

QABĪLAH, JIRBAH AND TANMIYAH: TRIBES AND AGRICULTURE IN THE NORTHERN HIGHLANDS OF YEMEN

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The stereotypical image of an Arab tribesman is a nomadic Bedouin mounted on a camel in the desert. To be tribal in Yemen, however, is to be sedentary and most often to engage in agriculture. This is especially the case in the highlands with its fertile valleys that have been cultivated for several millennia since the ancient kingdoms of South Arabia. The civil society throughout the Islamic era in the highlands has been tribal, especially in the northern area where the Zaydī imamate was established during the late 9th century. Throughout Yemen, agricultural activities were primarily governed by tribal customary law (*urf*), usually in harmony with Islamic legal principles. Irrigation from springs, wādī flood flow, and wells was shared according to customary procedures, as was the ownership and sale of land. Local markets, where agricultural produce was traded, were also subject to customary tribal law. This article discusses the historic role of agriculture in relation to tribal identity and tribal customary law against the backdrop of changes brought about through agricultural development and the current insecurity and open warfare. This includes the decline in water tables, land grabbing, the cash cropping of *qāt*, and reliance on imported foodstuffs. Although agriculture has declined in recent years, there is potential for sustainable development of Yemen's agriculture into the future.

Introduction

During much of the Islamic era, Yemen served as the breadbasket of the Arabian Peninsula, the vast majority of which is arid and inhospitable to sustainable agriculture. With its natural water sources of sufficient rainfall in the southern highlands, major wādīs toward the coasts, highland springs, and available ground water, farming became the primary economic livelihood in Yemen well before the Islamic Era. The ingenuity in creating massive and small-scale irrigation systems and turning mountain slopes into terraced gardens is well documented and still evident as one travels through the country. By the 10th century CE, Yemen had become an area rich in crops (Varisco 2009). During the Rasulid Era (13th–15th centuries CE) a wide variety of crops were cultivated, providing the state with food for its people and a significant source of taxes (Varisco 1994b). Food production was generally adequate for the local population and some foods were exported, including to Mecca. In this sense, the history of Yemen cannot be written without major attention to its agriculture over the centuries.

The focus of this study is on the role of agriculture in the northern highlands, including the regions of Ṣan'ā', Ḥajjah, Ṣa'dah and the Jawf. Unlike the southern highlands, rainfall was limited, forcing a need to develop innovative techniques in dry farming and water runoff harvesting and limiting the range of crops grown. Those areas with springs and groundwater accessible through wells allowed for more stable cultivation. The most difficult ecological zone was the Jawf, the region that borders the famed "Empty Quarter" of the Arabian desert. The population in the north was overwhelmingly rural,

tribally organized and self-sufficient. There was never a strong central state in control, even after the revolution that toppled the Zaydī imamate in 1962. Apart from the construction of the new Ma'rib dam, inaugurated in 1986, the northern governorates of Yemen did not receive as much development aid or investment in agriculture as the southern highlands and coastal Tihāmah.

Qabīlah: The Idea of Tribe in the Northern Highlands

In cultural terms, Yemen has a resilient tribal tradition, primarily rural, that persists into the present. Unfortunately, there is often confusion as to what it means to be tribal in Yemen. The population in most of Yemen has been sedentary for centuries, if not millennia. There are a few pockets of Bedouin nomads on the fringe, but to be a tribesman in Yemen has almost always been to belong to a settled farming community. This has implications on the role of customary law, which in most of the highlands is more attuned to the security needs of agriculturalists than pastoralists, to protection of land and markets rather than safekeeping of domestic animals. Tribal polity is stronger in the north than southern Yemen, which in places has more of a patron/client relationship, and the Tihāmah coastal zone, which has experienced the most foreign contact historically. Unlike in most other parts of the Middle East, tribalism in Yemen has never been subdued by the state, despite attempts by former president 'Alī 'Abd Allāh Ṣāliḥ to forge a party-based nationalism. Events since the Arab Spring and subsequent civil war resulting from the Saudi-led coalition bombing campaign have in some ways bolstered tribal sensitivities at the local level, but the prolonged insecurity and politicized polarization present a major challenge to the future of tribe-state relations.

The nature of tribalism varies throughout Yemen, although there is a long, shared history in genealogical terms. Yemen was the ancestral home of Qaḥṭān, the founder of the “Southern Arabs,” which figure in tribal identity throughout the Arab Peninsula and much of the Arab world. It is important to note that tribal genealogy in Yemen, as elsewhere in the Arab world, is a contested issue. The Yemeni savant al-Hamdānī (1940), writing in the 10th century, was critical of Arab authors who made errors regarding early Yemeni genealogy. As is clear from the observations of multiple anthropologists working in Yemen, most ordinary tribesmen have a limited knowledge of their direct ancestors (Varisco 2017). This is due in part to the fact that written genealogies of tribesmen are rare, but also because the “tribe” in Yemen has more of a geographical locus than a kinship focus. Some tribal names extend back more than two millennia in the same region (Robin 1978).

There are several terms used in the literature for tribal groups and divisions, but it is universal to refer to the individual male as a *qabīlī* and a female as *bint al-qabīlī*. Despite limitations as a political or social category, there is no substitute for translating Arabic *qabīlah* into tribe (English), tribù (Italian), tribu (French and Spanish), or Stamm (German) and *qabīlī* as tribesman. The plural form *qabā'il* is even referenced in the *Quran* (*Ṣūrat al-Hujurāt* 49:13). In Arabic lexicons *qabīlah* is defined as those who descend from a single father or ancestor (*banū ab wāḥid*). It is interesting to note that the verbal form (*q-b-l*) has a wide range of meanings, including to come face to face or in contact with, to receive hospitably, consent, power, and guarantee: all of these could be applied to Arab tribes. When a tribesman in Yemen is asked for his tribe, he invariably refers to one of the ancestral tribal names or even the tribal confederations of Bakīl, Ḥāshid and Khawlān ibn 'Āmir which comprise most of the northern tribes.¹

¹ For details on the tribes near Ṣa'dah, see Brandt 2017; Gingrich 1994; and Weir 2007. For tribes in the highlands of Yemen as a whole, see Dresch 1989, who also discusses the information from tribes in the work of al-Hamdānī. A master list of Yemeni tribes can be found in the geographical lexicon of al-Maqḥafī (2002).

At the lower levels, the most important reference is to the extended lineage of 5–7 generations, i.e., those in the memory of someone living. Since most tribes are sedentary, there is less need for the type of fusion and fission that has been noted for nomadic Bedouin (Peters 1960).

In a political sense, belonging to a tribe provides a community of support as well as a mechanism for maintaining allegiance. At the local level, the lineage may define a marriage pool, work parties and either a war or defense grouping. The basic principle of organization is based on consent rather than dictation. In theory the shaykh of a tribal segment is a first among equals, although there are also shaykhly lineages, which are more common when tribesmen are sedentary (Dresch 1989, 89). In his work among the Banī Hushaysh, Walter Dostal noted that the qualities of a tribal shaykh should be a good character, experience, a sense of justice, and the ability to negotiate (Dostal 1974, 8). Customary law, which in Yemen was at times written down, applies to all sorts of misbehavior and criminal acts, with shame and the threat of expulsion from a tribe working to mitigate disputes. In the northern area of Yemen, tribes were traditionally responsible for protecting the Zaydī *sādah* – who usually lived in an area known as a *hijrah* –, Jews, and those who were too weak to defend themselves.

To situate the role of the tribes in northern Yemen, it is important to place them within the total social structure. An elaborate and influential scheme of the highland Yemeni social structure of the past was presented by Eduard Glaser (1885b, 202), who traveled extensively in the Zaydī area over a century ago. Although he was not a trained anthropologist, he recognized a distinction between rural and urban areas and proposed three descriptive, hierarchical models: rural, urban, and generalized. While his rationale for distinguishing categories is not always clear, he presents the basic model of a social structure with the *sādah* (sg. *sayyid*) descendants of the Prophet Muḥammad at the top, tribes in the middle and a range of client groups, freed slaves and Jews at the bottom.² The *sayyid* was granted a higher status, on religious grounds, than the tribesman, although this did not mean that tribesmen considered themselves inferior.³ In the Zaydī areas the *sayyid* had a higher status than religious scholars of tribal origin, who are called *quḍā'* (literally, “judges”) in Yemen. Client groups performed ritual and menial tasks, such as circumcision, butchering animals and growing vegetables. For Glaser, freed slaves were ranked above the *akhdām*, a group of poor blacks who performed menial and degrading tasks. The Jews were held in least esteem, even though they might be wealthy merchants.

The general ordering of social categories is not something that Glaser or later anthropologists started. It reflects an emic distinction with a ring of truth, but also one that varied between regions and even within the northern parts of Yemen. Status was clearly important in arranging the group, often based on perceived genealogical ranking; there were urban/rural distinctions and no group existed in isolation from the others. Not every segment of society has been committed equally to a particular emic model of status. Claims of a specific descent often serve to cover up inequality for economic or political opportunities. Thus, no single scheme of the social structure is valid perpetually, nor can it be assumed

² In al-Ahjur, northwest of Ṣan‘ā’, where I conducted my fieldwork, a threefold distinction was made between *sādah*, *qabā’il* and *banū khūms*, the last covering several client groups that performed circumcisions, played music, grew vegetables and shouted praise (Varisco 1982a, 154–179). See Dresch 1989, 118–123 and Rathjens 1951:177–179 for a discussion of the relation of weak client groups to tribes. Tobi 1999, 142–156, examines the relationship between Yemeni Jews, tribes and the Zaydī elite in the northern highlands.

³ The social hierarchy does not necessarily reflect the socioeconomic aspects of individuals and there were indigent and politically marginal members of the *sādah* and *quḍā'*, as noted by Haykel 2002, 206.

to be accepted by all involved. A model of social structure is simply a convenient way of categorizing; it is most often used to justify the power and prestige of those groups at the top end of a hierarchy or those who benefit the most.

Another way of looking at tribalism is to focus on core tribal values, a notion called *qabyalah* in Yemen's North. In her extensive discussion of Yemeni *qabyalah*, Najwa Adra (1997, 87) notes that it

refers to proper behavior according to accepted standards and to a tribal esthetic. Honorable behavior, especially that which involves interaction with other families or groups, or contexts in which mutual responsibilities are called upon, where the welfare of the group is involved and where presentation of self is important, is described as *qabyalah*... For the tribal population of the northern highlands *qabyalah* represents the good, the true and the beautiful.

Central to the concept is the sense of honor, at least within the group. These values support group cohesion and allow for maintaining a civil society in the absence of a central government. The principles of *qabyalah*, more general than specific aspects of tribal law (*'urf*), were expected of tribesmen and admired in those from other social categories.

Jirbah: Traditional Agriculture before Development Impact

The primary economic activity of northern Yemeni tribesmen has been agriculture, notably the production of cereal grains and a few legumes on an agricultural field (*jirbah*). The vast system of highland terraces, still visible although in decline, was developed and maintained over centuries. Unlike the coastal region, where wādī flow from the highland escarpment allows for flood-based (*sayl*) irrigation, the majority of northern highland agriculture was based on dry farming, water runoff harvesting, limited local wādī flow and small-scale spring irrigation (*ghayl*). Until the 1970s, when pumpwells began to proliferate in the highland valleys, wells were primarily used for small garden plots, especially near major towns (Gingrich and Heiss 1986, 27). The major obstacle to cultivation was the relatively low annual rainfall, which could vary widely from year to year. Total annual rainfall in the Ṣa‘dah basin for 1983–1991 averaged only 129 mm (Lichtenthäler 2000, 143). Dry farming was possible due to the ingenuity of farmers in choosing drought-resistant crops, like sorghum and barley, and increasing the moisture in fields through water runoff harvesting.⁴ The goal of such a source is to channel slope flow by arranging a line of rocks or small channels to direct it to cultivable fields. An added advantage is that the runoff often carries with it organic content that increases the soil fertility. This must be done in such a way that the field is not flooded to the extent of erosion, since the farmer will not be present when the rain falls. Runoff rights in the Ṣa‘dah region became even more important as the groundwater declined through the unregulated sinking of tubewells (Lichtenthäler 2016, 26). There are also a few underground gravity-flow channels in parts of Yemen similar to the *anat* and *falaj* systems elsewhere in the Middle East.⁵

⁴ For detailed analysis of Yemen's runoff harvesting, see Eger 1987, 1984; and Hovden 2006. Runoff harvesting in al-Ahjur is discussed in Varisco 1982a, 209–212.

⁵ I observed such an underground channel from a spring cistern in al-Ahjur, although the local inhabitants had no idea how old it was. Similar systems in the Ḥarāz area are discussed by Vogel (1988).

The traditional agricultural methods changed little over the centuries until after the civil war in the north, with the introduction of modern pumpwells and mechanization. While cultivation on the steep terraces still required animal draft power and hand tillage, the proliferation of wells opened up field systems in the central plains where tractors could be used. One of the reasons for the long-term continuity of the traditional agricultural system was that it was well adapted to the local environment. Field systems could be created and maintained by the household, in which men, women, and children were actively involved in cultivation and the care of family livestock. The tools were usually made locally, using wood from regional trees for plow beams, yokes and handles (Varisco 1982b). For hand tillage the most important tool was a *mafraṣ*, a type of mattock with a narrow adze-shaped blade on one side. Those with access to a smith would have iron plowshares, but pointed wooden shares were also used. Draft animals on large fields consisted of bulls and at times camels, but for steep terrace systems, donkeys were more common. Local pasture and fodder from sorghum stalks and leaves was generally sufficient for these animals, but some lucerne (*qaḍb*) was grown where there was perennial flow from springs or wells.

The dominant crop in the northern highlands, given the subsistence economy of the past, has been sorghum (*dhurah*), a versatile cereal grain which can be cultivated at up to 3,000 meters elevation.⁶ A Yemeni proverb states that sorghum is as important for food as a woman is to running the household (*al-bayt al-mara'ah wa-al-ḥabb al-dhurah*) (al-Akwa' 1984, I, 304).⁷ Sorghum adapts well to drought and is able to survive on as little as 250 mm per year. The sorghum plant consists of a central stalk, leaves and a head or panicle of grain near the top. In the highlands the head is densely packed with seed kernels. The basic distinction of the variety is by color (white, yellow, red), but there are many names for local varieties. Sorghum provided for a variety of uses. The nutritious grain, threshed with the use of a flail on a stone floor, could be ground into flour for bread or for a local porridge known as *'aṣīd*. The leaves, often stripped before the harvest of the heads, along with the upper part of the stalk provided fodder for animals. The bottom part of the stalk, when dried, serves as firewood for the *tannūr* oven. Sorghum grown on rainfed land may be less than a meter high and has less fodder value than that grown with irrigation.

The two other important cereal grains in northern Yemen have been wheat (*burr*) and barley (*sha'īr*), which are limited to higher elevations above 1,000 m. In the past emmer wheat (*Triticum dicoccum*), known locally as *'alas*, was cultivated. Emmer is a hulled variety with two or three grains in each envelope. It must be crushed manually by a mill rather than threshed by draft animals. While emmer required more work, there is almost universal agreement in Yemen that it made the best bread (al-Wāsi'ī 1948:138). Barley is more drought resistant and tolerant of soil salinity than wheat, but not as able to withstand the cold as winter wheat varieties. A huskless barley variety known as *sult* was also grown. Maize is a relatively recent addition to Yemen, but gained in popularity on irrigated land in the highlands after the 1960s civil war.

⁶ Kopp 1981 provides estimates for the production of sorghum in all regions of Yemen. For details on the history of sorghum production in Yemen, see Varisco 1985. It is important to note that British scholars often referred to sorghum as "millet," but this should not be confused with the millets (*Pennisetum* and *Panicum*) in Yemen.

⁷ It should be noted that rural tribal women enjoyed much greater freedom than their urban sisters (Rathjens 1951, 184). In tribal customary law, offenses against women were severely punished (Rossi 1948,24).

Apart from the cereal grains, other traditional crops included legumes, such as lentils (*‘adas*), broad beans (*bāqillā’*) and cowpeas (*dijr*); the latter two were often intercropped with sorghum on irrigated land. The northern part of Yemen in the Ṣan‘ā’ and Ṣa‘dah basins was especially famous for its varieties of grapes in areas above 800 m (Kopp 1981, 99). Coffee was grown on the Western Escarpment between 1,000 and 2,000 m, where the ascending mists provided a perfect location. *Qāt* (*Catha edulis*) production was limited until the 1970s, when its production and use greatly increased.⁸ Several kinds of fruit and nut trees were also cultivated, but only in limited quantities. Lucerne (*qaḍb*) was cultivated where there was perennial water. Only a few vegetables were cultivated, mainly in gardens irrigated from hand-dug wells. Tribesmen usually considered cultivation of vegetables as having less honor.⁹ In the northern highlands these vegetable farmers include a servile group known as *qashshām*,¹⁰ in reference to someone who grows and sells *qushmī*, the Yemeni term for a long, white radish also known as *fijl*. In the valley of al-Ahjur the *qashshām* also cultivate the leek (*karrāth* or *qushmī akhḍar*) and the scallion (*baṣal*). It is wrong to assume that the status of the *qashshām* is related specifically to the vegetables he grows. Tribal farmers grow radishes, leeks, and scallions for their own household consumption. The difference is that the *qashshām* grows and sells vegetables as a profession; he continually deals with the market. Nor can the vegetables he grows be stored from year to year, as cereal crops and legumes can. It is this association with mundane concerns in commerce that has been considered beneath the dignity of a tribesman. Perhaps another reason for the low status of the *qashshām* was the association of vegetable farming with the Yemeni Jews, who also cultivated these vegetables. The *qashshām* generally lived near or in a market town. In the past he did not own land, but was a share-cropper.

‘Urf and Sharī‘ah: Tribal Customary and Islamic Law

The Islamic legal tradition (*sharī‘ah*), including the formal texts of *fiqh*, provide only a few rules or principles for agricultural production and irrigation, building on relevant traditions from the Prophet Muḥammad. In Yemen, as in many parts of the Islamic world, there is a balance between formal Islamic law and customary law and practice, usually known as *‘urf*.¹¹ While there have been elements of tribal customary law that have been criticized by Islamic scholars, both Zaydī and Shāfi‘ī, in the past, these related to issues like the denial of inheritance rights to women and resolution of blood feuds rather than how farmers practice agriculture and allocate irrigation water.¹² Yemeni tribesmen vigorously reject the idea that *‘urf* goes against *sharī‘ah* (Weir 2007, 148). It was often the case that customary law was preferable over Islamic law because tribal decisions tended to focus on compromise and healing a social breach; decisions were usually made sooner with less expense than a formal Islamic court (Meissner 1986, 271).

⁸ For the role of *qāt* in the northern highlands, see Shelagh Weir (1985). The debate over the use of *qāt* in Yemen is discussed in Varisco (2012).

⁹ It is reported that during the 1970s in al-Maḥābīshah, near Ḥajjah, tribesmen did not sell their own produce in the market, nor would they sell anything sold by weight (Meissner 1986, 197–198).

¹⁰ The low status of the *qashshām* is reflected in a Yemeni proverb recorded by Goitein 1934, 44: “The daughter of a *qashshām* and I paid the price for an Imam’s daughter (*bint al-qashshām ushrat sharṭ bint al-imām*).”

¹¹ For the relationship between *‘urf* and *sharī‘ah* in Yemen, see Donaldson 2000, 45–51; Dresch 2006; 1989, 184–188, 229; Maktari 197; Rathjens 1951; Rossi 1948 and Weir 2007, 143–225.

¹² Such violations of Islamic law were referred to as *tāghūt*; see Rossi 1948, 9–18 for an extended discussion of this issue in Yemen.

Customary practices from the very beginning of Islam are relevant for understanding irrigation in an Islamic context. There are several major *ḥadīth* sources providing the overall principles; these were clearly based on customary practices at the formation of Islam (Varisco 1982a, 229–244). Muḥammad said that “Muslims share in three things: water, pasture, and fire” (*al-Muslimūn shurakāʾ fī thalāth al-māʾ al-kalāʾ wa al-nār*). This was considered an inalienable right, although there was a hierarchy of needs, starting with water for drinking, then for watering animals, ablutions, and irrigation. Muḥammad also noted that whoever held back surplus water would have that amount of mercy withheld from him on the Day of Judgement. In this sense, water is an ownerless resource (*res nullius*), except for water in a given container or removed from a well on the land a man owns. The point is that water is a shared resource with concomitant obligations, a contractual agreement rather than ownership per se.

It is also important to recognize that access to water cannot be separated from the overall process of resource allocation, including land. In general, water rights are attached to land rights. Islamic jurists have usually argued that a water share (*shirb*) cannot be sold separately from the land it is meant to irrigate, nor can it be inherited separately from land (Abū Yūsuf 1985, 55). In Yemen it has often been possible to sell or rent a specific time share. The majority of cultivable land in northern Yemen is privately owned (*milk*), usually verified by documents, although some endowment (*waqf*) land is leased. Communal land is for pasture rather than agriculture. It was possible to obtain unowned land through a process known as *ihyāt al-mawāt* (the revival of wasteland). In the Zaydī highlands this is accomplished by the following: plowing (*ḥarth*); planting or sowing (*zarʿ*); cutting down trees (*qaṭʿ al-ashjār*); leveling the land (*taswiyyat al-ardʿ*); building a wall or bounding a field (*ittikhādh aʿrām aw sūr ʿalayhā*); digging a trench (*khandaq*); or placing markers on the borders of a plot (*ḍarb aʿlām fī jawānibhāh tumayyizhāh ʿan ghayrihā*) (al-Samāwī 1974, 214). This became a development problem in the Ṣaʿdah region, as noted by Lichtenthäler (2016, 27), where most of the land was not cultivated and not owned.

A well-known Islamic legal point, also reflected in customary law, is the right of pre-emption (*shufʿah*). The Zaydī jurist Ibn Miṭṭāḥ (1357/1938, III, 206) defined *shufʿah* as the pre-eminent right of a shareholder in the purchase of a property (*al-ḥaqq al-sābiq li-milk al-mushtarā li-l-sharīk*). Under Zaydī law there are four cases in which the right of *shufʿah* is said to apply (al-Murtaḍā 1975, V, 6):

1. joint ownership (*khaltah*);
2. partnership in water allocation (*shirkah fī shirb*);
3. partnership in a road or access route (*shirkah fī ṭarīq*);
4. adjacent neighbors (*jīwār al-mulāṣiq*).

The purpose of this doctrine is to protect the rights of shareholders who entered into a contractual agreement in relation to shared property, such as a spring, well, or qanat. There is a recognition that the right to a share of water involves an investment in a distribution network over land to exploit water for irrigation. In the customary law of the Banī Hushaysh this right is known as *juwārah*, in which land for sale must first be offered to a fellow tribesman (Dostal 1974, 3; see also Dresch 1989, 81 and Meissner 1986, 259). Similarly, if a tribesman is in debt to someone in another tribe, the creditor only has a limited right to use his land and cannot take it over (Kopp 1981, 136).¹³

¹³ *Shufʿah* in Wādī Ṣaḥr was restricted to joint ownership after the 1962 revolution, according to Mundy 1979, 183, note 10.

Since the Muslim community shares the resource water, there must be some way of providing fair access to that resource. This is covered by the idea of a *ḥarīm*, a type of buffer zone around a water source. The term *ḥarīm* literally refers to something which is inviolable; thus, the idea that it is forbidden to exploit this land in any way that limits access for legitimate purposes. Although the land of the *ḥarīm* may be owned, the owner is not at liberty to do with it as he pleases. The physical extent of a *ḥarīm* varies from source to source and school to school. The Prophet Muḥammad is reported to have said that the *ḥarīm* of a spring (*‘ayn*) should be 500 *dhirā‘* or about 325 meters on all sides (Abū Yūsuf 1885, 57). This refers to space within which it is forbidden to look for new water and does not mean that the land must be left vacant. In Zaydī Yemen, the *ḥarīm* of a well on open land was usually 60 *dhirā‘* (39 meters) if for irrigation or 40 *dhirā‘* (26 meters) if it is used for pasture and flocks. These distances were suggested when all wells were hand dug and are obviously insufficient with the appearance of tubewells which can mine much deeper aquifers.

Another legal issue relating to agriculture is the need for an agricultural contract (Donaldson 2000). As defined by the Zaydī jurist al-Samāwī (1974, 209), the contract (*muzāra‘ah*) is for the rental of land in which the landlord receives a fixed share of what is grown on the land and the tenant receives a fixed share of what is grown according to a mutual agreement. The land can also be leased for a designated sum of money, in which the tenant keeps all that he produces. The legal texts usually leave the determination of the amount of each share up to the parties involved. However, Muḥammad is quoted as forbidding an agricultural contract in which the tenant only receives a third or fourth (al-Sayāghī 1968, III, 650). Such a contract is only permitted if it is a special case of long-term arrangement (Zayd ibn ‘Alī 1966, 284). The rental agreement must be free of risk (*bi-kull shay‘ mimma laysa gharar*), according to al-Sayāghī. If a tenant is bound to pay off two-thirds of his crop, and it is a poor crop, he may not have enough for his own family’s needs. In practice, the specific shares agreed upon in the contract will vary depending on the nature of the crop, land, region, and the simple law of supply and demand.

Given the importance of both cultivable land and water for agriculture, it is not surprising that customary law provided mechanisms for the mitigation and resolution of disputes. A study at Ṣan‘ā’ University concluded that 70–80% of conflicts in rural Yemen related to water (Giesecke 2012, 2).¹⁴ A perennial problem when water is shared along a watercourse is the proverbial upstream/downstream conflict. In a dispute over the use of flood flow to irrigate date palms, the Prophet Muḥammad ruled that the higher fields should be watered before the lower in a gravity-flow system (al-Māwardī 1960, 180). This principle is often followed in Yemen, especially when there is sufficient water to share. As noted by Lichtenthäler (2000, 145) in the Ṣa‘dah region, for local narrow wādīs where it was difficult to expand the land area, the water demand for the flow was limited and thus there was no hindrance to downstream use of the flow. There are exceptions along the major wādī systems in the Tihāmah, where historical precedence can override location. Similarly, this rule does not apply when water is extracted from a stationary source, like a cistern or spring in which shares are designated by a certain time period or an amount of flow to a specific set of fields.

¹⁴ This figure appears to be exaggerated, as cases of theft are also common; see Weir 2007, 195–206.

Tanmiyah: Agricultural Development and Change

During the Mutawakkilite Kingdom of Yemen under the imams Yaḥyā and Aḥmad, there was virtually no development of agriculture in the northern highlands (Varisco 2018). The civil war, which lasted from 1962 to 1969, further prevented development. In the early 1970s UNDP created the Tihāmah Development Authority (TDA) and the Southern Uplands Rural Development Program (SURDUP) to coordinate agricultural and infrastructure development due to the weakness of the central government ministries. The Northern Regional Agricultural Development Project, established later, provided only minimal support to farmers north of Ṣan‘ā’, with hardly any near the Ṣa‘dah region. Strengthened by support from USAID in the 1980s, the Ministry of Agriculture gradually increased its extension services, but the most effective development came from specific bilateral projects, such as the Yemeni German Plant Protection Project based in Ṣan‘ā’, a German-funded agricultural station in al-Bawn north of Ṣan‘ā’ and the Dutch Rangeland Project in Dhamār.

While multiple foreign experts descended on Yemen to advise on agricultural development, little progress was made. In part this was due to the corruption of officials in government circles, but also to consultant recommendations that often failed to take into consideration the specific social and economic context of Yemen. For example, in the late 1970s the University of Arizona carried out a sorghum improvement project for USAID, which turned out to be mainly an opportunity to expand their seed bank with no practical results for Yemeni production of sorghum. In the mid-1980s an economist visiting Ṣan‘ā’ from Washington suggested that Yemen stop growing sorghum, still its main crop, without realizing that, in addition to its subsistence value for households, the fodder value made it at times a cash crop. In their brief roadside perspectives, foreign consultants often marveled at the ingenuity of the terrace system, but were unable to see the value of indigenous practices or recognize the important role that women played in the agricultural system. It was assumed that Yemenis were still quite “primitive” and needed to adopt Western modes of production. As a result, “modernizing” Yemeni agriculture was often little more than importing expensive machinery that could not be maintained, pesticides, seeds and fertilizers (Morris 1991; Varisco 1994a).

The most significant change in all of North Yemen after the civil war was the rapid and unregulated proliferation of tubewells. The amount of land irrigated by wells expanded from 3% of the total cultivated area of the Yemen Arab Republic in 1973 to 37% of the unified Republic of Yemen in 2003, with a major decline in dry farming from 84% to 45%. It is estimated that some 800 drilling rigs operated in Yemen by 2000 and 99% of all water extracted from wells was unlicensed (Giesecke 2012, 3). In 2005 there were as many as 55,000 active wells in Yemen, the vast majority tubewells. By 2014 it is estimated that there were 100,000 operating farm wells, irrigating 40% of the country’s cultivated area (Ward 2014, 91). As has been pointed out for years, Yemen is literally running out of water as it consumes more than the annual recharge. In the Ṣan‘ā’ basin it is estimated that by 2007 abstraction exceeded recharge by five times (al-Ameri 2011, 21). Adding to the water crisis, it is estimated that the overall efficiency of surface irrigation is only 30–40% and a mere 4% of the total irrigated area (25,000 ha or 344,691 ha in 2005) applied improved systems of pipe and sprinklers (al-Asbahi 2005, 3).

In the delicately balanced terrace systems in Yemen, erosion is an ever-present danger. If fields near the top of a terrace sequence are not maintained, there can be a domino effect with collapsed walls and migration of soil below. There has been extensive erosion of highland terraces, exacerbated during the civil war and the subsequent out-migration of many Yemeni tribesmen for work abroad in the 1970s and 1980s (Hovden 2006, 49). To some extent, maintenance of the terraces was left to women, but the level

of out-migration for work led to the widespread abandonment of more marginal terraces (Adra 2013). Another cause of neglect of rainfed terraces has been the switch to newly cultivated land in the central plains due to the ability to pump water from tubewells. Socioeconomic change is also a factor, as the previous tradition of young men continuing in the agricultural work of their fathers and grandfathers has changed with other forms of making a living or migration to urban areas.

Sharecropping is still widespread in Yemen, although the relative loss of manpower for traditional agriculture has had an impact on sharecropping contracts. In 1978, in the village of al-‘Urrah in Wādī al-Ahjur, the rental fee on irrigated land was a quarter of the crop for sorghum (*dhurah*), maize (*rūmī*), or wheat (*burr*). The share for growing barley (*sha‘īr*) was only an eighth on irrigated land. Land cultivated with a cash crop, such as coffee or *qāt*, went for a third of the harvest. Residents noted the rental fee for most crops was a third in the days of the imams before the 1962 revolution. This indicates that they were better off, in terms of the contracts, than they were before the revolution with major changes in the economy.

Crop choice has also changed in major ways since the formation of the Yemen Arab Republic. The most important example is production of *qāt* trees, increasing from 8,000 ha in 1970 to 103,000 ha in 2000. The demand for *qāt* leaves, a stimulant that has been used in Yemen for five centuries, rose with the influx of cash remittances into the rural sector and expanded or new cash-producing livelihoods in urban areas. It is estimated that as much as 40% of Yemen’s irrigation water, mainly from pumpwells, is devoted to *qāt*. Growing *qāt* in new areas was facilitated by expansion of the road network in Yemen, since the leaves must be marketed fresh. It is often assumed that the increase in *qāt* trees was at the expense of coffee, for which Yemen has long been famous.¹⁵ Coffee and *qāt* arrived in Yemen about the same time via a Šūfī network in the 15th century (Varisco 2012, 71). While the coffee trade from Yemen’s port of Mocha was once the major source, it was long ago eclipsed by coffee production worldwide. It is obvious that some farmers growing *qāt* could cultivate coffee, but the decline in Yemeni coffee has more to do with market forces, given the high cost per kilogram of Yemeni beans. It is also important to note that *qāt* can be grown in a wider variety of ecozones than coffee, which does best on the slopes of the Western Escarpment where there is mist.

North Yemen before the 1962 revolution was generally self-sufficient in food production. There was even limited export to nearby Saudi Arabia. However, the major increase in population and decline in local agriculture have today made Yemen dependent on food imports. It is estimated by the United Nations that Yemen’s dependence on food imports is 80–90%, a drastic situation exacerbated by the recent humanitarian crisis in which food and medical supplies have barely been allowed into areas controlled by the Hūthīs. With the decline in rainfed production, there is less cultivation of wheat and barley. In the 1960s, the United States, in their “Food for Peace” program, shipped white flour to Yemen.¹⁶ Although not as nutritious as the local varieties of wheat, the subsequent import of cheap

¹⁵ By 1983 in the Republic of Yemen the cultivated area in the northern governorates of Ḥajjah, al-Jawf, al-Maḥwīt, Ma’rib, Ṣa’dah, and Ṣan’ā’ for coffee was 14,082 ha, while there were 35,070 ha for *qāt* (YAR 1983). Before the 1960s there was virtually no cultivation of *qāt* in the Ṣa’dah basin, although there was in the mountain area of Rāziḥ to the west (Lichtenthäler 2016, 120).

¹⁶ In al-Ahjur during the late 1970s imported wheat, whether in reference to seed or flour, was locally known as *kanada* or *kanadī*. This is not, in fact, an Arabic term, but actually the Arabization of the last name of the American president John F. Kennedy, whose name in Arabic appeared on the bags of wheat shipped to Yemen in the early 1960s.

foreign white flour made it less profitable to grow wheat, even at the household level. Demand in urban markets for vegetables, such as potatoes and tomatoes, caused an increase in their production, invariably with pumpwell irrigation, but marketing was generally insufficient.

It appears that grape production, which is especially important in the Ṣa‘dah region, rebounded after the 1962 revolution. By 1998 Yemen ranked sixth among Arab countries for grape production, with increased production annually. In the 2003–2004 season, however, a major decline in grape production was reported, from 168,800 tons in 2003 to 104,100 tons in 2004 and a reduction in area from 22,200 ha to 12,000 ha (USAID 2005, 2). Most grapes are consumed locally, either fresh or as raisins. In 2003 Yemeni export of grapes amounted to only 4% of the total export of agricultural products. Efforts by the Tihāmah Development Authority led to an increase in tropical fruit production in the coastal region, especially bananas and papayas. Shelagh Weir (2007, 20) reports that bananas gained more commercial value in the 1970s since their leaves were used to wrap *qāt* in bundles.

The pace of socioeconomic change after the end of the Zaydī imamate in the north facilitated a rethinking of traditional status distinctions. Although *sādah* were integrated into Yemeni society following the civil war, they no longer had the level of prestige afforded them in the previous millennium, nor were they in principle under the protection of the tribes with the formation of the modern nation state. Tribes maintained their influence in rural areas, although the role of important shaykhs was often co-opted by the central government and tribal militias were created to counter what was often perceived as government interference. Officially, the traditional low-status groups were now afforded equal rights as citizens. The emergence of a cash economy lessened the dependence of such groups on the tribes. The demand for some services, like the music of the *muzayyin*, allowed some to accumulate wealth. Vegetables were no longer the exclusive domain of the *qashshām*. During the 1990s a village in Wādī al-Ahjur elected a *qashshām* as their shaykh, something that would not have happened during the imamate. Old status markers were still hard to overcome, as social barriers in marriage often continued (Kopp 1981, 141).

The Future of Agriculture in Northern Yemen

To predict the future of agriculture in Yemen is as fraught with uncertainty as planning the rebuilding of the state after the events of the disastrous campaign waged since 2015 by the Saudi coalition against the Hūthīs. The long and rich tradition of agriculture in South Arabia suggests that there is hope for sustainable production, but this will have to be with far more efficient use of the dwindling water resources. A major hurdle results from the large population, currently estimated as high as 28 million in 2018 and estimated to be over 47 million by 2050. The fact that the bulk of Yemen’s population is still rural suggests that agriculture at the household level is not going to disappear soon. There is sufficient fertile land for production, but the overdraw of groundwater resources severely limits expansion. The potential for increased dry farming, especially using runoff water harvesting techniques, is one of the few options available. Such agriculture would have to focus on traditional subsistence crops, which could at least provide food for the table. However, the reliance on food imports and loss of interest in the hard labor with minimal returns of past practices work against such a revival.

The current war that has created one of the worst humanitarian crises of the 21st century and has so devastated Yemen’s infrastructure and economic base negates virtually all the previous development efforts since the founding of the Yemen Arab Republic. The collapse of the state has resulted in an almost total inability of ministries to assist Yemen’s agricultural systems. The expected massive pouring

in of millions of dollars in post-conflict aid will not magically recreate a new verdant Yemen, especially given the likelihood of continued corruption due to the sheer amount of aid provided. The best hope for reviving agriculture in Yemen is to build on and improve the systems that were developed over centuries (Varisco 1995, 1992). This includes an expansion of water runoff harvesting, which was widely practiced in the pre-Islamic era, as well as more efficient use of wadi flood flow and spring systems. It is absolutely necessary to monitor groundwater extraction, but this will be one of the most difficult challenges facing the post-conflict government.

While some foreign observers routinely blame Yemen's problems on its tribal past, the centuries of tribal governance as the main civil society in rural areas and the role of customary law in resolving disputes over natural resources should not be dismissed. The set of values embedded in Yemen's *qabyalah* can serve as a basis for renewing the social contract in a country ravaged by conflict and outside intervention. The traditional value of cooperation at the local level, which stimulated most rural development in the 1970s and 1980s, can provide a safety net. Adapting long-standing tribal values to the needs of modern agricultural production can correct past policies that led to the loss of smallholdings and the consolidation of land by elites around unregulated tubewell systems. Building on the indigenous agricultural knowledge of Yemeni tribesmen that worked in the past does not mean returning to the past.¹⁷

The future of Yemen's current population, which is overwhelmingly young, must include a vibrant agricultural sector regardless of the obstacles. There are few other options for economic survival. Yemen's oil and gas production, severely curtailed by the current war, is limited; the income from this, even if not reduced by corruption and patronage, is not a solution. There is little opportunity for industrial expansion, especially given the reluctance of firms to invest in a country with such a conflict-ridden history and lacking in basic infrastructure. Since the expulsion of perhaps as many as 800,000 Yemeni workers from Saudi Arabia and the Gulf States in the first Gulf War, there is little demand for unskilled Yemeni labor in nearby countries. Concerns about terrorism also severely limit the ability of Yemenis, especially young men, to migrate outside of Yemen for jobs.

So what is the best way forward? More than anything else, the future of Yemen must be managed by Yemenis themselves and not by the dictated policies of neighboring countries and major development organizations. Regional politics and the dominant economic role of oil and gas work against the sustainable rebuilding of Yemen. The lack of leadership, with political operatives more interested in promoting their own agendas than the good of the people, does not bode well for the success of a future government. Should Yemen remain fragmented and not reunify, the future seems even more dismal. The current war has been particularly damaging to the northern parts of Yemen with the historic town of Sa'dah decimated and most of the regional infrastructure, hospitals and schools damaged or destroyed. The psychological damage of trauma from the war, especially for children, is an additional negative consequence.

One ray of hope is the accumulated indigenous knowledge about Yemen for each microzone. While it is not possible to simply return to the traditional methods, largely a function of subsistence production, it is possible to improve local production at the household level and create sufficient surplus for local

¹⁷ An example is the indigenous Yemeni knowledge regarding plant protection methods, which reduces the need for imported and dangerous pesticides (Varisco 1995).

distribution. Until such time as there is a government capable of providing assistance and effectively monitoring water extraction, production needs and marketing, the resilience of tribal customary law in the north can provide temporary relief. The Islamic principles of water resource use, when properly applied, were created to ensure sustainable use. Convincing young Yemenis to stay on the farm or take up farming may be a difficult task, but there are few other viable options for the majority. A millennium ago the Yemeni savant al-Hamdānī (1983, 317) called his homeland the Verdant Yemen (*al-Yaman al-khadrā*). It is well worth the effort, no matter how difficult in the future, to keep Yemen verdant with a sustainable agricultural system and the maximum of self-reliance that has sustained the people of Yemen throughout their history.

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