and Pascual, referencing hajj pilgrims in Damascus, state this: the *ratl* is 600 dirham and *ocque* is 300 dirhams, and the *ratl* is 1.85 kg and the *ocque* is half that.<sup>67</sup> Thus, an ***ocque* is 0.925 kg**. While this okka weight differs from the others cited, the difference could be a Damascene okka, similar to the Damascene *ratl*, which is regionally specific.
- Largueche states that the ***uqqa* is about 1.28 kg**. He cites Hinz (see below)
- Genç, writing about taxes on coffee in the Ottoman empire, states that 699,870 *okka* was about 900 tons.<sup>68</sup> Calculating from an ***okka* of 1.2828 kg**, that is 898 tons. The okka weight is accurate.

Hinz describes an oqqa in a very simple description: “An Ottoman weight unit of 400 dirham at 3.207g (per dirham), i.e., 1.2828 kg.”<sup>69</sup>

### Qintar (quintaux, centner)

All references to the qintar cite a weight of 44–45 kg. However, Hinz notes a variety of regional qintars, up to 100, 200, and even 300 kg.

- Kawatoko writes that one rub is equivalent to four *ratl*, and one qintar is 100 *ratl*.<sup>70</sup> He enumerates that one *ratl* is about 450 grams, thus a **qintar is 45 kg**.<sup>71</sup>

<sup>67</sup> Establet and Pascual, “Café et objets du café dans les inventaires de pèlerins musulmans vers 1700,” 145–146.

<sup>68</sup> Genç, “Contrôle et taxation du commerce du café dans l’Empire ottoman,” 162.

<sup>69</sup> Hinz, *Measures and Weights in the Islamic World*, 35.

<sup>70</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 53.

<sup>71</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 59.

- Tuchscherer writing about coffee trade in the Red Sea in the 16<sup>th</sup> century, says a **qintar is about 45 kg**.<sup>72</sup>
- Hanna writing about coffee in Cairo in 1580–1630 defines a **qintar as about 44 kg**.<sup>73</sup>
- Husam, writing about the town of Rosette in 16<sup>th</sup> to 17<sup>th</sup> century Ottoman Egypt, says a **qintar is about 45 kg**.<sup>74</sup>

Hinz describes a variety of regional qintars, weighing up to 100 kg, 200 kg, and even higher.<sup>75</sup>

Raymond describes a quintaux as weighing 44.33 kg, in the Egyptian coffee trade of the Ottoman era.<sup>76</sup>

### Volumetric Units

For the two units below—rub and farq—the citations describe these units in terms of mass; however, Hinz describes these units as volumetric. For the citations, it is unclear if the two authors understand rub and farq as mass or volume units. To connect a volume of green coffee to a mass, I calculate the weight per liter of Yemeni green coffee, below.

---

<sup>72</sup> Michel Tuchscherer, “Commerce et production du café en mer Rouge au XVI siècle,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer, 20 (Le Caire: Institut Français d’Archéologie Orientale, 2001), 76.

<sup>73</sup> Hanna, “Coffee and Coffee Merchants in Cairo, 1580–1630,” 92.

<sup>74</sup> Muhammad Husam al-Din Isma’il, “Le café dans la ville de Rosette à l’époque ottomane, xvi–svii siècle,” in *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, ed. Michel Tuchscherer, 20 (Le Caire: Institut Français d’Archéologie Orientale, 2001), 105.

<sup>75</sup> Hinz, *Measures and Weights in the Islamic World*, 35–39.

<sup>76</sup> André Raymond, *Artisans et commerçants au Caire au XVIIIe siècle. Tome I* (Damas: Presses de l’Ifpo, 2015), 35.



### Rub (aroube)

In the coffee trade, a rub is described as weighing 1.8–1.875 kg. However, Hinz describes a rub as a measure of volume rather than a measure of weight, and I am unable to deconflict these competing definitions.

- Kawatoko writes that one rub is equivalent to four ratl.<sup>77</sup> He later enumerates that one ratl is about 450 grams, thus a **rub is 1.8 kg**.<sup>78</sup>
- Husam, writing about the town of Rosette in 16<sup>th</sup> to 17<sup>th</sup> century Ottoman Egypt, says a **rub is 1/24 qintar, or 1.875 kg** (bolding added).<sup>79</sup>

Hinz describes a rub as a measure of capacity, with volume varying by region and over time. Perhaps the most accurate definition of an Egyptian rub is either 0.94 L or 0.47 L, or perhaps 1.9 L (based on a 17<sup>th</sup> century irdabb of 182 L).<sup>80</sup> Using a density of green coffee of 620 g/L, a rub of green coffee would weigh 0.58 kg or 0.29 kg, or possibly 1.18 kg. All these figures disagree with those given by Kawatoko and Husam.

In contrast, if one assumes the 1.8 kg rub of green coffee to be accurate—and working from a density of 556–656 g/L—then a rub of green coffee would have a volume of 2.74–3.23 liters.

Based on these figures, the Hinz volumetric definition does not match the mass-based definitions, and the weight or volume of a rub of green coffee is inconclusive.

### Farq (plural furuq)

<sup>77</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 53.

<sup>78</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 59.

<sup>79</sup> Husam al-Din Isma’il, “Le café dans la ville de Rosette à l’époque ottomane, xvi–svii siècle,” 105.

<sup>80</sup> Hinz, *Measures and Weights in the Islamic World*, 74.

A farq of green coffee in al-Madina may weigh approximately 7–8 kg. But per Hinz, the farq is a measure of *volume*, not weight. However, a given volume can be translated to weight on a commodity-by-commodity basis, such as wheat, pulse, or wine—or presumably green coffee. Applying the volumetric definition of Hinz, a farq of Yemeni green coffee varies in weight from about 7.01–8.27 kg.

- Kawatoko writes, “a measure unit used in al-Madina (Saudi Arabia). 1 farq is 4 rub, 16 ratl.<sup>81</sup> He later enumerates that one ratl is about 450 grams, thus a **farq is 7.2 kg**.<sup>82</sup> If we use the rub weight of 1.875 kg given by Husam, we can calculate that a **farq is 7.5 kg**.

Hinz describes a farq as a unit of dry measure of 12.617 liters in Medina. He further describes a farq of wheat in Iraq as “36 Baghdādian *ratl* at 406.25g each, thus 14.625 kg, corresponding to a volume of 19 liters.”<sup>83</sup>

Per Hinz’s definition of a Medina farq of 12.617 liters, and multiplying by the green coffee densities given below, a **farq of green coffee weighs about 7.01–8.27 kg** (7.01 kg, 7.87 kg, or 8.27 kg).

Per the historic al-Madina farq of 7.2 kg, this indicates a relatively low-density coffee compared to samples measured today. Such lower density *could* be caused by an older green coffee (multiple years old) that has less moisture content. Per my personal knowledge of the green coffee trade, such lower densities make sense for a coffee that travels for longer periods of time in drier climates. In today’s coffee trade, a relatively fresh coffee has a higher density.

---

<sup>81</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 52.

<sup>82</sup> Kawatoko, “Coffee Trade in the al-Tūr Port,” 59.

<sup>83</sup> Hinz, *Measures and Weights in the Islamic World*, 53.

### Liter of Green Coffee by Weight

A liter of Yemeni green coffee weighs approximately **556–656 grams per liter**.

To calculate this, on September 22, 2021, I weighed 250 mL of three different Yemeni green coffees. I obtained the following results: Khulani green coffee varietal from Sa'dah Governorate—**624 g/L**; Zamarrud green coffee blend from Bani Matar, Haraaz, Ishmaeli, Hajjah, which I believe to be relatively higher density—**656 g/L**; Matari green coffee from 2016 crop year, which I believe to be relatively lower density—**556 g/L**.

Notably, I measured the green coffee in a tall and narrow graduated cylinder, and I *did not* attempt to increase bean density by shaking the cylinder. Had I done this, the calculated density would increase.

In the previous pages, I have analyzed three types of units—traditional, weight, and volumetric. From this analysis, we can draw a few conclusions. For traditional units weights varied nearly two-fold. The use of the term is location and time dependent, and it is best to seek additional guidance in the associated section when applying a weight definition. For camel loads or *himl*, nearly all sources are consistent—or at least not inconsistent—with the assertion that two bales or two farda make one such unit. For weight units, they are generally straightforward and well-defined *within* the confines of the Yemeni coffee trade. Finally, volumetric units are seen less frequently. When encountered, a volume can be converted to a weight of green coffee using the conversion

ratio given. Additionally, the weight of a certain volume gives insight into the density and thus age of a given coffee.

## Chapter IV.

### Late-Seventeenth through Nineteenth Century Coffee Production

In the previous chapter I honed definitions of coffee trading terms such as bahar, bale, and farda, giving expected weights for each. In this chapter I will apply those definitions to historic records of Yemen's coffee production. In doing so, I add additional precision to calculations of Yemen's historic coffee output, particularly for the eighteenth century, and I show that coffee exports totaled about 10,000 tonnes for much of that century.

In this chapter to focus my approach, I have organized my research around a close reading of the book chapter *Coffee in the Red Sea Area from the Sixteenth to the Nineteenth Century*, by Michel Tuchscherer.<sup>84</sup> This chapter is found in the edited volume, *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989*.<sup>85</sup>

The strength of this approach is twofold. Tuchscherer, as the editor of the 2001 book<sup>86</sup> upon which chapter III is based, is well-versed with much of the most recent scholarship on Yemen's coffee sector. His book chapter draws on his deep familiarity of the source material as editor just two years previous, with his 2003 chapter serving as a summary and distillation of that edited work and its twenty-three scholars and chapters. Second, by limiting the scope of the dataset, we are pushed to probe and interrogate Tuchscherer, his sources, and his sources' sources.

---

<sup>84</sup> Tuchscherer, "Coffee in the Red Sea Area," 50–66.

<sup>85</sup> Clarence-Smith and Topik, *The Global Coffee Economy*.

<sup>86</sup> Tuchscherer, *Le commerce du café*.

The weakness of this approach is the conclusions about the nineteenth century are not nearly as robust as those of the eighteenth century. Tuchscherer's lack of sources for that century underscore the need for further research into Yemen's nineteenth century coffee output.

Tuchscherer organizes his chapter chronologically and excerpted here (mostly chronologically as well) are all mentions of Yemen's total coffee production, covering the period of 1690 to 1900. I separate these two centuries into two sections, and I apply my conclusions of chapter III (weights of historic coffee trading terms).

#### Michel Tuchscherer Book Chapter, circa 1690–1800

According to Tuchscherer, in the late 1600s and early 1700s Yemen's annual coffee production was between 4,500 and 9,000 tonnes. Specifically, he writes this: "In the late seventeenth and early eighteenth centuries,... [the agents of Cairo traders] annually bought an average of some 30,000 loads of coffee, equivalent to about 4,500 tonnes. This represented over half of Yemen's total exports at the time..."<sup>87</sup> From this statement we can derive two facts: production was greater than 4,500 tonnes but less than 9,000 tonnes; and a load of coffee was 150 kg (4,500 tonnes/30,000 loads).

Tuchscherer's use of a 150 kg load is an oddity, however, and it requires clarification. The typical camel load is 200–300 kg, not 150 kg. Tuchscherer may be using "load" to reference a "bale" or "farda", which is precisely one-half of a camel load. A bale or farda *does* reasonably weigh 150 kg. But Tuchscherer's use is ambiguous. Does he use "load" merely as a synonym for bale or farda? If so, the only error would be of

---

<sup>87</sup> Tuchscherer, "Coffee in the Red Sea Area," 53–54.

word choice, in which bale or farda is more precise. Or much more seriously, does Tuchscherer confuse a camel load to be a kilogram equivalent of bale and farda? If so, he uses a 150 kg multiplier when the correct multiplier should be in the range of 200–300 kg. If the proper multiplier is 200 kg, the correct production range would be between 6,000 tonnes and 12,000 tones. And for a 300 kg camel load, total production is 9,000 to 18,000 tonnes. This range is double the 4500–9000 tonne range that he gives.

This total production ambiguity can be resolved by consulting Tuchscherer's sources. And more than that, we can go beyond Tuchscherer's conclusion and add additional precision.

Tuchscherer arrives at his conclusion by citing Raymond; and Raymond cites four sources. If we analyze these references in reverse—starting with the four sources, then Raymond's subsequent conclusion, and finally Tuchscherer's conclusion based on Raymond—we can calculate a persuasive estimate for annual production circa 1700. And we can resolve what Tuchscherer means by "load". Additionally, we can also estimate annual coffee production during the eighteenth century.

Here is Raymond discussing his four sources (my translation and paraphrase of the original French). Note the use of a variety of historic trading terms including balles, quintaux, bahars, and fardes.

*The [annual export] numbers are rather in agreement in diverse sources....[Arendonk citing Halifa] gives the number of 80,000 balles (thus about 240,000 quintaux), towards the middle of the 17<sup>th</sup> century. Hamilton speaks of 22,000 tonnes. Parsons estimates 60,000 "bahars" (equivalent of fardes? which would be about 200,000 quintaux) as the total exports of Yemen around 1778: 35,000 left for Jedda, of which 30,000, thus half of total exports, were destined for Suez and Cairo. According to a note written in the margin of the manuscript of *Venture de Paradis*...Yemen produced 60 to 70,000 fardes of 4 quintaux (thus 240 to*

*280,000 quintaux) of coffee, half of which half was destined for Turkey, the rest going to Persia and India.*<sup>88</sup>

Raymond's use of a variety of weight terms underscores the need for precise definitions. For example, when discussing Parsons, Raymond indicates his uncertainty of the term Bahar—his suggestion of equivalency with farde is incorrect. Elsewhere in his dissertation (from which this quote comes) in his *Note on Weights and Measures in Ottoman Egypt*, he says farda and farq/furuq are essentially the same.<sup>89</sup> According to my analysis a farda is 10–20 times heavier than a farq of green coffee. Clearly precision with weight terms will give more precision with production totals.

Raymond's four sources can be deciphered and probed by applying our weights and measures definitions from *Table 1. Units of Weight Used in Pre-Colonial Yemen Coffee Logistics*. Here are those four sources one-by-one.

1. “...[Arendonk citing Halifa] gives the number of 80,000 balles (thus about 240,000 quintaux), towards the middle of the 17<sup>th</sup> century.”

A bale weighs 100–150 kg and a quintaux 44–45 kg. Thus, a bale is about 2.2–3.3 quintaux. Raymond in his *Note on Weights and Measures* describes a bale as 3–3.5 quintaux. In this quote he uses a bale of 3 quintaux (80,000 balles /

---

<sup>88</sup> Raymond, *Artisans et Commerçants*, 133. And here is Raymond in the original French: “Chiffres assez concordants dans les diverses sources. VAN ARENDONK, E.I., II, 674, article Çahwa, citant Ḥādī Ḥalīfa, donne le chiffre de 80.000 balles (soit environ 240.000 quintaux), vers le milieu du XVII<sup>e</sup> siècle. HAMILTON (A new Account, I, 37) parle de 22.000 tonnes. PARSONS (Travels, 282-3, 324) estime à 60.000 «bahars» (équivalent des fardes? ce qui ferait environ 200.000 quintaux) l'exportation totale du Yémen vers 1778 : 35.000 partaient pour Ġudda, dont 30.000, soit la moitié du total des exportations, étaient destinés à Suez et au Caire. D'après une note écrite en marge du manuscrit de VENTURE DE PARADIS (Détail sur l'État actuel, 100 a) le Yémen produisait 60 à 70.000 fardes de 4 quintaux (soit 240 à 280.000 quintaux) de café, dont la moitié était destinée à la Turquie, le reste allant en Perse et aux Indes.”

<sup>89</sup> Raymond, *Artisans et commerçants*, 35.



240,000 quintaux). Raymond's weights and measures are consistent with my weights and measures.

- 240,000 quintaux weigh 10,600 tonnes (44.33 kg per quintaux).
- 80,000 bales weigh 8,000–12,000 tonnes. (100–150 kg per bale)

Relying on this citation, we can conclude that **in the middle of the seventeenth century annual exports were 8,000–12,000 tonnes; and according to Raymond's calculation it was 10,600 tonnes.**

2. "*Hamilton speaks of 22,000 tonnes.*" This reference is straightforward. In the primary source, Hamilton specifies that "The Europe shipping lades yearly at Mocha, . . . about 2000 Tuns, rather more than less, and the other Nations above 20000 Tuns more."<sup>90</sup> Hamilton neither specifies how he arrived at these figures nor does he give a year. However, his book describes his travels 1688–1723.

Per this citation we can conclude that **Yemen's annual exports were 22,000 tonnes or more, sometime between 1688 and 1723.** I am, however, skeptical of this figure. It seems high, and it is unsubstantiated.

3. "*Parsons estimates 60,000 'bahars' (equivalent of fardes? which would be about 200,000 quintaux) as the total exports of Yemen around 1778: 35,000 left for Jedda, of which 30,000, thus half of total exports, were destined for Suez and Cairo.*"

Here we see Raymond questioning if bahar and farde are the same. Using our table of weights and measures, we can easily and without ambiguity identify that

---

<sup>90</sup> Alexander Hamilton, *A New Account Of The East-Indies 1688-1723*, Second, vol. 1 (London, 1739), 37–38.

a bahar is not a farde. Specifically, a Mocha bahar weighs 195 kg and a VOC bahar weighs 185 kg. In contrast, a farde is half a camel load and weighs about 90–160 kg.

But this citation of Parsons quickly becomes more complicated. There is also a Bayt al-Faqih bahar of about 333 kg, or perhaps up to 370 kg. Could the bahar of Parson be this bigger/heavier bahar? In consulting the Parsons primary source directly, the ambiguity remains. First, Parsons writes “The customer [customs agent] here assures me, that one year with another there are not less than sixty thousand bahars exported.” And Parson defines a bahar as “eight hundred and twenty English pounds weight.”<sup>91</sup> These 820 lbs would be 372 kg, assuming the referenced English pound weighs 454 grams. Such a finding of 372 kg is consistent with the that of Khan and Hinz’s discussion of bahars, specifically the big bahar of Bayt al-Faqih.

However, Parson has a different bahar definition just two pages later. He writes, “a bahar making two bales.”<sup>92</sup> He also writes this:

“The customer [customs house agent] here assures me, that last year upwards of seventy thousand bales of coffee were exported from Hodedah to Jedda, which, at two bales to the bahar, makes upwards of thirty-five thousand bahars, a greater quantity than was exported to all other parts: of that number he has been informed that upwards of sixty thousand bales were sent from Jedda to Suez.”<sup>93</sup>

Bales and bahars are unrelated units. Two bales make a camel load, with a bale weighing 100–150 kg. Two bales would weigh 200–300 kg. This range is

---

<sup>91</sup> Abraham Parsons, *Travels in Asia and Africa* (London, 1808), 282.

<sup>92</sup> Parsons, *Travels in Asia and Africa*, 284.

<sup>93</sup> Parsons, *Travels in Asia and Africa*, 285.

less than the Bayt al-Faqih bahar of 372 kg and more than the 185 kg VOC Bahar and 195 kg Mocha Bahar.

In these quotes it seems that Parsons makes the same mistake as other scholars have made—he is confusing his bahars. His enumerated bahar of 372 kg is likely the Bayt al-Faqih bahar and the definition is accurate. However, the figures given by customs agents are most likely in VOC or Mocha bahar units. This would reflect the units use at port. While the bahar sounds the same, it has a different weight at the inland coffee entrepot of Bayt al-Faqih, versus at the port city of Mocha in the hands of traders. Same term, different weights.

Notably, Raymond does not mention or explore Parsons 820 lb (372 kg) bahar. It seems that Raymond simply ignored the definition as it seemed nonsensical.

In this confusion of units both Parsons and Raymond make a similar mistake. Parsons tries unsuccessfully to convert bahars to bales and Raymond similarly tries unsuccessfully to convert from bahars to fardes. Raymond use of 35,000 and 30,000 fardes is based on Parsons figures of 70,000 and 60,000. The failure of Parson and Raymond is no surprise, given the difficulty these units have caused many scholars.

To make sense of Parsons, the most likely unit conversion is a Mocha bahar of 195 kg (reflecting the preferred bahar of the customs officer), and a bale of perhaps 150 kg. Thus, 60,000 bahars of total export is 11,700 tonnes. And 70,000 bales exported from Hodedah to Jedda is 10,500 tonnes; and 60,000 bales ongoing from Jedda to Suez is 9,000 tonnes.

This entire discussion aside, in Raymond’s original calculation he converts 60,000 fardes to 200,000 quintaux. This is a ratio of 3.33 quintaux per farde, which is reasonable, with a farde weighing 148 kg (44.33 kg per quintaux).

- 60,000 bahars weigh 11,100 or 11,700 tonnes. (185 kg VOC bahar or 195 kg Mocha bahar)
- 70,000 bales weigh 7,000–10,500 tonnes (100–150 kg per bale)
- 60,000 bales weight 6,000–9,000 tonnes (100–150 kg per bale)

Relying on this citation and by investigating Parsons and Raymond thoroughly—while correcting for the proper weight of a bahar—we can conclude that **these sources indicate that circa 1778 total annual exports were most likely 11,100–11,700 tonnes per year.** In contrast, Raymond’s incorrect calculation of 200,000 quintaux—equal to 8,860 tonnes—underestimates the total. Moreover, in the specific year 1777 (or whatever is referenced as “last year”), upwards of 7,000–10,500 tonnes of coffee shipped from Hodedah to Jedda, and 86% of that (six-sevenths or 6,000–9,000 tonnes) shipped onward from Jedda to Suez. In Suez, Ottoman traders presumably traded the coffee throughout Ottoman domains.

4. *“According to a note written in the margin of the manuscript of *Venture de Paradis... Yemen produced 60 to 70,000 fardes of 4 quintaux (thus 240 to 280,000 quintaux) of coffee, half of which half was destined for Turkey, the rest going to Persia and India.*”*

A farde weighs 90–160 kg, and it is half a camel load. A farde defined as 4 quintaux weighs 177 kg. While this is heavier than expected, a farde could reasonably weigh this amount, given the carrying capacity of a camel.

- 240,000–280,000 quintaux weigh 10,600–12,400 tonnes.

Relying on this citation we can conclude that **total production was 10,600–12,400 tonnes**. Notably, Raymond does not give a date for this citation.

In addition to these four citations about Yemen’s annual coffee production in the eighteenth century, Raymond also has another extremely valuable dataset. He devotes a significant portion of his dissertation to compiling import data of Yemeni coffee into Cairo, 1660–1798. This dataset gives insight in Yemen’s total production over a century, as the Ottoman empire and Cairene traders were one of the principal buyers of the coffee. Their import totals are a base of which Yemen’s production always exceeded. At most, Cairene traders could import 100% of Yemen’s output. In practice, they imported approximately half according of Raymond. During this time period exceeding a century, Raymond finds import totals largely unchanging, and averaging about 25,000 fardes or 3,700 tonnes annually. The table below, reproduced from Raymond, summarizes his findings. Notably he draws trade information from diverse sources, strengthening the robustness of his conclusions.

Table 2: Importation of Yemeni Coffee into Cairo, 1660–1798<sup>94</sup>

| <i>Année</i>                     | <i>Source</i>                         | <i>Charges   Fardes</i>                          |
|----------------------------------|---------------------------------------|--|
| (vers 1660)                      | Thévenot, II, 555                     | (30.000 charges)                                 |
| 1707                             | A.N., Caire, B 1 316                  | 100.000 qx soit environ<br>30.000 fardes         |
| (avant 1708)                     | id.                                   | (30 à 40.000 fardes)                             |
| (vers 1708)                      | id.                                   | (15.000)   |
| 1712                             | C.C.M., J 571                         | 30.000 fardes                                    |
| 1715                             | C.C.M., J 572                         | 25.000 fardes                                    |
| (avant 1716)                     | A.N., Caire, B 1 318                  | (30 à 35.000 fardes)                             |
| 1716                             | id.                                   | 22.000 fardes                                    |
| 1717                             | id.                                   | 25.000 fardes                                    |
| (avant 1718)                     | id.                                   | (24 à 25.000)                                    |
| (avant 1718)                     | C.C.M., J. 572                        | (30 à 35.000)                                    |
| 1718                             | id.                                   | 14.000 fardes                                    |
| 1720                             | A.N., Caire, B 1 319                  | 28.000 fardes*                                   |
| 1721                             | id.                                   | 29/30.000 fardes*                                |
| (vers 1722)                      | id.                                   | (15/20.000 fardes)                               |
| 1722                             | id.                                   | 25.000 fardes                                    |
| 1726                             | A.N., Caire, B 1 320                  | 24.000 fardes*                                   |
| 1730                             | C.C.M., Roux, LIX                     | 23 à 25.000 fardes*                              |
| 1732                             | id.                                   | env. 15.000 fardes*                              |
| 1733                             | A.N., Alexandrie, B 1 103             | 27 à 28.000 fardes*                              |
| 1736                             | C.C.M., Roux, LIX                     | 25.000 fardes                                    |
| (avant 1746)                     | A.N., Alexandrie, B 1 106             | (24.000 fardes)                                  |
| 1746                             | id.                                   | 30.000 fardes                                    |
| 1748                             | A.N., Caire, B 1 328                  | 70.000 qx soit env. 20.000 fardes                |
| 1749                             | id.                                   | 30.000 fardes                                    |
| (vers 1750)                      | Hasselquist, II, 128                  | (36.000 balles)                                  |
| 1753                             | A.N., Caire, B 1 330                  | 25.000 fardes                                    |
| (au temps d'Ibrâhîm<br>le Grand) | Vincennes, B 6 9, 1798                | (30.000 fardes)                                  |
| (vers 1761)                      | Niebuhr, <i>Voyage</i> , I, 117       | (22 à 25.000 fardes)                             |
| (sous 'Alî Bey)                  | Vincennes, B 6 9, 1798                | (24.000 fardes)                                  |
| 1775                             | Chabrol, 505                          | 30.000 balles                                    |
| (1780 - 1790)                    | Clerget, II, 73                       | (28 à 36.000 balles)                             |
| (avant 1783)                     | Girard, 655                           | (20 à 30.000 fardes de 3 qx $\frac{1}{3}$ )      |
| (avant 1783)                     | Volney, 125                           | (60 à 70.000 qx, soit 17.800 à<br>20.800 fardes) |
| 1783                             | Volney, 125                           | 30.000 fardes                                    |
| (1783)                           | Blumenau, d'après Clerget,<br>II, 334 | (30.000 balles)                                  |
| 1786                             | C.C.M., Roux, LIX                     | 40.000 fardes                                    |
| (sous Ismâ'il Bey)               | Vincennes, B 6 9, 1798                | (24.000 fardes)                                  |

<sup>94</sup> Raymond, *Artisans et commerçants*, 130.

| <i>Année</i>                      | <i>Source</i>  | <i>Charges / Fardes</i>                   |
|-----------------------------------|--|---|
| (sous Ismā'il Bey)<br>(vers 1791) | Girard, 681<br>Venture de Paradis, <i>Détail sur l'état actuel</i> , 100 a | (26.000 fardes)<br>(30.000 fardes)        |
| (vers 1795)                       | Magallon, A.E., Caire, 25  | (environ 30.000 fardes)                   |
| (vers 1795)                       | Olivier, <i>Voyage</i> , II, 186   | (environ 30.000 fardes)                   |
| 1795 - 1798                       | Girard, 686  | 14.144 balles, soit environ 28.000 fardes |
| 1797                              | Vincennes, B 6 9, 1798   | 21.000 fardes                             |

*Importation of Yemeni coffee into Cairo remained steady from 1660 (or 1707) to 1798, with annual imports typically between 25,000 and 30,000 fardes, or 3,700 and 4,440 tonnes. A charge, farde, and balle are essentially the same weight. A quintaux weighs 44.33 kg. (Reproduction of Table 23, Raymond 1973. Raymond's notes in footnote.<sup>95</sup>)*

Raymond, in his own words summarizes the chart as follows: one must conclude that the annual importation of Yemeni coffee is maintained with a rather nice regularity of around 25,000 fardes during a century-and-a-half.<sup>96</sup>

Raymond, writing in French, summarizes his findings: The annual export of Yemeni coffee seemed to have exceeded 200,000 quintaux [8,866 tonnes] at the end of the 17<sup>th</sup> and beginning of the 18<sup>th</sup> century. Of this total, close to half, averaging 30,000

<sup>95</sup>Raymond's notes, in the original French: "Notes sur ce tableau.

1. Sources : Archives Nationales (A.N.) ; Affaires Étrangères (A.E.) ; Archives de la Chambre de Commerce de Marseille, Fonds Roux (C.C.M.) ; Description de l'Égypte (Chabrol, Essai sur les Mœurs ; Girard, Mémoire) ; Archives de Vincennes, B 6, 9 (lettre de Poussielgue à Bonaparte, 5 octobre 1798). 2. Les chiffres donnés entre parenthèses sont des évaluations faites par les voyageurs, ou portant sur une période antérieure à la rédaction du rapport dont ils sont tirés. Les autres chiffres sont des évaluations portant sur l'année en cours (archives consulaires) ou des indications tirées des registres des douanes (Description).

La valeur de la farde ou de la charge variait entre 3 et 4 quintaux de 100 livres. On a converti les chiffres de 1707 et 1748, donnés en quintaux par les sources, en donnant des valeurs approchées : 30.000 fardes pour 100.000 qx et 20.000 fardes pour 70.000 qx.

Les chiffres qui figurent entre parenthèses sont en général des évaluations globales, comprenant en principe les quantités de café importées du Yémen par voie de terre et par voie de mer. Les chiffres donnés par les sources consulaires ou par les documents des archives de Marseille correspondent le plus souvent aux seules quantités importées par Suez ; ils sont donc inexacts par défaut. On a marqué du signe \* les chiffres qui indiquent le total des quantités apportées par voie de terre et par voie de mer."

<sup>96</sup> Raymond, *Artisans et commerçants*, 131.

*charges* (or *fardes*), thus about 100,00 quintaux, was shipped to Cairo, a quantity which we will see, varied little during the 18<sup>th</sup> century.<sup>97</sup> With 30,000 *fardes* = 100,000 quintaux, each *farde* weighed 148 kg. Raymond's conclusions of Yemeni exports exceeding 8,866 tonnes seems accurate and matches every data source.

Raymond has a particularly keen and *fascinating* observation about a sentiment of decline despite stable coffee exports. He writes that starting in about 1750, consuls and voyagers in Cairo observing Yemeni coffee imports, tended to consider that the situation previously was better than what they saw by their own eyes. Or more simply, things were better in the old days. Raymond notes that the data does not bear this out. In fact, he describes it as such: reconciling various datasets that we have identified between 1660 and 1798 do not give an image of a decline, but in fact give an image of remarkable stability.<sup>98</sup> This anecdote is remarkable—it mirrors a present-day sentiment that Yemeni coffee was doing better in the old days (loosely defined as the early to mid-twentieth century). Yet in both instances—250 years apart! —the sentiment of decline is defied by steady coffee exports.

Tuchscherer concludes a slightly higher total coffee output than Raymond: “The output of Yemeni coffee probably reached its zenith in the first quarter of the eighteenth century, at around 12,000 to 15,000 tonnes a year. This level was probably more or less maintained throughout the eighteenth century...”<sup>99</sup> It is unclear why Tuchscherer's estimate is higher than Raymond, based on the same sources. Perhaps Tuchscherer is drawing on unnamed insights. And in regard to Tuchscherer's use of the term “load” it

---

<sup>97</sup> Raymond, *Artisans et Commerçants*, 131.

<sup>98</sup> Raymond, *Artisans et commerçants*, 129.

<sup>99</sup> Tuchscherer, “Coffee in the Red Sea Area,” 55.



seems he merely was referencing bale or farda. His (mis)use was only ambiguity in word choice (*not* a calculation error).

Finally, Tuchscherer in a footnote interrogating his source of Raymond who cites Hamilton and Parsons, writes this: “The figure of 22,000 tonnes given here seems exaggerated, as my calculations indicate that a ‘load’ actually only weighed around 140 kilos.<sup>100</sup> Tuchscherer seems to combine multiple references into one, but has the same conclusions that the Hamilton figure seems too high.

In my estimation and based on Raymond’s four sources and his research on Cairene import data—while applying my more robust definitions of chapter III—Yemen’s coffee output is about 8,000–12,000 tonnes annually, for much of the time period 1690–1800. It was perhaps in the upper end of this range, 10,000–12,000 tonnes, after correcting for the mistake of Parsons. Hamilton’s data point of 22,000 tonnes seems an outlier that lacks substantiation. And with Tuchscherer’s higher estimate (12,000–15,000 tonnes) that lends additional support to my upper range of Yemen’s eighteenth-century coffee production averaging 10,000–12,000 per year.

#### Michel Tuchscherer Book Chapter, 1800–1900

In the nineteenth century, production data is much more limited. While output may decline, it is unclear by how much, due to the limited data points Tuchscherer offers. A starting estimate of 10,000 metric tonnes annually, seems reasonable. To bolster this estimate, it is first useful to question the meta-narrative Tuchscherer projects on Yemen’s

---

<sup>100</sup> Tuchscherer, “Coffee in the Red Sea Area,” 55.

coffee sector for the nineteenth century. Once doing this, we can look beyond his narrative and seek production data points in context.

Tuchscherer seems to fall into the trap of the pervasive narrative of Yemen's long, slow decline. His evidence, like many others, seems to be as simple as Yemen formally monopolized coffee trade but now is a mere footnote of production and has been forgotten. But does his data bear this out or is he projecting a narrative where the data does not actually tell this story?

Tuchscherer write about this narrative of decline, but his own data seems to tell a different story: "Whereas Yemen still had a quasimonopoly of supplies in 1720, its share of world production was down to a mere 2 to 3 percent around 1840. From the beginning of the nineteenth century, the absolute level of Yemeni output also began to decline, partly because of political troubles."<sup>101</sup> He is correct in noting the relative importance of Yemen in total production worldwide. But per his own data, he writes that in the 1870s "Yemen's yearly output,...can be estimated at around 10,000 tonnes..."<sup>102</sup> This hardly seems an industry in decline. His 12,000-15,000 tonnes estimate for the eighteenth century decreasing to 10,000 tonnes the following century seems a modest decline in output.

He also compares Yemen's historic output to today's output making similar comments of decline: "[From the seventeenth century onwards] Yemen then appears to have lost its capacity to adapt to the new conditions on the world market in a long, slow, but irreversible decline. Today its production is reduced to insignificant amounts..."<sup>103</sup>

---

<sup>101</sup> Tuchscherer, "Coffee in the Red Sea Area," 55.

<sup>102</sup> Tuchscherer, "Coffee in the Red Sea Area," 65.

<sup>103</sup> Tuchscherer, "Coffee in the Red Sea Area," 66.

But if today's output is 5,000 tonnes or half of what Yemen formally produced in its glory days, from another perspective, that is an industry half the size, not an industry that is insignificant.

To extract useful information about production totals in the eighteenth century, we must look beyond this narrative. What story do the datapoints tell—not what story does Tuchscherer lay on top of them. Here are the few datapoints provided in the second half of the chapter, showing trading volumes in the thousands of tonnes (bolding is my own). These totals in the thousands fits within his assertion that in 1875 overall production was about 10,000 tonnes. Notably, our trading terms of chapter III are less useful this century.

- “In 1806, Mocha still exported 13,000 loads of coffee (about **1,800 tonnes**), of which 9,000 loads (about **1,250 tonnes**) were taken by Americans.”<sup>104</sup> Per his calculation, a load is about 140 kg., a reasonable estimate.
- In the mid century, “Jiddah received some **3,000 to 4,000 tonnes** of coffee a year all told, probably about the same amount as at the peak of the trade in the preceding century.”<sup>105</sup>
- “...by 1857 they [exports] exceeded **1,000 [tonnes]**.”<sup>106</sup>
- In 1875-76 “Aden received 6,738 camel loads, equivalent to **1,268 tonnes**.” Per this calculation, a camel load is 188 kg. This is a bit low (typically 200–300 kg), but within the realm of possibility. This same year

---

<sup>104</sup> Tuchscherer, “Coffee in the Red Sea Area,” 56.

<sup>105</sup> Tuchscherer, “Coffee in the Red Sea Area,” 64.

<sup>106</sup> Tuchscherer, “Coffee in the Red Sea Area,” 61.

Tuchscherer describes **3,800 tonnes** of coffee arriving in Aden and nearly **2800 tonnes exported**.

From these quotes, we see in my bolding that trading volumes were easily in the thousands of tonnes. While they do not prove that total production was 10,000 tonnes, they do strongly indicate that production was at least 5,000 tonnes annually, and likely higher.

When Tuchscherer speaks of Yemen's decline, he seems to be speaking to changes happening in how the coffee was traded and its relative importance on the world stage. This is distinct from Yemen's output. He writes, "After 1840, the rate of European penetration into the Red Sea suddenly accelerated, provoking mutations in the coffee economy, but not fundamentally reshaping its ancient foundations."<sup>107</sup> This indicates that *how* the coffee was produced, remained steady. He also writes that starting in the 1850s Aden was a free port and "Now that Yemeni coffee was marginal in world terms, Western buyers could afford to be choosy, imposing the costs and risks for transport to Aden, further from production zones than Mocha, onto local producers and intermediaries."<sup>108</sup> This indicates not a change in production methods but a change in trade patterns. The production totals could have remained the same.

From this limited data, we can only draw limited conclusions about nineteenth century production totals. Tuchscherer says production in 1875 was 10,000 metric tonnes. And a variety of other data points indicates this is a plausible estimate, with production likely at least 5,0000 tonnes. We do have the benefit in knowing production totals in the centuries before and after, and there is no indication that Yemen's production dropped

---

<sup>107</sup> Tuchscherer, "Coffee in the Red Sea Area," 58.

<sup>108</sup> Tuchscherer, "Coffee in the Red Sea Area," 61.

precipitously in the nineteenth century to then increase in the twentieth century. We can reasonably conclude that production totals remained somewhat steady.

## Chapter V.

### Summary and Conclusions

While Yemen's coffee production totals have fluctuated over the last 400 years, claims of its decline are unfounded. Yes, Yemen formally produced one hundred percent of global production and now produces less than one percent. But in absolute terms, Yemen's production has proved remarkably resilient and steady. Production totals have been 10,000 metric tonnes, plus or minus 5,000 tonnes, for over four centuries. This is a story of enduring relevance and traditional production.

Multiple stories of decline of the sector seem to feed this narrative of a faltering industry. In the eighteenth century it was consuls and travelers in Cairo reminiscing for better days. In the twenty-first century, it is development reports and mainstream coffee news and publications wishing for the early to mid-twentieth century. Giving life to these narratives are the former grandeur of Yemen—it *was* global trade. But of course it lost ground, it was a monopoly.

To better understand Yemen's production, *much* work needs to be done on current, twenty-first century data collection. Quite simply, the FAO and ICO datasets are extremely limited in value. That data must be improved.

For the twentieth and nineteenth century, more datapoints need to be integrated with coffee production estimates. There is room for much refinement in both centuries.

For the eighteenth century, the work of Raymond continues to have relevance. It is no surprise that his work looms large in the study of Yemeni coffee. Based on his

work, we arguably understand better eighteenth century coffee production totals in Yemen, then we do 2020 production totals in Yemen. This is both a remarkable achievement for him and it speaks to the need for better quality data today.

The challenge presented by imprecise data today is not insurmountable. The years in front of us are ongoing opportunities to do better, with every year a new chance. Not only that, as we look to the future it seems reasonable to aim for another 400 years of traditional and vibrant coffee production.

## Appendix 1.

### Production Datasets

Table 3. FAO Data: Yemen Green Coffee Industry, 1961–2019<sup>109</sup>

| Year | Tonnes Coffee | Notes (tonnes)    | Hectares Harvested | Notes (hectares) | Yields kg/ha |
|------|---------------|-------------------|--------------------|------------------|--------------|
| 1961 | 6,300         | Unofficial figure | 13,900             | FAO estimate     | 453          |
| 1962 | 6,300         | Unofficial figure | 13,910             | FAO estimate     | 453          |
| 1963 | 5,800         | Unofficial figure | 12,720             | FAO estimate     | 456          |
| 1964 | 5,700         | Unofficial figure | 12,420             | FAO estimate     | 459          |
| 1965 | 6,300         | Unofficial figure | 13,950             | FAO estimate     | 452          |
| 1966 | 5,323         | Unofficial figure | 11,807             | FAO estimate     | 451          |
| 1967 | 4,423         | Unofficial figure | 9,607              | FAO estimate     | 460          |
| 1968 | 4,423         | Unofficial figure | 9,607              | FAO estimate     | 460          |
| 1969 | 5,013         | Unofficial figure | 11,107             | FAO estimate     | 451          |
| 1970 | 4,813         | Official data     | 10,607             | Official data    | 454          |
| 1971 | 4,823         | Official data     | 10,607             | Official data    | 455          |
| 1972 | 4,313         | Official data     | 9,607              | Official data    | 449          |
| 1973 | 4,313         | Official data     | 9,607              | Official data    | 449          |
| 1974 | 4,313         | Official data     | 9,607              | Official data    | 449          |
| 1975 | 3,810         | Official data     | 8,607              | Official data    | 443          |
| 1976 | 3,810         | Official data     | 7,607              | Official data    | 501          |
| 1977 | 4,710         | Official data     | 8,307              | Official data    | 567          |
| 1978 | 4,716         | Official data     | 8,307              | Official data    | 568          |
| 1979 | 4,410         | Official data     | 8,308              | Official data    | 531          |
| 1980 | 4,390         | Official data     | 8,308              | Official data    | 528          |
| 1981 | 4,405         | Official data     | 8,298              | Official data    | 531          |
| 1982 | 4,305         | Unofficial figure | 8,297              | Official data    | 519          |
| 1983 | 3,917         | Unofficial figure | 7,729              | Official data    | 507          |
| 1984 | 5,152         | Official data     | 16,783             | Official data    | 307          |
| 1985 | 4,913         | Official data     | 16,783             | Official data    | 293          |
| 1986 | 5,012         | Official data     | 16,973             | Official data    | 295          |
| 1987 | 5,111         | Official data     | 17,970             | Official data    | 284          |
| 1988 | 6,474         | Official data     | 19,463             | Official data    | 333          |
| 1989 | 6,807         | Official data     | 22,202             | Official data    | 307          |
| 1990 | 7,411         | Official data     | 24,804             | Official data    | 299          |
| 1991 | 5,430         | Official data     | 23,004             | Official data    | 236          |
| 1992 | 8,218         | Official data     | 23,665             | Official data    | 347          |
| 1993 | 8,727         | Official data     | 24,569             | Official data    | 355          |
| 1994 | 8,480         | Official data     | 25,174             | Official data    | 337          |
| 1995 | 8,993         | Official data     | 27,347             | Official data    | 329          |
| 1996 | 10,600        | Official data     | 29,220             | Official data    | 363          |

<sup>109</sup> FAO, “FAOSTAT Statistical Database.”



| <b>Year</b> | <b>Tonnes Coffee</b> | <b>Notes (tonnes)</b> | <b>Hectares Harvested</b> | <b>Notes (hectares)</b> | <b>Yields kg/ha</b> |
|-------------|----------------------|-----------------------|---------------------------|-------------------------|---------------------|
| 1997        | 10,325               | Official data         | 31,618                    | Official data           | 327                 |
| 1998        | 11,283               | Official data         | 32,032                    | Official data           | 352                 |
| 1999        | 11,182               | Official data         | 32,837                    | Official data           | 341                 |
| 2000        | 11,363               | Official data         | 33,443                    | Official data           | 340                 |
| 2001        | 11,906               | Official data         | 33,641                    | Official data           | 354                 |
| 2002        | 11,499               | Official data         | 33,545                    | Official data           | 343                 |
| 2003        | 11,608               | Official data         | 33,662                    | Official data           | 345                 |
| 2004        | 10,260               | Official data         | 28,354                    | Official data           | 362                 |
| 2005        | 11,331               | Official data         | 28,821                    | Official data           | 393                 |
| 2006        | 17,292               | Official data         | 32,260                    | Official data           | 536                 |
| 2007        | 18,330               | Official data         | 33,521                    | Official data           | 547                 |
| 2008        | 18,788               | Official data         | 34,292                    | Official data           | 548                 |
| 2009        | 18,924               | Official data         | 34,497                    | Official data           | 549                 |
| 2010        | 19,029               | Official data         | 34,717                    | Official data           | 548                 |
| 2011        | 19,275               | Official data         | 34,837                    | Official data           | 553                 |
| 2012        | 19,828               | Official data         | 34,987                    | Official data           | 567                 |
| 2013        | 19,984               | Official data         | 35,060                    | Official data           | 570                 |
| 2014        | 20,059               | Official data         | 34,652                    | Official data           | 579                 |
| 2015        | 19,257               | Official data         | 33,959                    | Official data           | 567                 |
| 2016        | 18,945               | Official data         | 33,929                    | Official data           | 558                 |
| 2017        | 18,767               | Official data         | 33,544                    | Official data           | 559                 |
| 2018        | 18,642               | Official data         | 32,984                    | Official data           | 565                 |
| 2019        | 20,812               | Official data         | 34,981                    | Official data           | 595                 |

Table 4. ICO Data: Yemen Green Coffee Industry, 1991–2020<sup>110</sup>

| <b>Crop year</b> | <b>Production (tonnes)</b> | <b>Exports (tonnes)</b> | <b>Domestic Consumption (tonnes)</b> |
|------------------|----------------------------|-------------------------|--------------------------------------|
| 1991             | 0                          | 4,350                   | 0                                    |
| 1992             | 0                          | 2,740                   | 0                                    |
| 1993             | 0                          | 2,843                   | 0                                    |
| 1994             | 0                          | 4,941                   | 0                                    |
| 1995             | 0                          | 4,852                   | 0                                    |
| 1996             | 0                          | 3,043                   | 0                                    |
| 1997             | 0                          | 4,221                   | 0                                    |
| 1998             | 0                          | 4,382                   | 0                                    |
| 1999             | 4,122                      | 4,122                   | 0                                    |
| 2000             | 3,635                      | 3,635                   | 0                                    |
| 2001             | 3,836                      | 3,836                   | 0                                    |
| 2002             | 3,733                      | 3,733                   | 0                                    |
| 2003             | 3,405                      | 3,405                   | 0                                    |
| 2004             | 11,598                     | 2,838                   | 8,760                                |
| 2005             | 12,334                     | 4,174                   | 8,160                                |
| 2006             | 12,191                     | 3,911                   | 8,280                                |
| 2007             | 12,434                     | 4,154                   | 8,280                                |
| 2008             | 11,877                     | 4,077                   | 7,800                                |
| 2009             | 13,188                     | 2,808                   | 7,800                                |
| 2010             | 8,111                      | 2,591                   | 7,800                                |
| 2011             | 9,670                      | 2,170                   | 7,800                                |
| 2012             | 11,104                     | 3,304                   | 7,800                                |
| 2013             | 11,252                     | 3,452                   | 7,800                                |
| 2014             | 11,238                     | 3,438                   | 7,800                                |
| 2015             | 10,703                     | 3,203                   | 7,500                                |
| 2016             | 9,375                      | 2,475                   | 6,900                                |
| 2017             | 8,607                      | 2,607                   | 6,000                                |
| 2018             | 7,928                      | 2,528                   | 5,400                                |
| 2019             | 5,135                      | 1,235                   | 3,900                                |
| 2020             | 5,486                      | 1,646                   | 3,840                                |

---

<sup>110</sup> International Coffee Organization, “Historical Data on the Global Coffee Trade.”

Table 5. FAO Data: Yemen Coffee Exports, 1929–1960<sup>111</sup>

| Year | Total Exports (tonnes) |
|------|------------------------|
| 1929 | 3800                   |
| 1930 | 4100                   |
| 1931 | 4500                   |
| 1932 | 4900                   |
| 1933 | 4500                   |
| 1934 | 4200                   |
| 1935 | 5200                   |
| 1936 | 4500                   |
| 1937 | 3300                   |
| 1938 | 4500                   |
| 1939 | 5600                   |
| 1940 | 2600                   |
| 1941 | 3200                   |
| 1942 | 9100                   |
| 1943 | 14200                  |
| 1944 | 9000                   |
| 1945 | 9800                   |
| 1946 | 7000                   |
| 1947 | 6300                   |
| 1948 | 6300                   |
| 1949 | 8700                   |
| 1950 | 7200                   |
| 1951 | 7900                   |
| 1952 | 9000                   |
| 1953 | 8000                   |
| 1954 | 7200                   |
| 1955 | 8400                   |
| 1956 | 7500                   |
| 1957 | 7600                   |
| 1958 | 2800                   |
| 1959 | 4600                   |
| 1960 | 4100                   |

---

<sup>111</sup> FAO, *The World Coffee Economy*, 33:55–56.

## Works Cited

- Bostan, Idris. "Acheminement du café yéménite de l'Égypte vers Istanbul et quelques ports de la mer Égée au xviii siècle." In *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 153–59. Le Caire: Institut Français d'Archéologie Orientale, 2001.
- Braudel, Fernand. *Civilization and Capitalism, 15th-18th Century*. 1st U.S. ed. New York: Harper & Row, 1982.
- Brouwer, C. G. "Al-Mukhā as a Coffee Port in the Early Decades of the Seventeenth Century According to Dutch Sources." In *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 271–95. Le Caire: Institut Français d'Archéologie Orientale, 2001.
- . *Al-Mukhā: Profile of a Yemeni Seaport as Sketched by Servants of the Dutch East India Company (VOC) 1614-1640*. Amsterdam: D'Fluyte Rarob, 1997.
- Buti, Gilbert. "Marseille entre Moka et café des îles: espaces, flux, réseaux (xvii–xviii siècles)." In *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 213–44. Le Caire: Institut Français d'Archéologie Orientale, 2001.
- Carreira, Ernestine. "Les Français et le commerce du café dans l'océan Indien au xviii siècle." In *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 333–57. Le Caire: Institut Français d'Archéologie Orientale, 2001.
- Clarence-Smith, W. G., and Steven Topik, eds. *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989*. Cambridge, UK ; New York: Cambridge University Press, 2003.
- Establet, Colette, and Jean-Paul Pascual. "Café et objets du café dans les inventaires de pèlerins musulmans vers 1700." In *Le commerce du café avant l'ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer. Le Caire: Institut Français d'Archéologie Orientale, 2001.
- FAO. "FAOSTAT Statistical Database / Yemen Coffee Data." Database, 2021. <https://www.fao.org/faostat/en/#home>.
- . *The World Coffee Economy*. Vol. 33. Commodity Bulletin Series. Rome, 1961.

- Genç, Mehmet. “Contrôle et taxation du commerce du café dans l’Empire ottoman.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 161–79. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- Gopal, Surendra. “Coffee Trade of Western India in the Seventeenth Century.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 297–318. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- Hamilton, Alexander. *A New Account Of The East-Indies 1688-1723*. Second. Vol. 1. London, 1739.
- Hanna, Nelly. “Coffee and Coffee Merchants in Cairo, 1580–1630.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 91–101. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- Hinz, Walther. *Measures and Weights in the Islamic World an English translation of Walther Hinz’s handbook Islamische Maße und Gewichte*. Translated by M. Ismail Marcinkowski. Kuala Lumpur: International institute of islamic thought and civilization, 2003.
- Husam al-Din Isma’il, Muhammad. “Le café dans la ville de Rosette à l’époque ottomane, xvi–svii siècle.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 103–9. 20. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- International Coffee Organization. “Historical Data on the Global Coffee Trade / Yemen Coffee Data.” Database, 2020. [https://www.ico.org/new\\_historical.asp](https://www.ico.org/new_historical.asp).
- International Trade Centre. *The Coffee Exporter’s Guide*. 3rd ed., 2012.
- Kawatoko, Mutsuo. “Coffee Trade in the al-Tūr Port, South Sudan.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 51–66. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- Khan, Iftikhar Ahmad. “Coffee Trade of the Red Sea First Half of the 18th Century.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 319–31. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- Larguèche, Dalenda. “Le café à Tunis du XVIII au XIX siècle: Produit de commerce et espace de sociabilité.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 181–210. Le Caire: Institut Français d’Archéologie Orientale, 2001.

- Oxford English Dictionary. “‘bale, n.3’.” n.d.  
<https://www.oed.com/view/Entry/14855?rskey=V8ESvU&result=3&isAdvanced=false>.
- Parsons, Abraham. *Travels in Asia and Africa*. London, 1808.
- Paulsen, Olaf. “Breaking the Vicious Cycle in Coffee: Results from a Value Chain Analyses of the Coffee Industry in Yemen.” German Technical Cooperation (GTZ) and Small and Micro Enterprise Promotion Service (SMEPS), 2008.
- Rafeq, Abdul-Karim. “The Socioeconomic and Political Implications of the Introduction of Coffee into Syria. 16th–18th Centuries.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 127–42. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- Raymond, André. *Artisans et Commerçants Au Caire Au XVIIIe Siècle*. Damas: Institut français de Damas, 1973.
- . *Artisans et commerçants au Caire au XVIIIe siècle. Tome I*. Damas: Presses de l’Ifpo, 2015.
- REACH, ACTED, IMPACT. “Coffee Production Assessment in Raymah Governorate, Yemen – Preliminary Findings,” June 2014.
- Samper, Mario, and Radin Fernando. “Historical Statistics of Coffee Production and Trade from 1700 to 1960.” In *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989*, 411–62, 2003.
- Trumble, William R., Angus Stevenson, and Lesley Brown, eds. *Shorter Oxford English Dictionary on Historical Principles*. 5th ed. Oxford ; New York: Oxford University Press, 2002.
- Tuchscherer, Michel. “Coffee in the Red Sea Area from the Sixteenth to the Nineteenth Century.” In *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989*, edited by W. G. Clarence-Smith and Steven Topik, 50–66. Cambridge, UK ; New York: Cambridge University Press, 2003.
- . “Commerce et production du café en mer Rouge au XVI siècle.” In *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*, edited by Michel Tuchscherer, 69–90. 20. Le Caire: Institut Français d’Archéologie Orientale, 2001.
- , ed. *Le commerce du café avant l’ère des plantations coloniales: espaces, réseaux, sociétés (XVe - XIXe siècle)*. Le Caire: Institut Français d’Archéologie Orientale, 2001.

- Ukers, William. *All about Coffee*. 2nd ed. The Tea and Coffee Trade Journal Company, 1935.
- Um, Nancy. "Order in the 'Arbitrary': The Distribution, Content, and Temporal Cycles of English Merchant Tribute in Eighteenth-Century Yemen." *Journal of Early Modern History* 18, no. 3 (March 21, 2014): 227–53.  
<https://doi.org/10.1163/15700658-12342413>.
- . *Shipped but Not Sold: Material Culture and the Social Protocols of Trade during Yemen's Age of Coffee*. Perspectives on the Global Past. Honolulu: University of Hawai'i Press, 2017.
- . *The Merchant Houses of Mocha: Trade and Architecture in an Indian Ocean Port*. Publications on the Near East. Seattle: University of Washington Press, 2009.
- USAID. "Expanding Yemen's Specialty Coffee Industry: Strengthening the Role and Capacity of the Yemen Coffee Association and Coffee Producer Associations," March 2008.
- . "Moving Yemen Coffee Forward: Assessment of the Coffee Industry in Yemen to Sustainably Improve Incomes and Expand Trade." US Agency for International Development, December 2005.
- . "Rediscovering Coffee in Yemen: Updating the Coffee Value Chain and a Marketing Strategy to Reposition Yemen in the International Coffee Markets," 2013.
- . "Yemen Agricultural Support Program: Final Report October 2005 - April 2008," 2008.
- Wintgens, Jean Nicolas, ed. *Coffee: Growing, Processing, Sustainable Production: A Guidebook for Growers, Processors, Traders, and Researchers*. Second, Updated edition. Weinheim, Germany: Wiley-VCH Verlag GmbH & Co. KGaA, 2012.