Small-Scale Farmers, Foreign Experts, and the Dynamics of Agricultural Change in Sudan, Eritrea, and Djibouti before the Second World War

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In the first half of the twentieth century, small-scale farmers in the Anglo-Egyptian Sudan, Eritrea, and the Côte Française des Somalis (Djibouti) introduced a number of innovations into their practices. Across the region, peasants began to plant new crops, such as coffee, and new varieties of old crops, such as American strains of long-staple cotton, alongside traditional crops of sorghum, millet and wheat.[1] In some areas, new forms of water management were adopted. Peasants living along the Sudanese Nile established producer collectives to pool their resources to buy, install and run mechanical irrigation pumps.[2] Some pastoralists on the Red Sea littoral began to build earthen dams and rudimentary canals to divert the water from torrential rivers onto cultivable land on their banks.[3] Each of these innovations required other changes in cultivation practice. New crops required different kinds of attention; they had their own planting and harvesting schedules and required their own kinds of care as they developed. New irrigation practices often required new ways of managing land to ensure the best use of the water while guaranteeing the continued fertility of the land.

Historians have largely ignored the important role that small-scale farmers played in agricultural change in Sudan, Eritrea, and Djibouti. Small-scale producers have often been portrayed in scholarly accounts as inherently conservative. These accounts tend to portray innovation as the prerogative of the foreign capitalists, scientific experts and colonial officials who worked together to design and implement large-scale, export-oriented agricultural development programs. This has been true of

[1] Ufficio Agrario dell'Eritrea, "Attività Agricola in Eritrea dal 1923," Dec. 1931, FASC1965, Istituto Agrinomice per l'Oltremare, Florence (IAO); Steven Serels, "Spinners, Weavers, Merchants and Wearers: The Twentieth Century Decline of the Sudanese Textile Industry," in Saud T. Ali, Stephanie Beswick, Richard Lobban, and Jay Spaulding, eds., *The Road to Two Sudans* (Newcastle upon Tyne, UK: Cambridge Scholars Press, 2014), 166–67.

[2] Steven Serels, *Starvation and the State: Famine, Slavery and Power in Sudan, 1883–1956* (New York: Palgrave Macmillan, 2013), 165–69.

[3] Steven Serels, *The Impoverishment of the African Red Sea Littoral, 1640–1945* (New York: Palgrave Macmillan, 2018), 146–47.

scholarship that praises as that which critiques such programs.[4] In this regard, histories of these three countries are not unique. The myth of "peasant conservatism" has played an important structural role in the study of the Global South throughout much of the second half of the twentieth century. Cold War politics and their legacies created an intellectual and institutional environment that encouraged scholars to assume that peasants were unwilling to engage in self-directed agricultural change.[5] However, there was nothing new about this characterization of peasants. Post-war scholarship often echoed the older racist and classist assumptions that had been held by colonial officials. The myth of "peasant conservatism" was one such echo. As a result, scholars easily found evidence of it within the colonial archive.

Though harder to come by, the documentary evidence that contradicts this myth can also be found within the archive. Doing so requires not just the well-established technique of reading against the grain, but also a more careful sifting through the documentary record for fragmentary information that was often included haphazardly. The colonial officials that compiled the archive were not looking for proof of the dynamism of small-scale farmers, so they did not seek to systematically record it. Nonetheless, evidence for this does exist. Over the past two decades, a number of scholars studying other parts of the colonial world have used the official archive to give the lie to the dichotomy of colonized/unchanging and colonizer/dynamic that underpins the myth of "peasant conservatism."[6] These techniques have not been used to reexamine the history of agricultural change in Sudan, Eritrea and Djibouti. This article is both an attempt to similarly reread the colonial archive of these three countries and to point a way for future scholarship. Towards this end, the article examines just one aspect of agricultural change—the production and circulation of agricultural knowledge within and across the region in the first half of the twentieth century.

This article is organized into two sections, each one looking at one half of colonized/unchanging and colonizer/dynamic dichotomy. First, the article addresses the claim that an innate conservatism led small-scale farmers to refuse to submit to

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[4] For some illustrative examples, see James McCann, *People of the Plow: An Agricultural History of Ethiopia, 1800–1990* (Madison, WI: University of Wisconsin Press, 1995); A. Trilsbach, "Historical Development of Agriculture," in G.M. Craig, ed., *The Agriculture of the Sudan* (Oxford: Oxford University Press, 1991), 177–92; M.W. Daly, *The Imperial Sudan: The Anglo-Egyptian Condominium, 1934–1956* (New York: Cambridge University Press, 1991).

[5] Eric B. Ross. "Peasants on Our Mind: Anthropology, the Cold War, and the Myth of Peasant Conservatism," in Dustin M. Wax, ed., *Anthropology at the Dawn of the Cold War: The Influence of Foundations, McCarthyism and the CIA* (London: Pluto Press, 2008), 108–32.

[6] For some examples, see Patrick Harries, *Butterflies and Barbarians: Swiss Missionaries and Systems of Knowledge in South-East Africa* (Oxford: James Currey, 2007); Christopher Conz, "Wisdom Does Not Live in One House": Compiling Environmental Knowledge in Lesotho, Southern Africa, c. 1880–1965" (Ph.D. dissertation, Department of History, Boston University, 2017); Judith Ann Carney, *Black Rice: The African Origins of Rice Cultivation in the Americas* (Cambridge, MA: Harvard University Press, 2001).

the directives of colonial agricultural experts. Small-scale farmers had good reason not to listen to these experts. Though colonial experts believed that their own technical, scientific knowledge was a uniquely powerful tool for managing the natural world, they quickly developed an aura of failure at the start of the twentieth century. This is in part a result of the nature of scientific experimentation, in which negative results are common. In the process of deducing what worked, experts necessarily also determined what failed. This was true for experimental farm, which often failed to produce desired yields, as well as for technically managed agricultural improvement schemes, which typically ended in financial disaster. Small-scale farmers were not being conservative in avoiding the directives of scientific experts; they were acting rationally to safeguard their own interests.

The second part of the article shows that small-scale farmers were open to listening to outsiders who could demonstrate that their knowledge helped improve outcomes. There were three particularly important groups of non-European outsiders that migrated to and within the Anglo-Egyptian Sudan, Eritrea and the Côte Française des Somalis in the first half of the twentieth century—Yemeni farmers, West African pilgrims, and former slaves. Each of these groups settled down locally and took up farming, either on their own or through some form of dependent relation with a landowner. They brought with them expert knowledge derived through experience working the land elsewhere. In contrast to colonial agricultural experts, some of these outsiders became associated with success. Unfortunately, the extant documentary record pertaining to the activities of these groups and their interactions with local communities is thin. Nonetheless, there is tantalizing fragmentary evidence that this success inspired local small-scale farmers to change their practices.

At the start of the twentieth century, communities in the Anglo-Egyptian Sudan, Eritrea and the Côte Française des Somalis were particularly invested in agricultural innovation because they were looking for ways to husband their remaining resources after a historically unparalleled regional disaster. The outbreak of the Mahdist Rebellion in Central Sudan in 1883 set off a multi-sided, violent political succession conflict that lasted over fifteen years and involved the British, French, Ethiopian, Italian, Egyptian and Mahdist Sudanese armies, as well as numerous indigenous militias. The conflict was especially devastating for two reasons. First, it accelerated the local adoption of the rifle as the weapon of choice. Previously, the most widely used military technology in the region was the spear and political violence was generally symbolic in nature. With the proliferation of modern weaponry, the killing of adversaries on the battlefield became a central goal of fighting.[7] Second, the fighting directly led to the outbreak of a severe epizootic. In 1887, Italian military officials trying to provision their conquering force unknowingly imported cattle infected with rinderpest into Massawa. Rinderpest is a cattle disease

[7] Jonathan Grant, *Rulers, Guns, and Money: The Global Arms Trade in the Age of Imperialism* (Cambridge, MA: Harvard University Press, 2007), 37–59; John Dunn, "Egypt's Nineteenth-Century Armaments Industry," in Donald Stoker Jr. and Jonathan Grant, eds., *Girding for Battle: The Arms Trade in a Global Perspective, 1815–1940* (Westport, CT: Praeger, 2003), 1–24.

that kills up to 90 percent of infected animals in virgin populations such as those that existed throughout the region. The epizootic quickly spread along overland trade routes throughout the region, decimating herds.[8] Since cattle formed the basis of much pastoralist wealth and provided much of the labor for cultivation, the epizootic precipitated a devastating famine. Richard Pankhurst has estimated that as much as two-thirds of the population of some regions perished during the famine.[9] Though the acute food crisis ended in 1892, the disease remained enzootic and fighting continued. By the time the fighting had ended in 1898 nearly 7 million people had died in Sudan alone, according to British military estimates.[10] Those that had survived were left generally poor and food insecure. In the decades that followed, small-scale farmers and other members of local society looked for new ways to move forward. Rather than try to recreate what had been destroyed, they sought out new practices better suited to their ever-changing present.

Colonial Experts

At the start of the twentieth century, colonial agricultural experts misrecognized the dynamics on the ground in the Anglo-Egyptian Sudan, Eritrea and the Côte Française des Somalis. When British, Italian and French experts studied, experimented and analyzed local practices they did so without a clear historical lens. Generally, technical experts believed in the uniqueness of their own scientific knowledge. By extension, they generally assumed that other forms of knowledge were too weak to form the basis for effective and beneficial management of the natural world. Since the communities indigenous to the region lacked access to western scientific knowledge, they were believed incapable of escaping on their own from the patterns of human-environment interaction that structured their lives. In other words, technical experts tended to assume that the human and natural world in the Anglo-Egyptian Sudan, Eritrea and the Côte Française des Somalis that they encountered had existed since

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[8] Richard Pankhurst and Douglas Johnson, "The Great Drought and Famine of 1888–92 in Northeast Africa," in D. Johnson and David Anderson, eds., *The Ecology of Survival: Case Studies from Northeast African History* (Boulder, CO: Westview Press, 1988), 63; John Rowe and Kjell Hødnebø, "Rinderpest in the Sudan 1888–1890: The Mystery of the Missing Panzootic," *Sudanic Africa* 5 (1994), 149–79.

[9] For descriptions of the famine, see Richard Pankhurst, *The Great Ethiopian Famine of 1888–1892: A New Assessment* (Addis Ababa: Haile Sellassie I University, 1964); Steven Serels, "Famines of War: The Red Sea Grain Market and Famine in Eastern Sudan 1889–1891," *Northeast African Studies* 12, 1 (2012), 73–94; Rudolph von Slatin, *Fire and Sword in the Sudan: A Personal Narrative of Fighting and Serving the Dervishes, 1879–1895* (London: Edward Arnold, 1896), 452–57; Francis Reginald Wingate, *Ten Years' Captivity in the Mahdi's Camp 1882–1892* (London: Sampson, Low, Marston & Co, 1892), 284–91; Ferdinando Martini, *Nell'Africa Italiana,* 8th ed. (Milan, Italy: Fratelli Treves, 1925), 29–31.

[10] While this is just an estimate and is not based in a systemic analysis, it nonetheless demonstrates the scale of the devastation. Foreign Office, Government of the United Kingdom, *Reports by His Majesty's Agent and Consul-General on the Finances, Administration and Condition of Egypt and the Soudan in 1903,* Cd1951 (London: His Majesty's Stationary Office, 1904) 79.

time immemorial in a virtually unchanging steady state. This state was static precisely because indigenous communities could not impact it and because the natural world, though subject to rhythmic fluctuations, was in the time scale of human existence unchanging.

This technical imaginary transcended imperial divides. British, French and Italian technical experts assumed that conditions had always been as they saw them. They could not conceive that conditions had ever been otherwise—that there had been a time where populations were greater and land was more intensively utilized, as had been the case before the devastation of the 1880s and 1890s. By taking the present and projecting it into the past, technical experts erased from their view the tragedy that local communities saw all around them. Experts participated in this erasure despite the existence of data on earlier periods. These experts could have consulted with those imperial military officers who had witnessed the devastation. They also could have looked in their own colonial archives, read earlier reports or asked locals. But they did not.[11]

British, French and Italian officials for the most part agreed that technical experts were uniquely capable of effectively expanding agricultural output, commercializing local flora, and combatting human and animal diseases. Technical experts had been involved in exercising imperial power from the outset. Civil engineers, doctors and veterinarians were members of the invading forces that established the colonial claims of Britain to the Anglo-Egyptian Sudan, Italy to Eritrea and France to the Côte Française des Somalis (Djibouti) at the end of the nineteenth century. With the turn of the century transition from military to civilian rule in these three colonies, military resources were redeployed. Military technical experts had to either be withdrawn and replaced by civilians, or seconded into civilian positions. In setting up their respective civilian colonial governments, the three imperial powers differed in terms of their investment in technical expertise.

British officials saw technical experts as a normal part of any colonial government.[12] As was the case elsewhere in the British Empire, the civilian government in Sudan had, from the outset, a dedicated Department of Agriculture and Lands. The technical staff working in this department were charged, amongst other things, with creating new scientific agricultural knowledge. In the first decade

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[11] Some examples of influential technical reports that miss this perspective include: A. Omodeo, V. Peglion, and G. Valenti, eds., *La Colonia Eritrea: Condizioni E Problemi: Fascicolo I* (Rome: Tipographia Nazionale di G. Bertero, 1913); Gino Bartolimmei Gioli, "La Produzione Frumentaria in Eritrea di fronte alle relazioni doganali fra Metropoli e Colonia," *Atti della R. Academia dei Geografili,* Series 5, 1, 1 (1904); Pierre Saboureau, "Rapport de Mission Effectué en Côte Française des Somalis par M. Le Conservateur des Eaux et Forêts," 1947, ANOM FT/1E7, Archives Nationales d'Outre-Mer, Aix-en-Provence (ANOM); Richard Hewison, "Note on the Gash Irrigation Scheme," 24 June 1920 CIVSEC2/8/30 National Records Office, Khartoum (NRO).

[12] Though Sudan was, at least on paper, ruled as a "condominium" with Egypt, British officials staffed all senior positions. These senior officials shaped the civilian government of the Anglo-Egyptian Sudan in lines with established norms of government within the British Empire.

of the twentieth century, this department either set up or supervised experimental farms at Kamlin, Shambat, Khartoum North, Shandi, Wad Madani, Tayyiba and Khartoum. These experimental farms tested new irrigation techniques, seed varieties and crop rotations.[13] Following the First World War, the rhetoric of scientific experimentation informed the establishment and expansion of large-scale agricultural development programs, such as the Gezira Scheme. This program sought to develop approximately 300,000 acres of the fertile Jazira plane south of Khartoum into a tightly monitored, scientifically efficient cotton-growing plantation. The history of this scheme is particularly illustrative because the scheme began with an experimental farm. In 1911, officials in the Department of Agriculture and Lands opened the Tayyiba experimental farm specifically to scientifically test the possibility of growing cotton on a large scale in Sudan and to determine the best practices for doing so.[14] When the development program was implemented in earnest after the First World War, officials established the Gezira Research Institute staffed by a team of biologists, chemists and agronomists to ensure that the scheme continued to progress along scientific lines.[15] From its inauguration, the Gezira Scheme, with its focus on technical expertise and scientific management, was conceptualized by colonial officials as the model for future large-scale agricultural development in Sudan.[16]

Italian officials could not draw on long imperial traditions and on practices of governance developed in other, more established colonial territories because Eritrea was Italy's first colony. Though colonial policy was initially designed by civilian authorities without the input of technical expertise, by the start of the twentieth century this style of governance was seen as a failure.[17] So, in 1901, *Governatore* Ferdinando Martini invited the agronomist Gino Bartolommei Gioli to tour the colony

[13] The early progress of these farms can be charted in the annual reports of the Department of Agriculture and Lands, and of the various provincial governments. These reports are compiled in: *Reports on the Finances, Administration and Condition of the Sudan*, 1902–1913, Sudan Archive, Durham, UK (SAD).

[14] Arthur Gaitskell, *Gezira: A Story of Development in the Sudan* (London: Farber and Farber, 1959), 59–60.

[15] Gaitskell, *Gezira,* 172–78.

[16] Serels, *Starvation and the State*, 155–57.

[17] At the end of the nineteenth century, the Italian government sought to develop Eritrea into a settler colony. Through a series of decrees promulgated between 11 May 1893 and 12 July 1895, the government reserved 300,000 hectares in the Eritrean highlands for settlers. Plots large enough to support a family were to be granted to any settler that moved onto the land, made fixed improvements and began farming. However, this program proved a failure. The relatively small number of settlers who migrated through this program could not figure out how to successfully maintain themselves on their land. By the start of the twentieth century, nearly all had abandoned their grants. Officials interpreted this failure as a failure of knowledge. Settlers brought with them knowledge gained through experience farming in Italy. But Eritrea is not Italy. Eritrea has different soils, meteorological conditions, and disease environments. Istituto Agricolo Coloniale Italiana, *L'Economia Eritrea nel cinquatennio dell'occupazione di Assab (1882–1932)* (Rome: Istituto Agricolo Coloniale, 1932), 8.

and craft a plan for its future development.[18] Bartolommei Gioli recommended that the government turn to scientific expertise to guide agricultural improvement. In keeping with this, officials in Eritrea established a special *Sperimentale* (Experiments) section within the *Ufficio Agrario* to provide a home for the development of new technical agricultural knowledge. Technical experts within the *Ufficio Agrario* established a number of their own experimental farms. At the central experimental farm at Sembel, *Ufficio Agrario* officials experimented with new seed varieties and crop rotations.[19] They also had experimental nurseries at Fagena, Filfil, Merara, Abbamaitan and Ghelbes.[20] In addition to managing their own experiments, officials gave small-scale cultivators new seed varieties to grow, under official monitoring and supervision, on an experimental basis on their own land.[21] Officials also granted land and seeds to private companies to run their own experimental farms. For example, in the early years of the twentieth century, they granted a small concession of land at Ambatcàlla to *La Società Coloniale Italiana* with the express purpose of having the company experiment so as to establish the best, most scientifically sound practice for growing coffee.[22] Similarly *La Società per la Coltivazione del Cotone in Eritrea* established their own experimental farm in 1905 on land they were granted at Agordat to test the suitability of various cotton varieties and to try and develop a scientifically sound best practice.[23]

Unlike their British or Italian counterparts, French officials initially saw little need to incorporate agricultural experts in the civilian government of the Côte Française des Somalis. The reluctance to incorporate these experts into the government did not reflect a biases against the claims of science. Rather, it reflected the belief that the Côte Française des Somalis was not sufficiently valuable to justify the added costs of a technical staff. In 1911, A.G. Rozis, a *Conseiller du Commerce Extèrieur de la France* was sent to the Côte Française des Somalis to make recommendations about the further development of the government. Rozis concluded that "the totality of France's interests in the colony reside in the port of Djibouti, which we need to develop into the rival of Aden [for Red Sea maritime traffic] and into the key to Ethiopian commerce." Since all government activities were to be

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[18] Gino Bartolommei Gioli, *Le Attitudini della Colonia Eritrea all'Agricultura* (Florence, Italy: Tipographia di M. Ricci, 1902), 34.

[19] Luigi M. Bologna, "Sperimentazione grani," 27 Dec. 1938, FASC850, IAO.

[20] Istituto Agricolo Coloniale. *L'Agricoltura nella Colonia Eritrea e l'Opera dell'Italia* (Rome: Istituto Agricolo Coloniale, 1947), 12–13.

[21] Luigi M. Bologna, "Sperimentazione grani," 27 Dec. 1938, FASC850, IAO.

[22] Michele Checchi, *Il Commercio del Caffè nella Colonia Eritrea* (Rome: Istituto Agricolo Coloniale, 1910), 7–8.

[23] G. de Ponti, "Il Cotone in Eritrea," 27 Aug. 1930, FASC1962, IAO.

focused on achieving these two goals, there was no particular need for agricultural experts.[24]

The French position shifted in the 1930s when officials began to bring the government of the Côte Française des Somalis in line with established governance practices elsewhere in the French Empire. This included bringing French agricultural experts into the government. In 1935, the colonial government's budget, for the first time, included funds for agricultural development.[25] The following year, officials commissioned a scientific mission to study the country with the aim of helping shape future development projects.[26] In 1938, the government opened experimental farms at Dikhil and Asseilah.[27] The process of integrating technical experts into the administration was interrupted by the Second World War. However, after the war, officials inaugurated the *Service Agriculture* to systematically supervise agricultural development projects and bring them in line with the latest scientific principles.[28]

Small-scale farmers in the Anglo-Egyptian Sudan, Eritrea and Côte Française des Somalis were initially open to collaborating with colonial technical experts. This openness is best exemplified by the widespread participation in early-twentieth-century rinderpest vaccination campaigns. Rinderpest had become enzootic to the region following the initial epizootic that began in 1887. Cattle owners, senior colonial officials and European technical experts all agreed that rinderpest was an ongoing threat that could not be controlled by traditional, local practices. During the initial epizootic, cattle owners had tried to use traditional forms of variolation to protect their animals; they spread healthy animals with milk, urine and feces from infected cattle in an effort to induce acquired immunity. Tragically, this only hastened the spread of the disease.[29] When rinderpest returned to Sudan and Eritrea in 1905, many cattle owners willingly brought in their animals to government inoculation stations to receive vaccines offered by veterinary experts. During this outbreak, over 33,000 cattle in the Anglo-Egyptian Sudan and 71,000 in Eritrea received the vaccine.[30] These vaccines proved themselves effective and vaccinating herds became

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[24] A.G. Rozis, "Protectorate de la Cote des Somalis et Colonie de Djibouti," 1911 FM 1AFFPOL/133, ANOM.

[25] Governor of French Somaliland, "Circulaire à Messieurs les Commandants de Cercle" 18 Oct. 1934, FM/1AFFPOL/2666, ANOM.

[26] Le Chef du Poste administratif d'Obock to the Governor of French Somalilannd, 18 Feb. 1939, FT/3G3, ANOM.

[27] Inspection des Services du Cerlce de Dikkil-Gobad, "Situation Economique," 30 Nov. 1938, FT/1B5, ANOM.

[28] Service Agriculture, "Rapprt Agricole," Aug. 1961, FT/12A4, ANOM.

[29] Gaetano Conti, "Il Servizio Veterinario in Eritrea" in Government of Italy, Ministero degli Affari Esteri, Comitato per la documentazione dell'opera dell'italia in africa. *Italia in africa*. Serie Civile, Volume Secondo, *Il Servizion Veterinario Nell'Africa Italiana* (Rome: Istituto poligrafico dello stato, 1965), 6.

[30] R. Wingate. "Memorandum by the Governor General," in *Reports on the Finances, Accounts and Conditions in the Sudan, 1905,* 127, SAD; Conti, "Il Servizio," 14.

routine. By the early 1920s, 400,000 vaccines were being administered in Eritrea per year.[31] Unfortunately, there were no similar contemporary campaigns in the Côte Française des Somalis. As late as 1920, there was not even a single veterinarian working in the colony. Though a permanent veterinary service was not started until 1938, there is no reason to believe that communities in the Côte Française des Somalis would have been any less willing to participate in vaccination campaigns than were their neighbors in the Anglo-Egyptian Sudan and Eritrea.[32]

This openness to collaborating had a limit. Small-scale farmers were willing to listen to only those technical experts who could prove the material power of their knowledge. An illustrative example can be seen in the development of the experimental farm near Fagena in Eritrea into a large-scale plantation. This experimental station was opened in 1921 on 30 hectares of land. Its initial mission was to test the viability of growing coffee in the region. The experimental farm was worked on a tenancy system, with the land divided between seven local families. Tenants were required to dedicate one-third of their allotment to growing coffee under the strict supervision of agriculture experts. The experiment was a success; coffee was successfully cultivated and tenants were able to both provide for themselves and earn a steady profit. When the government transformed the experimental farm into a plantation, tenants were easy to find. By 1931, there were 103 indigenously-operated tenancies growing over 420,000 coffee plants.[33]

A similar dynamic occurred in Sudan with the implantation of the Gezira Scheme. In 1911, the government of the Anglo-Egyptian Sudan opened an experimental farm on approximately 500 acres of land at Tayyiba just south of Wad Madani to test the viability of growing cotton on a tenancy system worked under strict technical supervision. From the outset, tenancies proved highly profitable. In the first year, the average tenant earned a gross income of over £E220. In 1913, the tenancy arrangements were changed and tenant incomes declined significantly. However, tenancies had another draw. The experimental farm used mechanical pumps to pull water up from the Nile and deposit it onto fields. Pumps, unlike traditional waterwheels, could be used to irrigate land even during years of drought and low-Nile as was the case in 1913–14. Though tenants made less after the 1913 change in the tenancy agreement, they recognized that they benefitted from the pump's insurance against drought. By the time the experimental farm was scaled-up into the Gezira Scheme, the drought insurance benefits of tenancies were widely known and there were more than enough volunteers for tenancies.[34]

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[31] Istituto Agricolo Coloniale, *L'Economia Eritrea,* 36–37.

[32] Governor of French Somaliland to Ministère des colonies, 7 May 1920, FM/1AFFPOL/187/2, ANOM; Consul de France à Alexandrie to Ministre des Affaired Etrangeres, 6 Jan. 1915, FM/8AFFECO/27, ANOM; "Situation Politique, Economique et Sociale de la Côte Francaise des Somalis du 1er Janvier au 1er Septembre 1938," 1938, FM/1AFFPOL/2666, ANOM.

[33] Ufficio Agrario dell'Eritrea, "Attività Agricola in Eritrea dal 1923," Dec. 1931, FASC1965, IAO.

[34] Serels, *Starvation and the State*, 148–50.

The success of the experimental farms at Fagena and Tayyiba were exceptions. Generally, experimental farms and nurseries produced only negative results. Plants often would not take in new micro-environments. For example, experiments in growing coffee in the Eritrean regions of Keren and the Sahel showed the agricultural experts that ran them that these regions were not suited for this crop.[35] Similarly, almost all the Italian varieties of wheat that the Eritrean *Ufficio Agrario* tried to grow at their experimental stations failed to thrive.[36] New labor regimes implemented on these experimental farms also proved unattractive to the local population. For example, the experimental cotton growing scheme established at Khor Arbaat in Eastern Sudan in 1923 closed in 1927 because returns were not high enough to encourage neighboring pastoralists to take up tenancies.[37]

Even the Gezira Scheme, which had begun as a successful experimental farm, soon proved itself to be a failure. Initially, tenants were able to work their allotments in ways that allowed them to grow their own subsistence and turn a profit. For example, in 1926 tenants grew enough grain to support their families, had enough grazing ground to keep a few domestic animals and harvested enough cotton to earn, on average, £E117 from their crop. However, the early boom years ended in 1927, when blackarm, a bacterial infection that affects cotton plants, spread through the plantation. Technical experts based at the Gezira Research Institute struggled to combat the disease. The average yield per acre declined by over 80 percent. It took technical experts almost eight years to bring blackarm under control. In the meantime, the Sudanese tenants working the scheme kept themselves afloat by selling off their assets and taking on heavy debts. In 1935, cotton yields returned to their pre-blackarm high. But, this did not significantly improve the lives of the tenants, who had become visibly poorer then their neighbors outside the scheme. Though prices improved along with yields, debt prevented tenants from enjoying the benefits. Unable to afford to leave the scheme, tenants began to refer to themselves as "prisoners."[38]

Small-scale farmers in the Anglo-Egyptian Sudan, Eritrea and the Côte Française des Somalis also witnessed technical experts fail private enterprise. One particularly visible failure was the *Società per la Coltivazione del Cotone nell'Eritrea.* This company was founded in 1904 by a consortium of Milanese cotton mill owners who were inspired by Bartolommei Gioli's research on the cotton growing potential of Eritrea. The company began operations during the 1904–1905 season by opening its own experimental farm on the Baraka River. That year they also inaugurated a widespread propaganda campaign amongst the local population to induce them to take up cotton cultivation along technically-sound principles.[39] The propaganda

[35] Checchi, *Il Commercio*, 6.

[36] Luigi M. Bologna, "Sperimentazione grani," 27 Dec. 1938, FASC850, IAO.

[37] Kenneth Perkins, *Port Sudan: The Evolution of a Colonial City* (Boulder, CO: Westview Press, 1993), 146.

[38] Serels, *Starvation and the State*, 159–60.

[39] Guido Mangano, "La Cotonicoltura e le iniziative cotoniere nell'Eritrea," 1945, FASC2345, IAO.

campaign proved successful and seed cotton yields produced as a result of the company's initiatives increased over seventeen-fold between 1904 and 1911. Unfortunately, the company was unable to turn a profit and had to close in 1914.[40] The propaganda campaign made the failure of this company particularly visible. However, local communities also witnessed the failure of other companies, including: the *Società Imprese Coloniali Caramelli & Co.*, which had to close for financial reasons and abandon its 4,000 hectare concession on the Zula plain in Eritrea in 1921 after just one growing season[41]; the *Compagnia Mineraria Coloniale*, which similarly closed in 1927, after operating a technically-managed plantation at Badda in Eritrea for four years[42]; and the *Société de Sinéty et Esnault-Pelleterie*, which closed after two years of working a plantation in Wadi Ambouli near Djibouti because their operations proved unprofitable.[43]

Outsider Knowledge and Local Transformations

The public failures of European agricultural experts did not stop small-scale farmers from seeking out other outsiders who could help them rebuild after the devastation of the late nineteenth century. An important group that inspired many to transform local agricultural practices were Yemeni farmers who brought with them generations worth of knowledge when they immigrated to Eritrea and the Côte Française des Somalis at the start of the twentieth century. Environmental conditions in Yemen mirror those on the African littoral of the southern Red Sea. Both regions are characterized by temperate highlands surrounded by semi-arid and arid lowlands. Rain that falls on both sides of the southern Red Sea collects into torrential rivers that flow down in spats from the highlands into the lowlands. Yemeni farmers have developed advanced water management techniques that historically allowed them to maximize the extent of cultivation including in the dryer lowlands.

At the start of the twentieth century, Yemeni farmers started settling on the African side of the Red Sea. The first major Yemeni owned and operated plantation on the southern littoral of the African Red Sea was established in 1904 by Shaykh Mohammed al-Safi on a 4,000-hectare concession at Uachiro in Eritrea. The land was worked on a dual system of share cropping tenancies and directly managed plantations, with all the labor provided by Yemeni immigrant farmers.[44] The success at Uachiro was quickly followed by another in Wad Ambouli near Djibouti. In 1909, a small, independent settlement of Yemeni farmers was established in the wadi right next to the land owned by *Société de Sinéty et Esnault-Pelleterie*. Unlike the French

[40] Private investors tried to revive the company's operations after the war, but these too were unprofitable. In the 1920s, they too had to be abandoned. Ufficio Agrario dell'Eritrea, "Attività Agricola in Eritrea dal 1923," Dec. 1931, FASC1965, IAO.

[41] Guido Mangano, "La Cotonicoltura e le iniziative cotoniere nell'Eritrea," 1945, FASC2345, IAO.

[42] F. Cappelleti, "Rapporto Sulle zone agricole di Zula, Uangabò, Bardoli e Badda (Bassopiano Orientale) nel periodo 3–8 Febraio 1947," FASC2201, IAO.

[43] Norès to le Ministre des Colonies, 10 April 1911, FM/1AFFPOL/133, IAO.

[44] Guido Mangano, "La Cotonicoltura e le iniziative cotoniere nell'Eritrea," 1945, FASC2345, IAO.

company, this Yemeni settlement was a commercial success. Instead of focusing on growing cotton for European mills, the Yemeni farmers focused on growing garden vegetables to sell to the residents of Djibouti.[45] When international shipping seized up during the First World War, these farmers became the sole suppliers of vegetables in the Côte Française des Somalis. They invested the high profits derived from this monopoly back into their operations by bringing more land under cultivation. By 1916, all suitable land in the Wadi was being cultivated.[46] These two successes were then followed by the establishment of Yemeni farming settlements in other parts of the region.[47]

Unfortunately, here is where we run into a problem of sources. There simply is not enough archived material to answer basic questions about this migration. Either officials were not concerned enough about these migrants to write reports, memoranda and letters about them, or they were not concerned enough to archive the documents that they produced. My extensive research at the *Archivio Storico Diplomatico degli Affari Estranieri* in Rome, the *Istituto Agrinomico per l'Oltremare* in Florence and the *Archives nationales d'outre-mer* in Aix-en-Provence uncovered just passing mentions of these communities in a few reports predominantly focused on other matters. The Wad Ambouli farms were mentioned in conjunction first to the activities of the *Société de Sinéty et Esnault-Pelleterie* and then to the problems supplying Djibouti with food during the First World War. Similarly, the al-Safi plantation was mentioned in a report about cotton cultivation because its author, Guido Mangano, saw it as a sight for potential future development.

Though these Yemeni farmers are nearly invisible in the colonial record, there is some evidence that their settlements became centers for the diffusion of Yemeni agricultural expertise. In Yemen, farming communities living in the semi-arid lower elevations of mountain slopes historically used minor stone and mud dams to divert water onto fields adjacent to torrential rivers.[48] This practice was not common in the foothills of the Ethiopian/Eritrean plateau before the twentieth century. Rather, the pastoralists that lived in the region typically used low input methods to work the land because, for them, this was a secondary economic activity. They normally sowed only the land that was naturally temporarily flooded by torrential spates. Though some pastoralist continued to employ these techniques, others began to use Yemeni irrigation methods at some point in the middle third of the twentieth century.[49] These pastoralists were willing to invest more effort in the hope of securing better yields

[45] Norès to le Ministre des Colonies, 10 April 1911, FM/1AFFPOL/133, IAO.

[46] Commissaire de Police to Governor of French Somaliland, 31 Jan. 1916, FM/8AFFECO/27, IAO.

[47] Guido Mangano, "La Cotonicoltura e le iniziative cotoniere nell'Eritrea," 1945, FASC2345, IAO.

[48] Ingrid Hehmeyer, "Water Engineering and Management Practices in South Arabia: Aspects of Continuity and Change from Ancient to Medieval and Modern Times," in Andre Gingrich and Siegfried Haas, eds., *Southwest Arabia across History: Essays to the Memory of Walter Dostal* (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 2014), 43–54.

[49] Guido Mangano, "La Cotonicoltura e le iniziative cotoniere nell'Eritrea," 1945, FASC2345, IAO.

because it had become clear that their traditional practices were no longer sufficient to guarantee their own subsistence.[50]

The presence of the Yemeni migrants is attested to by just a handful of passing references in the archive and their impact is demonstrated by the spread of Yemeni irrigation techniques along the African Red Sea littoral. However, there is much that cannot be deduced from these sources. Who were these Yemeni migrants? Where in Yemen did they come from? How many were there? Where did they settle? How many settlements were there? How did they fair economically and socially over time? What kind of contact did they have with their neighbors? Were they seen as competitors or collaborators? Did this change over time? Did Yemeni's actively teach their techniques to their neighbors? Or, did their neighbors learn by observing?

Yemeni farmers were not the only non-Europeans to move into and within the broader region at the start of the twentieth century bringing with them new agricultural practices. As Europeans were establishing colonial claims to the African Red Sea littoral, the number of West Africans pilgrims passing along the Sahel route to Mecca increased. Many of these pilgrims arrived in Sudan and decided not to finish their journey. Instead, they have become what C. Bawa Yamba calls "permanent pilgrims." These original migrants and their descendants maintain a distinct communal identity predicated on the assertion that they are transitory, despite having lived in Sudan for years and/or having been born there. There are no reliable statistics for the number of West Africans that arrived in Sudan at the start of the twentieth century. Even estimates of the number of these "permanent pilgrims" currently in the country vary widely between about 1 and 3 million. Many of these migrants chose to live in rural settlements and engage primarily in agriculture. According to Yamba, members of this community "see [farming] as enhancing qualities in rural dwellers that are ideals pilgrims must aspire for…. They claim that the hardiness from working close to nature strengthens one's resolves, thereby making one less likely to become corrupt."[51]

The West African migrants that began working the land in Sudan brought with them their own agricultural knowledge. Their presence must necessarily have resulted in contacts with local communities. It is extremely likely that this sustained inter-generational contact involved knowledge transfers and cross-cultural synthesis of practices. Unfortunately, the exact dynamics of this process cannot be determined from the colonial archive. I have conducted extensive research at the National Archive in London, the National Records Office in Khartoum and the Sudan Archive at Durham University. Generally, West Africans only appear in these archives as wage laborers or tenants on scientifically managed agricultural schemes in which their agricultural practices are determined for them. I have not encountered documents pertaining to their practices on their own farms, away from the control of agricultural experts.

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[50] Serels, *The Impovrishment of the African Red Sea Littoral, 1640–1945*, 131–60.

[51] C. Bawa Yamba, *Permanent Pilgrims: The Role of Pilgrimage in the Lives of West African Muslims in Sudan* (Washington, D.C.: Smithsonian Institution Press, 1995), 70.

Ex-slaves are another important group whose contribution to the twentieth century evolution of agricultural practices is not easy to assess. From the nineteenth century until the early twentieth century, male slaves were used in large numbers as agricultural labors in northern Sudan. Over this period, the slave system collapsed, was rebuilt and collapsed again. During each of these collapses, slaves fled from northern Sudan in large numbers to gain their freedom. The first collapse took place during the devastation of the 1880s and 1890s. When the British-led force finally conquered Sudan, untold numbers of slaves fled either to South Sudan, or towards the Ethiopian frontier. The second migration occurred amidst the 1914 famine. During this crisis, tens of thousands of male slaves ran away from their masters in northern Sudan and settled in the borderlands of Eritrea and Ethiopia.[52] These migrations are recorded in the colonial archive. Unfortunately, there are no subsequent documentary traces of these slaves once they resettled as free men. As a result, there are many questions about their history that remain unanswered. How did these freed slaves use the agricultural knowledge that they acquired through years of unfree labor? Did they share this knowledge with their neighbors? Or did they adopt their neighbors' techniques?

The silences and gaps in the colonial archive regarding the agricultural practices of ex-slaves, West African pilgrims and Yemeni farmers stands in sharp contrast to the wealth of archival material documenting the activities of European agricultural experts. This imbalance has had direct historiographic consequences. It has allowed historians to assume that the only historically important knowledge transfers were those that went from agricultural experts to small-scale farmers. However, there is reason to believe that the influence of these experts was narrower than conventionally assumed. The agricultural experts who arrived in the region in the first half of the twentieth century did so with little knowledge about local conditions. They came to the region to engage in experiments so as to establish basic scientific facts and eventually work out best practices. Therefore, most of their experiments failed. Since they were backed by the resources of government, they were able to fail on a grand scale. For example, the Gezira Scheme produced debt, poverty and misery across nearly 300,000 acres in the 1930s. These failures gave small-scale farmers reason to be suspicious of agricultural experts and to treat their instructions with caution. Small-scale farmers that could choose often chose to ignore the agricultural experts circulating around them. This was not a sign of the conservatism of these farmers. They were not holding tightly to tradition. Rather, small-scale farmers were in the process of rebuilding after years of devastation by actively adopting new agricultural practices. This made them open to learning from other outsiders, such as ex-slaves, West African pilgrims and Yemeni farmers, who were settling amongst them and bringing with them powerful new forms of knowledge.

[52] For a detailed description of the collapse of the slave plantation in Northern Nilotic Sudan at the start of the twentieth century, see Serels, *Starvation and the State*, 114–28, 135–43.