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THE STATE OF AGRICULTURE IN THE MUTAWAKKILITE KINGDOM OF YEMEN, 1918-1962: A DOCUMENTARY OVERVIEW

DANIEL MARTIN VARISCO

Traditional plow pulled by camel near Ṣan‘ā’, photography by Rossi in the late 1930s.

Abstract

Yemen has a rich tradition of agriculture, stemming from the South Arabian kingdoms through the Islamic era. In the 10th century the Yemeni savant al-Ḥasan al-Hamdānī referred to his homeland as al-Yaman *al-khaḍrā’* (the verdant Yemen) due to its agricultural wealth. Several important treatises and almanacs exist from the Rasulid era (13th-15th centuries). Yemeni scholars, anthropologists and agricultural experts have written about Yemen’s agriculture in the past half century, but less is known about the state of agriculture during the Mutawakkilite Kingdom of Imams Yaḥyā and Aḥmad during the 20th century. This study draws on Arabic sources, foreign travelers and the report of a 1955 FAO mission to Yemen in describing the role of agriculture and cultivated crops in the area ruled by the two imams between 1918 and 1962. The information in these sources is here made available in English.

Note

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Contents

Introduction

At the start of the 20th century most of Yemen was under the nominal control of the Ottoman Empire, which was never able to effectively control the highlands and was forced to allow the Zaydī imams to remain as local power brokers.[1] In the southern part of Yemen, centered on Aden and Ḥaḍramawt, the British had been in nominal control since 1839. With the onset of World War I in 1913, the Zaydī imams gained de facto control in most of the highlands, and with the fall of the Ottomans in 1918 Imam Yaḥyā established absolute rule, declaring the Mutawakkilite kingdom. Yaḥyā struggled at first with the Idrisis in the ʻAsīr region for control of the northern Tihāma, including the port of al-Ḥudayda. In 1934 King Saʻūd took control of the ʻAsīr region and Najrān. His forces unsuccessfully invaded Yaḥyā's Yemen, culminating in the Treaty of Ṭā'if in which Yemen ceded control of the annexed areas for a limited time period. Imam Yaḥyā was assassinated in February, 1948, and shortly thereafter his son Aḥmad became the ruler. Although there were diplomatic delegations from Britain, Italy and the Soviets, the kingdom was virtually closed to foreigners. With the death of Aḥmad in 1962, a revolution brought the Yemen Arab Republic into existence. Supported by Egypt's President Nasser, the young republic was engaged in a civil war with the Saudi-backed imamate successor, Imam Badr, until 1970.

The coastal region of the Tihāma along the Red Sea and the southern coast in the Gulf of Aden were frequently overrun by foreign invaders, but the highlands were isolated from most political currents in the region due to its geographical barriers and the power of local tribes. The Zaydī imams, who first came to Yemen in the late 9th century, ruled by forming alliances with tribes rather than forming a strong central state. At the end of the Mutawakkilite kingdom there were seven recognised provinces (*liwā'*, sg.): Taʻizz, Ibb, al-Bayḍā', Ṣanʻā', Ḥajja, Ṣaʻda, al-Ḥudayda, basically following the divisions during the Turkish period.[2] Although ʻAsīr and Najrān were under the control of of Saudi Arabia after 1934, the Yemeni historian al-Waysī included them in "Greater Yemen" (al-Yaman *al-kubrā*).[3] The British held power, nominal outside Aden for the most part, in the Aden Protectorate and Ḥaḍramawt. For several centuries there had been major Haḍramī emigration to Southeast Asia and the east coast of Africa with continuing family and economic links. In 1967 a revolution in the south threw out the British and created the Peoples' Democratic Republic of Yemen (PDRY), which in 1990 was united with the Yemen Arab Republic (YAR) in the north to become the Republic of Yemen (ROY).[4]

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[1] As noted by a British diplomat in Aden, "The Turkish suzerainty in the Yemen, during its final phase from 1878 to 1918, bred blight and decay" (Jacob 1932: 136). Writing in a 1923 dispatch to the U.S. Consul in Aden, Ameen Rihani commented: "The Turks did little or nothing to change or improve conditions. They planted hasheesh, and brought dancing girls, and spent a little money and used to get drunk – that's all the natives remember about them. The stagnation, religious and moral and political, is appalling" (Sinclair 1976: 97).

[2] Al-Waysī (1962: 18). Imam Yaḥyā had earlier divided Yemen four divisions, each under control of one of his sons (Naval Intelligence Division 1946: 331, 332, 357). As of 1946 it is reported that no Western traveler had visited Ṣaʻda (Naval Intelligence Division 1946: 575).

[3] Al-Waysī (1962:117). This included al-Mikhlāf al-Sulaymāniya and Liwā' Jīzān. An official Yemeni publication in 1360/1941 divided Yemen into three parts: the independent part of the Mutawakkilite Kingdom, the area under control of the British and ʻAsīr subject to the Saudi regime (Lambardi 1947: 143, note 1).

[4] For a concise history of modern Yemen during the 20th century, see Dresch (2000).

The population in Yemen in 1900 was estimated at around 2,400,000, rising to almost 3,000,000 in 1918.[5] In 1922 Imām Yaḥyā told Ameen Rihani that he ruled over 5,000,000 people, although Rihani believed it was closer to 3,000,000.[6] By the early 1940s there were conflicting claims for the population of the kingdom, from as little as 2-3 million[7] to over 4,000,000. For the early 1940s the Italian researcher Lambardi recorded a population of 4,069,087, with 55% Zaydī and 45% Shāfi'ī as well as a minority of Ismā'īlī at about 50,000. At the time there were said to be 60-70,000 Jews.[8] A report from 1947, however, reduced the total population to about 3,000,000 due in large part to emigration. In 1962 the population of the kingdom was estimated at 4,300,000 with an additional 910,000 in Aden and the Ḥaḍramawt.[9]

Yemen's rich agricultural heritage, stemming back to the Bronze Age and pre-Islamic kingdoms through the Rasulid era (13th-15th centuries) has been well documented.[10] Several travellers to northern Yemen during the second Ottoman occupation (1871-1918), including the Austrian Eduard Glaser and the Italian Renzo Manzoni, commented on Yemen's agriculture at the time.[11] There is a comprehensive analysis in German about these and other 19th century sources on agriculture by Adolf Grohmann.[12] During the British control of Aden, their colonial reports and special studies describe local agriculture, especially for the Ḥaḍramawt.[13]

The remainder of this monograph is devoted to eight sources that provide information on agriculture in Yemen during the early part of the 20th century up through the end of the Zaydī imamate in 1962. While much of the traditional systems of cultivation and irrigation had changed little over the years, new crops were being introduced. Four of the sources, translated from the Arabic, are by Yemeni authors, one is by a Syrian journalist visiting the Yemen of Imam Yaḥyā, one by an Italian Orientalist and another is a description of a report by an FAO team from the 1950s. Following these sources, a brief overview of agriculture during the kingdom is provided.

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[5] Al-Wāsi'ī (1927: 291, 319) estimated the population of Yemen at 15 million, with 5 million in the Tihāma, but this is clearly well off the mark. In 1886, Glaser (Grohmann 1922: 47) estimated the northern area controlled by the Ottomans as having 1.8 million. A dispatch by the U.S. Consul in Aden in 1922 estimated the population of the kingdom at around 2 million, with the number of people in Ṣan'ā' at 200,000 (Sinclair 1976(1): 13). As noted by Steffen et al. (1978: I/85, 90-91) there were no accurate population statistics for North Yemen before 1975, when the Swiss-conducted census estimated the de facto population at 4,705,000 with some 330,000 Yemenis said to be living abroad.

[6] Rihani (1930: ix, 98).

[7] Naval Intelligence Division (1946: 364).

[8] Lambardi (1947: 156).

[9] Tarsīsī (1962: 210). Sharafaddin (1961: 7) suggests 4,000,000 in "Free Yemen" and 1,434,000 in the "Occupied area". According to Ruiz (1966: 1250), records kept by the Imam Aḥmad indicated a population of 4-5,000,000.

[10] For recent studies of agriculture and irrigation in South Arabia before Islam, see Harrower (2016) and Maraqten (2017); for agriculture during the first few centuries of Islam in Yemen, see Varisco (2009); for Rasulid Yemen, see Varisco (1994); for recent agriculture change in the north since 1962, see Varisco (2018).

[11] Glaser (1884), whose work is described by Dostal (1993), and Manzoni (1884), which has been translated into Arabic. See also Millingen (1874).

[12] Grohmann (1922: 203-272).

[13] See Hartley (1944), Ingrams (1936) and Serjeant (1964).

1. ‘Abd al-Wāsi‘ ibn Yaḥyā al-Wāsi‘ī. *Ta’rīkh al-Yaman.* Cairo: Maṭba‘at Ḥijāzī, 1366/1948 (Second edition)

One of the most useful descriptions of agriculture during the early part of Imam Yaḥyā’s reign is the historical survey written by ‘Abd al-Wāsi‘ ibn Yaḥyā al-Wāsi‘ī, first published in 1346/1927 and expanded in 1366/1948.[14] In his edition of a text by the Yemeni author al-‘Arshī, Anastase de St-Elie calls al-Wāsi‘ī’s history the best in its genre and he borrows heavily from it in his annotation of al-‘Arshī’s work.[15] Al-Wāsi‘ī’s text is subtitled *Furja al-humūm wa-al-ḥuzn fī ḥawādith wa-ta’rīkh al-Yaman* (Relief from Worry and Sadness regarding Current Events and the History of Yemen). The original publication in 1346/1927 consisted of 400 pages and was divided into two main parts. The first covered the history of Yemen from the time of the Prophet Muḥammad up until 1346/1927, with a lengthy discussion of the second Turkish occupation. The second part addressed geography and politics, including the ‘Asīr region and ethnographic details on educational institutions, women and marriage.

The author’s full *nisba* includes al-Zaydī, al-Yamānī, al-Ānisī, al-Ṣan‘ānī and he lived from 1295/1878 to 1379/1959. He studied a variety of Islamic sciences and memorised the Qu’rān in Ṣan‘ā’ and Zabīd, then went to Mecca and also Damascus and Cairo, where he studied at al-Azhar. From his many studies he wrote *al-Durr al-farīd al-jāmi‘ al-mutafarriqāt al-asānīd* (*The Matchless Pearls Collected on the Various Chains of Ḥadīth Transmitters*) and in all completed some twenty books, among them a short astronomical almanac called *Kanz al-thiqāt fī ‘ilm al-awqāt* (The Reliable Treasure for Timekeeping). He was well-known for his teaching and preaching in the Great Mosque of Ṣan‘ā’.

Al-Wāsi‘ī provides a lengthy discussion on Yemen’s agriculture in the 1920s, as translated below. At the time Yemen’s major export was coffee, but trade was also made in hides, tobacco, some clarified butter (*samn*), honey, sesame oil, and grains when they were abundant. Near the end of his discussion on agriculture, he noted that most of the water in the wadis does not reach the sea but settles into the ground, and he was hopeful that by sinking wells the barren desert could be transformed into gardens (*taḥawwalat tilka al-ṣaḥārī al-qāḥila ilā jannāt*). He goes on to say that Yemen has a rich tradition of irrigated agriculture but modern agricultural methods and systems can be built on this, perhaps making the Tihāma appear like California with the introduction of mechanical pumps. The highlands are said to be suitable for temperate climate plants and he optimistically thinks it possible that crop production would one day rival Egypt and India.[16]

Translation:

Chapter 9 on the city of Ṣan‘ā’[17]

[29][18] Around Ṣan‘ā’ are towns, villages, suburbs (*irbāḍ*), as I will mention… [30] Bi’r al-‘Azab has many gardens, a variety of trees and excellent fruit. Every house has a garden

[14] Few details are available on the biography of this Yemeni scholar, apart from the account in al-Mar‘ashalī (1427/2006: 836-837) and online by Ilhām ‘Abd Allāh al-Wāsi‘ī (http://www.ahlalhdeeth.com/vb/showthread.php?t=321329). Al-Wāsi‘ī is praised for distributing an original copy (*kurrāsa*) of the *Musnad* with comments that would benefit all Islamic legal schools.

[15] al-‘Arshī (1939: 261-26). This includes information on agriculture quoted verbatim from al-Wāsi‘ī (1927:136-137).

[16] Al-Wāsi‘ī (1927: 348).

[17] I only translate the information on agriculture and water sources here.

(*bustān*). There is a water channel that enters here from the south, irrigating al-Ṣāfiya to the south of Ṣan‘ā’, and the name of this watercourse is Ghayl Ālāf.[19]

Al-Rawḍ is a suburb about an hour and a half north of Ṣan‘ā’. It is famous for its kinds of grapes. There are twenty one or more varieties of grapes in Yemen, the first being the most famous. These are arranged in alphabetical order: *aṣābi‘* Zaynab, *al-aṭrāf*, *al-biyāḍ* (which is the sweetest, and the best white variety is from al-Rawḍa), *bayḍ al-ḥamām* (so-called because the size of the grape resembles that of a pigeon’s egg), *al-jurashī*, *al-jawfī*, *al-ḥātimī*, *al-ḥabashī*, *al-ḥusaynī*, *al-durunj*, *al-dhībīnī* [al-Wāsi‘ī reads *al-dībīnī* (!)], *al-rāziqī*, al-*zaytūn*, *al-saysabānī*, *al-‘adhārī*, *al-‘irq*, *al-‘uyūn*, *al-‘aṣamī*, *al-qazāqiz*, *al-qawārīr*, and *al-qahmī*…[20]

To the east of al-Rawḍa is Ṣaruf (pronounced like *‘aḍud*), which is also famous for its grapes, especially on rainfed land (*‘aqar*), which does not receive rain except for once or twice a year. When the grapes are irrigated by well water or water channels, the sweetness is less. The term *‘aqar* is known as *ba‘l* in Egypt and Syria.

Sa‘wān (pronounced like *sakrān*) is an hour and a half to the east of Ṣan‘ā’. It has many fruits and is famous for its watermelon and yellow melon (*al-biṭṭīkh al-aḥmar wa-al-aṣfar*). Recently [31] a yellow variety called *sanṭ* in Egypt and Syria, and also *‘ajūr*[21] in Syria, has been planted. This has an aroma and the mark of its sweetness is its intense aroma. Also planted here is cucumber (*khiyār*) and fig (*tīn*), which in Yemen is called *balas.*

Ḥadda is famous for a spring called ‘Ayn Ḥumays (pronounced like Zubayr). Among the fruits it is famous for are apricots (*barqūq*), which are *mishmish* in Arabic dialects outside Yemen,[22] and walnuts (*jawz*). In Ḥadda there is a mill, turned by the water of the spring. To the east of Ḥadda is Sinā‘ (pronounced like *siḥāb*), which has many trees. To the east of Sinā‘ is Ḥamil (pronounced like *ḥadhir*), where most of the trees are pear (*kummathrā*) and plum (*ijjāṣ*).

To the west of Ṣan‘ā’, about a half-hour distance, is ‘Aṣur (pronounced like *‘aḍud*), which has apricots and figs. It is named after a mountain near it. ‘Aṣur is two villages: upper and lower (‘Aṣur ‘ulyā wa-‘Aṣur suflā), with a large watercourse flowing into them. These two are inhabited areas near Ṣan‘ā’...

Ghaḍrān (pronounced like *sakrān*) is famous for its grapes, especially the *rāziqī* variety, a grape of long length without a seed. When you bite into it, the color is that of gold.

Qaryat al-Qābil (pronounced like *‘ālim*) has varieties of grapes and figs. Imām Yaḥyā called this village al-Rawḍ.

[32] Thaqāb (pronounced like *sakrān*) has varieties of grapes and figs.

Wādī Ẓahr, which is connected to a mountain by this name, is a large Wādī which is a major watercourse (*nahr*). In it there are varieties of fruits and crop produce, flowers of different colors and birds singing. Each village is elevated over the water, with gardens to the left and right of someone. At the lower part of the Wādī is Qaryat al-Qābil, previously mentioned.

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[18] Page numbers in the original text are indicated in brackets.

[19] For details on the old *ghayl* systems of Ṣan‘ā’, see R. B. Serjeant and Ronald Lewcock (2013: 19-31) and ‘Aslān (2000).

[20] Several of these varietal names are after place names. Al-‘Anṣī (1998: 119) lists 40 varietal names of grapes in Yemen. Rossi (1939: 166) lists 12 varieties for Ṣan‘ā’.

[21] This is a smaller melon than the *shammām.*

[22] Al-Wāsi‘ī notes in a footnote that *barqūq* is not originally an Arabic term. It is mentioned in *Lisān al-‘Arab* as a synonym for *mishmish.*

Al-Ḍila‘ (pronounced like *surad*) has many trees, but these were torn out several years ago and *qāt* was planted in their place.[23]

Al-Kibs is south of Ṣan‘ā’ and it is a city of scholars and erudition with a population of Ashrāf. It has many grapes. It is part of the land of Khawlān, one of the famous Yemeni tribes. *Qāt* has been planted there…

[34] Zabīd … around it are tall date palms and excellent palaces. It is 40 *farsakh* to the southwest of Ṣan‘ā’.[24] It has a lot of water, fruits and large gardens. Its dates are every color: red, yellow and green. It also has a lot of white jasmine (*al-fill al-abyaḍ*), jasmine, screw-pine (*al-kādhī*) and a variety of flowers that oils and essences are taken from.

[36] Ṣa‘da … has grapes, fruits, varieties of crop produce and legumes (*buqūl*) known in the regions of Syria.

[39] Ḥaḍramawt … is an agricultural land. When you see its date palms, cereal grains (*ḥubūb*), and *ḥamūmī* tobacco (*tibagh*, known as *tutun*), these are among its most important exports.

Some of the watercourses (*anhār*) or flowing water sources (*ghuyūl*), their wadis and floods

[83] The Yemenis say *ghayl*, with a *fatḥa* over the *ghayn* and a plural of *ghuyūl*, for a flowing water channel (*nahr*). The most famous of the *ghuyūl* of Ṣan‘ā’ is Ghayl al-Aswad, which travels to two mosques (*masjid* al-Mutawakkil and *masjid* Ḥajar), then waters the garden of al-Mutawakkil, and departs to Shu‘ūb, north of Ṣan‘ā’, where it irrigates the fields until al-Jirāf.

Ghayl Ālaf travels to Bi’r al-‘Azab, after watering al-Ṣāfīya, which has fields and crops south of Ṣan‘ā’.

The water of Ghayl Abī Ṭālib flows to al-Rawḍa and its source is east of Shu‘ūb, below the village of al-Ḥāfa. It was opened up by Ṭughtakīn ibn Ayyūb,[25] but when the government and succession went to the imam al-Manṣūr bi-Allāh al-Qāsim ibn Muḥammad, he named it for his son Abī Ṭālib Aḥmad ibn al-Qāsim.[26] Some of this is *waqf* for the estates in Darb al-Salāṭīn [134] in al-Rawḍa, al-Ḥalla and Bi’r Zayd, and other parts are for the mosque of al-Rawḍa. This functions until the present, sometimes with increased flow and sometimes weak.

Ghayl al-Imām al-Mahdī is for al-Mahdī Aḥmad ibn al-Ḥusayn and irrigates al-Rawḍa.[27] It was opened up by the governor (*wālī*) Muḥammad ‘Izzat in 1302 A. H. The best of its flow went to al-Rawḍa. Its cost was very expensive. Later it was purchased by Shaykh ‘Alī al-Balīlī.

The source of Ghayl Muṣṭafā is higher than that of Ghayl al-Mahdī and nearer to Ṣan‘ā’. Its water was cut off for awhile, but in the government of Aḥmad Fayḍī Bāshā in 1310 A. H. it was opened up and restored. After being restored, it was purchased by Shaykh Muḥammad al-Balīlī.

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[23] This is probably in reference to al-Ḍilā‘ Hamdān, where former YAR President al-Ghashmī was born.

[24] The distance term *farsakh*, originally from Persian, can refer to different lengths. It originally referred to the distance that could be covered on foot in an hour, ranging up to 6 km in Iran. The distance from Ṣan‘ā’ to Zabīd is about 160 km, as the crow flies. This indicates that al-Wāsi‘ī is probably assuming the *farsakh* to be similar to the *marḥala*. Assuming the distance covered could be up to 40 km, this would imply a trip of four to five days or so, depending on the terrain.

[25] Ṭughtakīn was the brother of the Ayyubid founder Ṣalāh al-Dīn. In 1182 CE he succeeded his brother Tūrānshāh as the second Ayyubid emir in Yemen. He died in 593/1197. There is an error in the published text of al-Wāsi‘ī of 543 instead of 593.

[26] This imam led a revolt against the Ottomans in the 17th century and founded the Qāsimī dynasty.

[27] Al-Mahdī Aḥmad died in 1681.

The emir Ṭughtakīn, who became the ruler of Yemen, let himself be deluded into buying all of Yemen's land, so that all of Yemen would belong to him. This was a burden on the people of Yemen. A group of nobles gathered and entered a mosque and would not leave the mosque until it was destroyed. They entered the mosque and stayed for three days, fasting during the day and standing up during the night. On the third day Ṭughtakīn died, his death coming in *Shawwāl*, 593 A.H.

This is for Ṣan'ā', but the following are the other watercourses (*anhār*) and wadis in Yemen: Wādī Mawr collects from a number of Yemeni water sources, which is why it is called the water outlet (*mīẓāb*) for the Tihāma. Wādī Banā collects a number of watercourses, including al-Dalānī, Ḥawra, al-Radā'ī and al-Juban, and then descends to Laḥj, benefiting all the areas it passes through.

Wādī Hindūwān is a large wādī passing through Ta'izz until near Mocha. Wādī Sihām is a group of watercourses which separate and then all of them pass through the Tihāma. Some of these reach the sea, such as Wādī Khidār, Sāmik, Ḥāfid, A'shār, Buqlān and Wādī al-Tālūq. Al-Khārid gathers the water from 'Ans, Dhamār and Radā', then passes to the northeast to Ma'rib and finally to al-Khārid.

There are other sources of water near Ṣan'ā' that drain into al-Khārid. Then there is Wādī al-Sirr and Sayl [85] Sa'wān, which only has rainfall. The floodwater that descends from Jabal Lawz after rainfall enters Ṣan'ā' in the well-known floodbed, then to Shu'ūb and al-Rawḍa.

Other wadis are Wādī al-Tanā'um, Wādī Saḥar, Ṣabir, 'Āshir, Ramak, Ghaymān, Mulḥā' in the Jawf, Qarwā Sayyān, and many other Wadis in al-Ḥayma and Ānis, but the most famous are those mentioned here.

Some of the wadis

The wadis of the Tihāma and 'Asīr[28] are fertile and can be cropped three times a year. The most fertile is Wādī Yabā.[29] The area of its crops is at the level of cultivation of the Egyptians, some

[28] In her trip along the coast of 'Aṣīr in 1922, Forbes (1923: 275) noted the following crops: "The main cultivation is in the wādīs, where durra, dukhn, sem-sem, many kinds of vegetables, hemp grown for acid, incense plants and ful [i.e. jasmine], from which strong scent is made. As the ground-level rises, there is wheat and a little barley, while from the hills come coffee, bananas, roses, grapes, almonds, papaia, custard apples, and melons. Coarse rice is grown in the Wa'zat country, and cotton by the Hashabira tribes." Traveling through the 'Asīr coast in 1946, Thesiger (1947: 191) writes: "The two staple crops are dhurra which is grown on the silt deposits, producing from three to five ratoons from one sowing, and dukhn which is generally sown as a rain crop on the "khabt" or sandy land between the Wādīs. Dhurra is first harvested three months after sowing and then every two months, while dukhn is cut only once after three months. Stalks of dhurra, but not dukhn, even when dry, are valuable fodder and the crops ripening in July and August are used solely for this purpose since the burning winds at that season parch up the grain. Simsim is grown on the edge of the flood lands where a small amount of cotton and beans is also cultivated. The Tihamiyin have no rotation of crops and sow as often as there is a flood. There are small gardens round some of the wells where tomatoes, aubergines, ladies fingers, pumpkins, water melons, sweet melons, and sweet-scented herbs are planted. No onions, garlic, or red pepper are grown here; these with lemons, grapes, apricots, peaches, pomegranates, bananas, potatoes, and the herbs "birk" and "ashar" [probably *Calotropis procera*] are brought down to the markets from the Hijaz. Date palms are few and grow mostly in the upper Yaba and along the coast between 'Amq and Qahma, the bulk of the dates consumed arriving by sea or from the Bisha oasis." Describing the agriculture near the Yemen border, Thesiger (1947: 196) adds: "Jabal Faifa, 6000 feet high on the Yaman border, is extensively terraced and coffee, "qat" (Catha edulis), bananas, paw-paws, grapes, pomegranates, peaches, prickly pears, dhurra, wheat, and barley are cultivated. The neighbouring Jabal Bani Malik, 7500 feet high, is also terraced and coffee, bananas, dhurra, wheat, and barley are grown

70,000 *faddān* of [86] the best quality land. The *faddān* in the usage of Yemenis is 75 *lubna*. The *lubna* is 10 iron ells (*dhirā'*, sg.; *adhra'*, pl.). There are 7,500 iron ells in a *faddān.*[30] The length of the wādī from east to west is 70 km, and from north to south almost 8,000 m. Its crops are sorghum (*dhura*), bulrush millet (*dukhn*), sesame, indigo, lemon, green vegetables and various flowering tree crops.

Wādī Ḥalī is famous for its resources and is three times the size of the first [i.e., Wādī Yabā].[31] Between these two and Ṣabyā to the northeast is about a 7 days journey (*marāḥil*).[32] In Wādī Ḥawā' they plant what has been mentioned, including wheat (*burr*), and there are many trees, such as juniper (*'ar'ar*), almond (*lawz*), fig (*tīn*), grapes (*'inab*) and other fruits.[33]

Wādī Bāriq is very fertile and it comprises 50 villages.[34] Some of the crops of these wadis include coffee (*bunn*) and date palms (*nakhīl*).

From Ranya of Ghāmid northward to Abhā[35] is a 10 days journey. There are more than 100,000 date palms raised here. In Wādī Turba and its environs there are what exceeds 100,000 date palms.

Among the Wadis of Yemen is Wādī al-Sirr and its mountains of Kalsiyya, where there are many grapevines (*kurūm*). Planted here is lucerne (*qaḍb*), also known as *fiṣṣa* and called *birsīm* in Egypt, as animal fodder, as well as wheat, barley, sorghum and some figs (*balas*). There are also non-deciduous trees.

[87] Wādī Ḥarīb (pronounced like *kabīr*) is rich in plants such as the mastic tree (*ḍarw*),[36] *fuḥiyya*[37] and fumitory (*shāh al-turunj)*[38], which is *al-bādhrinjūwīya.* There are also non-

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there. Qat from Faifa is sold in the Tihama at Qizan Sabya and 'Abu 'Arish and fetches a very high price but nowhere else in the Tihama, Hijaz, or 'Asir is it grown or eaten."

[29] Wādī Yabā or Yabah is located in the district of al-Qunfudha in Saudi Arabia.

[30] For a description of measures and weights in the Mutawakillite Kingdom, see Table 1.

[31] Thesiger (1947: 191) notes, "Last year [i.e., 1945] the main irrigation bank in the Hali gave way and the Wādī above Baidhain was deserted, its inhabitants having moved to the Yaba. Floods, which may occur in any month but are most usual in the winter and autumn, are held up and distributed over a large area by a number of these banks called "zabir", needing constant attention. These floods cannot be controlled and damage may result from flooding on young crops."

[32] Al-Barakātī (1384/1964: 58) writes that a *marḥala* with a camel is about 40 kilometers. Thesiger (1947: 197) saw indigo being grown near Ṣabyā.

[33] Al-Barakātī (1384/1964: 62) for this wādī lists wheat, barley, much sorghum, almond, figs, grapes, peaches, etc. and notes that it is famous for its juniper trees.

[34] Al-Barakātī (1384/1964: 54) for this wādī notes sesame, sorghum, barley, millet, indigo; he adds that sesame oil was exported from here.

[35] Al-Barakātī (1384/1964: 72-73) provides the prices of various wheat, *samn* and tobacco in Abhā at around the turn of the 20th century. Thesiger (1947: 195) visited Abha in May, 1946, noting: "In these mountains wheat ("burr") or barley ("sha'ir") is sown in the winter and dhurra in the summer. I arrived at Abha on May 2. While many of the fields were bare, some dhurra was already sown although the barley and wheat were not yet all harvested. The cultivated slopes are everywhere terraced and a few fields are irrigated from the wells. Apricots, peaches, plums, pears and small green apples, grapes, pomegranates and figs, prickly pears and almonds are the fruits grown in the Hijaz."

[36] *Pistacia lentiscus.* Al-'Aẓm (1986: 340) says that part of the branch is boiled in water and drunk for disease of the liver and kidneys.

[37] Al-'Aẓm (1986: 340) said this tree is very aromatic and it is cooked with fenugreek or added to yogurt, as you would with mint. In Ta'izz and al-Ḥujariyya this term refers to an aromatic dwarf shrub from the *Asteraceae* family that is used by women under their head covering to give them a nice smell (Dr. Abdulrahman Aldubaie, personal communication).

[38] *Shāhturunj* is the Persian term for *Fumaria officinalis*.

deciduous trees like christ's thorn (*'ilb*),[39] doum palm (*dūm*),[40] *bashr*,[41] wild fig (*athab*)[42] from which the people take the wick (*fatīl*) for old-fashioned muskets, acacia (*al-sumur*), etc.

Crops (*zurū'*)

[138] In Yemen there are many varieties of grains (*ḥubūb*), crops (*zurū'*), plants, fruits and trees. Wheat (*ḥinṭa*), is called *burr*[43] for what is called *qamḥ* outside Yemen. The varieties extend from red [139] to white. The best quality is *al-burr* al-'Ansī in the basins of 'Ans and Dhamār. After this is *al-burr* al-Bawnī from Qā' al-Bawn, a wide district six hours north of Ṣan'ā'. In addition to planting this there, another variety is called *samrā'*. Red (*aḥmar*) to dark (*sawād*) is sown in Shu'ūb and al-Ṣāfīya and other parts around Ṣan'ā'. The best variety for bread is *'alas* (emmer wheat), which is called *nusūl*. The people of Yemen are masters of bread making from varieties of wheat.[44] There is a variety of bread called *fuḥūq* and another called *malūj*[45] and *sabāyā*, which are kneaded with claified butter (*samn*). There are different types but each are called *malūj* and *muqawwa'* (flat). The reason for calling it *khubz* is that it is flat (*raqīq*) and round (*mudawwar*) and is baked both in regular ovens and clay ovens (*tanāwīr*). The latter are found in Damascus but not in Egyptian areas. *Malūj* is only for the *tannūr* and its specific shape is round and it can be up to twice the size of other bread but the author likes a small amount of milk in it. If wheat is kneaded with ghee or egg, one of the varieties is *dhamūl*. *Bint al-ṣaḥn* is baked in a similar fashion, and a variety called *sūsī* is made with egg, milk and ghee.

As for barley (*sha'īr*), there is a variety known as *saqla*, which is thinner than ordinary barley grain, which is very white, and only wheat is eaten more than this in bread. It is only made into *malūj*. Then there are white, red and yellow varieties of sorghum (*dhura*), for each of which there is a name. Maize (*al-dhura al-Shāmīya*) is called *Rūmī* or *Shām* by Yemenis. Other crops are millet (*dukhn*), cowpea (*lūbiyā*), broad bean (*fūl*), teff (*ṭahaf*), lentils (*'adas)*, peas (*julubbān*), which are called *'atar* in Yemen and are similar to *bisilla* in Egypt and Syria, sesame (*simsim*), mustard (*khardal*), from which an edible oil (*duhn*) is made, and poppy (*khashkhāsh*).

Yemen has various aromatic plants and flowers, including rose (*ward*), jasmine (*yāsamīn*), Arabian jasmine (*fill*), narcissus (*narjis*), violet (*banafsaj*), and varieties of sweet smelling plants. If any of these are not present in Ṣan'ā', they are found in other areas of Yemen such as Zabīd, Laḥj and in lush wadis of the western area. There are also marjoram (*marzanjūsh*), lavender (*khuzāmā*), which is called *raymān*, dill (*shibith*), which is called *zuqīqā*, [140]

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[39]. *Ziziphus spina Christi.*

[40] *Hyphaene thebaica.*

[41] I have not been able to identify this tree variety.

[42] *Ficus salicifolia.*

[43] *Burr* or *birr* is found in South Arabic as well. Al-Iryānī (1996: 62-64) discusses the history of the term and its use in Yemeni proverbs and poetry. When the Syrian traveler al-'Aẓm (1986: 91) visited Yemen in 1927, he said he had no idea that *burr* meant wheat and remarked on a number of words that were exclusive to Yemeni dialects.

[44] For more details on Yemeni varieties of bread, see al-Akwa' (1979: 137-150).

[45] As explained by al-Iryānī (1996: 836-837), *malūj* can be made from wheat or barley and is the largest bread made in Yemen. The method of making it is to take a small ball of dough and take it in your hand with ghee or cooking oil or wet fenugreek. Then flatten the ball to the side of the *tannūr* so that it sticks to the *tannūr* wall. He notes that the woman doing this must have patience due to the heat of the *tannūr*. Al-Akwa' (1979: 149) notes that it is made without yeast. *Malūj* can also be made from sorghum grain.

screwpine (*kādhī*) and mint (*na'na'*). Fruits include grapes (*'inab*), in all their varieties, which I mentioned in Part 9 in the account of al-Rawḍa. The *dhībīnī* grape is the best black grape variety for sweetness and lack of a seed in it. The grapes are tightly packed together on the vine. The red varieties are *zaytūn* and *'āṣamī*, the latter being called *ḥulwānī* in Syria, but the sweetness of the Syrian is less than the sweetness of the Yemeni. For all of these sweet varieties, some Syrian grapes are sweet like the Yemeni, such as the red (*aḥmar*).

As for figs (*tīn*) in Yemen, most varieties are black (*aswad*) and figs are called *balas* by Yemenis; I mentioned them on p. 21. There is also a thorny fig called *Turkī* in Yemen and *ṣubayra* in Syria.[46] The apricot (*mishmish*) is called *barqūq* in Yemen and it is not the same as the apricot in Syria, which is not present in Yemen. The Syrian apricot is much sweeter than the Yemeni. Peach (*firsik*) in Yemen is called *injāṣ* outside Yemen, but the *injāṣ* of Yemen is a different variety than that of Egypt and Syria. Pear (*'anbarūd*) is also called *kumathrā* in Yemen, which is an original Arabic term. Yemen also has a sour red mulberry (*tūt*), but the white variety is in Syria and is sweet as sugar, as well as a red variety. The sweet variety is in al-Ṭā'if, India and Iraq. Yemen has bananas (*mawz*),[47] walnuts (*jawz*) and lots of almonds (*lawz*). The varieties of dates are not in Ṣan'ā', but in Zabīd, Najrān and 'Asīr. Yemenis call tamarind *ḥumar*. There are sweet and sour pomegranates (*rummān*) as well as quince (*safarjal*), and the sweetness of pomegranates and quince is greater than that of Syrian and Egyptian pomegranates. As for the quince in Egypt, it is only known by this name. There are sweet and sour lemons, but the citron (*utrujj*) in Yemen is different from that present in Egypt and Syria.[48] Other plants include pseudo saffron (*wars*), which is the same as *ās* and *hadas*, safflower (*'usfur*), indigo (*nīl*), henna (*ḥinnā*), and ginger (*zinjibīl*) in Rayma, Ḥufāsh and Lā'a.

Frankincense (*al-lubān al-dhikr*) is found in the mountains of Haḍramawt and al-Shiḥr. This is called *kundur* and in Yemen it is *al-lubān al-Shiḥrī*. There is myrrh (*murr*) and mastic (*maṣṭaqā*), a resin I saw in Ghamdān and northern 'Asīr, as well as cummin (*kammūn*), anise (*ansūn*), fennel (*shamār*), guava (*jawāfa*) in Laḥj[49] like that of Egypt, and mango (*'amb*) called *manja* and *ambā'* in Egypt.[50] [141] I saw custard apple (*khirmish*), called *qishṭa* in Egypt, in Laḥj and al-Ḥudayda, brought in from the surrounding area.[51] In Laḥj and al-Ḥudayda I saw fruits with a size smaller than melon (*biṭṭīkh*) and very yellow in color and I did not see anything like it in Egypt or Syria. Eating it is commended for its sweetness; it has small, very black seeds. Nigella (*quḥṭa*) is *al-ḥabba al-sawdā'* and is called *shawnīz* and *al-ḥabba al-baraka* in Egypt and Syria.

There are many kinds of vegetables (*khaḍrawāt*) present in Yemen, such as the long snake cucumber (*qiththā'*), which in some areas is called *qatt*, a common misperception, and the sleek and smooth one being *khiyār*. There are varieties of watermelon (*ḥabḥab*), called *biṭṭīkh* outside

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[46] *Balas Turkī* is *Opuntia fucus-indica* or cactus fruit, which was originally from Mexico.
[47] Al-Barakātī (1384/1964: 161) notes that bananas are plentiful and cheap in the Tihāma.
[48] Al-Wāsi'ī (1947: 130) has a lengthy discussion on the usage of Burtuqāl for citrus in Yemen. He notes that it is a type of *līmūn* which resembles the orange (*nāranj*) in size and color. He brought tangerine (Yūsuf Affandī) from Egypt and recently planted these.
[49] Scott (1939: 100) also records guava in Laḥj, among other fruits.
[50]. Al-Barakātī (1384/1964: 161) notes that mango (*anbā*) is plentiful in the Tihāma.
[51] Scott (1939: 100) saw custard apple in Laḥj. In the 1927 edition al-Wāsi'ī adds here: "I had not tasted this until the year this book was published in Egypt. I was in the house of my friend, the noted scholar Aḥmad Zakī Pasha when I first tasted it."

Yemen.[52] The cantaloupe (*shammām*) is newly planted by older people in Yemen. Sugarcane (*qaṣab al-sukkar*) is present in Yemen. A reddish sugar called *ʻaṭwī* in Yemen is made from it. In Ṣanʻā' and al-Ḥudayda they make sugar (*al-sukkar al-nabāt*) and other sweets are made for festivals and celebrations. Yemen has many trees which blossom and others such as gum trees (*ṣamgh*) and aloe (*al-ṣabr al-Ḥaḍramī*), as well as cotton.[53] Also present in Yemen is tobacco (*tibgh*), which Yemenis call *tutun* with varieties known as *ḥamūmī*, *al-khabṭī*, and *jumayrī*, the first being the most famous.[54] These are exported to several countries…

[52] In the 1927 edition, al-Wāsiʻī adds: "such as the red and yellow and one variety called *khirbiz* and green melon (*ʻajjūr*) are not planted in Yemen, except for a variety in palace garden cultivation. While the Ottoman Empire ruled Yemen for some time, there was no focus on developing agriculture, trade , industry, education or the spread of modern knowledge. When Imam Yaḥyā entered Ṣanʻā' he found it ravaged, so now he revived it like a fresh robe and famous Yemeni coffee."

[53] In the 1927 edition, al-Wāsiʻī adds: "During this time the Mutawakkilite Kingdom places importance, with the help of Allāh, in spreading the planting of cotton in parts of Yemen." In his trip to Yemen in 1927, al-ʻAẓm (1986: 26) was told that Imam Yaḥyā had imported cotton seed from Egypt and America and wanted to have it grown all over Yemen. Rosita Forbes (1923: 275) reported cotton being grown in the ʻAsīr region around Wādī Jāzān.

[54] Al-Barakātī (1384/1964: 161) records tobacco (*tunbāk*), a variety of which is called *akhḍar* in the mountain region (*sarāt*). Ingrams (1943: 156) describes tobacco grown near al-Mukallā. The Turkish term *tutun* is generally reserved for black tobacco (*Nicotiana tabacum*) with pink or white flowers and grown at elelevations between 4,500-5,600 feet in the Amīrī highlands of the south, while *tunbāk* was used for the yellow-flowered *Nicotiana glauca* (Naval Intelligence Division 1946: 494).

2. Muḥammad ibn ʻAlī al-Akwaʻ. *Ṣaḥfat min taʼrīkh al-Yemen al-ijtimāʻī wa-qiṣṣat ḥayātī*. Damascus: Maṭbaʻat al-Kātib al-ʻArabī, 1979

Qāḍī Muḥammad ibn ʻAlī al-Akwaʻ al-Ḥiwālī was one of the most important Yemeni historians of his generation, especially for his editions of works by the tenth century Yemeni savant al-Ḥasan al-Hamdānī. He was born in Dhamār in 1321/1903 and died in 1419/1998. He was thrown into prison in Ḥajja twice, first by Imam Yaḥyā and then by Imam Aḥmad. After the Republican revolution in 1962 he served as a deputy to the Minister of Justice, then later in the ministries of *Awqāf* and Information. He is the brother of Qāḍī Ismāʻīl al-Akwaʻ, another respected Yemeni historian.

Translation:

ʻAllān [124]

The season of *ʻallān* is one of the seasonal periods and festivities throughout Yemen. This is the harvest time during the days of autumn. There is rainfall and the start of crop produce, which is almost mature, from all the kinds of crops, such as sorghum, wheat, broad bean (*qillā* or *fūl*), barley, lentils (*bilsin* or *ʻadas*) and maize (*Shām* or *dhurra ṣafrāʼ*), with others besides these.

Perhaps it is called *ʻallān* because the season of autumn announces (*aʻlana*) the season of winter. The days of *ʻallān* are the most significant of the festivities, celebrations and pleasurable activities because every year people come alive with a pleasurable and comfortable way of living.

I discovered before that the term *ʻallān* is one of the Himyarite months known as *Dhū ʻAllān*, but the Yemeni people shorten the term and found it sufficient to say *ʻallān* after the Himyarite period.

[125] *Dhū ʻAllān* corresponds to the Syriac *Aylūl*[55] and Christian September… As soon as the sky is clear from rain, people including children and women hurry out to their fields to collect weeds (*ḥashāʼish*) and pasture plants (*aʻshāb*), bundle them up and place them on the ground to dry. Eventually they take them to places where they are stored for winter and spring (*ṣayf*)[56] fodder for their animals. When they have finished this activity and the sorghum is close to being ripe, they do something called *shiryāf*,[57] which is a local dialect term not recorded in the dictionaries, and this is stripping the leaves from the sorghum stalks (*ʻajūr*), thinning them and throwing them behind themselves and bundling them to dry, proceeding in the same way as the purpose of the activity with the weeds.

In each activity of weeding or stripping sorghum leaves, you hear singing and chanting that fill the wadis. The echoes of their voices ring out in the high mountain peaks, arousing sorrow and delight, as though the air is dancing for joy and delight, but sometimes people make light of this mirth on occasions when the singer loses his senses.

On all these occasions there are poems, folk sayings and charming melodies, [126] of which the reader will read the best part later. I memorised one in the village of al-Dhārī, where they

[55] In Yemen these month names are called *Rūmī*, literally Byzantine, referring to the solar months of the eastern church.

[56] In Yemen the term *ṣayf* was traditionally used for spring.

[57] The more common term in Yemen is *sharf*, but there is a much older term, *shirnāf*, recorded in lexicons; see al-Iryānī (1996: 481-482).

say: "Harvest, harvest, after the rains we thank God" (*ghaltat, ghaltat, ba'd al-kharīf naḥmadu Allāh*).[58]

Jahīsh and lasīs

In this same season and during the same days the farming people and others, like visiting guests and those happening by in the wādī, eat parched (*jahīsh*) sorghum. *Jahīsh* is a term used through every location in Yemen, without exception. It is derived from "he was about to shed tears" (*ajhasha bi-al-bukā'*), i.e. 'getting ready to', and *jahsha* means a flow of tears (*'abra*), or 'he hurried such a one' (*ajhasha fulānān*) or 'he rushed' (*a'jala*). The way it is done is to go to the crooked panicle (*sabūl*, i.e. *sunbula*) or seed cluster (*'idhq*), when it is fully grown, ripened and has become well-formed, cutting off a number of this kind of panicles. A fire is prepared, not stopping until the smoke is rising up and the panicle is placed on this fire, turning it around and placing one after another. When it is well done and parched, it is placed between the left and right hand and the seeds are rubbed out into a container or to a cloth on the ground. This is done when it is intensely hot and only someone with a strong and hardened hand can tolerate the heat of the fire in both hands. When everything is finished by filling the container or cloth to maintain the heat, then it is opened up and everyone takes a handful and blows on it, eating it while it is still hot. They all gather around and look at it and each tries to go before the other to take it, striving by this for such delicious food. [127] In every place where you see a wādī there are lights and smoke and you hear the shouts and cheers from all around the wādī. Amazement, joking and happiness enter into you.

Regarding *lasīs*, this refers to what you eat when it ripens…[59] The term *lasīs* is a Yemeni dialect term and mainly used for wheat (*ḥinṭa*), which is *burr* or *qamḥ*, as well as broad bean (*qilla* or *fūl*), lentils (*bilsin* or *'adas*) or peas (*'atar* or *bisāliyā'*) or cowpea (*dijr* or *lūbiyā'*) or hyacinth bean (*kishd*) and even from sorghum (*dhura*). The *lasīs* of these varieties in this season of *'allān* is only in the land and mountains that plant in *kharīf*[60] and harvest in *'allān*. In Wādī al-Dhārī, however, they only plant wheat in winter (*shitā'*), but near the harvest they take *lasīs*.

The description of *lasīs* of wheat is when the farmer goes to his wheat fields and chooses the suitable spikes (*sanābil*) of grain for *lasīs*, gathering them by the *qisla*,[61] which is a bundle of spikes, then tying them at the bottom of the spikes. These are removed by its stems (*ḥishrī*), that is its woody stalks (*a'wād*). Each bundle of spikes is thrown to a place so that what is sufficient for the *lasīs* can be gathered for a family or something like this is gathered up. Then that is taken to the house and the *tannūr* oven (*ṭābūn*) is heated up. The spikes are held by the bottom of the wheat stalks (*'īdān*) over the fire in order to get rid of pests (*marāqish*)[62] and wheat beards (*marāqin*),[63] *marāqin* being the plural of *mirqān* and meaning that which is [128] like thorns (*ashwāk*). Next to the oven (*ṭābūn* or *tannūr*) is a woman who takes hold of the bundled

[58] Al-Akwa's text reads *'altat 'altat*, but this seems to be either a dialectical variant or a printing error for *ghaltat*, which refers to the harvest (*ḥiṣad*), according to a resident of al-Nādira, near where al-Akwa' was born (Abbas Alsoswa, personal communication). In cases where rain is late in coming, it was customary to practice a rain invocation (*istisqā'*), as discussed by Rossi (1939: 187-188).
[59] Al-Iryānī (1996: 802) notes that *lasīs* is grain (*ḥabb*) boiled in water.
[60] Al-Akwa' is using *kharīf* to refer to the late summer autumn rains in Yemen.
[61] Al-Iryānī (1996: 723) defines this as a small bundle (*ḥuẓma ṣaghīra*) of wheat or the like.
[62] I have not been able to identify this term, but al-Zabīdī (*r-q-sh*) defines *raqshā'* as a small worm (*duwayba*) in pasture (*'ushb*).
[63] Al-Iryānī (1996: 361) defines *marāqin* as a pile (*kuds* or *kawm*), especially of bundled stalks.

spikes from which the beards have been taken away. In her hands is a winnowing basket (*minsaf*), which is made from stalks and plant material (*a'shāb*), and she winnows the spikes from underneath so the wheat kernels will fall into the winnowing basket and the chaff (*qishra*) is removed. She winnows it until everything attached to the kernel will be removed so that she can complete the work and there will be pure kernels, which are placed in a pot (*qidr*) filled with water and boiled, then taken off the heat and not opened until ready.

Most of the *lasīs* is eaten at night because it warms the body on winter nights due to the difficulty of digesting.

As for the *lasīs* of other kinds, as we mentioned for cowpea (*lūbiyā'*), hyacinth bean (*kishd*), lentils (*'adas*) and broad beans (*qillā*), these are done in the same way as the *lasīs* of wheat…

Sugar cane (*muḍḍār*) [129]

Muḍḍār is derived from the verb *maḍara shī'* for when one bites with his teeth and sucks the juice from it, throwing away the parts left over and any remaining juice.

Muḍḍār is a common Yemeni term and it is mentioned by al-Hamdānī in his unparalleled book *Ṣifat jazīrat al-'Arab.*[64] In the town of Dhamār it is called *la'āṣ*. *Muḍḍār* is from sugar cane (*qand* or *qaṣab al-sukkar*) and sorghum cane (*qaṣab al-dhura*). Regarding sorghum stalk, the cane used is for what is spoiled and does not give rise to heads (*sabūl*) but holds a kind of sweet sugar, which is called *labādī* in al-Dhārī. The youth and some farmers take it and they bite into the hard part of it and chew the core, throwing away what is left. The season for sorghum cane only occurs in the month of *'allān*. As for the season of sugar cane, we will mention it in what follows, as well as where it is grown.

The guard (*shāriḥ*)

Wādī al-Dhārī lies between two mountain chains, west and east, like the rest of Wādī Khubān. One cannot descend to it or go up from it except by a special passage and known paths. When *'allān* comes and the land is full of [130] crop produce, this is the suitable time to post a guard (*shāriḥ*), a man on these gaps and roads watching those descending into and leaving the *wādī*. *Shāriḥ* is a common Yemeni term, and *ḥāmī* is also said in the area of Dhamār and Ṣan'ā'. Both terms are core language and recorded as in the dictionary rendering of *shāriḥ* as a protector of the crop from birds and *ḥāmī* as the one protecting.

For these guards there is a known payment in kind paid to them at the *ṣurāb* harvest from all the kinds of crop produce.

A farmer, loaded with fodder and flood-water sorghum heads, returning from the wādī is allowed to pass without any trouble based on the known amount of the agricultural area he owns. Whoever has only a small agricultural area and takes more than the amount of the land that he is taking produce from is held responsible, since the guards have an intimate knowledge of everyone's land, whether large fields (*jirab*) or small plots (*aḥwāl*). Every day that the fatmers descend, they follow the tracks and observe if there is any corruption or important changes. When they know the thieves, robbers and the like, everything is returned to its proper family.

[64] Al-Hamdānī (1884: 193).

Harvest and sorghum threshing floors (*al-ṣurāb wa-jarīn al-dhura*)

Ṣurāb is the harvest (*ḥiṣād*) and is a dialect term in our common Yemeni tradition. The harvest of sorghum in the villages of Wādī Khubān is not unique as it occurs in several districts. This involves harvesting the sorghum by its stalk and taking it to threshing floors (*jarīn*) near the fields.[65] The *ḥawl* means the field (*jirba*) [131] where the sorghum plant is left between three weeks and a month so that the stalk absorbs more and becomes more mature, edible and of excellent quality until a greasy substance (*dusūm*) resembling clarified butter (*samn*) emerges when you twist it. Then you cut it off from the crook at the threshing floor, where it remains for a few days. After this you beat it (*talbiju*[66] or *taḍribu*) with a stick specially made for this activity. The stick is called a *mikhbaṭ*, the plural being *makhābiṭ*, as well as the plurals *mislabij* and *malālbij*.[67] The farmers have a specific way to beat out the kernels, which is closely associated with songs and chanting during the activity. Then they winnow these using a *madhārī* (*madhrā*, plural), which is a well-known tool made of wood, until the kernels are collected and form a pile (*ṣubra*),[68] which is called an *abla*. Then the grain is measured in cold weather, with the sorghum being cold so that it can be entered into the granaries (*madāfin*) and remain for a year or years and they can take it out when there is a need.

When the sorghum on the threshing floors is still on its stalks, they select from it the heads that are pure with large kernels and take these for sowing (*dharī* or *badhr*) in the coming year.

The term *jarīn* is well-known, the singular being *jurn*, and is also called *bayādir*, the singular being *baydār*. This refers to where the crop produce is placed after its harvest from both the large fields and small plots. Regarding the village of al-Dhārī, most of the sides of the wādī are clear with suitable areas of flat rocks. When the crop produce and grains are placed here and they want to beat them and tread on them, the kernels are spread around. It is important that farmers do this activity by surrounding the area with stalks and brush.

Most of the peasants in Wādī al-Dhārī go to the side [132] of their field, harvest the sorghum in it and pull out the *jadhā*, which are the bottom of the sorghum stalks (*uṣūl al-ʻajūr al-qaṣab*). The land can be leveled so that it can also become a threshing floor. They take permission from whoever is in charge of the threshing, stamping the ground with their feet until it hardens, doing so day after day, until it dries in the heat of the sun. When that threshing floor cracks open, it is patched with ashes and soft mud mixed with water and thus the the cracks are fused.

The opportunity for children to help in these activities is one of the joys of their days and pastimes.

Groom of the crows (*ḥarīwat al-ghurbān*)

The *ḥarāra* is the bride and the *ḥarīw*[69] is the groom… As for the crows, in these days of the coming of *ʻallān* they associate with the people through their cawing and screeching between the sky and the hills. The farmers form a gathering in a circle called "the groom of the crows" similar to events such as weddings and festivals. When the crows take the grain, whether in the mountain or the *wādī*, they prospers from freely eating the grains as they move about.

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[65] The text reads *mawṣiʻ* (!) instead of *mawḍiʻ*.
[66] Al-Zabīdī (*l-b-j*) defines *labaja* as to beat with a stick.
[67] I am unsure of the voweling of these two dialect terms.
[68] Al-Iryānī (1996: 27) defines this as a pile of grain before it is weighed or measured.
[69] For an extensive discussion of this term, see al-Iryānī (1996: 172-174).

The woman who brings food and the headgear (*al-milḥiqa wa-al-shūdhat al-tuḥwāfa*)

The *milḥiqa* is the woman who brings a meal to the field for the plowman (*batūl*), [133] who plows the land. The *shūdhat* is like a kind of "packsaddle" (*akāf*) for the head, made from straw and of round shape and which the woman puts on her head in order to securely carry a pot (*qidr* or *qaṣaṣ*) holding a meal, protecting her from its heat, and for carrying a bundle of firewood without fear that it will fall off of her head. Similar to this is the *tuhwāfa*. The woman binds a strap (*niṭāq* or *rumma*) around the side of it to bundle up the firewood, but she is only known as a *milḥiqa* when she is a relative of the plowman.

This is one of the memories which is attached in my mind with the village of al-Dhārī and is connected to the social customs which are current in general among the peasants and farmers of Yemen.

As an example, when the peasant or farmer is a sharecropper, he wakes up early to perform the dawn prayer, then returns to feed his bulls and leisurely takes his breakfast, which is something dry, sour milk (*ḥaqīn*) or something else. Then he carries his plow (*ḥirātha*), which will be used later, by himself, or on a donkey prepared for that or as an aid in his work. He goes to the field to plow and till it in furrows, the term for a furrow (*shaqq*) being *tilm*,[70] even if this lasts into the afternoon. This is when the woman (*milḥiqa*) arrives, a meal on her head and some other things like water or coffee in her hands. She gives this to him and if he has water, he washes his hands, but if not he rubs them with soft soil and blows on them. She will share the meal with him, if she has not already eaten. If she has eaten, she gathers firewood, collecting grass and fodder for the domestic animal. Then she returns home with the meal container on her head and her work is well appreciated.

[70] The term *tilm* is widely used in Yemen for a furrow; see al-Iryānī (1996: 97-104) for a lengthy discussion of this term and its use.

3. Nazīh Mu'ayyid al-'Aẓm. *Riḥla fī bilād al-'Arabiyya al-Sa'ūdiyya*. Second Edition. Cairo: Sharikat Dār al-Tanwīr li-al-Ṭibā'a wa-al-Nashr, 1986. Original, 1937.

The Syrian journalist Nazīh al-Mu'ayyad al-'Aẓm visited Yemen four times, between 1927 and 1936, the last time being allowed by Imām Yaḥyā to visit and describe Ma'rib.[71] He provides a vivid description of Yemen during the late 1920s, including the Tihāma, his trip up to Ṣan'ā' and then south. He was able to meet and interview a number of Yemeni officials. He comments in several places on the agriculture he observed, but not with as much depth as al-Wāsi'ī.[72] Born in 1890, Nazīh al-'Aẓm graduated from the American University of Beirut in 1913 and briefly served in the Ottoman army. In 1920, when Faisal reached Damascus, he returned to Syria from Egypt. He was an ardent nationalist working against the French occupation. After his return to Cairo, he met the American diplomat Charles Crane, who invited him to visit Hejaz and Yemen. In 1930 he returned to Syria, eventually taking up farming. He died in 1977.

Translation:

Gardener of al-Rawḍa

[106] After departing from al-Rawḍa, I started off from where I was staying and I still remember this. I walked in a garden and a gardener came into view, so I went up to him and said to him, 'May your evening be happy, O uncle!.' 'God reward you with goodness and kindness.' I asked him who is in charge of al-Rawḍa and what is his office? He responded that the one in charge is from Ṣan'ā' and he is the official of public welfare (*ma'mūr al-a'āsha*) in the court and he is responsible for taking care of guests, assuring their rest, food and drink. He provides them with the same things given to his highness the Imam, making a visit to the guests everyday. Thus he talked with me. He knew how to weed out the strange plants which sprouted up between the lettuce (*khass*). I had not noticed that the tool he used for weeding was so very simple. I took it and turned it over in my hand and found that it is from the smiths in Ṣan'ā'. The tool is long and cast in iron with a small wooden handle, nearly the length of the iron blade. They call this tool that they use *mafris* and use it for digging holes, mud dams and everything in the garden. There is not among the other agricultural tools anything better than the *mafris*. Their plow does not reach the length of the iron part, since the plowshare (*sikka)* only enters a few centimeters into the ground. Sometimes they make the plowshare from wood as a substitute for the iron. The great fertility of their soil allows them to produce a great deal by these innovative agricultural methods.

Several of the people in the Jawf located a distance of some days to the east of Ṣan'ā' told me that there they never use plows and plowshares unless they have learned about them from others. Rather they take the cow to the field (*ḥaql*) and allow it to go back and forth several times. Then they throw their seed under its legs, where it is stepped on and planted in the ground. What is amazing is that they harvest from this simple crop a large amount of wheat and sorghum. Their yield, by the *mudd* measure, is no less than 50 *mudd*.[73] One of the villagers from the Jawf told me

[71] For a description of the author and his visit to Yemen, see Rossi (1940)a and http://www.almasalik.com/locationPassage.do?locationId=33091&languageId=ar&passageId=13880 (accessed November, 2017).

[72] At times he copies information from al-Wāsi'ī without acknowledgement, such as his discussion of trees in Wādi Ḥarīb (al-'Aẓm 1986: 340).

[73] I am not certain what the value of the *mudd* in the Jawf was, since it varies from place to place and over time. For Mecca, Mortel (1990: 180) defined the *mudd* as weighing between 1.8 and 2.2 kg.

that in their villages there was only one tool and it was also used to dig graves for interring the dead.

I went through the garden accompanied by the gardener and saw many dry branches remaining on the trees. I noticed some of the trees, like quince, apple, peach and pomegranates with thick branches and small-size fruit. But I also did not see that many of the gardens of Ṣan'ā' nor the gardens of Wādī al-Qābil (which among them is like al-Ghūṭa among us).[74] About an hour's car ride from Ṣan'ā', the cultivated trees resemble wild trees, due to the little care and lack of pruning branches which have no benefit. They let these grow in a natural way until the gardens become small groves, which can only be entered with difficulty. I asked some of the villagers [108] and farmers 'Why did you let your trees get to this state from little care?' They said, 'This is the custom which we became accustomed to since ancient times and we inherited, the father from the grandfather.' So I responded to them, 'You are making a mistake with what you do, since if you were to prune the trees by cutting off the dry branches which have no benefit and plant your trees apart from each other, trees will be large and grow well and be beneficial for you with yields better by far than the present yields.' They responded, 'By God, not one of us knew this before now and no one learned this agricultural method, but God willing we will try this method and perhaps it will be good.'

Distribution of fruit and produce cultivation in Ṣan'ā'

One of the nice things about Yemenis is that when they see a man more knowledgable about some things, he can give them some observations that are unfamiliar and that do not agree with their customs and yet they see the possibility of not defending their old views. They do not say 'no, our ways are better and we stand with our fathers and grandfathers and we can not possibly change', like others, but the opposite. They take to new views and try them out and if they find them better than their ways and customs, they follow them and do not reject them. They are clever by nature and know the difference between thin and fat.

Despite the lack of professional care of trees and despite being left in a state of neglect, they have excellent and appetising fruit. All of this is due to the fine quality of climate and excellent land. No doubt if they take professional care, there will be a large increase in their production. I saw in the garden of where I was staying several apricot trees grafted with plum (*iṭjjāṣ*) and peach (*durrāq*).[75] This was many times in my thoughts. Even with Damascus being famous for its fruits, I never witnessed something like this in it, nor have I heard that apricot could be grafted with plum and peach, nor have I read in agricultural texts that these kinds of fruit trees can be grafted together. So I asked the gardener, 'Who guided you in grafting trees in this manner?' He responded that some of the Ottoman officials during the Ottoman government brought the plants with them from a country they had entered, i.e. outside Yemen. This included various kinds of fruit trees, food crops (*ṭu'ūm*)[76] and legumes (*buqūl*), all of which they tried using in Ṣan'ā' and other parts of the country. Some of the plants introduced were suitable for growth due to [109] the air and soil, blossomed and their planting then spread. Some of them were scorched by the Yemeni sun and died right away.

[74] Al-Ghūṭa is a famous agricultural area near Damascus in Syria.
[75] The text reads *dh-r-ā-q*, which is either a printing error or a dialectical variant for the author.
[76] If the author is using Yemeni dialect here, the term *ṭa'am* refers to cereal grains, but I suspect he means food crops in general.

Ghayl Ālāf, Ghayl al-Aswad and the wells

Between our garden and the garden I visited I noticed a small water channel (*jadwal*), which was the first water channel I saw in Ṣan‘ā’, so I asked the gardener about it. He told me this was Ghayl Ālāf, the term *ghayl* meaning a flowing water channel (*jadwal*). There was little water in it now due to little rainfall, but it increases a lot during the rainy season and irrigates most of the gardens of B’ir al-‘Azab and the agricultural lands on the outskirts of Ṣan‘ā’. Its source is in the mountains a distance of several hours from Ṣan‘ā’. There is another larger *ghayl*, called Ghayl al-Aswad, which passes through Bāb al-Sharāra and enters the garden of his majesty the Imam. Local inhabitants use the water for drinking and irrigating fields. This is also small in comparison with the water channels of Damascus. In truth there are no large water courses (*anhār*) in Yemen as the term *nahr* is understood. However, some of the water courses which resemble our water courses increase during the days of rain, proportional to the rainfall. During the rain periods, great floods (*suyūl*) surge in the mountain ravines and wadis for hours or days and then lessen and dry out after the end of the rains. This was what led the Himyarites in ancient times to build dams (*sudūd*) and large cisterns. I saw many dams in various places.

Inclined ramp of well in Ṣan‘ā ;‘photo-graphy by Salvatore Aponti, 1930s

However, there is a lot of underground water present in Yemen at various depths, ranging from one to thirty or forty meters. In some mountain areas the depth reaches fifty or more meters. The evidence for this large amount of water is that I saw water from wells in various places, some close to others, coming from a type of soil the English call ‘turf’, rather than a rocky layer. These water sources (*yanābī‘*) are near the ground surface and prove the abundant presence of water underground. Often these water sources are depleted if too many people withdraw their water, since the water being held leaks into the surrounding soil. Nevertheless, if one breaks through these soil layers until reaching solid rock, [111] then much water will gush out and that which is extracted would not be exhausted. Those who work with wells and

farmers in Yemen have done this in the present time. It is amazing that I did not see one well with water coming out of rock directly. Because of this, the local wells are exhausted every day and then they wait until it fills a second time and they can return to it once more.

We were asked many times for a method to increase the amount of water in their wells without having to dig down to the rock layer. We told them that perhaps if they were to dig a number of tunnels (*aqbiya*) next to the bottom of the well, the width of each not more than a quarter of a meter and the length a meter and half, this will guarantee an increase in their water sources. So some of them did this simple method and the water increased a lot.

al-Qāḍī Ḥusayn al-Muṭahhar and agriculture in Yemen

[231] On one of the days, as I was strolling through the Ṣan'ā' *sūq*, I met with al-Qāḍī Ḥusayn al-Muṭahhar, who invited me to a visit with him in his house in Bi'r al-'Azab. Al-Qāḍi al-Muṭahhar is one of the scribes in the service of the victorious one and close to his majesty, the Imam. His invitation to the house was very pleasing. He brought me to a room facing a garden fountain (*shādurwān*), i.e. *nawāfīr*, and while we were talking it was apparent to me that he was an expert on agricultural matters. I saw an amount of the cotton that only grows in Egypt and America and asked him where [232] he got this cotton from. He said it was a crop from Yemen and his majesty the Imam took an interest in it and imported a number of its seeds (*budhūr*) – and in Yemen the term for seed is *ṣīb*[77] – from Egypt and America. This type of cotton succeeded well in the wadis, the outlying low areas, al-Rawḍa, al-Jawf and other places. Thus, the Imam gave a major amount of seed to the farmers and peasants in order for them to expand the cultivation of cotton. A special cotton gin (*miḥlaj*) was imported for ginning cotton and bundling it by the thousands. I recommended to one of the American businessmen (Mr. Holbridge) in Aden that he import new cotton gins from America. There is no doubt that the cultivation of cotton will flourish greatly in Yemen and bring excellent benefits to its people, if it is spread to all the regions. This is because the climate of Yemen, its air, heat, water sources and land, assists the success of cotton in every way. This is something worthy of a solution and a successful outcome so that they are not distracted in their thinking from this great agricultural resource.

[243] Present during my visit with al-Qāḍī Ḥusayn al-Muṭahhar was one of the elite[78] from the region of al-Jawf. He was an owner of a *ghayl* (i.e. a *nahr*) known as Ghayl al-Murād. He is called the noble Faysal ibn 'Alī Jār Allāh and he was introduced to me by al-Qāḍī al-Ḥusayn. I asked him about his region and its circumstances. He said: 'We thank God for the best, but our region is poor and we are poor people and ignorant, not knowing how to benefit from our land.' So I said to him, 'Learn from al-Qāḍi al-Muṭahhar so that your land can be suitable for planting cotton and from the knowhow of superior planting of cotton. Why do they not increase its cultivation?' Then he added, saying 'We are poor people and do not possess the agricultural methods which would help us in developing the cultivation of cotton and other crops.' Then I asked al-Qāḍi al-Muṭahhar if it was true about this man's description and condition and if he was as poor as he declared. He responded to me, 'By no means is this man poor, since he owns a wide expanse of land and has servants, retainers, slave girls (*jawārī*), horses and camels. He is

[77] As noted by al-Iryānī (1996: 569) everything that is sown, comes to life and produces is called *ṣīb*, including agricultural and wild plants, as well as human and animal semen.

[78] The text reads *aḥad al-shurafā'*, but he is described as a tribal *shaykh* and not a member of the Sāda class.

like other tribal shaykhs, lazy and indeed very lazy, preferring to sleep than to make an effort at hard and productive work.' I suspect that al-Qāḍī al-Muṭahhar is correct in his complaint about the Bedouin princes and shaykhs, since on my third trip I observed very excellent parts of the Yemeni countryside and agricultural capability in everything, but, unfortunately, with a lack of crops due to the lethargy of Bedouin owners.

Out of affection for the benefit of Yemen and its people, here are some notes on agriculture, by way of example, for the sake of being concerned about the current state and future outcome. I suggest that the Tihāma, which is the well-known level plain adjacent to the Red Sea coast until the mountains, is suitable for planting varieties of date palms. There is much water underground at various depths and it is possible to extract and raise it to the ground surface by means of pneumatic pumps or mechanical motors. It is also suitable for varieties of sorghum and sesame. The foothills near the Tihāma and extending north to south for 100 kilometers are suitable overall with an emphasis on oranges (*burtuqāl*), sour and sweet lemons, citron (*kabbād*), and sweet orange (*nāranj*), as well as all kinds of citrus trees. In some areas I observed some of these trees growing without care from anyone. The mountains and the upper wadis are suitable for planting mango (*al-mankū*), banana and all kinds of timber trees like oak (*sindiyān*) and others. [244] This, except for coffee, is what is planted here. But coffee is planted in large quantities in many places. Planting is suitable in the plains and highlands (plateau) above the mountain range facing the Tihāma and in the proper Yemeni land surface for all types of flowering trees, cotton, flax and hemp (*qunnab*). One time I took with me some hemp seed from Damascus and planted it in a field of al-Sāfiya near Ṣan'ā' and it grew to an amazing extent. However, some of the people told his majesty the Imam that *hashīsh* was made from hemp, so the Imam ordered that it not be grown. I also planted various kinds of flax seed in a field in al-Sāfiya and it grew to an amazing extent, but many locusts came that year and consumed it all. What is amazing abut Yemen is that they are not worried about or afraid of the coming of the locusts.[79] One day I saw them go out a long distance from Ṣan'ā' where the locusts were attacking agricultural crops and they collected them in large quantities and brought them back to Ṣan'ā' with joy and happiness. When I saw them in this state, I said 'Are you happy that the locusts are eating up your crops?' They responded, 'We are happy with this because the locust may eat our crops but we eat them and store them away in our houses from year to year.'

The planting of rice is suitable in the plain of Jahrān, which is about 30 kilometers from Ṣan'ā', [245] just as the planting of rice is suitable in the fields of al-Jawf and other areas with plentiful water. Unfortunately, the Yemenis are not interested, despite the efforts of their Imam and their government, to upgrade their agriculture with the kind of sufficient attention that would return huge profits. Although Yemen is one of the most fertile countries in the world, it lacks science and diligence. His majesty the Imam exerts excellent effort in upgrading the agriculture, but it is also incumbent on the people to support their Imam and their government to arrive at the benefit called for. Cultivation of tobacco (*tutun wa-tunbāk*) is suitable in most localities of Yemen. I observed some of the poor types of tobacco planted in some parts, but these can be widely circulated and bring about a great benefit because the Yemenis use these

[79] Qāḍī Muḥammad al-Akwa' (1979: 114), on the other hand, viewed the damage caused by locusts on cultivated and natural plants an overwhelming disaster (*ṭāmma*); he provides a lengthy discussion of their impact, their collection, talismans written to keep them away and even how to cook them.

two types of tobacco to a great extent and import a very large amount. Were they to import seeds from Persia and Turkey and spread their cultivation, they will be almost able to export rather than import tobacco. This would serve themselves and their country with an important service and will not need the import, as is the case in every country of the world.

4. Ettore Rossi, "Note sull'irrigazione, l'agricoltura e le stagioni nel Yemen." *Oriento Moderno* 33(8-9): 349-361, 1953

The Italian orientalist Ettore Rossi visited Yemen in 1936-37 and wrote the first grammar of Ṣan'ānī dialect.[80] His article is divided into four parts: (1) irrigation systems, looking at wells, watercourses and perennial canals, distribution systems and utilisation of rain water; (2) water and irrigation in popular proverbs and customary law; (3) vocabulary relative to water and agriculture; and (4) the seasons. His work is especially valuable because it is based on field observation around Ṣan'ā' and the text is accompanied with eight photographs of water systems, irrigation and agriculture.

The description below is a summary rather than a literal translation in order to provide the details from his personal observations and dialect study. Rossi begins his discussion of irrigation systems by noting that Imam Yaḥyā had personally commissioned a Polish engineer who came to Yemen in 1937-38 and bored an artesian well on the slope of Jabal Nuqum. Three types of irrigation systems are listed: raising of well water with animal power; utilisation of a few channels and perennial water courses known as *ghayl*; and, limited and inefficient utilisation of rainwater and water collected in cisterns and through small dams (i.e., *sadd,* sg.) now in ruins. He further notes that the use of water varies from place to place, as does the vocabulary, some of which extends back to earlier South Arabic.[81] The focus throughout his article is on the dialect terms used, but also includes descriptive detail.[82]

Inclined ramp of well in Ṣan'ā'; photography by Rossi in the late 1930s.

The basic term recorded for the well in Arabic for Ṣa'da was *bīr* (*abyār* and *biyār*, plurals) but with a plural of *būr* in Dhahbān, northwest of Ṣan'ā'. In the arid coastal region of the Tihāma the term *ḥasī* is used for a well. In Ṣan'ā', however, the precise term used for the well is *masnā* (*masānī*, plural) with *sānī* for the one drawing the water from the well. The common form of

[80] Rossi (1939). This text contains terms and proverbs associated with agriculture. In addition to his 1953 article discussed here, he recorded Yemeni terms in several other publications. For more Yemeni terms on agriculture and livestock raising, see also Lambardi (1950).

[81] See Rossi (1940). For an up-to-date assessment of irrigation in ancient South Arabia, see Harrower 2016 and Maraqten 2017.

[82] I transliterate the Arabic terms here according to the system used in this article rather than the system used by Rossi. It is important to note that in Ṣan'a' and north the Arabic *qāf* is pronounced as *gāf.*

the well is circular with a diameter of one to two meters, lined with stones on the inside. For extracting the well water a superstructure is necessary. This consists of a vertical wall (*ṣawra*; *ṣawā'ir*, pl.) for use of a large pulley (*'ajala*) and small winch (*ja'īr*) using horizontal (*'arār*) and vertical (*sulākh*) beams. The axis of the pulley is called *maḥwar*, while the cord (*ḥabl*) has a bucket or leather bag attached and is usually pulled by camels, or sometimes cows and donkeys.[83] These go up and down a walking path called *marnā* in Ṣan'ā' and nearby areas and *maḍāḥ* in Ṣa'da. The water in the bucket is thus poured out into a small channel going into a cistern (*barik*), where it is distributed to gardens by water channels (*sāqī*, *sawāqī*). To the east of Ṣan'ā' he reports that the verb *dalā* is used for drawing water and the well is called *madlā.* In Ṣan'ā' he also saw small wells with the water pulled out by hand; this kind of well was called a *manza'a.* In Dhamār and Radā' the goatskin used for the water is called *dalī* and the inclined path for the animal is *majlab* (*majālīb*, pl.).

In explaining the usage of *sanā* for the action of drawing water from a well, Rossi quotes a *zāmil* lyric from the Balḥārith:

naḥnu Banī al-Ḥārith wa-law sanaynā
wa-iḥnā' rijāl al-ḥarb idhā 'ādaynā
We are the Banī Ḥārith, and even if we are drawing water
we are men of war when we are attacked.

He also records a song from a man drawing water from a well in Ṣan'ā'.

Regarding irrigation through perennial watercourses, Rossi observed that these were always quite small and derived from springs at the bottom of mountains and led into a major channel (*sāqiya*, *jāl*) covered (*masqūf*) with stone for long distances.[84] The term for this type of channel is *ghayl* (*ghuyūl*, pl.). At some point most will fill into a cistern or basin called *ma'jil* or *mājil*, from which the water will be distributed. The examples Rossi gives include those in Bayt Ma'yād, southwest of Ṣan'ā' on the way to Ḥadda, in Ṣan'ā', Ḥadda and the small village of 'Aṣur to the west of Ṣan'ā'. These cisterns vary in size and depth. They are usually circular or rectangular with a perimeter up to a hundred meters that may be surrounded by a wall (*ḥājiz, ṣafīf, ṣwār*). The water that arrives in the main channel (*sāqiya*) enters through a passage called *darrāba*. When the cistern is full, the stone (*nāṣiḥī*) blocking an outflow passage at the top is removed so that any excess water can flow out. The verb used for the flowing out is *ansaḥa*. The water used for irrigating fields is drained through a hole (*mijallī, mabāḥ, fūra manjūla*) located at the bottom of the cistern. The hole near the bottom is opened and closed by using a large wooden beam (*khashaba*).

The water master who manages the distribution is called *dā'ilī*. He regulates the time or amount of water in a share with different systems.[85] Rossi describes this for thirteen different locations he observed, as follows:

(1) Southwest of Ṣan'ā' the water master uses a marking pole (*'alam*) divided into 24 palm lengths (*kaff; kufūf,* pl.). The water is then allocated according to the share (*farḍ; furūḍ*, pl.) of individual farmers. For eight hours during the night there is no allocation, while the overflow from the upper part of the cistern flows into an underlying one. In this location the master

[83] Al-'Aẓm (1986: 102-103) observed this kind of system in Ṣan'ā' in 1927.
[84] This type of covered channel is usually known in the literature as a *qanāt* or *falaj* in Oman. There are a few of these in Yemen, and many of these systems are centuries old.
[85] For a description of the role of the *dā'il*, see 'Aslān (2000: 60).

distributes water according to the shadow (*fāya*) that the sun projects on a nearby wall, when a wall is available.

(2) In Ḥadda, an area rich in water and plants to the southwest of Ṣan'ā', the water share is called *mafra'* (*mafāri'*, pl.) and allocation is made by using a pole (*'ūdī* or *'alam*) which is submerged in the cistern and measured by the sun's shadow on a wall (*jidr* or *'alam*) oriented north/south. On average, every twelve hours defines a *farḍ*, which is divided into 60 parts (*mafāri'*), each consisting of about 12 minutes of water supply. In the morning the first nine segments are determined by the time elapsed between sunrise over a mountain to the west and the time when the wall's shadow from the sun reaches a specific point marked on the ground. The measuring proceeds until the sun reaches its zenith and there is no shadow projected. In the afternoon the 30 remaining shares are measured by the shadow projected to the east of the wall. A second wall with other marks on the ground is used to calculate the time in winter when the sun rises and travels in the other direction.

One farmer told Rossi his total water allotment each *ḥijrī* month was 30 parts with ten *mafāri'*[86] on the 4th, 15th and 28th days of the month. The exact amount of water per share would vary, depending on the flow from the cistern. The whole irrigation process in Ḥadda consumes a large part of the farmer's day, since he needs to prepare and maintain the channels going to his fields, as well as be present when the water master shouts the name of the next shareholder to come and take out (*yaqlab al-mā'*) his share of water. The farmer would then respond from the valley below.

(3) In the plain of Shu'ūb, immediately to the north of Ṣan'ā', the extent of a *farḍ* share at Ghayl al-Aswad is 24 hours, with a half share (*nuṣṣ farḍ*) of 12 hours, quarter share (*rub' farḍ*) of 6 hours,[87] 8th share (*thumun farḍ*) of 3 hours, 16th share (*nuṣṣ thumun*) of 1 and a half hours and 32nd share (*rub' thumun*) of 45 minutes.[88] Time measurement is made by use of a copper cup called a *ṭāṣa* (*ṭīṣān*, pl.), which has a hole of a given size that serves as a water clock.[89] Here a measure of 16 *ṭāṣa* is equal to three hours (an eighth of a *farḍ* share), so that each *ṭāṣa* has a duration of 11 minutes, 15 seconds. Each 24-hour period thus would equal 128 *ṭāṣa* measures.

Rossi notes that the *ṭāṣa* is not used in cases of water disputes or when there is an alternate form of measurement, such as the use of shadow lengths in Ḥadda. The water master, who is subordinate to the official known as a *wakīl*, is responsible for the allocation of *ghayl* water. Each day he calculates the height and position (*manzala*; *manāzil*, plural) of the sun. About three hours after sunrise, the master in Ḥadda calculates the time in a *manzala*, each one of which equals 1/32 of a *farḍ* share or four *ṭāṣā.* From this time on the water master adjusts the time using his body as a gnomon for the shadow it projects on a fixed set of markers on the ground, as measured by each step (*qadam*). At the third hour after sunrise his shadow is equal to 8 steps. For the third to the ninth hour each step equals two *ṭāṣa* (i.e., 22 minutes and 30 seconds); from the ninth to the tenth hour each step is one *ṭāṣa* and after the tenth hour each step and a half is a *ṭāṣa.* At Shu'ūb a complete cycle (*dawla*) is renewed every 18 days, each day equaling one *farḍ* of 24 hours.

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[86] This term is derived from South Arabic ('Aslān 2000: 58).

[87] Rossi (1953: 352) mistakenly has 4 hours here.

[88] The history of Ghayl al-Aswad, which was first dug in 803/1400, is provided by 'Aslān (2000: 83-89).

[89] See 'Aslān (2000: 55) for a description of the *ṭāsa* in Ṣan'ā'.

When there is no daylight, the water master uses a modern mechanical method. Each hour is heralded from the walled city of Ṣan‘ā’ by a trumpet (*būrī*), announcing it from a tower (*nūba*). This is the hour determined by the *wakīl.* In case of a dispute, the time measurement of the *ṭāṣa* is used.[90] Since it is made from copper, the hole at the bottom is precise. In Shu‘ūb the *ṭāṣa* has a liquid capacity of two *raṭl.*[91] When the *ṭāṣa* is emptied (*tanjaha* or *tfarragha*), it is filled up again with water. During the night, time can be measured by the moon’s shadow as the stars rise and set. The water master follows the paths of the following stars: Canopus (*suhayl*), Sirius (*‘alab*), the Pleiades (*thurayyā*), a star in Orion (*ṣulm* or *aṣlam*), a star in Taurus (*thawr*), Venus (*zahra*), a star in Ursa Major (*na‘sh al-nabī*).[92]

(4) In Wādī al-Ḍilā‘, northwest of Ṣan‘ā’, water is distributed by the *farḍ,* as in Shu‘ūb, with the *farḍ* equal to the twelve hours following sunrise until sunset, and each specific share is called a *dawl.* During the day measurement is made by shadow lengths and at night by stars. In both cases it is an approximate measure (*‘alā ghālib ẓann*).

(5) For Wādī Ẓahr, northwest of Ṣan‘ā’, the *ghayl* now called Wādī Ẓahr used to be known as Ghayl ‘Isāwī.[93] It descends from Bayt Na‘ām and has a special allocation regime. The water is used for 15 days by the village of Qaryat al-Qābil, now also called Rawḍ, then for 10 days for the villages along the wādī and 5 days for the village of Bayt Na‘ām. When the cycle is filled for Qaryat al-Qābil, they return (*iriddū* or *i‘awwudū*) the water to the wādī. Distribution is done here with the *ṭāṣa*, but in a particular way. A small, bowl-shaped *ṭāṣa*, which has a hole underneath, is placed in a large one full of water. The smaller one floats initially, but then fills and sinks (*tuqmis*) to the bottom of the larger one. On the morning of April 22, 1937, I saw a water master on a stone slab with the large and small *ṭāṣa* bowls, and with the inseparable waterpipe (*madā‘a*), as the *ghayl* water was flowing out to the lush garden plots. In Wādī Ẓahr one hour is equal to ten *ṭāṣa* and a *farḍ* equals 24 hours of flow. The *ṭāṣa* measure regulates each specific share term, called a *makīl.* When the turn is for someone, the water master calls out his name, saying *al-makīl ‘alayk.*

(6) At Masājid, three hours west of Ṣān‘ā’ on the way to Sūq al-Khamīs, there is a *ghayl* of greenish color water on a hill at the foot of the village. The water is distributed by a water master (*mudawwil*) using a 12-hour *farḍ*, but this is an approximate system.

(7) At Bayt Ghawbar, a village northeast of Sūq al-Khamīs, the *ghayl* flows into a cistern (*mājil*), from which it is distributed by a local official who knows the exact name for every time slot (*sanīb* or *mustanib*). The *dawīl* is the person who releases the water for irrigation. He submerges the marker pole (*‘alam*) into the cistern. The point at which the water flows in is called *muradd*, and the place where it flows out is called *khallā’*. The process of releasing and blocking the water flow is made with a wooden beam (*khashaba*). The amount of water is measured by the palm length (*shibr*) on the marker, which is approximate.

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[90] This contradicts what he said about use of the *ṭāṣa* in disputes earlier in the section on Shu‘ūb.

[91] The *raṭl* in Yemen varies according to place and the type of measure. It is generally around 560 grams; see Table 1.

[92] For details on local star names in Yemen, see Varisco (1993). Rossi does not provide sufficient information to clarify which stars were used. For time-telling at night, rather than stars as marking seasonal times, the system of 28 lunar mansions was used.

[93] An ethnographic study of irrigation in Wādī Ẓahr was made by Martha Mundy (1996).

(8) In Sanḥān, to the east of Ṣan‘ā’, the turn is called *dawl* and the one irrigating is the *mudawwul*. The flow of water for 24 hours, day and night, is called *sadda*.

(9) In Ṣa‘da in northern Yemen, the water is distributed by the local governor, called *‘āmil*.

(10) In Wādī Sirr, east of Ṣan‘ā’, the water is measured with a *ṭāṣa* by the local water master (*ma’mūr al-mā’*).

(11) At Radā’ and Dhamār the *ghayl* water is distributed by the time measured in feet (*aqdām*) in relation to the position of the sun, the *farḍ* being for 24 hours. The one distributing the water is called *duwīl*. In Dhamār the water outlet from the cistern is called *makhlūla*, but *fūra* in Radā’.

(12) At Shaḥdī, the water master (*dā’il*) distributes each turn with a stick (*wathan*), engraved with marks, that is submerged in the cistern.

(13) At Qaryat al-Ghayl in the Jawf water is distributed by the *ṣarrāf* and calculated by the *qīrāṭ* (*qarārīṭ*, pl.), a measure of time equal to a half hour. The method of time measurement is by shadow length and the use of stars. When it is cloudy, the *ṣarrāf* regulates the time according to his conscience (*‘alā dhimmata*). He is paid a *qīrāṭ* share for his service.

The distribution of *ghayl* water and the information regulating its use are recorded in special documents or notaries. The registration log for the Ḥadda *ghayl* is with Sayyid ‘Alī al-Muṭā’ of Ṣan‘ā’; for Ghayl al-Aswad in Shu‘ūb it is with a certain al-Razzaqī in Ṣan‘ā’. In Wādī (Ẓahr) the secretary (*kātib*) is al-Tijānī. The one who does not want to utilise a specific turn of water can sell this to someone else. The right to a share of water from the *ghayl* is not necessarily linked to the land, but can be sold separately.

In 1936 the perpetual right to a *ṭāṣa* (11 minutes and 15 seconds of irrigation every 18 days) would be for 90 riyals; a single *farḍ* of 24 hours of irrigation was for 28 riyals.[94]

The *ghayl* is sometimes endowed as *waqf* for a mosque or pious institution (such as ‘Aṣur to the west of Ṣan‘ā’). Most often, however, the shares are owned by farmers of a given area of irrigated land or members participating in a set of shares. In Ṣan‘ā’ the land which has a given water share is called *gharīm.*

The water master (*dā’ilī*) is paid by the landowner in cash or produce. When lucerne (*qaḍb*) and cereals are sold, a tenth of the price is distributed between the *wakīl* and the water master. This is the case for Shu‘ūb, where the *wakīl* has eight days less than the water master. The *wakīl* records (*yaḥsub*) the *ghayl* register and divides (*yiṣubb*) the land into plots, while the water master only distributes the water. The *wakīl* is also entitled to two *farḍ* (every 18 days); this is called *raqabat min ra’s al-ghayl* and the *wakīl* may sell this, using the proceeds to compensate the ones who clean the *ghayl* system (i.e., *tanḍīfāt*).

In Wādī Ẓahr I heard about punishments (*‘adhāb*) for those who open (*yifjir*) the flow of a *ghayl* or a distribution canal out of turn. The offender must pay two riyals, one of which goes to treasury (*bayt al-māl*) and the other to the *ghayl* system itself.

The *ghayl* system is usually covered, especially if there is a long distance to the irrigated fields. For example, Ghayl al-Aswad is covered up to the southern wall of Ṣan‘ā’ and through the city. In the vicinity of the Imam’s palace (*maqām*), there is an opening where the inhabitants can draw water. It then leaves through the northern wall of Ṣan‘ā’ and flows to the Shu‘ūb

[94] The apparent discrepancy in price is not explained.

fields, in which are channels lined with plants, bushes and roses, until the these channels extend out to the north about a meter in width and half a meter in depth.

In Ghayl al-Ṣāfiya, to the northwest of Ṣan‘ā’ and towards Shamla, Rossi noticed openings in the covered *ghayl.* These are called *kada’im* (*kadama*, sg.) and are used for digging down into the channel and cleaning sediment and stones from the bottom. The bulkhead over the opening is called *masrī* (*masār,* pl.).[95]

The source of the *ghayl*, which is often surrounded by legends and mystery, is called *ma‘yana* (*ma‘āyin*, pl.), but this same term in ‘Uṣāb refers to a small watercourse. In the local area of Rayma a watercourse is indicated by many synonyms: *ghayl, nahr, ‘ayn al-mā’.*

Rossi provides a final list of other *ghayl* sysems. An area rich in such systems is Wādī Ḍilā‘, to the northwest of Ṣan‘ā’. The seven systems there mentioned to Rossi include al-Ṣabara, al-Masbīḥa, ‘Ambarūd, Ghayl al-Dawla, al-Ṣāfiyān, al-Raysha and Ghayl Ḥaqq al-Shāri‘. Other names that he heard about include: Ṣarada (a valley in the Manākha region), ‘Awman (a wādī in Manākha on the way to Maḍmār), al-Jibin (irrigated cultivation of coffee in Manākha), and Ghayl al-Kharid (a place in Arḥab). Near Manākha, at the end of the town towards the west, there is a *ghayl* used by the town. An iron grid, erected by a Turkish pasha in 1326 (1908-1909), protects the cistern.

The Utilisation of Rainwater. Rainwater was used in the past for irrigation involving dams and reservoirs. The ruins of ancient hydraulic works can be found in many valleys and the notices in al-Hamdānī’s books *al-Iklīl* and *Ṣifat jazīrat al-‘Arab* are valuable in this regard. Someone from ‘Uṣāb told Rossi that they deflect the flood water (*sayl)* with wood (*‘ūdī*; *aw‘ād*) and stone barriers. The main offtake channel is called a *mashrab* (*mashārib*, pl.) and the dam or barrier is *marzam* (*marāzim*, plural) or *maksaf* (*makāsif*, pl.). To protect the flood land, they construct small walls, which in Manākha are called a *maradda*.

The system north of Ṣan‘ā’ towards ‘Amrān uses flood water (*sayl*), as explained in an interesting note by Goitein.[96] The secondary channels (*sirar*; *assirra*, pl.; or *salīl*; *silwal*, pl.) are blocked with a small dam (*maṣraf*; *maṣārif*, pl., or *mazaff*; *mazaffāt*, pl., or *ḥarra* to the west), constructed of stone, soil and grass (*zīl*). This forms an impenetrable barrier, so that the stored water first irrigates the upstream field and then descends to fields below when part of the barrier is removed. During the irrigation from the floodwater, the farmers warn each other by shooting rifles and shouting. There is someone who guards (*ḥarasa*) the barrier.

Water and irrigation in popular proverbs and canon law

The importance of water and its use from rain and perennial sources is reflected in Yemen, as in all Arab countries, in proverbs and other types of expression. Regarding the *ghayl* for irrigation in Wādī Ẓahr, it is said “The *ghayl* of Bayt Na‘ām irrigates beyond their own people” (*ghayl* Bayt Na‘ām *yisqī li-ghayr ahlah*). This is because most of the water descending from Bayt Na‘ām benefits the fields of Wādī Ẓahr. The same is said for Ghayl ‘Alāf (“The *ghayl* of Wādī ‘Alāf irrigates beyond their own people,” *ghayl* Ghayl ‘Alāf *yisqī li-ghayr ahlah*)[97] since this *ghayl* stems from Bayt Baws to the south of Ṣan‘ā’ and above Ḥadda and descends to

[95] Rossi (1953: 356) suggests that this term is related to a South Arabic term recorded by Rossini in his *Chrestomathia* (Glossario, p. 179).
[96] Rossi footnotes the index in Goitein (1934) for Regen and Wasser.
[97] This saying is also recorded in al-Akwa‘ (1984(2): 758).

Ṣan‘ā’ crossing the garden district of Bi’r al-‘Azab until it ends up in the fields of al-Ṣāfiya. They also say: the *ghayl* of a neighbor and yet a shameful hunger (*ghayl sarraḥ wa-jū‘ faḍḍa*).[98]

In Islamic legal works (*fiqh*) there is a tithe on agricultural produce, with differences noted for fields watered by rain, flowing watercourse and perennial sources versus fields irrigated with greater effort, such as wells or hydraulic pumps. The latter, such as the well (*masnā*), are normally subject to a twentieth rather than a tenth as the tithe. In Yemen the tithe (*‘ushr*, commonly known as *zakāt*) is paid to the treasury (*bayt al-māl*), which is represented by a trustee (*ma’mūn*), who keeps a record of the assessments and payments in a special register (*qudfa*).

The theoretical discussion of this material in Yemen is found in the classical Zaydī legal work known as *Kitāb al-Azhar* of Imām al-Mahdī and the commentary *al-Ghayth al-midrār*, edited in four volumes in Cairo.[99] In the third volume there is a treatise on *shuf‘a* (the right of preemption) by ‘Abd Allāh ibn Muḥsin al-Ḥaymī. This covers everything related to the courses of water (*majārī al-mā’*), water channels (*anhar*), floodwater (*suyūl*), wells (*būr*) and slope runoff (*ṣabābāt al-jibāl*) with schematic drawings and vocabulary relating to irrigation, such as field (*jirba*), cistern or reservoir (*ma’jil*), channel (*sāqiya*), mill (*raḥā*), channel opening (*manshara*; *manāshir*, pl.), field bund (*‘arim*), etc.

Vocabulary relative to water and irrigation

In addition to the vocabulary referred to in his previous pages, Rossi provides a list of other Yemeni terms for water and agriculture. Although some are from Ṣan‘ā’ or found throughout Yemen, he also describes terms for specific locations. Some of these may be dialectial variants. These include:

- *‘āra* (*‘awā’ir,* pl.): bund for channel (Wādī Ẓahr) and small partition in a field (Masājid and Mafḥaq)
- *‘āriḍa* (*‘arwām* or *‘irwām*, pl.): bund in a small water channel made of soil and stones to divert water
- *bāhī*: riverbank of a *ghayl* or land cultivated near the riverbank of a canal (Jawf)
- *fāniya*: canal (Zabīd)
- *jaḥra*: small sunken Wādī (Ḥarāz)
- *jarf*: cave or shore of a wādī (Zabīd and Jawf)
- *qafada*: barrage for *ghayl* (Ḥadda)
- *qalūba*: action of lifting the stone that blocks flow in a channel in order for the water to flow to flow and irrigate a field
- *ḥarra*: terrace wall
- *kharaza*: stone in the middle of a basin (*marjaw*)[100] separating the water from one side to the other.
- *maqlab*: place where water is diverted from the channel to the field
- *manfas*: opening in a channel or in the wall of a building
- *manshara* (*manāshir*, pl.): stone placed against the openings in the retaining walls of a field to prevent the influx of water

[98] See al-Akwa‘ (1985(2): 758).
[99] Ibn Miftāḥ (1938).
[100] Al-Iryānī (1996: 343) defines this as the basin (*ḥayḍ*) in which the water from a well bucket or skin spills.

- *mazamm*: bridge over a watercourse; in Wādī Ẓahr it is the hole in the wall enclosing a field
- *nafas*: hole in the wall surrounding a field for regulating the influx of water (Jawf)
- *'aqla*:[101] basin in which the water from a flood rests
- *sayl* or *sayla*: seasonal flood
- *sawm* or *sūm*: bank of a channel (Ḥarīb)
- *shaghara*: small derivation canal (Wādī Ẓahr)
- *thaqb*:[102] hole or subterranean channel.

The land cultivated in the Ṣan'ā' area is called *māl*, a cultivated and irrigated field is a *jirba* (*jirāb*, plural) and subdivided into plots called *qasam* (sg.). A Ṣan'ānī proverb states: "Better the gleaning of a field than the harvest of a plot" (*qumān jirba wa-lā zara' qasam*). The field is called *shubar* or *ḥarra* in Jabal Ḥufāsh, *sabba* at Masājid and *'ūbr* in the Arḥab region. In Ṣan'ā' the fields are measured by the *labna*[103] (elsewhere called a *ḥabla* or *shakla*). In the Jawf the *ḥabla* measures 10 ells. The *labna* in the Arḥab area is 10 square ells, corresponding to 7 1/2 *wa'r* (*a'wār*, pl.), which has a broader length about half the stature of a normal man measured from the tip of the fingers of a hand across his chest.

The ground is plowed with camels or oxen and rarely with donkeys. The plow in the highlands is called *ḥalī* (*ḥalā'*, pl.).[104] The tip of the plowshare is the *sinn*, the beam supporting the plowshare is *tajr* (*aṭjār*, plural), *ḥalaq* is the upper part, *dafla* the handle, *qadīm* for the axis that binds the yoke together, *hijj* for the yoke, and *simaj* for the wood that holds the yoke on the animal's back. The plow has other names in different regions: *'adā* (Rayma), *sāqa* (Ḥajaila), *nibāl* (Yarīm), *sabb* (Habbāt) and *ḥadid* ('Attāra).

Other terms relative to plowing and agricultural work include:

- *batūl*: farmer
- *maḍmaḍ*: yoke
- *ḍamḍ* or *ḍāmida*: pair of oxen
- *mawthab*: wedge that holds the parts of the plow together or the string attached to the feet of an animal (Jawf)
- *makhyas*: a type of hoe for removing the soil from the plowshare; the action is called *khayyasa*
- *'aqar*: rainfed land without irrigation
- *kawbal*: pile of soil
- *ḥarra*: land, field, bund that holds in the earth and filters the water to the fields
- *qā'a*: plain
- *madar*: mud, a potter is a *maddār*
- *mawjir:* land cultivated far from a channel (Jawf)
- *ṣulbī*: uncultivated land
- *ṭīn*: desert or hard ground (Jawf)

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[101] Al-Iryānī (1996: 643) describes *'uqla* as a dirt hole in the ground which collects water. It is not a cistern (*birka* or *ma'jil*), nor a type of cistern for collecting water known as *karīf*, nor a dam (*sadd*).
[102] Rossi reports *thaghb*, which may be a dialectical variant, but the Arabic term is *thaqb*.
[103] The more common form in Yemen is *lubna* or *libna*; see al-Iryānī (1996: 796).
[104] For Yemeni vocabulary relating to plow cultivation, see Varisco (2004).

- *wathan* (*awthān*, pl.): stones piled up as a field marker, also on graves. Two stones are used on the graves of a woman and one on that of a man in the Khuzayma cemetery in Ṣan‘ā’. In the Tihāma two stones are used for men and three for women.
- *wadn* (*awdān*, pl.): a field or a plot of land for the cultivation of coffee (‘Uṣāb).

The Seasons

The citizens of Ṣan‘ā’ commonly distinguish four seasons: spring (*rabī‘*), summer (*ṣayf*), autumn (*kharīf*), winter (*shitā’*). Fruits are called *mukharrafāt*, since they are especially ripe in the fall. There are particular terms in the countryside that Rossi could only pick up incompletely. In Ṣan‘ā’ and the surrounding area late autumn is called *qiyāḍ* (*qīḍ* in Ṣa‘da). In Ṣan‘ā’ he heard about an extreme cold called *wuqūf* in December and January, starting December 21 (*Kānūn al-Awwal* 9); this period is also called the days of the months of *Kānūn* (*ayyām al-Kāwānīn*).

In Wādī Ẓahr they distinguish the beginning of winter with rain as *‘allān*[105] separate from true winter (*shitā’*), followed by the spring season as *ṣayf*, a dry period of two months in summer called *jahr* and autumn (*kharīf*). Near Banī Ismā‘īl to the north of Manākha the harvest season is called *‘allān* in the valleys and *khāmis*[106] in lower areas.

The short period of spring rains in Ṣan‘ā’ is called *maṭar al-ṣayf*. The longer period of autumn rains is called *maṭar al-kharīf*, which produce the most rain.

When it rains the children celebrate and sing:

“*yā karīm*
lā khallat lā jirba wa-lā ‘arīm.”
“O generous God
nothing is empty, no field and no field bund.”

Rossi records a song used to ask for rain:[107]

“yā maṭar wa-imṭar
wa-al-sha‘īr wa-al-birr
wa-al-dharā’ [108] *tukbar*
fī juba al-manẓar
ḥannat ru‘ūd ‘Ālī
ḥannat ‘alā al-jibāl(i)
nasqī bih al-waṭan(i)
yā Allāh bi-ghayth al-ḥanīn
nasqī bih al-waṭan(i).”
“O rain, do rain
so the barley and wheat
and sorghum will accumulate
on the scenic terrace.

[105] Rossi (1939: 151) mistakingly has ‘allām (!) for this rain period.
[106] Rossi (1953: 360) writes *kāmis* (!), but the reference is to the rising of the fifth (*khāmis*) star of Ursa Major (*banāt na‘sh*). According to the Yemeni agricultural marker system, *khāmis* is a period of 14 days in September (*Aylūl* 3-16) in the Julian reckoning (Varisco 1993: 127). The common term for the harvest of grain in Yemen is *ṣurāb* and in the mountains generally occurs in October and November (al-Akwa‘ 1979: 116).
[107] Rossi (1953: 360) records this in dialect, but I provide the formal Arabic terms.
[108] I interpret this as a reference to sorghum (*dhura*), the most common cereal crop at the time in Yemen.

The high thunder ringing out,
ringing out on the mountains,
so we can irrigate by this the homeland.
Oh God with the longed for plentiful rain
we irrigate by this the homeland."

The harvest season, as well as the harvest itself is called *ṣarāb*[109] or *thamara*; the return from the fields after the harvest is called *rawīḥ*.

[109] In most of Yemen this is either *ṣirāb* or *ṣurāb* and it usually relates to the autumn harvest of sorghum. In the Himyaritic calendar *Dhū Ṣirāb* refered to *Tishrīn al-Awwal* or October.

5. Muḥammad Ḥaydara, *Takwīm*. Ta'izz, 1945 [Translated by Serjeant (1954)]

Yemen has a long history of agricultural almanacs, especially for the Rasulid period of the 13th-15th centuries C.E.[110] The almanac of Ḥaydara, translated by Serjeant, was composed in 1945 for then crown-prince Aḥmad for official use. Ḥaydara (1902-1973) was a scholar and astronomer; he started teaching in the first modern school in the Mutawakkilite Kingdom in Turba, near Ta'izz. Besides astronomical and agricultural information, the almanac contains a variety of lore common to the genre. Although it is arranged according to the *ḥijrī* lunar calendar, this is correlated to the solar calendar and the risings of certain stars and asterisms. It is meant to be a general guide for farmers, but the compiler also notes: "Now, concerning the seasons of sowing (*badhr*) and harvesting (*ḥiṣād*), I am unable to include them all, on account of the great differences between each district (*nāḥiya*) and *wādī*."[111]

His almanac was still being published as late as 1394/1974, when it was called *Ṭawāli' al-Yaman al-zirā'ī*. The details relating to agriculture, with a focus on the highland Ta'izz and coastal Tihāma, region are noted below:[112]

Translation:

January (*Kānūn al-Thānī*)

1 Mustard (*tartar*) is planted.
5 The time is now suitable to plant madder (*fuwwa*).
14 The *qiyāḍ* [winter harvest] of white emmer wheat (*'alas*) (rye).[113]
15 Grafting of vines.
16 Planting of sour pomegranate (a small green type).
17 The grain harvest (*ḥiṣād*) begins in Tihāma.
22 Trees are planted.
24 Sugarcane is cut.
25 Roses collected until *Nīsān* (April 14).
27 Small palms transplanted
28 Planting of figs ends.
29 The young vine shoot (*gharīsa*) transplanted.

February (*Shubāṭ*)

7 Cotton and melons (*biṭṭīkh*) planted.
11 Vines are planted.
12 From now, fruit-bearing trees are planted.
14 *Qiyāḍ* harvest of wheat (*burr*), harvested till the end of *Shubāṭ* (March 13).
15 Sugarcane is planted.
17 Sesame (*juljulān*) is sown in Tihāma on the flowing water (*ghayl*).
21 Sowing of grain in al-Rabādī and Ḥubaysh.
24 Sugarcane is planted.

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[110] See Varisco (1994) for a study of Rasulid agricultural almanacs.
[111] Serjeant (1954: 443).
[112] These are taken from Serjeant's article, although I use my standard transliteration, correct errors in Serjeant's translation and change the language at points to make the information clearer. Although I have not seen the original almanac translated by Serjeant, I have a copy of the almanac from 1394/1974, which has much of the same information.
[113] This is actually emmer wheat, also known as *nusūl* in Yemen, although Serjeant refers to it as rye.

28 Cabbage (*lahāna*), i.e. *kurunb*, is planted.

March (*Ādhār*)

1 Grapevines (*'inab*) are irrigated.
3 End of tree planting.
5 Pruning (*taqlīm*) of grapevine stocks.
12 Roses and flowers planted.
13 Grapes are abundant in some districts.
15 Indian banana (*al-mawz al-Hindī*) planted.
16 Black cummin (*ḥabba sawdā'*) is sown in hot districts and taken after half a year.
21 Grain is winnowed at Ibb and Jibla and in their district.
28 Red sorghum (*dhura*) sown, and harvested after seven months.

April (*Nīsān*)

6 Sowing of grain in al-Suḥūl and Jibla, etc.
10 Trees in leaf.
14 Grain sown in the hot and temperate districts, and plucked after four months; cowpea (*dijr*), etc. are plucked in the Tihāma after 75 days.
17 Planting of the broad bean (*fūl*) is suitable in cold places, but it is unsuitable elsewhere; it is harvested after six months.
19 The beginning of rainfall on the hill-slopes. Palm trees are fertilised.
24 The heavy rains on the hill-slopes begin, and the heat intensifies.
28 Planting of sorghum begins in al-Ḥujarīya at the end of the month.
30 Winnowing.

May (*Ayyār*)

5 The South Wind (*janūb*) blows, and the *wadis* expand and over-flow.
13 Fruit firms and almonds become ripe.
14 Sowing of barley (*sha'īr*) in parts of the country.
20 Sowing of broomcorn millet (*gharib*) and bulrush millet (*dukhn*) in al-Ḥujarīya.

June (*Ḥazīrān*)

2 Planting of bulrush millet in Tihāma and the hot districts.
3 The falling of the rains begins in the high ground, and the flow of flood water (*sayl*) in the Tihāma.
7 The hot winds (*samā'im*) commence, and the grapes turn black.
10 Rice is planted.
12 The ground splits open.
14 Sowing of *gharb* sorghum in hot districts.
15 Bulrush millet planted in the mountains.
24 Winnowing of wheat (*burr*) in Ibb from June 15-July 11.
28 Sowing of *'Arabī* wheat (a small-eared Yemeni kind smaller than that found elsewhere) and barley.
29 Sowing of *khashkhāsh* (poppies) and *mūma* (cotton seed), which is plucked after five months.
30 Close of the rain season in the hill-slopes.

July (*Tammūz*)

8 Planting of bulrush millet in the hot and temperate districts.
9 Foxtail millet (*kinib*) and teff (*ṭahaf*) are planted and harvested after 70 days.
15 Sowing of white emmer wheat (*'alas*), fenugreek (*ḥilba*), barley and lentils, which are plucked after three months.
17 Dates collected.
25 Planting of lucerne (*qaḍb*) is not suitable during the whole of the season of early autumn (*kharīf*); rain and cold are harmful to it.

August (*Āb*)

5 The flood water (*sayl*) is expected in Tihāma.
7 Carrots (*jazar*) and melon (*biṭṭīkh*) planted.
9 Wheat reddens.
11 Grapes and figs become sweet.
13 All fruits ripen.
15 Plucking of fruits begins.
16 Planting of *gharb* sorghum in part of the Tihāma.
17 Planting of sorghum in Zabīd and Rima'.
19 The flood water irrigates the Tihāma.
24 Leaves of the trees change.
25 Quinces (*safarjal*) and pomegranates (*rummān*) abound.
27 Watermelons (*ḥabḥab*), garlic (*thūm*) and onions (*baṣal*) are planted.
29 White radish (*fijl*) is planted.
31 Cessation of rains in the mountains.

September (*Aylūl*)

2 The flood water ceases in the Tihāma.
4 Planting of *baynī* and *ḥijna* sorghum in the Tihāma, as well as red and white (*thālithī*) sorghum.
10 Ripe dates (*ruṭab*) and grapes abound.
15 Fruit trees planted in some of the sunny districts.
16 Time of planting and pruning grapevines.
17 Cucumbers (*khiyār*) are collected in the provinces and administrative district of Ta'izz.
18 Sour pomegranates, figs, and the prickly pear (*al-balas al-Turkī* or *al-shawkī*) are planted.
20 Grapes are plucked. The sap rises to the tops of trees.
21 Parched grain (*jaḥīsh al-ḥubūb*) is present in the administrative province of Ta'izz.
23 The crows come to the fields.
25 Planting of *khāmisī* sorghum in Tihāma.
26 Quinces and pomegranates come to end.
28 Grain harvest in the districts of eastern Yemen (al-Mashriq).

October (*Tishrīn al-Awwal*)

3 Planting of *sābi'ī* sorghum and cowpea (*dijra*) in the Tihāma.
5 Chickpeas (*ḥimmiṣ*) planted along with sorghum and plucked after three months.
7 Abundance of lemons.
8 *Qiyāḍ* harvest of of broad beans (*fūl*) and safflower (*'usfur*) in eastern Yemen (al-Mashriq).

9 *Qiyāḍ* harvest of barley in Janadīya and the surrounding districts.

15 In al-Ḥujarīya parching (*jaḥīsh*) begins.

20 Harvest of grains in part of al-Ḥujarīya.

29 Planting of wheat in the Ta'izz district where there are perennial streams (*ghayl*) until late *Tishrīn al-Thānī* (November 28).

November (*Tishrīn al-Thānī*)

2 Harvest of grains and *gharb* sorghum begins in al-Ḥujarīya.

7 Violets (*banafsaj*) planted.

14 In Ibb "the bull does not enter [the fields] under *thawr* (a star in Taurus)."

15 Barley harvest, lasting half a month in the mountains.

21 Mists (*ghaym*) are frequent.

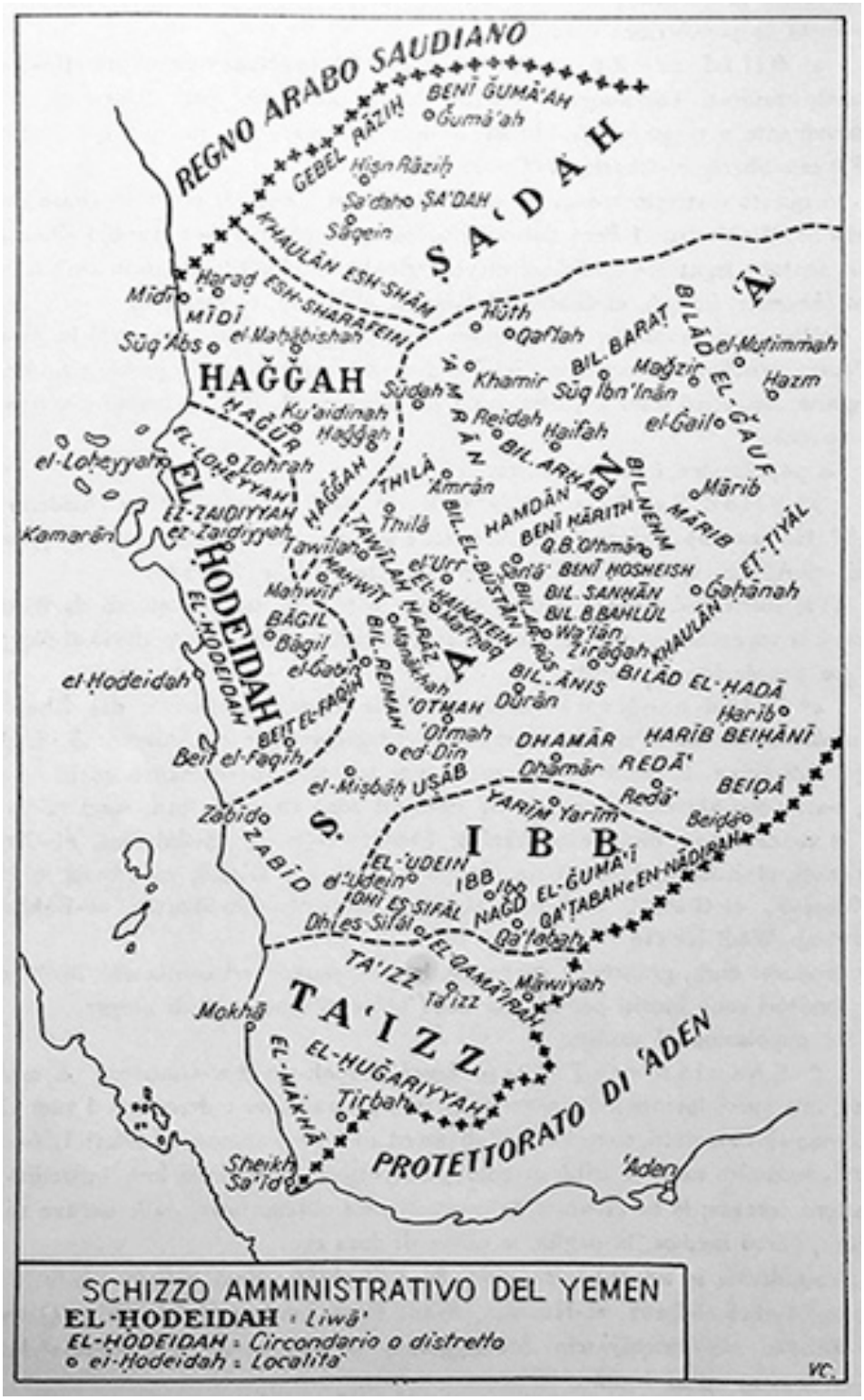
December (*Kānūn al-Awwal*)

7 *Qiyāḍ* harvest of wheat after the sorghum.

16 Grain is planted in part of the Tihāma.

25 Tree leaves fall.

6. Nello Lambardi. Divisioni Amministrative del Yemen con Notizie Economiche e Demografiche. *Oriente Moderno* 27(7/9): 143-162, 1947[114]



Administrative map of Yemen for 1940-44 (Lambardi 1947: 145)

[114] A later article by Pietravalle (1952) also provides information on Yemeni agriculture, but this appears to mainly be taken from Lambardi's work.

Drawing on statistics provided by the government of Yemen and personal reconnaissance, the Italian Nello Lambardi published an annotated list of the administrative districts of Yemen for the years 1940-1944. At the time the kingdom was divided into six provinces (*alwiya/liwā'*, sg.). These were Ṣan'ā', Ibb, Ta'izz, al-Ḥudayda, Ḥajja and Ṣa'da, the latter also known as al-Shām and al-Qibla. Each province was divided into a major district (*qaḍā'/qaḍawāt*, pl.) and then another district known as *nāḥiya* (*nawāḥī*, pl.). This was in turn made up of a variety of smaller units, such as the tribe (*qabīla/qabā'il*, pl.), *'uzla* (*'uzal*, pl.), *qism* (*aqsām*, pl.), *mikhlāf* (*makhālīf*, pl.), *ḥabl* (*ḥibāl*, pl.), *khums* (*akhmās*, pl.); and *thumn* (*athmān*, pl.). It is important to note that in this system the largest province was Ṣan'ā', stretching south to Dhamār, east to Bayḍā' and Ma'rib and north to Ḥūth and including Zabīd in the Tihāma. The article provides information on agricultural products for each area, as well as three charts documenting the *zakāt* tax, customs duties and *jizya* tax on Jews.

The following translation provides the information on agriculture, as delineated by Lambardi for the kingdom.

Translation:

I. Ṣan'ā' Province

Ṣan'ā' was the seat of government for the Imam. Western observers estimated a population of 30,000 for the city, but the Yemeni publication *'Ilm al-buldān* from 1360/1941 indicated 50,000 from the official register (*al-muḥāsaba al-'āmma*), rising to 80,000 including Bi'r al-'Azab, Qā' al-Yahūd and the nearby localities of 'Aṣur and Bayt Mi'yād. The province as a whole was said to have a population of 394,906.

I.1 Bilād al-Bustān (*nāḥiya*): population 32,634, divided into 10 units. The main crops are coffee and *qāt*. The *Maṭarī* coffee variety is considered the best; *qāt* is grown to the south; cereals in the north with sorghum in the colder areas; other crops are wheat and barley, legumes and fruit in Ḥadda.

I.2 Bilād al-Rūs and Banī Bahlūl (*nāḥiya*): population 9,540, divided into 4 units.

Crops: wheat and barley, sorghum, legumes, vegetables, *qāt*, a little fruit and tamarisk groves. Bilād al-Rūs has poor fields of volcanic soil and Banī Bahlūl, with a scarcity of water, is poor.

I.3. Bilād Sanḥān (*nāhiya*): population 10,484, divided into 5 units.

Crops: cereals, legumes, vegetables, grapes, *qāt*, several kinds of fruit trees. Because of the scarcity of natural vegetation, many fields are not cultivated due to neglect and the shortage of rain.

I.4 Bilād al-Ḥadā (*nāḥiya*): population 18,074, divided into 16 units with some Bedouin nomads.

Crops: sorghum, maize, wheat and barley, legumes, mustard, fenugreek, etc. Most of the area is uncultivated due to neglect by the inhabitants and the scarcity of rain.

I.5 Khawlān al-Ṭiyāl (*nāḥiya*): population 12,160, divided into 6 tribes. The Imam exempted the tribes here from paying the *zakāt* tax on vegetables, medical herbs, straw, sorghum stalks, etc.

Crops: Due to the scarcity of rain, the cultivation is limited to cereals and legumes.

I.6 Banī Ḥushaysh (*nāḥiya*): population 9,353, divided into 8 units.

Crops: fruits, figs, vegetables, watermelons, *qāt*, sorghum, wheat and barley. This is a fertile area (especially Wādī al-Sirr, Wādī Rijām, Wādī Sa'wān and al-Rawna).

I.7 Banī al-Ḥārith (*nāḥiya*): population 16,474, divided into eight units.

Crops: rich area with grapes, fruits, *qāt*, vegetables, cereal grains, legumes, sorghum and lush tamarisk[115] groves.

I.8 Hamdān ibn Zayd (*nāḥiya*): population 38,393, divided into 4 units.

Crops: *qāt*, fruits, vegetables, cereal grains in discrete quantities.

I.9 Bilād Arḥab (*nāḥiya*): population 16,092, divided into six units.

Crops: cereal grains, legumes and grapes in Mirrān, but there is a scarcity of rain and springs.

I.10. Nihm (*nāḥiya*): population 5,657, divided into 6 units.

Crops: sorghum, other cereal grains, legumes, a little *qāt*, grapes and fruits.

I.11 Ma'rib (*nāḥiya*): population 15,490, divided into 4 units. The inhabitants are said to be fierce and bellicose Bedouins.

Crops: There is a scarcity of rain and springs and only a small amount of cultivation limited to cereals.[116]

I.12 Ḥarīb Bayḥānī (*nāḥiya*): population 11,320, under the influence of the English with some Bedouin nomads and rock salt merchants.

Crops: sorghum and cereal grains with abundant livestock.

I.13 Jawf (*nāḥiya*): population 10,768, divided into 8 units. The inhabitants are a mixture of sedentary farmers and Bedouin nomads. The tribes are said to be fierce and bellicose.

Crops: sorghum, cereal grains of excellent quality, barley, excellent oil seeds, etc. and an abundance of livestock.

I.15 Baraṭ (*nāḥiya*): population 4,297, divided into 4 units.

Crops: Similar to the Jawf with limited agriculture and scarcity of water.

I.15 'Amrān (*qaḍā'*): population 235,558, divided into 14 districts.

Crops: sorghum, cereal grains (especially the famous wheat *al-bawnī*), legumes, coffee (especially in Wādī 'Usmān), vegetables, *qāt,* various fruits (e.g., figs and apricots), some grapes, many bananas, mustard, cotton and tobacco (in Wādī Shuwāba).

I.16 Thulā' (*nāḥiya*): population 14,373, divided into four parts.

Crops: Similar to those in 'Amrān, but particularly mustard, from which oil is extracted.

I. 17 al-Ṭawīla (*qaḍā'*): population 85,500, divided into seven districts.

Crops: This is an agricultural area, especially Wādī al-Ahjur, producing sorghum cereal grains, emmer wheat, barley, maize, lentils and other legumes, coffee and a variety of fruit trees.

I.18 al-Maḥwīt (*qaḍā'*): population 93,540, divided into seven units.

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[115] Tamarisk wood was used for plow beams and its brush was used to construct temporary barrages to divert flood water (Naval Intelligence Division 1946: 590).

[116] In 1927 al-'Aẓm (1986: 381) observed sorghum, barley, wheat and sesame (*juljulān*) growing on flood land near Ma'rib, and provides a detailed description of the former dam site in his travel account. He also saw a small garden planted by the soldiers there with chili pepper, radish (*qushmī* or *fijl*) and basil (*rayḥān*), noting that all were very tall.

Crops: The area between the mountain slope and valley floor is well equipped with springs and rainwater that allows for varied and productive cultivation. There is a wealth of sorghum and its varieties. Coffee is cultivated around al-Maḥwīt and Wādī Yusr, along with *qāt.* The crops include a variety of cereal grains, maize, millet, barley, fenugreek, various legumes, vegetables, a type of beet root (barbabietola in Italian) that is particularly sweet, good sesame and a variety of fruits, such as apricots, pomegranates, mangos, papayas, bananas, etc. There is also an abundance of livestock.

I.19 al-Ḥayma (*qaḍā'*): population 28,842, divided into al-Ḥayma al-dākhilīya with 8 units and al-Ḥayma al-khārijīya (with 4 units).

Crops: coffee, sorghum, maize, wheat, barley, millet, mustard, fenugreek, *qāt*, bananas, mangos, vegetables, tamarind. Lumber is taken from the *ṭanūb* tree.[117]

I.20 Ḥarāz (*qaḍā'*): population 120,878, divided into 13 districts.

Crops: The major cultivation is coffee, but there are also other crops and many fruits and natural trees due to the abundance of water.

I.21 Bilād Ānis (*qaḍā'*): population 57,800, divided into six units.

Crops: citrus fruits in Ḥammām ʻAlī; in the regular rainfall areas and important wadis of Rimaʻ, Jarāra, Ānis and Sihām there is an abundance of cereals and legumes, wheat, barley, millet, lentils, fava beans, broad beans [fagioli in Italian), fenugreek, especially yellow sorghum, most of Yemen's cotton, coffee, *qāt*, as well as excellent honey. There is an abundance of livestock and natural trees.

I.22 Rayma (*qaḍā'*): population 154,080, divided into four districts.

Crops: This zone is very mountainous with numerous small wadis and excellent cultivation, especially of sorghum and coffee, as well as other cereals and legumes. In addition to the livestock, the wild animals are leopards, ocelots, ibex and gazelles.

I.23 ʻUtma (*nāḥiya*): population 49,960, divided into 6 units.

Crops: This area is well supplied with springs and rain, producing cereal grains, coffee, *qāt*, honey, etc.

I.24 Dhamār (*qaḍā'*): population 56,721, divided into al-Maghrib al-ʻĀlī with 2 units and al-Maghrib al-Sāfil with 9 units.

Crops: sorghum, cereal grains, legumes, etc.

I.25 Radāʻ (*qaḍā'*): population 39,590, divided into seven units.

Crops: Despite the desert parts, this has vast areas cultivated in cereals, legumes, maize, sorghum, fruit trees, grapes, etc.

I.26 al-Bayḍā' (*qaḍā'*): population 49,816, divided into three districts.

Crops: the normal crops, such as cereal grains, legumes, certain fruits and a few grapes.

I. 27 ʻUṣāb (*qaḍā'*): population 56, 915, divided into 11 units.

Crops: cereal grains, legumes, coffee, *qāt*, etc.

I.28 Zabīd (*qaḍā'*): population 131,890, divided into 5 units.

[117] Al-ʻAẓm (1986: 79) lists the crops grown in al-Ḥayma as sorghum, lentils, barley and wheat with coffee, *qāt*, banana and mango grown in Wādīs to the north. The *ṭanūb* tree is *Cordia abyssinica.*

Crops: Along the coast there is little cultivated land, but inland is well cultivated, including cotton, palms and cereal crops.

II. Ibb Province

The population of the province was 422,115.

II.1 Ibb (*qaḍā'*): population 107,458, divided into six principal units.

Crops: This is the richest agricultural area of the province, which produces sorghum, maize, cereal grains, *qāt,* coffee, tobacco, fruits and vegetables. Local vegetation is abundant, as are the livestock.

II.2 Yarīm (*qaḍā'*): population 87,472, divided into two districts.

Crops: wheat and barley, sorghum, legumes, mustard, vegetables, fruits, as well as numerous beehives and livestock.

II.3. al-Nādira and Qa'ṭaba (*qaḍā'*): population 62,379, divided into two districts.

Crops: wheat and barley, legumes, *qāt* in abundance and exported, fruits and citrus, as well as honey. This mountainous area has numerous perennial watercourses, especially in Wādī Banā and Wādī Tubbān.

II.4 Najd al-Jumā'ī (*nāḥiya*): population 17,148, divided into 5 units.

Crops: The same crops and conditions as in al-Nādira and Qa'taba.

II.5 Dhī al-Sifāl (*nāḥiya*): population 27,895, divided into 8 units.

Crops: wheat and barley, sorghum, maize, fenugreek, coffee, *qāt*, fruits. There are numerous sheep and cows.

II.6. al-'Udayn (*qaḍā'*): population 119,763, divided into two districts.

Crops: coffee, *qāt*, wheat and barley, legumes, vegetables, mangos, bananas, and there is said to be sugar cane (*qand*).

III. Ta'izz Province

The population of the province was 605,964.

III.1 Ta'izz (*qaḍā'*): population 272,445, divided into 4 districts.

Crops: Due to the springs and rainfall, this is a good area for production of cereals, legumes, vegetables, bananas and fruits. So much *qāt* is cultivated that it is exported; both *qāt* and coffee are grown in Misrākh. There is an abundance of livestock.

III.2 al-Qamā'ira (*qaḍā'*): population 73,631, divided into 5 units.

Crops: Agriculture is well maintained and it is rich in livestock, especially the donkey variety of *sawraqīya.*

III.3 al-Ḥujarīya (*qaḍā'*): population 192,392, divided into 12 units.

Crops: Agriculture is similar to that of al-Qamā'ira.

III.4 al-Makhā (*qaḍā'*): population 67,496, divided into 5 areas.

Crops: This is a vast area with date palms along the coast and in the interior there are cereal crops, legumes, *qāt* and coffee.

IV. al-Ḥudayda Province

The population is 654,039.

IV.1 al-Ḥudayda (*qaḍā'*): population 238,867, divided into 5 units.

Crops: This dry and hot area is rather poor for agriculture, but the fertile and higher area of Bura‘ produces sesame, *qāt* and coffee.

IV.2 Bayt al-Faqīh (*qaḍā’*): population 138,617, consisting of the Zarānīq tribe, known for their fierceness and trouble making and working on land and the sea as well as in piracy.

Crops: cereals, sorghum, sesame, some vegetables, dates and cotton.

IV.3 Bājil (*qaḍā’*): population 106,379, divided into 5 units.

Crops: The area of Wādī Bājil and Wādī Sihām is cultivated with sorghum, but in an unhealthy climate. The other crops are similar to those in nearby districts.

IV.4 al-Zaydīya (*qaḍā’*): population 96,720, divided into 5 units.

Crops: sorghum, the very poor variety of *gharb* sorghum, millet, maize, sesame, dates, vegetables, grains, barley, *qāt*, coffee and fruits.

IV.5 al-Luḥayya (*qaḍā’*): population 73,456.

Crops: The district along Wādī Mawr and Wādī Sulṭān has abundant perennial water, producing sorghum, *gharb* sorghum, millet, maize, sesame, cotton, dates, etc.

V. Ḥajja Province

The population is 553,107.

V.1 Ḥajja (*qaḍā’*): population 210,404, divided into 10 units.

Crops: sorghum, *gharb* sorghum, millet, wheat, emmer wheat, legumes and all the plants appropriate to the highlands, as well as some fruits and extensive cultivation of coffee and *qāt.*

V.2 al-Sharafayn (*qaḍā’*): population 89,912, divided into 9 units.

Crops: The agriculture is similar to that of Ḥajja, in addition to some grapes. There is an abundance of livestock.

V.3 Ḥajūr (*qaḍā’*): population 27,038, divided into 3 units.

Crops: This is similar to Ḥajja and al-Sharafayn, with an abundance of springs and rain.

V.4 Mīdī (*qaḍā’*): population 225,753, divided into three main areas: Mīdī on the coast, Ḥaraḍ in the interior and ‘Abs to the south.

Crops: Because of the meager rain and the hot climate, especially along the coast, the cultivation is limited to sorghum, millet and *gharb.*

VI. Ṣa‘da Province

The population is 439,356.

VI.1 Ṣa‘da and Sinnāra (*qaḍā’*): population 138,427, divided into 6 units.

Crops: cereals, legumes, fruits, grapes. The area is rich in livestock.

VI.2 Sāqayn (*nāḥiya*): population 119,695.

Crops: This is a mountainous zone with abundant honey.

VI.3 Jabal Rāziḥ (*nāḥiya*): population 89,913, divided into 5 units.

Crops: abundance of *qāt* and coffee.

VI.4 Jumā‘a (*nāḥiya*): population 91,321.

7. FAO. *Report of the FAO Mission to Yemen.* Rome: FAO, 1960

In the last three months of 1955 an FAO mission visited the Mutawakkilite Kingdom of Yemen "to make a general survey of the food and agriculture resources of the country and of the problems involved in the development of those resources" and to propose recommendations for agricultural development.[118] The report, consisting of 99 pages, was divided into the following sections: I: The People and the Environment; II: The Agriculture of Yemen; III: Marketing and Foreign Trade; IV: Nutrition; V: Development and Improvement of Agricultural Production, and Food Distribution and Consumption; VI: Summary and Main Recommendations. The team was led by Dr. A. W. R. Joachin, a general agriculturalist, and included an agricultural economist and marketing expert, irrigation and drainage engineer, veterinarian and animal production expert, forestry expert, horticulturalist, and expert in rice production. Joining the team was an interpreter and the FAO locust control expert. A coffee expert and fisheries specialist had visited Yemen for FAO earlier. I summarize below the major information provided in the report on Yemen's agriculture at the time.

The information in the FAO report, while valuable for its time, suffers from several factors. First, the team was only permitted to visit the Tihāma and the central highlands between Ṣan'ā' and Ta'izz with a brief trip to Ma'rib. They also did not observe the entire annual cycle of cultivation. Some of their conclusions reflect this lack of exposure to the kingdom as a whole. For example, it is reported that animal manure is rarely applied to crops, because there is so little of it. This really depends on the region; such manure is also more likely to be applied where there are wells or springs. The experts reflect the bias of the time in promoting "modern" methods and assuming that many past practices were too primitive. While the team was clearly impressed by the capabilities of Yemeni farmers, they found out very little about traditional methods other than what they saw in their brief observations. The claim that there is a complete absence of pest and disease control is not accurate.[119]

In 1955 the FAO mission concluded that only about 2% of the area of the country was cultivated. They reported little use of wells in the Tihāma, which relied heavily on the floods that descended in the *wadis* from the highlands. Coffee was said to be the characteristic crop of the foothills and middle heights, along with sorghum, wheat, pulses, lucerne, citrus, papayas, pomegranates, bananas, tomatoes, onions, okra and horse-radish. The report focuses on irrigation in the highlands, reporting wheat, barley, sorghum, grapes, figs, pears, walnuts, plums, coffee, lucerne, potatoes, okra, onions and tomatoes. Regarding the terraces, the report states that they are "exceptionally well built and, in general, very well maintained."

Summarising the state of agriculture in Yemen, the report notes:[120]

> "On the whole, the country is largely self-sufficient as regards its food supply. Large potential resources for agricultural production are untapped, though there is striking evidence of the existence, in years gone by, of an advanced agricultural system

[118] FAO (1960: 1). All the information in this section is taken from the FAO report, which was a mission report and unpublished.
[119] See Varisco (1995) for details on traditional plant protection in Yemen.
[120] FAO (1960: 13).

> which even the ravages of centuries have not been able to eradicate. This is exemplified in the skill displayed by most Yemeni farmers in the feeding and rearing of livestock, and, even more so, by the contour terraces for soil and water conservation on some of the mountain slopes and by the earth banks erected to retain flood water and silt in the plains. Yemen is probably one of the best terraced countries in the world; thanks to these terraces, agriculture has been developed and maintained in the generally friable volcanic soils. their stone retaining walls – in some places they are over 3.5 meters high – are indeed a tribute to the enterprise and energy of a people with a fine tradition of, and aptitude for, agriculture. Even today they display this aptitude to a remarkable degree."

In terms of land tenure, this differed according to the ecological zone. Larger holdings with mainly absentee ownership predominated in the Tihāma and in parts of the middle heights. In the mountains, however, the land holdings were small and usually owned by the farmer, except near the larger cities and towns. The team was told that more than 90% of farmers owned the land they cultivated. Tenancy shares depended on the type of crop and the availability of water for irrigation. The shares of the tenant, they write, "after the deduction of taxes, are, at most, 25-30 percent of the produce of the trees and from 40 to 70 percent of the grains." In the Ṣan'ā' area, for example, the share on rainfed land was 45 percent for grains and 30 percent for trees; on *ghayl* or flood irrigation for grains the share was 45 percent if the water source was owned by the landlord and 60 percent if the source was communal, but 30 percent for tree crops. For well irrigation the share was said to be 70 percent.

The authors thought that water resources were "generally adequate" except for the dry eastern area. They note that most of the channels used for irrigation of flood water in the Tihāma are "very defective" and lose much water through seepage and negligence by the irrigators. However, the diversion method is said to be "very efficient" due to the high-moisture retaining capacity of the soils. As a result they recommend that the existing system not be discarded but improved by adding better control works. Wells were common in the highlands where the groundwater was accessible. The average depth in Ṣan'ā' was 20 meters, 10 meters in Ma'bar and 5-10 meters at Yarīm. Their observations led the team to conclude that generally "cultivators make good use of the water available." Floods in the wadis are described as "relatively short and torrential," with flood peaks at times exceeding 1,000 cubic meters per second. Recognising that sufficient hydrologic data was not yet available, the report suggests that the total annual rainfall would be roughly 10 billion cubic meters (based on annual rainfall of 500 millimeters for 20,000 square kilometers catchment on the western slope), resulting in about 2 billion cubic meters per year in annual runoff.

As might be expected, the FAO team regarded the tools of the farmers as "extremely rudimentary implements." Despite this, it is noted that furrows and ridges made with their tools "are almost perfectly executed." They discussed the local agricultural methods as follows:

> "To prepare the soil, the land is plowed with primitive wooden plows… in which an iron-capped spike is driven simply forward, but there is no curved plow-share to turn the soil. Sometimes the soil is laboriously turned by a team of three men who follow

the plow with a heavy shovel; and one wields the handle, while the other two men hold cords attached to the blade. Sometimes women follow the plowman and break the clods with wooden mattocks. No harrow is used, but wooden levellers with an iron border are employed to complete the work after the plow. They are dragged by oxen or other beasts, and the driver stands on the boards.

In the vineyards the soil is trenched with long-bladed mattocks, in which the curved blade or iron spike is nearly at a right-angle to the handle. This kind of hand hoe, called 'fas' or 'mafras'... is practically the only implement widely used for tilling, digging or hoeing the soil by hand. Shears, saws and pruning tools are practically unknown by the farmers for use in orchards.

There are no harvesters or threshers. Wheat and barley are reaped by men, boys and girls, who grasp handfuls of the stems and saw through them with a sickle, or some-times those crops are torn up by the roots. Threshing is done with flails or by cattle treading the sheaves of grain spread on the ground. Sometimes a heavy rectangular stone is drawn by a pair of bullocks over the grain to thresh it."

There was a general lack of tractors, apart from those the team observed at the Jarouba Estate Farm in the Tihāma.

The report provides details on the crops grown in Yemen. These can be summarised as follows:

Sorghum: *Sorghum* sp. was the dominant crop, estimated to be grown on 200,000 ha between sea level and 3,000 meters. This crop was cultivated on both irrigated and rainfed land for its food and fodder values. Some ratooning was possible if the water was sufficient and sometimes it was interplanted with pulses. The average yield for Yemen was estimated at 1.5 metric tons per ha. In good years some would be exported to nearby countries.

Bulrush millet: *Pennisetum* sp. was said to be the second most common cereal in Yemen, mostly on more marginal land in the Tihāma and lowland areas. One advantage was that little attention needed to be paid to it once planted. It was also important in dry years.

Wheat and barley: Spring and winter varieties are cultivated mainly in the highland plateaux of Ṣan'ā', Ma'bar, Dhamār and Yarīm. Yields were said to be poor with rust and other diseases common.

Maize: This was said to be cultivated mainly in the lowlands and middle altitudes, especially where it could be irrigated. Yields were reported to be reasonably good.

Rice: Rice was considered an unimportant crop in Yemen, perhaps no more than 100 ha being cultivated in Yemen.[121] In 1953 some 387 tons of rice were imported into Yemen. The team observed that in the area of al-Ḥūth, north of Ṣan'ā', rice was grown on a maximum of four ha at 1,000 meters, but often less due to the lack of sufficient water. In another area, on land belonging to a son of the Imam, American rice seed had been introduced some three years before, but it was poorly planted.

[121] Forbes (1923: 275) saw rice growing in the 'Asīr region. Qāḍī Muḥammad al-Akwa' (1979: 106), reflecting on the early part of Yaḥyā's rule, noted that in Yarīm there were those so ignorant of rice they thought it was worms.

Pulses: These included broad bean (*Vicia faba*), lablab (*Dolichos lablab*), fenugreek (*Trigonella foenum-graecum*), lentils (*Lens seculentis*), green gram (*Phaseolus aureus*), cowpeas (*Vigna sinensis*), moth bean (*Phaseolus acontifolius*), and groundnuts.

Sesame: *Sesamun indicum* is indicated as the second major crop in the Tihāma, where it is cultivated mainly under irrigation, but also on rainfed land. It was frequently grown in association with sorghum in flood irrigated areas. The team noted a bad infestation in some areas of the termite *Cryptotermes* sp.

Coffee: Coffee was said to be the main export item of the kingdom, annually about 4,000-5,000 tons.[122] In 1954 almost 2,000 metric tons of coffee were shipped to the United States of America, 666 metric tons to Aden and 1,000 metric tons to Saudi Arabia and the Gulf. Three special features were noted of coffee in Yemen: it was generally grown under irrigation,[123] largely free from pests and diseases, and the bean was rarely consumed in Yemen. The main varieties listed in the report are: Yamānī (grown in al-'Udayn and Waṣāb), *sharqī* (grown in Ānis and 'Utma), Raymī (grown in Rayma), Bur'ī (grown in Jabal Bura'), Ṣan'ānī (grown in Ḥayma and Ḥarāz), Maṭarī (grown in Banī Maṭar) and Shāmī (grown in Ḥajja, Milḥān, Kuḥlān, Ḥufāsh, al-Maḥābisha). The coffee husk (*qishr*) was used to make a drink while the beans were exported. About 6,000 ha, between 1,200 to 2,100 meters elevation, were said to be cultivated with coffee. Shade was almost universal for coffee, especially from species of *Cordia* and *Ficus*. No annual pruning was observed, but some manure and ashes were applied. There can be damage from locusts. It was noted that coffee production had decreased, attributed by some to an increase in cultivation of *qāt.*

Cotton: The team notes that the commercial scale of cotton for cultivation in Wadis Zabīd, Rima' and Mawr is a recent development, although cotton has traditionally been grown. The variety cultivated was the "stapled Sakal type Sudan 1730" with an increase of 80 ha in 1951 to 1200 ha in 1954. The kingdom subsidised a private organisation to operate the scheme and determine pricing for the ginnery in al-Ḥudayda.

Tobacco: This was cultivated with irrigation in the lowlands and the highland plateau during summer. The variety cultivated was *tunbāk* for use in the waterpipe (*madā'a*). Profits were high due to a hefty duty on imported tobacco of the same type.

Horticulture: Horticulture was said to be of limited importance due to the almost total lack of marketing facilities for perishable produce.

Fruit Culture: The main fruits mentioned for the Tihāma (from sea level to about 200 meters elevation) are the date palm, banana and papaya. In the foothills and middle heights (200 to 1,500 meters elevation) there was a wide variety of species, including citrus, pomegranates, papaya and banana. Temperate fruit species grown in the highlands included grapes and deciduous varieties such as figs, pears, peaches, apricots, apples, quinces, walnuts and stone fruits (except cherries). It was argued that all orchards are irrigated and generally have several species planted together.

[122] At this time Yemen's export of coffee was only 0.2 percent of the world trade.

[123] The team seems unaware that the mists rising up into the Western escarpment allowed coffee production on rainfed land.

Planting trees to close to each other and lack of pruning limit yields. No manure was reported to be used, nor pest control.

Date Palm: *Phoenix dactylifera* is grown primarily in the coastal part of the southern Tihāma and higher parts of the wadi valleys, often in association with the *dūm* palm (*Hyphaene thebaica*). The team was unable to give a figure for the total area cultivated with date palms, but noted that the areas visited contained between 200,000 and 250,000 trees. Specific areas mentioned for date palms included about 500 ha south of al-Khawkha, where it is said that some families have four or five trees, and some have 6,000, all irrigated from wells. Wild bushes were noted to be growing between the palms with no major diseases or pests reported. Other areas include Jarūba at 20 kilometers southwest of Bayt al-Faqīh, Murzay'a some 20 kilometers northeast of al-Ḥudayda, 'Unkufa at 5 kilometers south of al-Zuhra, and near 'Ubāl, Zabīd, Ḥays and Mocha. Plantations were noted at Wādī Barah 60 kilometers east of Mocha, and one of 20,000 trees reported midway between Ta'izz and Ḥays. The main varieties mentioned include *munāṣif*, which is half soft and half hard, *lubān*, a small blackish-red date, "Tubayki" a yellow and dry fruit, 'Uraykī (hard and dry red fruit), *al-khuḍārī* (green fruit 10 cm in length), "Khondari, Mechtoum and Magini."

Citrus: These were generally recent, with some 20,000 seedlings introduced during the previous few years. They were planted in Ḥammām 'Alī ten years before, near Ta'izz some six years before, Ibb and in the Tihāma at Jarūba and Dār al-Nāja. The best results were reported above 1,500 meters. The specific varieties included sweet oranges, tangerines, sour and sweet lemons, limes and citrons. No pruning or pest control was observed, but diseases and pests were noted.

Banana and pawpaw (i.e., papaya): These local varieties are said to be very common in the Tihāma, especially at Jarūba and al-Khawkha, the foothills east of Zabīd, the wadi valleys, and in the regions of Ta'izz, Ibb and Ḥammām 'Alī.

Mango, Guava, Custard Apples: These were not widespread and only a few isolated trees were observed in Ta'izz and parts of the Tihāma.

Pomegranates: Both sweet and sour varieties are widespread throughout Yemen, especially in Ta'izz, Ṣan'ā' ("Soyani and Bovari" varieties), Ibb and Yarīm (two sweet varieties being "Malaesi and Hosrumi"). There is the worm *Virachola livia* as well as splitting of the fruit.

Stone fruits: For the central plateau area between 1,400 and 2,300 meters of Ṣan'ā', Ibb, Yarīm, Ma'bar, Dhamār and Ta'izz the common trees are apricots, peaches, plums and almonds. Yemeni apricots were reported as "fruit of very good quality, juicy, very sweet and perfumed." Several pests and fungus diseases were noted.

Pears and Quinces: A few isolated pear trees of 10 to 12 meters high and 100 to 200 years old were observed in the central plateau areas of Ṣan'ā', Ibb and Yarīm.

Apples: Only a small number of trees in the central plateau were observed, but some American varieties had recently been imported. Pests included scale insects, aphids and borers.

Figs: Figs were widespread in the mountain areas and only eaten fresh.

Grapes: About 40 varieties of grapes are grown, especially in the Ṣan'ā' area, but also in Dhamār, Ibb, Ta'izz and Ṣa'da. The most important are *rāziqī* (small, white, seedless), *'āṣimī* (large

greenish-yellow with pink side, very pulpy and sweet), *ʻīrqī* (white seeded and the latest to mature), as well as black varieties. Grape production is described as follows:

> "The vine plants are generally trained in trellises supported by stone pillars about 1 to 1.5 meters high. Distance between plants is generally 2.5 x 2.5 meters. Propagation is done by layering, and grafting was soon. Pruning is general, but too much dead wood is kept. Irrigation is practised during the growing season. Powder mildew (*Uncinila necator*) was the only disease noted, and generally growers control this disease by sprinkling a special earth. They claim, however, that sulphur flour is more effective. The grapes are ripe from June to October but the atmosphere is so dry in the Ṣanʻā' area that grapes are preserved in good condition on the plants until November and sold in the markets of Taʻiz, San'a and Hodeida even in December and January.
>
> The grapes are packed in wooden boxes containing about 18 kilos each. The sale price in San'a was about 2 rials ($1.60) for a box, while in Ta'iz at the same time the price was very much higher because of the cost of transportation (10 rials or $8.00 per box).
>
> There is a rather important dried-grape industry in the San'a district (Raudha and Dahr). Raisins and currents of this region are very widely sold in the markets of Ta'iz, San'a and Hodeida. During the last few years the exportation of grapes has reached the level of 300 metric tons per year."

Walnuts: Healthy plantations were observed in Ḥadda with trees reaching 15 to 20 meters in height. Smaller plantations were noted for ʻAṣur, Wādi Ẓahr, Rawḍa and Yarīm.

Olives: These were reported to be "practically unknown" in Yemen, apart from a plantation of the Imam in ʻUṣayfira near Taʻizz which had not yielded fruit in six years and one in Ṣanʻā' which had not borne fruit in 15 years.

Other species: Of secondary value were prickly pear (*Opuntia ficus-indica*), wild jujube (*Zizyphus spina christi*) and carob (*Caratonia siliqua*).

Vegetables: Few vegetables are grown in Yemen and they are not much used in meals. Vegetable gardens are primarily in Ṣanʻā' and Taʻizz and their surroundings. In the Tiḥāma they were observed at Rafih (10 kilometers south of al-Zuhra), ʻUnkufa (5 kilometers south of al-Zuhra), Bayt al-Faqīh, ʻAbbāsī 10 kilometers west of Zabīd, al-Khawkha and al-Ḍaḥī.

Potatoes: Yemen appeared to be self-sufficient in production of potatoes. These were produced in areas around Ṣanʻā' and Ibb from local seed, although some new varieties had recently been introduced from Europe.

Other vegetables: The most important other vegetables are okra (*Hibiscus esculentus*), carrots, onions, garlic, tomatoes, watermelons and horse-radish. On a smaller scale there are leeks, red peppers and chillies, sweet potatoes, eggplant, sweet onions, squash, pumpkin, marrow, cucumber, spinach, cabbage, cauliflower, lettuce, celery, artichokes and green rocket (*Eruca sativa*).

Pulses: These include various beans, broad beans, lentils, peas, chickpeas, pigeon peas (*Cajanus cajan*) and small amounts of garden purselane (*Portulaca oleracera*) and Jews' mallow (*Chor-*

chorus olitorius) were cultivated near Ṣan'ā' and parts of the Tihāma such as Bayt al-Faqīh and al-Khawkha. These were also exported annually from al-Ḥūdayda.

Aromatic and seasoning plants: These include dill (*Anothum graveolens*), parsley, thyme, mint and peppermint. Black cummin (*Nigella sativa*) seeds were sprinkled on bread. Sweet basil (*Ocimum basilicum*) is both a kitchen herb and the sprigs are stuck in men's turbans at weddings, etc. or laid among clothes in a chest.

Alfalfa: *Medicago sativa* is the only fodder crop grown in Yemen. The team reports that it is not grown under irrigation around Ṣan'ā', Ma'bar, Dhamār and Yarīm and is sometimes grown between grapevines and in orchards.[124] Four cuts per year are reported under dry farming conditions.

The authors of the FAO report note several challenges to development of agriculture in Yemen. The infrastructure was barely developed with poor road transport, there was a lack of organised marketing and price inducements, control and utilisation of water was not properly controlled, modern methods of agriculture were not known and there was no institution to assist farmers.[125] In addition the team considered the high taxation of produce an impediment to agricultural progress.

[124] Alfalfa or lucerne is also grown under irrigation in the highlands. In the 'Asīr region it is only grown under irrigation (Abdulfattah 1981: 51). It is important to note that sorghum and maize stalks also serve as fodder.

[125] A similar rationale was given by Tarsīsī (1962: 159) for the problems facing agricultural development.

8. Ḥusayn ibn ʻAlī al-Waysī, *al-Yaman al-Kubrā*. Cairo: Maṭbaʻat al-Nahḍa al-ʻArabiyya, 1962

This important geographical survey of Yemen was made shortly before the 1962 revolution that toppled the Mutawakkilite Kingdom and thus provides an overview of the regional distribution of Yemen's agriculture at that time. Al-Waysī's book consists of 298 pages, with numerous black-and-white photographs, maps and charts. A preface was provided by the Egyptian archaeologist Aḥmad al-Fakhrī, who had written about ancient Ma'rib. In his introduction, al-Waysī states that he had been collecting information for this book since 1351/1932. He served as a soldier in various parts of Yemen and made a tour of most of Yemen later by car.

His book begins with a geographic survey (pp. 1-9), including a hand-drawn map of Yemen. He concludes that the area of the Mutawakillite Kingdom was 1,600,000 sq. km. This is followed by a geographical description of southern Yemen (pp. 10-17), at the time under British control, before his lengthy geographic account of the kingdom (pp. 18-125). Information is provided on climate (p. 126), seasons, including a chart of the 28 agricultural marker stars (pp. 126-129), geology (pp. 130-142), and hot springs (pp. 142-147). A section on Yemen's tribal genealogy (pp. 150-162) includes a large genealogical chart. There is also a glossary of Yemeni place names (pp. 163-198) and a discussion of Yemen's pre-Islamic and Islamic history (pp. 199-282), including a list of rulers throughout Yemen's history.

Translation:

Taʻizz Province (*liwāʼ*)

[36] The crops belonging to the fertile agricultural area of Taʻizz are due to the abundance of water in its wadis. Among the most important crops are coffee, sorghum and its varieties, wheat, and barley. Most of the date palms are in Wādī Rasyān in Maqbana and Wādī al-Zirāʻī, like what is found in Wādī al-Akhmūr, al-Mashāwala, al-Mafālīs, al-Zarrayqa, al-Wāziʻiyya min al-Ḥujariyya, and Wādī Marzaʻ and al-Zahāwā in al-Mukhā…

Coffee is one of the economic crops of the province of Taʻizz. It is found in large regions suitable for spreading its cultivation in large quantities, such as in the wadis of al-Masnaḥ, al-Ḥayma, and al-Ḍabāb, the wadis of Taʻizz and the Wadis of al-Ḥujarīya, Khadīr, Warazān and Māwiya. Similarly there are regions suitable for cotton, like the region of ʻUṣayfira, al-Mashāwala, al-Akhmūr, al-Mafālīs, Mawzaʻ, al-Mukhā, al-Ḥakm, al-Ahmūl, and the wadis of Maqbana, Rasyān and al-Zirāʻī. There are wadis that could double cereal grain crops if they used groundwater lifted by pumps, such as the wadis of al-Mashāwala, Banī Khawlān, al-Kalābiya, al-Ḍabāb, Khadīr, and the areas surrounding Taʻizz where there is abundant water to exploit, such as al-Daʻaysa and al-Raʻayna of Sharʻab and al-Sūdān of Māwiya, Wādī al-Qamāʻira and al-Sharmān and the Wadis of al-Hashma, al-Nashma, al-Ḥayma and al-Janad of Taʻizz. Fruits include banana, orange, pomegranate, fig varieties, peach, apricot and watermelon (*ḥabḥab*). Although these are in small quantities, it is possible to double production to provide food for the population.

Vegetables are green beans (*fāṣūliyā*), okra, tomatoes (*ṭamāṭim*), and potatoes (*baṭāṭā*), which are produced so much that they are exported to Aden. There is also a limited production of onions, but this can be developed in many regions for export.

Ibb Province (population 600,000)

[45] The population of Ibb province is supported by agriculture. The most important and abundant crops of the province are cereal grains, coffee, potatoes and *qāt*. The fruits include bananas alongside the variety of fruits previously mentioned for the province of Ta'izz, as is true for what was mentioned about vegetables. Pseudo-saffron (*wars*), from which a dye material is extracted, is cultivated. There is a small amount of sugar cane in the wadis of al-'Udayn. In general the area is more fertile than Ta'izz.

al-Bayḍā' Province (population 150,000)

[47] Ḥarīb is 1,000 m above sea level; pumps for lifting water have been introduced and the residents of Wādī al-Khaṣīb benefit from this… [48] The most famous town is al-Bayḍā'... and it rises 1,800 m above sea level … Fruits of grapes and figs are found in it and there is plentiful underground water. The second most important town is Radā', and it enjoys a temperate climate and they use pumps for raising water resulting in a verdant garden area. Fruits of grapes, figs and pomegranates are plentiful. Its elevation is similar to Ṣan'ā' at 2,100 m above sea level. [50] In Radā', al-Jūba and Ḥarīb most of the residents work in making woolen clothing. The people are supported by agriculture and livestock raising of camels and sheep, from which they take the wool… In al-Bayḍā' there is active commerce because of its strategic location in connecting to Aden. It is a region suitable for cultivation of cotton, wheat, barley and fruits.

Ṣan'ā' Province

[57] Qaḍā' Ānis: present in Wādī al-Ḥamām are many fruits, such as oranges, lemons, bananas and other crops. Bilād Ānis is famous for its coffee, livestock raising and agriculture… Qaḍā' Rayma is the most famous mountain area in Yemen for its fertility… [58] The population of the *qaḍā'* of Rayma reaches 100,000 and it is famous for the cultivation of coffee, cereal grains and the fruits of mangos and bananas. Agriculture is carried out alongside livestock raising… [60] The residents of Ḥarāz equal 50,000 and the energy of the residents is devoted to the cultivation of coffee, cereal grains and livestock raising, except for Manākha, where most of the residents engage in commerce and the external export of coffee through al-Ḥudayda.

[61] The most famous town of the *qaḍā'* of al-Maḥwīt is al-Maḥwīt, whose residents work in commerce, especially trade of tobacco and coffee which are present in Sumi' and Wādī al-Ḥirra in Sāri'. Most of the residents engage in the cultivation of coffee, cereal grains and livestock raising... [65] The population of Kawkabān province is about 50,000 and most are working in agriculture and livestock raising… [66] The population of Thulā' province reaches about 20,000. Its most important cultivation is for the varieties of cereal grains and its fruits are apricots, plums and quince.

[69] The district (*nāḥiya*) of al-Ḥadā is an agricultural region, having wadis which are suitable for the cultivation of coffee, fruits, grapes and figs, as well as planting of cereal grains in their different varieties. Most of the residents work in agriculture and livestock raising… [For

the district of Khawlān al-‘Āliyya or Khawlān al-Ṭiyāl] [70] Wādī Ḥarīb is divided between the tribes of Khawlān and Nihm, and excellent quality coffee is grown there. The most famous of the mountains in Khawlān are Jabal al-Lawz, the mountains of al-Ṭiyāl, Jabal al-Khaḍrā’ and Jabal ‘Aḍiya, which form a chain from east to west, and where there is much cultivation of almonds (*lawz*)… The fruits grown in Khawlān include good quality grapes in Maswar, al-Kibs, Qarwā and al-A‘rūsh just as almonds are plentiful in Jabal al-Lawz, and al-Ṭiyāl of the Banī Jabr. The residents of the region are supported by agriculture and livestock raising…

[71] [For the district of Banī Ḥushaysh and Nihm] there is a large wadi with an abundance of grapes… In this region different varieties of cereal grains are cultivated. The fruits include grapes, pomegranates and figs which are plentiful in al-Sirr, Rijām, al-Rawna, Sa‘wān and Ḥirrat Banī Jurmūz, just as there is cultivation of cucumbers, cereal grains and melons (*biṭṭīkh* and *shammām*)… [73] [For the district of Arḥab] among its wadis is Sha‘b and in Bayt Marrān where there are grapes and figs and its cultivation includes sorghum, wheat and barley… [74] [For the district of Banī al-Ḥārith] its important agriculture is from fruits like grapes, walnuts and almonds, various kinds of vegetables and there is much cultivation of lucerne (*birsīm*). For their agriculture they use water pumps (*al-ālāt al-artuwāziyya*). Bani al-Ḥārith has not ceased to be an agricultural area, all of which is suitable for cultivation due to the abundance of its underground water.

[75] [For the district of Hamdān] its most important wadis are Wādī Ẓahr, Wādī al-Ḍil‘ and Wādī Lu’lū’a. These wadis just mentioned are in the *makhārif* region of Ṣan‘ā’. The term *kharīf* in Yemen stands for the season of autumn, when fruits are plentiful. This is a rain season which dresses the land as though with a silver braid, beginning at 29 *Ḥazīrān* until 26 *Aylūl*. This coincides with the season of summer (*ṣayf*) in the same northern region. Cultivated in it are fruits, grapes, pomegranates, figs, plums [86], quince, peaches, lemons, oranges, alongside the cultivation of various varieties of cereal grains… [78] [For the district of Sanḥān] Wādī Ḥizyaz is rich in groundwater, so that some of the wells reach it in 3 meters. The most famous cultivation is of various varieties of cereal grains, fruits like figs, grapes, pomegranates and apricots, as well as livestock raising.

[79] [For the district of Bilād al-Rūs] the population of the region is about 30,000, most of whom work in agriculture and livestock raising… The center of al-Ḥayma al-Dākhiliyya is al-‘Irr and the center of al-Ḥayma al-Khārijiyya as well as Mafḥaq and al-Khamīs, both being coffee regions… [80] The energy of the residents is directed at the cultivation of cereal grains, coffee and livestock raising. [81] [For the district of ‘Amrān] Wādī Akhraf and ‘Uqmān are famous in the area of Ḥāshid for excellent coffee… [83] Most of the district of ‘Amrān cultivates wheat, barley, sorghum and other cereal grains. The fruits are grapes and figs in al-‘Ayad and Banī Jubar in the sub-district (*nāḥiya*) of Rayda and Dhībīn. Much coffee is cultivated in the sub-district of al-Sūda. [85] [For the district of al-Ḥūth], there is underground water at a depth of 5 or 6 meters, as in the areas of Khabb and al-Jawf. There are areas where water flows on the surface of the ground… [86] The regions of al-Jawf and Sufyān are suitable for cultivation of various kinds, especially date palms, grapes, cotton and tobacco, in addition to wheat, sorghum and barley.

al-Ḥudayda Province

[88] [For the district of Ḥays] there is sweet water along the coast with many date palms and doum trees, from which mats are made… The elevation above sea level of Jabal Rās is 2,000 m and in it coffee and a variety of different cereal crops are planted. The region of Zabīd is one of the coastal regions rich in agriculture. The length of Wādī Zabīd for agriculture is 40 km, as is its width… [89] The wadis of Zabīd are suitable for cultivation of cotton, tobacco, cereal grains and sesame. There is always water in Wādī Zabīd and Wādī Nakhla and there are plans for construction of a stone dam at the top of Wādī Zabīd in the gap of Kubba Ma'ād, which is a small mountain chain. In the district of Zabīd there are areas with many date palms in Nakhla, Zabīd, al-Khawkha, al-Tuḥaytā and other areas. There is also a place west of Zabīd on the coast called al-Fāzza, with sweet water springing up. This is always the case because the constant flow of Wādī Zabīd water disappears underground and reappears here. Much white jasmine (*fill*) is cultivated in Wādī Zabīd. Jasmine is used in the folds of a groom's clothing and in containers within sitting areas to spread around the aroma.

[90] In the district of Bayt al-Faqīh date palms are grown, with an abundance in al-Durayhamī, Wādī al-Najāḥ and Wādī Rimāl, with much cultivation of tobacco in Wādī al-Lāwiya. Cotton is cultivated in Wādī Rima' and al-Ḥusayniyya. Most of the region grows sorghum, millet and sesame… [92] [For the district of al-Ḥudayda] there is a sub-district connected to it at Jabal Bura', which is 60 km east of al-Ḥudayda and its elevation above sea level is 2,400 m. This is an area blessed with the cultivation of coffee, where the coffee tree continually produces... [95] [For the district of Bājil] most of the agriculture in the region is for the cereal crops of sorghum and millet, as well as sesame, and tobacco and cotton are present in it... [98] The region of al-Zaydiyya is in general an agricultural region. In Wādī Surdud cotton and tobacco are cultivated, as are also sesame, sorghum and millet. The most famous tree in al-Zaydiyya is *dawm*,[126] which resembles the date palm and from which mats and baskets are made to preserve the food. These are called *ẓurūf* in the Tihāma, and also made from them are the baskets (*ẓanābīl*) and head coverings which are called *ẓulal* (*ẓulla*, sg.) in the Tihāma… [99] [For the district of al-Luḥayya apart from the southern *sabkha* area] there is one of the most fertile areas with plentiful water that flows through Wādī Mawr, the largest of the coastal wadis. This emerges from the eastern foothills of al-Luḥayya, traveling though agricultural land for 70 km with an area width of 40 m. There is always water in Wādī Mawr, but there is not even a tenth of it in al-Zuhra, where the remaining water disappears under the sand. The underground water is at a depth of 3 m in most of the region… The residents of the region work in cultivation of a new variety of cotton to a great extent, as well as tobacco. The date palms and cultivation of sesame, sorghum and millet do well here.

Ḥajja Province (population 400,000)

[108] The mountain region is rich in the cultivation of coffee, fruits and cereal of various varieties, as well as livestock production. Rice is cultivated in some of the wadis lush with water, such as Aslam and Ḥajūr, with tobacco and date palms planted in the lower wadis. This is the

[126] This is the doum palm or *Hyphaene thebaica.*

case for the mountainous area in the province of Ḥajja. In all of Ahnūm, Sharaf and Washḥa there are fruits of grapes, figs and pomegranates… [110] A branch of Wādī Ḥaraḍ irrigates the lands of al-Muwassam, which is located on the border between Mīdī and Jīzān, a region suitable for cultivation of cotton, tobacco, date palms and the cereal grains of sorghum, millet and sesame.

Ṣa‘da Province (population 20,000)

[116] The residents work in agriculture and livestock raising. Coffee is found in Khawlān ibn ‘Āmr, Rāziḥ, and the mountains of Western Jumā‘a. Grapes and fruits such as figs, pomegranates, peaches and apricots are found in the region of Hamdān ibn Zayd, Saḥār and Jumā‘a.

‘Asīr and Najrān Province

The most important crops of Najrān are dates and various varieties of cereal grains. The excellent quality dates are sent to Ṣa‘da and Ṣan‘ā’.

Overview of Agriculture in Mutawakkilite Yemen:

On the eve of the 1962 revolution that signaled the end of the Zaydī imamate in Yemen, a wide variety of crops was cultivated (Appendix A). Up to this time, apart from occasional poor harvest years that caused famine, Yemen was basically self-sufficient in food. Given the lack of modern health care and endemic poverty in many areas, the population was relatively stable throughout the period of the Mutawakkilite Kingdom. Both imams Yaḥyā and Aḥmad limited foreign travel and intervention in Yemen, so the economic system remained stagnant with limited trade. The currency in Yemen was based mainly on the silver Maria Theresa thaler, known as the *riyāl*, which weighed about 28 grams. In 1955 it was worth 80 U.S. cents.[127] The *riyāl* was divided into smaller units, each known as a *buqsha*. The units of 2 *buqsha* and above were in silver and the ones below were copper. Weights and measures relating to agriculture varied in Yemen, depending on the time and location (Table 1).

term	weight	location	source
ūqiyya	28 gr		FAO (1960: v)
ūqiyya	ca. 33 gr	Ṣan‘ā’	Rossi (1939: 152)
qafla/qifāl, pl.	for precious items	Ṣan‘ā’	Rossi (1939: 152)
raṭl/arṭāl, pl.	small = 17 *ūqiyya* or ca. 566 gr; used for coffee, sugar, rice, dates, drugs	Ṣan‘ā’	Rossi (1939: 152)
raṭl/arṭāl, pl.	medium = 20 *ūqiyya* or ca. 666 gr; used for meat and vegetables	Ṣan‘ā’	Rossi (1939: 152)
raṭl/arṭāl, pl.	large = 24 *ūqiyya* pr ca. 799 gr; used for fruit, oil, butter, honey, petrol	Ṣan‘ā’	Rossi (1939: 152)
raṭl	560 gr (20 *ūqiyya*)		FAO (1960: v)
raṭl	520 gr	al-Ḥudayda	Pietravalle (1952: 176)
raṭl (*“Yemenite Pound”*)	16 ounces	Ta‘izz	Sharafaddin (1961: 14)
uqqa	1,176 gr (42 *uqiyya*)		FAO (1960: v)
farāsila/farāsil, pl.	*20 raṭl*	Ṣan‘ā’, Ta‘izz	Rossi(1939:152), Sharafaddin (1961: 14)
farsala	1 2.6 kg (22.5 *raṭl*)	Aden	FAO (1960: v)
farsala	11.2 kg (20 *raṭl*)	Ṣan‘ā’	FAO (1960: v)

[127] FAO: (1960: v).

farsala	11.2 kg (18.5 *raṭl*)	al-Ḥudayda	FAO (1960: v)
farsala	10.4 kg (20 *raṭl*)	al-Ḥudayda	Pietravalle (1952: 176)

Weights

term	measure	location	source
frāsila	10.5-11.5 kg	Wādī Mawr	Escher (1976: xxi)
frāsila	10.5 kg	al-Ḥudayda	al-‘Aẓm (1986: 85)
mudd	perhaps 1.8-2.2 kg	Jawf	al-‘Aẓm (1986: 106)
nafar	0.625 liter (1/8 *thumn*)		FAO (1960:v)
nafar	0.9625 lb	Ta‘izz	Sharafaddin (1961: 14)
nafar/anfār, pl.	1/64 *qadaḥ*	Ṣan‘ā’	Rossi (1939: 152)
qadaḥ	40 liters		FAO (1960: v) Pietravalle (1952: 176)
qadaḥ/aqdāḥ, pl.	ca. 36 liters; used for solid items; divided into 64 *nafar*	Ṣan‘ā’	Rossi (1939: 152)
qadaḥ	61.6 lb	Ta‘izz	Sharafaddin (1961: 14)
qadaḥ	30 kg (sorghum) 32 kg (millet) 25kg (sesame)	Wādī Mawr	Escher (1976 :xxi)
thumn	5 liters (1/8 *qadaḥ*)		FAO (1960: v)
thumn	1.8 *qadaḥ*	Ṣan‘ā’	Rossi (1939: 152)
mudd		al-Jawf	

Capacity Measures

term	measure	location	source
bā‘	ca. 160 cm, two arm lengths	Wādī Mawr	Escher (1976: xxi)
dhirā‘	ell or armlength	Ṣan‘ā;	Rossi (1939: 152)
dhirā‘	67 cm		FAO (1960: v)
dhirā‘	68 cm		Pietravalle (1952:176)
dhirā‘ (iron)	2/3 meter	Ta‘īzz	Sharafaddin (1961:14)
dhirā‘ (hand)	1/2 meter	Ta‘izz	Sharafaddin (1961:14)
faddān	75 lubna		al-Wāsi‘ī (1948:86)
lubna/libna	45 sq m (100 square *dhirā‘*)		FAO (1960:v)
libna	10 iron ells		Rossi (1939:152); al-Wāsi‘ī (1948: 86)

ma'ad	4,500 sq m (100 *lubna*)		FAO (1960: v)
ma'ad	ca. 4,200 sq m (40x40 *bā'*)	Wādī Mawr	Escher (1976: xxi)
qāma	length of a man standing	Ṣan'ā'	Rossi (1939: 153)
shayz/ashyāz, pl.	"inch," from the tip of the index finger extended to the tip of the thumb	Ṣan'ā'	Rossi (1939: 153)
shibr	extended palm of the hand, from the tip of the little finger to the tip of the index	Ṣan'ā'	Rossi (1939: 153)

Lineal Measures

Table 1. Weights and Measures during the Mutawakkilite Kingdom

Terrace Agriculture

One of the most visible aspects of agriculture in Yemen's highlands is the system of terraces. As suggested by the traveler G. Wyman Bury, who traveled in Yemen during the late Ottoman era, the highland farmer was ingenious but had to deal with many dangers:[128]

> "He has to wrestle with elemental forces that may cover acres of coffee under tons of debris, or skin the surface-soil from his carefully prepared gardens, and dump valuable alluvial deposits beyond the reach of even a baboon.
>
> His only tools are the hoe or mattock, a reed basket, and an empty kerosene tin for carrying water, but these are wielded with skill and infinite perseverance. It is not too much to say that, in the highlands of central Yamen, every accessible spot where crops will grow has been terraced and tilled for coffee, corn or garden produce. These terraces are faced with stone, and follow the contours of the hill, sometimes enclosing a mere strip some few feet wide, and sometimes an acre or so, according to the profile of the slope. Most of them were built centuries ago, and they are maintained and cultivated by constant toil and vigilance.
>
> Let a mountain-rill but cut its way onto one of these terraced plots from above and, unless noticed and diverted, it may swell, in some sudden storm, to a torrent that will bring an acre or two down with it, into depths beyond the reach of man, or, worse still, deposit the lot onto some other farm. Then the question of ruined crops and ownership of the soil is thrashed out with bitter, and often bloody, feud. Legal procedure, whether Ottoman or Arab, tends to put responsibility where it should be – on the owner of the upper farm.
>
> He may be called upon to defray all expenses for clearing his neighbour's land, be-

[128] Bury (1915: 103-104).

side damages to any crop underneath the landslip, and has also the mortification of having lost a good slice of his own farm.

All these possibilities unite to promote careful and painstaking husbandry, while the large population, and more regular rainfall of the highlands, make such detailed methods practicable and profitable.

Apart from the rainfall, however, the soil of the mountains is not so fertile as that of the lowlands. None of those wild mountain-torrents can be trusted to deposit alluvial silt on terraced ground; they are far too drastic in their action. Therefore, the highland farmer must renew his soil from time to time, carrying it in laborious basketfuls up some mere goat-track, from any deposit he has been lucky enough to find unclaimed. The soil can only be turned over to a limited extent, and a plough can barely reach — still less cultivate — any but the larger and more accessible fields. In the smaller upland plots the soil only lies a foot or two deep, and must be tilled gingerly. The principal highland crops are coffee, barley, bearded wheat, white millet, garden-produce and kât (*katha edulis*), the leaves and tender shoots of which are much in demand for their exhilarant properties.

Animal manure is stored near most of the villages in large heaps, against the stone field-terraces, and deodorised with light soil. It must be used freely, especially for coffee, and is often carried for miles in open panniers on donkey-back."

Another description of terrace cultivation is provided in a British colonial report:[129]

"The topmost terraces on steep mountain slopes are so narrow as to be cultivated only by hand. On the easier middle slopes the field-terraces are broader and supported by ancient massive stone walls; to these fields the rain-water from bare unterraced slopes is led by an intricate system of channels, often cemented, and descending from terrace to terrace. Still lower, the cultivators rely mainly on controlled flood-water; land bordering Wadis is carefully terraced and bunded for basin irrigation; flooded torrents are led down between stone-faced walls and deflected by structures of stone and brushwood into furrows which serve the land. Below the mountains the water from the large wadi systems is deflected to inundate the alluvial plains.

The field-terraces in mountainous districts are erected with great toil, and severe punishments are prescribed for their neglect. Soil is often carried from a distance, though carts and other wheeled vehicles are non-existent. Sloping fields are unknown, low terraces being constructed even when the incline is slight, as on the plateau around San'ā."

During the imamate period there was virtually no modern technology applied in agriculture. Preparation of the land was done with the scratch plow, using animal draught power of oxen, camels or donkeys.[130] Other hand-held tools included the hoe and a type of shovel-scoop. Flat boards of

[129] Naval Intelligence Division (1946: 477).
[130] For details on the scratch plow in Yemen, see Gingrich and Heiss (1986) and Varisco (1983).

wood or iron were used to smooth soil after initial plowing and clods of dirt would be beaten with a club. For some crops, like wheat and barley, the plow might be fitted with a seed funnel; with sorghum the seeds were dropped by hand into the furrow at given spaces. Due to the presence of animals on all farms, manure was applied with no imported fertilisers. Interplanting of legumes with sorghum and millet was practiced, as was crop rotation and the use of fallow. Pruning and harvesting were done with fretted knives. Threshing of wheat and barley was usually done on a stone floor or hard mud surface with a stone or iron board pulled by an animal, while sorghum heads were beaten with flails. The Syrian traveler al-ʻAẓm noted in 1927 that rural women were actively engaged in agricultural activities, such as planting, plowing, marketing produce, collecting and grinding coffee.[131] Much of what is described in the sources before 1962 could be observed in the late 1970s and in some areas continues through the present day.[132]

Cultivated crops

A wide variety of crops are recorded as cultivated in the kingdom, most having been a feature of Yemeni agriculture for generations (Appendix A). The main cereal crop, planted in the spring and harvested in the fall, was sorghum (*dhura*), both coastal and highland varieties.[133] Sorghum was valued both for its nutritious grain, which could be made into a porridge (*ʻaṣīd*) or bread, but also was a major source of animal fodder. In his journey through Yemen in 1937-1938, Hugh Scott remarked that in mid-September for the valley of al-Ḍāliʻ "almost every cultivable spot was covered with tall green crops of ripening *dhura.*"[134] He describes the sorghum and local agricultural work on Jabal Jihaf at 7100 feet above sea level as follows:[135]

> "At the end of September the tribesmen of Jebel Jihaf were busy with *dhurra* harvest. Gangs of labourers, stripped to the waist, wearing white skirts to the knees and white or indigo-dyed turbans, hand-picked the heads of grain from the tall *dhurra* plants. All day the countryside resounded with a chorus, haunting and drawn out into quavering notes, sung by the harvesters. Wheat and barley were also reaped and laid out in small bundles on natural threshing-floors of bare rock. Threshing is done with an unjointed flail consisting of a long curved stick, and winnowing by the simple process of holding a petrol tin or other receptacle over the head and pouring the grain and chaff out slowly, so that the chaff is blown away. After the *dhurra* heads are gathered the stems are grubbed up and piled in conical stacks for fodder and litter. Ploughing with yoked oxen then begins, and the ploughman's womenfolk often follow in his wake, breaking the clods with mattocks.[136] Water is drawn all

[131] Al-ʻAẓm (1986: 95).
[132] The most detailed study of traditional Yemeni agriculture is by al-ʻAnsī (1998).
[133] For details on sorghum production in Yemen, see Naval Intelligence Division (1946: 480-482) and Varisco (1985).
[134] Scott (1939: 100). Note that British accounts often refer to *dhura* as "millet" rather than sorghum, but this should not be confused with *dukhn* as the common term for millet.
[135] Scott (1939: 102-103).
[136] On the Ṣanʻā' plain Rossi (1939: 117) observed a team of three men using a heavy iron shovel to shift the soil of the furrows.

> through the day for drinking and for the irrigation of beds of young onions and other crops; a yoke of oxen, descending an inclined plane, hauls up a large leather bucket by a rope passing over a wooden pulley."

The other major cereal grains were wheat and barley, sown as winter crops in the highlands. Maize had been introduced during the Ottoman period. In the coastal region bulrush millet, foxtail millet and teff were cultivated. A variety of vegetables, fruits, herbs and flowers were cultivated. Dates were especially prevalent in the Tihāma, Ḥaḍramawt and Najrān.[137] Most of these crops, apart from tomatoes and potatoes, had been planted in Yemen for centuries. A perennial problem throughout Yemen's history has been plagues of locusts. It is reported that Imam Yaḥyā refused anti-locust workers from the Aden Protectorate until 1944.[138]

Qāt in Yemen

It is apparent from the texts that there had been an increase in production of *qāt* (*Catha edulis*), one of the most important tree crops in Yemen.[139] In his trip at the turn of the 20th century, al-Barakātī provides a few details.[140] He describes the leaves of *qāt* as similar but larger to those of the pomegranate tree. *Qāt* chewing is accompanied by smoking tobacco and drinking coffee, but he notes that it is not chewed in the 'Asīr region. He does not have a high opinion of *qāt*, noting that it can cost up to half a day's wages and reduces hunger, but for no real benefit.[141] The Syrian traveler al-'Aẓm notes that *qāt* treees, which can reach up to five meters, were grown like those of coffee in upper wadi areas without too much heat.[142] He adds that *qāt* varieties were primarily known by where they were grown, such as in Ta'izz, Bura' and Raymā. In 1927 the cost of a small bundle (*rizma*) was expensive, almost three francs. Al-Wāsi'ī suggests that *qāt* had recently been planted in al-Ḍilā'.

Most Western travelers were critical of *qāt* chewing. The criticism by Harold Ingrams is poetic: "It must be a very acquired taste, for I have tried a leaf or two and thought it was filthy, but when you have acquired that taste it makes you feel a devil of a dog so long as the feeling lasts."[143] Hugh Scott, in the 1930s, called it the "bane of this part of Arabia," comparing it to being drunk.[144] Also writing in the 1930s, Britton describes its cultivation:[145]

> "Each plant is said to produce three crops a year. The sprigs, 6-8 inches in length, of younger leaves are picked and bound into small bundles, which in turn are wrapped for protection in grass. In this way the drug is kept in good condition for about a

[137] See Naval Intelligence Division (1946: 486-490) for details on date production in the Arabian Peninsula, including Yemen.
[138] Naval Intelligence Division (1946: 498).
[139] See Naval Intelligence Division (1946: 492-493) for details on *qāt* production in Yemen.
[140] Al-Barakātī (1384/1964: 162).
[141] This negative view of *qāt* as a dangerous "drug" is echoed by Tarsīsī (1962: 156-157), noting the difference between *qāt* and coffee is like black and white in terms of *qāt*'s negative influence on the economy and health.
[142] Al-'Aẓm (1986: 69). Ameen Rihani (1930: 35) notes that it is grown between 2,000-7,000 feet and cites Bukhārī as the best variety.
[143] Ingrams (1943: 109-110), who details the taxes imposed by the imam on the *qat* trade.
[144] Scott (1939: 107).
[145] Britton (1939: 122).

week, and so can be carried to Aden by camel. In Arabia the tree is cultivated at altitudes between 5000 and 9000 feet, on the mountain terraces. Its optimum conditions of growth seem to be similar to those of coffee. In the Aden Protectorate the necessary conditions are found only in the mountains near the Yemen frontier; at Dhala (4800 feet) the growth is stunted, the plants being no more than a foot in height, while they appear to attain their maximum growth on the terraces of Jabal Sabir, neat Ta'izz in the Yemen, a district where the rainfall is comparatively great."

Officially, only a small amount of *qāt* was said to be grown in the Aden Protectorate, as late as the 1950s, and it was banned in the Aden Colony in 1957. According to Brooke:[146]

"Before October 1949 nearly all the leaf consumed in the Colony was imported from Yemen. Without foreign competition, Yemen had increased its shipments to Aden from 616,988 pounds in 1935 to 2,415,248 pounds in 1949. Ethiopian khat sent by air to Aden gained rapidly consumer preference and a far greater market than was ever reached by the Yemen variety. In a little more than a year after the initial shipment, Ethiopia displaced Yemen as the leading exporter, and the relative position of Yemen in the Aden market thereafter declined... in 1956 the British Colony imported 3,781,344 pounds of khat valued at £1,890,701 (U.S. $5,293,962); of this, only twelve per cent, was the share of imports from Yemen."

Coffee in Yemen

Yemen was best known in the early part of the 20th century for its coffee, even though the trade from the Red Sea port of Mocha had long been eclipsed by coffee grown elsewhere.[147] Coffee was grown mainly in the western escarpment and benefitted from the mists during the monsoon season. There were many varieties of coffee, but one of the best was often said to be from Banī Maṭar and was generally known as *ṣāfī*.[148] In 1911 an anonymous article in the *Journal of the Royal Society of Arts* described the state of coffee production in Yemen at that time:

"In cultivating coffee for export, the Arab realises a good profit in money when his trees yield their crop and it is sold. But he must wait four years after planting, during which the cost of labour is heavy, before his trees begin to yield, and the main desideratum with him is not money but food. In a land where the barter of commodities is difficult, through lack of mean of communication, money may mean clothing and comforts, but the one necessity is food, and he may not always be where he can buy food with his money. In consequence the Yemen Arab devotes little of his land to coffee and very much excellent coffee land to dhurra, a plant resembling Indian corn in appearance but producing a grain like millet. He argues that, however superior the money-getting qualities of land planted with coffee, he gets sixteen crops of dhurra while waiting for one of coffee, and is sure that his family is safe from starvation. According to the American Consul at Aden, the principal coffee regions

[146] Brooke (1960: 55).
[147] For details on Yemeni coffee during the kingdom, see Naval Intelligence Division (1946: 490-492).
[148] Al-'Aẓm (1986: 85), who also mentions coffee from Jabal Bura' and Rayma.

> are in the mountains between Taiz and Ibb, and between Ibb and Yerim, and Yerim and Sanaa on the caravan route from Taiz to Zabeed; between Hayelah and Menakha on the route from Hodeida to Sanaa, and in the wild mountain ranges both to the north and south of that route; between Beit-el-Fakih and Obal, and between Manakha and Mathan to the north of Bajil. Of all Yemen or Mocha coffee the best is that known as Mohtari, from the district of Beni Mohtar lying almost due south of Sanaa. Another nearly, if not quite as good, comes from Yafi, near Taiz. Other kinds that are considered superior are Sharsh, Menakha, and Hifash. It is said that all these coffees are the same variety, and that the superior quality of any of the so-called kinds is due wholly to the curing. In Beni Mohtar the coffee lands are held by large and wealthy proprietors, whose means enable them to hold their crop for some months after it is gathered. The berries picked in September are accordingly stored away, and allowed to cure all the winter. The bean thus dries out thoroughly before it is hulled and brought to market. This accounts for the clear, almost translucent yellow colour of the finest berries when they reach the market. The planters in the other districts, however, are compelled to sell their crop quickly in order to tide over the winter. Hence they pick the fruit before it is properly ripened and hull the berry before it is properly dried. As a result, the colour is pale and lifeless, the flavour weak and flat compared with the berry cured within the hull."

The traveler al-'Aẓm, in 1927, described the coffee he saw on his trip from al-Ḥudayda to Ṣan'ā':

> "I observed the coffee tree, which in some respects resembles the lemon tree; its berry is red in color, like coral. When it matures and completely ripens, women take it to their homes and spread it on the roof until it is dry and takes on the color of black. It is ground in hand mills, extracting the black husk (*qishra*) and with the pure bean *(ṣāfī*) remaining. The Yemenis only use the *qishr* for drinking and never use the beans. They say the *qishr* is soothing and very beneficial to the body. Sometimes they boil it with cardamom (*hāl*) or cinnamon (*qirfa*) in clay coffee pots especially made in Yemen."[149]

Views on agricultural development

Western observers of agriculture in the kingdom were impressed by the ingenuity and work ethic of Yemeni farmers, but were also aware that it had become stagnant. Paolo Pietravalle argues that this was due to the autocratic regime of the imams, who kept Yemen isolated from outside influence, including development of agriculture.[150] He remarks that future development of Yemeni agriculture was constrained by the limited consumption demands, transport difficulty, burdensome taxation, long distances for trade, and lack of economic vitality.[151] Noting that the average Yemeni consumed no more than 120 kg of sorghum per year, he calculated the annual

[149] Al-'Aẓm (1986: 85).
[150] Pietravalle (1952: 169-170).
[151] A U.S. Consul report from Aden in 1922 noted that Imam Yaḥyā was taxing agriculture at a rate of 20% due to his lack of funds after the Ottomans left (Sinclair 1976(1): 21).

sum of sorghum consumption at 5 million cubic meters; this was said to be sufficient to feed twice the current population at the time, ca. 1952.

Several writers indicate that the imams were interested in developing the production of cotton, including the import of new varieties. As early as the 1940s it was noted that the import of new varieties of plants and seeds was "leading to wholesale extermination of local varieties almost everywhere except in primitive communities."[152] There was a general impression throughout the first half of the 20th century that Yemen had plenty of water available due to its seasonal floods and groundwater. Only a few pumpwells had been installed before the 1962 revolution. In many areas the groundwater was still accessible in hand-dug wells, but this was to change radically with the influx of tubewells in the 1970s and beyond.

In sum, on the eve of the 1962 revolution, Yemen's agriculture had changed little from previous centuries. The second Ottoman occupation introduced a few new crops and techniques, but the protective mindset of the two imams hindered development in the agricultural sector. Much of the civil war was fought in the areas north of Ṣan'ā', causing damage to the highland terrace systems and interrupting trade in agricultural produce. The lack of technical education training, as was happening elsewhere in the Arab world at this time, left farmers on their own in battling climate, pests and crop diseases. Development aid poured into Yemen after the civil war ended, but the decline of the traditional system was inevitable.

[152] Naval Intelligence Division (1946: 474).

Appendix A. Cultivated Crops of Mutawakkilite Yemen[153]

Arabic	English	Comments
'adas	lentils	also called *bilsin;* term used by tribesmen Rossi (1939: 165); al-Wāsi'ī (1948: 139)
'ajjūr	green melon	only planted in palace garden (al-Wāsi'ī (1927)
'alas	emmer wheat	also called *nusūl;* best variety for bread (al-Wāsi'ī 1948: 139); Ḥaydara (in Serjeant 1954)
'amb	mango	equivalent of *manja* and *'ambā'* in Egypt (al-Wāsi'ī 1948: 140); also *'anbā* (al-Barakātī 1964:161); Rossi (1939: 165)
'anbarūd	pear	Rossi (1939: 166); al-Wāsi'ī (1948: 140)
ansūn	anise	al-Wāsi'ī (1948: 140)
'atar	peas	Yemeni term for *julubbān* and *bisilla* in Egypt (al-Wāsi'ī 1948: 139); Rossi (1939: 164)
bābāya or 'amba al-Shām	papaya, pawpaw	
bābūnaj	camomile	Rossi (1939: 164)
bādhinjān	eggplant, aubergine	said to be introduced by Ottoman soldiers in 19th century (Abdul-fattah 1981: 46); see *batlajān*
balas	fig	alternative term for *tīn;* Rossi (1939: 164); al-Wāsi'ī (1948: 31)
balas Turkī/al-Shawkī	*Opuntia* cactus or prickly pear	called *ṣubayra* in Syria (al-Wāsi'ī 1948: 140); Ḥaydara (in Serjeant 1954)
bāmiya	okra	grown in Tihāma; said to be introduced by Ottoman soldiers in 19th century (Abdulfat-tah 1981: 46)
banafsaj	violet	Ḥaydara (in Serjeant 1954); al-

[153] This list is compiled from the sources translated and summarised above and also from Naval Intel-ligence Division [or NDI] (1946), Scott (1939), Sharaf al-Dīn (1964: 22) and other sources. This is not a compre-hensive list and many of the crops listed have a long history of cultivation in Yemen. Some of the terms listed are in dialect, as recorded by Rossi.

		Wāsi‘ī (1948: 139); Rossi (1939: 166) has *banafsha*
banjar	beet	Rossi (1939: 163)
baqdanūs	parsley	Rossi (1939: 166)
bāqillā’	broad bean	also known as *fūl*; Rossi (1939: 164); see *qilla*
bardaqūsh	marjoram	Rossi (1939: 165)
barqūq	apricot	alternative for *mishmish*, in full bloom at end of January and green fruit by end of February in Ṣan‘ā’ (Scott 1939: 117); Rossi (1939: 163); al-Wāsi‘ī (1948: 31)
baṣal	onion	grown with irrigation between 7,000-8,000 feet (NDI:473); Ḥaydara (in Serjeant 1954); Rossi (1939: 164)
baṭāṭīs/baṭāṭā	potato and sweet potato	grown in Aden Protectorate and elsewhere; Rossi (1939: 165); introduced into highlands in 1939 (Keen 1946)
batlajān	eggplant	Rossi (1939: 165); see *bādhinjān*
baynī	sorghum variety	Ḥaydara (in Serjeant 1954)
bilsin	lentils	term in towns Rossi (1939: 165); see *‘adas*
birr/burr	wheat	equivalent of *ḥinṭa* and *qamḥ*, the best varieties are al-‘Ansī and al-Bawnī; varieties include *samrā’*, *aḥmar* and *sawād* (al-Wāsi‘ī 1948: 138-139); limited production in Yemen; Ḥaydara (in Serjeant 1954); Pietravalle 1952: 166); Rossi (1939: 165)
birsīm	lucerne	See *qaḍb*; al-Waysī (1962: 71)
bisbās	chilli pepper	
bizāliya	pea	Rossi (1939:166); see *‘atar*
biṭṭīkh/baṭṭīkh	melon varieties	see *ḥabḥab, khirbiz* and *shammām;* yellow variety from Egypt and Syria called *sanṭ* and *‘ajūr* (al-Wāsi‘ī 1948: 31); Rossi (1939: 165); Ḥaydara (in Serjeant

		1954); al-Waysī (1962: 71)
bunn	coffee	grown mostly on the western escarpment; Rossi (1939: 163)
burtuqāl	sweet orange	said to be available in Ṣan‘ā’ *sūq* year round (Pietravalle 1952: 167); al-‘Aẓm (1986: 243) al-Wāsi‘ī (1947: 130)
buqūl	legumes	Al-‘Aẓm (1986: 108); al-Wāsi‘ī (1948: 36)
dhura/dhira	sorghum	many varieties grown all over Yemen; principle crop of Yemen, stalks useful as fodder, especially for camels (Pietravalle 1952: 166); Ḥaydara (in Serjeant 1954); Rossi (1939: 164); al-Wāsi‘ī (1948: 85)
al-dhura al-Shāmiya	maize	al-Wāsi‘ī (1948: 139); also called *Hind, Rūmī, Shām*
dijra/dujra	cowpea *Vigna unguiculata*	also known as *lūbiyā’*; Ḥaydara (in Serjeant 1954)
dubba	gourd	Rossi (1939: 166); see *qar‘*
dukhn	bulrush millet *Pennisetum glaucum*	grown in Tihāma; Ḥaydara (in Serjeant 1954); Rossi (1939: 165); al-Wāsi‘ī (1948: 85, 139)
fāṣūliyā	green bean	Rossi (1939: 164); al-Waysī (1962: 36)
firsik	peach	Rossi (1939: 166); see *khawkh;* called *injāṣ* outside Yemen (al-Wāsi‘ī 1948: 140)
fijl	white radish	also called *qushmī* in Yemen (al-Wāsi‘ī 1947: 131); Ḥaydara (in Serjeant 1954)
fūl	broad bean	also known as *bāqillā’* or *qilla/qillā*; Ḥaydara (in Serjeant 1954); al-Wāsi‘ī (1948: 139)
al-fulful al-aswad	black pepper	said to be not of good quality
full/fill	Arabian jasmine	grown in Tihāma (al-Wāsi‘ī 1948: 34, 139); Rossi (1939: 165); al-Waysī (1962: 88)
fuwwa	madder	Ḥaydara (in Serjeant 1954)
gharb	sorghum variety	Ḥaydara (in Serjeant 1954)

gharib	broomcorn millet *Panicum miliaceum*	Ḥaydara (in Serjeant 1954)
ḥabba sawdā'	Black cumin or Nigella	Ḥaydara (in Serjeant 1954)
ḥabḥab	watermelon	called *biṭṭīkh* outside Yemen (al-Wāsi'ī 1948: 140); Ḥaydara (in Serjeant 1954); Rossi (1939: 164); al-Waysī (1962: 36)
ḥamūmī	tobacco variety	variety in the Ḥaḍramawt (al-Wāsi'ī 1948: 39, 141)
ḥanḍal	colocynth	Rossi (1939: 164)
ḥijna	sorghum variety	Ḥaydara (in Serjeant 1954)
ḥilba	fenugreek	Ḥaydara (in Serjeant 1954); Rossi (1939: 166)
ḥimmiṣ	chick pea	Ḥaydara (in Serjeant 1954)
Hind	maize	also called *Rūmī, Shām*
ḥinnā'	henna	al-Wāsi'ī (1948: 140)
ḥinṭa	wheat	see *birr/burr*
ḥubūb	cereal grains	includes wheat, barley, sorghum, millet, sesame, etc.; al-Wāsi'ī (1948:39)
ḥumar	tamarind	al-Wāsi'ī (1948: 140)
ijjāṣ	plum	grown in highlands; al-'Aẓm (1986: 106); Rossi (1939: 166) has *njāṣ*; al-Wāsi'ī (1948: 31)
'inab	grapes	grown mostly in the highlands; Ḥaydara (in Serjeant 1954); Rossi (1939: 166) has *'anab*; al-Wāsi'ī (1948: 140)
jawāfa	guava	grown in Laḥj (al-Wāsi'ī 1948: 140)
jawz	walnut	grown in highlands; Rossi (1939: 165); al-Wāsi'ī (1948: 31, 140)
jawz al-Hind	coconut	grown in Laḥj
jazar	carrots	Ḥaydara (in Serjeant 1954); Rossi (1939: 164)
juljulān/jiljilān	sesame	Tihāma term for *simsim* al-'Aẓm (1986: 51); Ḥaydara (in Serjeant 1954); Rossi (1939: 66)
jumayrī	tobacco variety	al-Wāsi'ī (1948: 141)

kabbād	citron	al-ʻAẓm (1986: 243)
kabzara	coriander	Rossi (1939: 164)
kādhī	screwpine	grown in the Tihāma (al-Wāsiʻī 1948: 34, 140)
kammūn	cummin	al-Wāsiʻī (1948: 140)
karrāth	chinese chive	Rossi (1939: 166) has *karaṭ*
khabṭī	tobacco variety	al-Wāsiʻī (1948: 141)
khaḍrawāt	vegetables	al-Wāsiʻī (1948: 141)
khāmisī	sorghum variety	Tihāma variety (Ḥaydara in Serjeant 1954)
khardal	mustard	grown in Taʻizz (NDI: 473); also known as *tartar*; pressed for oil (al-Wāsiʻī 1948: 139); Rossi (1939: 166)
khashkhāsh	poppy	Ḥaydara (in Serjeant 1954); al-Wāsiʻī (1948: 139)
khass	lettuce	al-ʻAẓm (1986: 106)
khawkh	peach	equivalent of *firsik*; called *ijjāṣ* outside Yemen
khirbiz	melon variety	only planted in palace garden (al-Wāsiʻī 1927)
khirmish	custard apple	Laḥj and Ḥudayda, called *qishṭa* in Egypt (al-Wāsiʻī 1948: 141)
khiyār	cucumber	Ḥaydara (in Serjeant 1954); Rossi (1939: 164); al-Wāsiʻī (1948: 31)
khubbayza	mallow	Rossi (1939: 165)
khuzāma	lavender	equivalent of *raymān* (al-Wāsiʻī 1948: 139)
kinib	foxtail millet *Setaria italica*	Ḥaydara (in Serjeant 1954)
kishd	hyacinth bean	
kattān	flax	Rossi (1939: 165)
kummathrā	pear	equivalent of *ʻanbarūd*; al-Wāsiʻī (1948: 31, 140)
lahāna	cabbage	grown in Ḥaḍramawt; equivalent of *kurunb* (Ḥaydara in Serjeant 1954); said to be introduced by Ottoman soldiers in 19th century (Abdulfattah 1981:46); Rossi

		(1939: 164)
lawz	almond	*ḥalḥal* in the shell; Rossi (1939: 165); al-Waysī (1962: 69, 140)
līmūn	lemon	sweet and sour varieties
lūbiyā'	cowpea	al-Wāsi'ī (1948: 139)
marzanjūsh	marjoram	al-Wāsi'ī (1948: 139)
mawz	banana	Ḥaydara (in Serjeant 1954) has al-mawz al-Hindī; Rossi (1939: 163); al-Wāsi'ī (1948: 140)
mishmish	apricot	alternate for *barqūq*
muḍḍār	sugar care	Yemeni term for *qaṣab al-sukkar*
mūma	cotton seed	Ḥaydara (in Serjeant 1954)
narjis	narcissus	al-Wāsi'ī (1948: 139)
nakhl/nakhīl	date palm	grown in Tihāma, Ḥaḍramawt and Najrān; Rossi (1939: 165)
na'na' or na'nā'	mint	see *nu'ḍ*; Rossi (1939: 165); al-(Wāsi'ī 1948: 140)
nāranj	orange	al-'Aẓm (1986: 243)
nīl	indigo	grown in Tiḥama and Ḥaḍramawt; al-Wāsi'ī (1948: 140)
nu'ḍ	mint	Rossi (1939: 165); see *na'na'*
nusūl	emmer wheat	also called *'alas*
qaḍb	lucerne or alfalfa	also called *birsīm;* Ḥaydara (in Serjeant 1954); Rossi (1939: 164)
qar'	gourd	Rossi (1939: 166); see *dubba*
qaṣab al-sukkar	sugarcane	also known as *muḍḍār;* Rossi (1939: 164); al-Wāsi'ī (1948: 141)
qāt	*Catha edulis*	grown in highlands; internal trade worth 1.5 million thalers per day (Pietravalle 1952: 168); Rossi (1939: 165)
qilla	broad bean	Rossi (1939: 164); see *bāqillā'*
qiththā'	snake cucumber	called *qatt* outside Yemen (al-Wāsi'ī 1948: 141)
qunnab	hemp	al-'Aẓm (1986: 244)
qurunfil	carnation	Rossi (1939: 165)

quḥṭa	Nigella or black cumin	equivalent of *al-ḥabba al-sawdā'* and called *shawnīz* and *al-ḥabba al-baraka* in Egypt and Syria (al-Wāsi'ī 1948: 141)
qushmī	long white radish	Rossi (1939: 166)
quṭn	cotton	also called *'uṭb*; cotton seed is *mūma*
rayḥān	basil	Rossi (1939: 163)
raymān	lavender	equivalent of *khuzāma*
rizz	rice	Rossi (1939: 166)
sābi'ī	sorghum variety	Ḥaydara (in Serjeant 1954)
Rūmī	maize	also called *Hind, Shām;* Rossi (1939: 165)
rummān	pomegranate	in bloom in early March in Ṣan'ā' (Scott 1939:117); Ḥaydara (in Serjeant 1954); Rossi (1939: 165); al-Wāsi'ī (1948: 140)
ruṭab	ripe dates	see *nakhl/nakhīl*; Ḥaydara (in Serjeant 1954)
safarjal/sfarjal	quince	in bloom in early March in Ṣan'ā' (Scott 1939: 117); Ḥaydara (in Serjeant 1954); Rossi (1939: 164); al-Wāsi'ī (1948: 140)
samrā'	wheat variety	
saqla	barley variety	white and thinner than ordinary barley (al-Wāsi'ī 1948: 139)
ṣa'tar	thyme	Rossi (1939: 166)
sbānak	spinach	Rossi (1939: 166)
shadhāb	rue	Rossi (1939: 166)
shāh al-turunj	fumitory	Also known as *al-bādhrinjūwīya*
sha'īr	barley	Ḥaydara (in Serjeant 1954); Rossi (1939: 165); (al-Wāsi'ī 1948: 139);
Shām	maize	also called *Hind, Rūmī*, *al-dhura* al-Shāmīya*;* Rossi (1939: 165)
shamār	fennel	Rossi (1939: 164); al-Wāsi'ī (1948: 140)
shammām	cantaloupe	al-Wāsi'ī (1948: 141); al-Waysī (1962: 71)

shibith	dill	see *zuqīqa* (al-Wāsi‘ī 1948: 139)
shilik	strawberry	derived from Turkish, rare Rossi (1939: 164)
ṣīb	seed	al-‘Aẓm (1986: 232)
simsim	sesame	also known as *juljulān*; grown in Tihāma; al-Wāsi‘ī (1948: 139)
ṭahaf	teff	Ḥaydara (in Serjeant 1954); al-Wāsi‘ī (1948: 139)
ṭamāṭīs/ṭamāṭim	tomatoes	said to be introduced by Ottoman soldiers in 19th century (Abdul-fattah 1981: 46); Rossi (1939: 166); al-Waysī (1962: 36)
tartar	mustard	Ḥaydara (Serjeant 1954); see *khardal*
thūm	garlic	Ḥaydara (in Serjeant 1954); Rossi (1939: 163)
tīn	fig	widespread in the highlands, called *balas* in Yemen (al-Wāsi‘ī 1948: 31, 140)
ṭranj	citron	Rossi (1939:164); see utrujj
tuffāḥ	apple	rare; Rossi (1939: 165)
tunbāk	tobacco	al-Barakātī (1964:161)
tūt	mulberry	al-Wāsi‘ī (1948: 140)
tutun	tobacco	equivalent of *tibgh/tibagh* and *tunbāk*; grown in Tihāma and Ḥaḍramawt; grown in limited quantities (Pietravalle 1952: 168); al-‘Aẓm (1986: 244); al-Wāsi‘ī (1948: 141)
uṣfur	safflower	Ḥaydara (in Serjeant 1954); al-Wāsi‘ī (1948: 140)
‘uṭb	cotton	also called *quṭn*; Rossi (1939: 164)
utrujj	citron	also known as *kabbād;* al-Wāsi‘ī (1948: 140); see *ṭranj*
ward	rose	Rossi (1939: 166); al-Wāsi‘ī (1948: 139)
wars	pseudo saffron	also known as *hadas* and *ās* (al-Wāsi‘ī 1948: 140)
yāsamīn	jasmine	see *full;* grown in Tihāma; al-Wāsi‘ī (1948: 139)

yūsufī	tangerine	
zinjibīl	ginger	in Rayma, Ḥufāsh, Lā'a (al-Wāsi'ī 1948: 140)
zuqīqa	dill	Yemeni term for *shibith*
zurū'	crops	al-Wāsi'ī (1948: 138)

Bibliography

Abdulfattah, Kamal. 1981. *Mountain Farmer and Fellah in 'Asīr Southwest Saudi Arabia. The Conditions of Agriculture in a Traditional Society*. Erlangen: Erlangen Geographischen Arbeiten, Sonderband 12.

al-Akwa', Ismā'īl ibn 'Alī. 1985. *al-Amthāl al-Yamāniyya.* Ṣan'ā': Maktaba al-Jīl al-Jadīd.

al-Akwa', Muḥammad ibn 'Alī. 1979. *Ṣaḥfat min ta'rīkh al-Yemen al-ijtimā'ī wa-qiṣṣat ḥayātī.* Damascus: Maṭba'at al-Kātib al-'Arabī.

Anonymous. 1911. The Production of Mocha Coffee. *Journal of the Royal Society of Arts.* 59(3050):618-619.

al-'Anṣī, Yaḥyā ibn Yaḥyā. 1998. *al-Ma'ālim al-zirā'īya fī al-Yaman.* Ṣan'ā': al-Markaz al-Fransī li-al-Dirāsāt al-Yamaniyya and al-Ma'had al-Amrīkī li-al-Dirāsāt al-Yamanīya.

al-'Arshī, Ḥusayn ibn Aḥmad. 1939. *Bulūgh al-marām fī sharḥ misk al-khitām.* Edited by Anastase-Marie de St-Elie. Cairo: Maktaba al-Thaqāfa al-Dīnīya.

'Aslān, 'Abd al-Wahhāb Muḥammad. 2000. *Ghuyūl Ṣan'ā': Dirāsa ta'rīkhīya, atharīya wa-thā'qīyā.* Beirut: Dār al-Fikr al-Ma'āṣir.

al-'Aẓm, Nazīh Mu'ayyid. 1986. *Riḥla fī bilād al-'Arabiyya al-Sa'ūdiyya.* Second Edition. Cairo: Sharikat Dār al-Tanwīr li-al-Ṭibā'a wa-al-Nashr. [Original, 1927]

al-Barakātī, Sharaf ibn al-Muḥsin.1384/1964. *al-Riḥla al-Yamānīya.* Beirut: Manshūrāt al-Maktab al-Islāmī.

Britton, Everard B. 1939. Appendix 1: The Use of Qat. *Geographical Journa*l 93(2): 121-122.

Brooke, Clarke. 1960. Khat (*Catha Edulis*): Its Production and Trade in the Middle East. *The Geographical Journal* 126(1): 52-59.

Bury, G. Wyman. 1915. *Arabia Infelix or The Turks in Yamen*. London: MacMillan and Company.

Dostal, Walter. 1993. *Ethnographica Jemenija: Auszüge aus den Tagebüchern Eduard Glasers mit einem Kommentar versehen.* Sitzungsberichte der philosophisch-historischen Klasse, Band 593, Veröffentlichungen der Arabischen Kommission, Band 5.

Dresch, Paul. 2000. *A History of Modern Yemen.* Cambridge: Cambridge University Press.

FAO 1960 *Report of the FAO Mission to Yemen.* Rome: FAO.

Forbes, Rosita. 1923. A Visit to the Idrisi Territory in 'Asir and Yemen. *The Geographical Journal* 62(4): 271-278.

Gingrich, Andre and Johann Heiss. 1986. A Note on Traditional Agricultural Tools in Ṣa'dah Province (with Special Reference to the Ard). *Proceedings of the Seminar for Arabian Studies* 16: 51-63.

Glaser, Eduard. 1884. Meine Reise durch Arḥab und Hâshid. *Petermanns Geographische Mitteilungen* 30: 174-183, 204-213.

Goitein, Shelomo Dov. 1934. *Jemenica: Sprichwörter und Redensarten aus Zentral-Jemen.* Leipzig: Harrassowitz.

Grohmann, Adolf. 1922. *Südarabien als Wirtschaftsgebiet.* Volume 1. Vienna: Verlag des Forschungsinstitutes für Osten und Orient.

al-Hamdānī, al-Ḥasan ibn Aḥmad. 1884. *Ṣifat jazīrat al-'Arab.* Leiden: Brill.

Harrower, Michael J. 2016. *Water Histories and Spatial Archaeology: Ancient Yemen and the American West.* Cambridge: Cambridge University Press.

Hartley, Brian J. 1944. *Dry Farming Methods in the Aden Protectorate. Proceedings of the Conference on Middle East Agriculture.* Agricultural Report No. 6: 37-45.

Ibn Miftāḥ, Abū al-Ḥasan ʻAbd Allāh. 1357/1938. *Sharḥ al-azhar al-muntazʻ min al-ghayth al-midrār al-mafātiḥ li-kamā'im al-azhār fī fiqh al-a'imma al-aṭhār.* Cairo: Maṭbaʻat al-Ḥijāzī.

Ingrams, Harold. 1943. *Arabia and the Isles.* London: John Murray.

— 1936. *A Report on the Social, Economic and Political Condition of the Hadramawt.* London: H.M. Stationary Office, Colonial Report #123.

al-Iryānī, Muṭahhar. 1471/1996. *al-Muʻjam al-Yamanī fi al-lugha wa-al-turath*. Damascus.

Jacob, Harold. 1932. The Kingdom of the Yemen: Its Place in the Comity of Nations. *Transactions of the Grotius Society* 18:131-153.

Lambardi, Nello. 1950. Yemen: agricoltura e pastorizia sfruttamento del regno animale e vegetale, denominazione arabe locali. *Rivista di Agricoltura Subtropicale e Tropicale* 44(1-3): 24-46.

— 1947. Divisioni Amministrative del Yemen con Notizie Economiche e Demografiche. *Oriente Moderno* 27(7/9): 143-162.

Keen, B. A. 1946. *The Agricultural Development of the Middle East.* London: H.H. Stationary Office.

Manzoni, Renzo. 1884. *El Yèmen: Tre anni nell'Arabia felice.* Rome.

al-Marʻashalī, Yūsuf. 1427/2006. *Nathr al-jawāhir wa-al-durur fī ʻulamā' al-qarn al-rābiʻ ʻashar.* Beirut: Dār al-Maʻrifa.

Maraqten, Mohammed. 2017. Typology of Irrigation Systems in Ancient Yemen in the Light of the Epigraphic Evidence. In Walid Yasin Al Tikriti and Paul Alan Yule, editors, *Proceedings of Water & Life in Arabia Conference*, 115-135. Abu Dhabi: Abu Dhabi Tourism and Culture Authority.

Millingen, Charles. 1874. Notes of a Journey in Yemen. *Journal of the Royal Geographical Society* 44: 118-125.

Mortel, Richard T. 1990. Weights and Measures in Mecca during the late Ayyūbid and Mamlūk Periods. *Arabian Studies* 9: 177-85.

Mundy, Martha (1996) *Domestic Government: Kinship, Community and Policy in North Yemen.* London: I. B. Tauris.

Naval Intelligence Division. 1946. *Western Arabia and the Red Sea.* London: Naval Intelligence Division.

Pietravalle, Paolo. 1952. L'Economia de i lavori pubblici nel Yemen d'oggi. *Oriente Moderno* 32(7/8): 165-189.

Rihani, Ameen. 1930. *Arabian Peak and Desert: Travels in Al-Yaman.* London: Constable & Co.

Rossi, Ettore. 1953. Note sull'irrigazione, l'agricoltura e le stagioni nel Yemen. *Oriento Moderno* 33(8-9): 349-361.

— 1940a. Un libro di Nazīh el-Mu'ayyad el-ʻAẓm sui suoi viaggi nel Yemen e una escursione a Ma'rib nel gennaio-febbraio 1936. *Orient Moderno* 20(9): 452-458.

— 1940b. Vocaboli sud-arabici nelle odierne parlate arabe del Yemen. *Rivista degli Studi Orientali* 18: 299-314.

— 1939. *L'Arabo Parlato a Ṣan'ā'.* Rome: Instituto per l'Oriente.

Ruiz, Aldemo. 1966. Efforts of US Agency for International Development to Supply Water to People of Yemen. *Journal American Water Works Association* 58(10): 1247-1259.

Scott, Hugh. 1939. A Journey to the Yemen. *Geographical Journal* 93(2): 97-122.

Serjeant, R. B. 1964. Some Irrigation Systems in Ḥaḍramawt. *Bulletin of the School of Oriental and African Studies* 27: 33-76.

— 1954. Star-Calendars and an Almanac from South-West Arabia. *Anthropos* 49(3/4):433-459.

Serjeant. R. B. and Ronald Lewcock (eds.). 2013. *Ṣan'ā': An Arabian Islamic City*. UK: Melisende UK Ltd. The original was published in 1983.

Sharafaddin, Ahmad Hossin. 1961. *Yemen: "Arabia Felix"*. Taiz.

Sharaf al-Dīn, Aḥmad Ḥusayn. 1964. *al-Yaman 'abr al-ta'rīkh*. Second Edition. 'Ābadīn: Maktabat al-Sunna al-Muḥammadīya.

Sinclair, Reginald W. (ed.). 1976. *Documents on the History of Southwest Arabia: Tribal Warfare and Foreign Policy in Yemen, Aden and Adjacent Tribal Kingdoms*, 1920-1929. Salisbury, NC: Documentary Publications.

Tarsīsī, 'Adnān. 1962. *al-Yaman wa-ḥaḍārat al-'Arab ma'a dirāsa jughāfīya kāmila.* Beirut: Manshūrāt Dār Maktabat al-Ḥayāt.

Thesiger, Wilfred. 1947. A Journey through the Tihama, the 'Asīr and the Hijaz Mountains. *The Geographical Journal* 110(4/6): 188-200.

Varisco, Daniel Martin. 2018. Agriculture in the Northern Highlands of Yemen: From Subsistence to Cash Cropping. *Journal of Arabian Studies*. 8(2):171-192.

— 2009. Agriculture in al-Hamdānī's Yemen: A Survey from Early Islamic Geographical Texts. *Journal of the Economic and Social History of the Orient.* 52(3):382-412.

— 2004. Terminology for Plough Cultivation in Yemeni Arabic. *Journal of Semitic Studies* 49(1): 71-129.

— 1995. Indigenous Plant Protection Methods in Yemen. *GeoJournal* 37(1):27-38.

— 1994. *Medieval Agriculture and Islamic Science: The Almanac of a Yemeni Sultan*. Seattle: University of Washington Press.

— 1993. The Agricultural Marker Stars in Yemeni Folklore. *Asian Folklore Studies* 52(1): 119-142.

— 1985. The Production of Sorghum (*Dhurah*) in Highland Yemen. *Arabian Studies* 7: 53-88.

— 1983. The Ard in Highland Yemeni Agriculture. *Tools and Tillage* 4: 158-172.

al-Wāsi'ī, 'Abd al-Wāsi' ibn Yaḥyā. 1948/1927. *Ta'rīkh al-Yaman.* Cairo: al-Maṭba'a Ḥijāzī.

al-Wāsi'ī, Ilhām 'Abd Allāh. 2013. Tarjama al-mu'alif *al-Durr al-farīd al-jāmi' al-mutafarriqāt al-asānīd.* Electronic document: http://www.ahlalhdeeth.com/vb/showthread.php?t=321329 (Accessed October, 2017).

al-Waysī, Ḥusayn ibn 'Alī. 1962. *al-Yaman al-kubrā.* Cairo: Maṭba'at al-Nahḍa al-'Arabīya.

al-Zabīdī, Muḥammad b. al-Murtaḍā. 1965. *Tāj al-'arūs min jawāhir al-qāmūs*. Kuwait.