



Cultivating Wheat in the Philippines, ca. 1600–1800 CE: Why a Grain Was Not Adopted by Local Populations

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Abstract

Studying why newly introduced cultivars fail to make inroads with local populations is notoriously difficult, as these “rejected” crops often leave little or no physical evidence. Taking advantage of unusually ample historical documentation, this paper studies wheat’s introduction, dispersal, and sporadic cultivation in the Philippine archipelago, with an emphasis on the period between 1640 and 1670 CE when sustained wheat cultivation began near Manila. Using documents and comparisons to other cultivars imported during the Pacific Columbian Exchange, the paper identifies several independent barriers to wheat’s cultivation, all of which aligned to ensure wheat was never widely farmed by local populations.

Keywords Philippines · Columbian exchange · Wheat · Imported domesticates · Agriculture

Introduction

From an environmental perspective, the start of trans Atlantic trade represented the human recreation of Pangaea. Derived from Alfred Crosby’s (2000:2–4, 42–43, 164) *Ecological Imperialism*, this argument posits that the Atlantic after 1492 CE morphed from a barrier to a conduit for terrestrial species to move between continents, marking the first steps towards a global homogenization of environments that persists

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to this day (see also Lenzner et al. 2022:1724–1725). By that same argument, the extension of this Columbian Exchange and its ecological interactions into the Pacific through human labor and technology created a world that was, literally, supernatural. However, the Pacific half of the Columbian Exchange is not as well studied its Atlantic counterpart, despite its profound effects on peoples and environments on both sides of Earth’s largest ocean, including in East and Southeast Asia. The adoption of crops like sweet potato and maize was seemingly responsible for population growth in early Qing China (Flynn and Giraldez 2002:406–407; Spence 1999:80). Luxury crops, meanwhile, altered tastes, farming patterns, and relaxation throughout the Indo-Pacific, including in the Philippines where tobacco spread across the archipelago, even to regions outside of colonial control, “Where neither Spanish soldiers nor missionaries could make headway, tobacco gained entry” (in de Jesus 1998:2–3; see also Machuca 2014:239; Quiason 1966:47). Complementing these crops from the Americas were western Eurasian foodstuffs and luxuries, which gained footholds in East and Southeast Asia as interregional trade intensified (Reid 1988:6, 30–31, 44, 1993:6–9, 14–16, 32–33; see also Topik 2009:42–43). Collectively, the dispersal and adoption of these cultivars—domesticated plant species specifically bred to be cultivated—as well as various animals like cattle and horses throughout East and Southeast Asia permanently altered regional lifestyles and fostered novel socioecological arrangements within colonial, pericolonial, and noncolonial spaces (Acabado 2017:2–3, 14–15; Amano et al. 2020:315; Bankoff 2007:85; Warren 2008:71, 99).

In the late sixteenth and early seventeenth centuries, the pathways that formed this global exchange crossed in Manila, a diverse Philippine colonial city founded in 1571 upon the conquered remnants of Maynila, its Indigenous predecessor (Baumgartner 1975:52–53; Blair and Robertson 1903–1906, 3:145–147). Manila was arguably the world’s first “global” entrepot—a city that imported and exported goods made elsewhere rather than from its own hinterland (Mukherjee 2014:39)—because its existence was predicated on economic and political forces that spanned Eurasia, Africa, and the Americas (Alva Rodriguez 1997:73–74, 86; Reed 1978:28–33, 67). Prior to the eighteenth century, it was also the only city in East or Southeast Asia engaged in routine and direct trade with the Americas (Schottenhammer 2019:182; Spate 1979:141–143), so the famed Manila Galleons that connected the Philippines to Acapulco were undoubtedly the initial vector of transmission for several imported crops and animals (Machuca 2014:235, 255–256; Schottenhammer 2019:231, 2020:10–11). How these foodstuffs were dispersed throughout Asia after arriving is not well understood, nor are the parameters that determined whether communities or regions adopted or rejected imported foodstuffs adequately studied (on local factors’ importance, see Amano et al. 2020:318–319; Machuca 2014:240–242, 257). In brief, the local dynamics that defined the Pacific part of the Columbian Exchange through time have not been fully described.

To begin rectifying that omission, this paper focuses on the delayed introduction and eventual abandonment of wheat cultivation in the Philippine Archipelago, a region whose thousands of islands underscores the role that local conditions played in the global Columbian Exchange. Through the galleons, North and South American crops like maize (*mais* in Tagalog [Tag]), sweet potatoes (*camote* in Nahuatl and Spanish [Sp], *kamote* in Tagalog), calabaza squashes (Tag: *kalabasa*), tobacco (Tag:

tabako), and cacao (Tag: *kakao*) began to arrive in the archipelago, as did Eurasian crops like coffee (Sp: *café*, Tag: *kape*) and wheat (Sp: *trigo*, Tag: *trigo*) (Amano et al. 2020:319–321). Some of these crops, most prominently *kamote*, were rapidly adopted into local diets and farming strategies (Amano et al. 2020: 319; Machuca 2014:240–242; Scott, 1999:42–43). *Trigo* (wheat) had the opposite experience. Despite wheat being essential to the *hostia* (Host) and the practice of Catholicism, sustained wheat cultivation only began in the Spanish Philippines in 1664, 99 years after the colony was first established. Furthermore, until the nineteenth century, cultivation only took place sparingly in select provinces, suggesting wheat products failed to become widely incorporated into most Philippine peoples' daily diets (e.g., *Lilly Library*, Philippine mss. II, Sotheby 521). Finally, by the end of the Spanish occupation in 1898, wheat cultivation was seemingly abandoned (US Bureau of the Census 1905). Thus, despite being widely consumed, Philippine wheat was “rejected” as a cultivar.

Wheat cultivation's lackluster reception and its eventual abandonment are historically intriguing, both as a seeming paradox that highlights the difference between cultivation and consumption and as a uniquely well-documented phenomenon. Rejection came about despite direct, well-documented interventions by the Spanish colonial administration to enforce wheat's cultivation in the archipelago's largest island, Luzon. As a result, Philippine wheat is an ideal case study for archaeologists and historians studying foodways, one that highlights the multiplicity of factors affecting whether and how new crops are adopted into agricultural regimes and diets. This paper uses the substantial documentation generated by Spanish colonial administrators to study wheat's introduction, dispersal, and eventual cultivation in the Philippines during the seventeenth and, to a lesser extent, eighteenth centuries. By analyzing documents retained by the Archivo General de Indias (AGI) in Seville, the Lilly Library in Indiana, and the Newberry Library in Chicago, the paper chronicles how increasing volatility in regional trade, particularly between 1640 and 1660, caused Spanish colonial authorities to introduce wheat cultivation nearly a century after first establishing a colony in the archipelago. Then, the paper compares Philippine wheat to other imported crops as well as wet rice by drawing upon ethnographic, archaeological, and historical data. These dual approaches identify the local and global factors that made wheat's widespread cultivation unfavorable, suggesting distinct and overlapping “barriers to adoption” consigned wheat to be a minor or peripheral crop in the Philippines, despite its religious significance to Catholic regions.

Wheat in the Philippines and Historical Archaeology

Why study Philippine wheat as opposed to more successful imports like *kamote* or *kape*? Abundant historical documentation renders it an ideal case study on how imported crops and grains can be rejected. Its history may, therefore, offer broad insights into the cultivation and rejection of novel species in the Columbian Exchange or earlier periods when historical documentation is not available, making it of great interest to the archaeologists and ethnographers who typically study foodways (e.g., Jones et al. 2011:666–667; Reed 2021:51–53). Additionally, as is detailed in the next

section, wheat cultivation became a priority of the colonial administration, so its failure to become widespread offers insights into the limits of governmental policies' capacity to affect agriculture and diets. However, because Philippine wheat was not consistently or widely cultivated in a single location, it probably left limited traces that would be difficult to identify through archaeologists' analytical techniques. Instead, Philippine wheat is more readily approached through historical analysis that both locates and contextualizes archival documents within contemporaneous politico-economic, social, and cultural trends (for similar archaeological and historical collaboration in maritime archaeology, see Vosmer 1999:291–292, 302).

Before progressing, the claim that archaeological analytical techniques are unsuited to studying Philippine wheat must be justified. In recent decades, archaeologists have revolutionized understandings of past diets and crop dispersals, conducting pathbreaking research predicated on archaeobotanical and chemical analytical techniques deployed in conjunction with more traditional archaeological methods (for overviews, see Hastorf 2017; Twiss 2019). Presently, archaeologists can characterize past diets by identifying the charred remains of plants and seeds as well as through microbotanical analysis of plant silica imprints (phytoliths; see Piperno 2001:237–238, 246–247). More recently, scholars employing “shotgun proteomics” in conjunction with gas chromatography-mass spectrometry and liquid chromatography-tandem mass spectrometry have identified molecular biomarkers specific to wheat, grains, and other edible plant species that can be detected from calcified plant remains encountered on sherds and old containers, providing further insights into diets and cuisines as far back as 7100 BCE (Colonese et al. 2017:1–2; Henty et al. 2018:3–5; Henty 2021: 2–3). As far as animal remains are concerned, zooarchaeological analysis can indicate which animals were hunted, domesticated, consumed frequently, and slaughtered ritualistically (Amano et al. 2013:323–325; Kennedy and VanValkenburgh 2016:84–85, 93–94; Thomas 2005:74–75). Complementing these approaches is pollen analysis of lakebed sediments, which broadly indicates which plants dominated historical landscapes and how human agriculture altered them (Bennett and Willis 2001:5–6, 24–26). Lastly, stable isotope analysis of bones and other remains can identify a sample's general origins, allowing for the reconstruction of historical migrations and trade routes while suggesting which foods were imported or raised locally (Knudson and Torres 2023:252; Somerville and Beasley 2023:22–24).

These powerful techniques are being deployed throughout the Philippines and are well-suited to studying many Columbian imports. However, they are unsuited to studying wheat due to an inherent and obvious limitation: these methods cannot analyze what failed to occur or what occurred at very small scales (i.e., below their detection thresholds). An import like Philippine wheat, which was often cultivated sparingly and inconsistently (see below) is ill-suited to material analysis. Further complicating matters, even if historical cultivation sites were identified and targeted for archaeological or palaeoecological analysis, pollen grains from large grasses, including *Triticum* spp. (wheat), are hard to distinguish from Asian grass species using conventional methods (see Maloney 1990:135–136). Compounding these methodological limitations is the relative lack of archaeological data on Philippine biota. Hamilton et al.'s (2021:1178) recent review of all published and unpublished data available for the former Spanish East Indies on the Neotoma database found

only one pollen and two charcoal records for the entire Philippine archipelago during the Spanish colonial period. While the Neotoma database is not complete—some work by Horrocks is not listed, including his recent contribution to Peterson et al.'s (2020:18–19) pollen analysis underneath Cebu City's Jesuit House—it does reflect the relative paucity of archaeobotanical data available for the Philippines in the Spanish period. Similarly, Amano et al.'s (2020:314) review of Philippine archaeological and historical evidence on species introduction from 2000 BCE to 1900 CE counted only five archaeological sites dated to the Spanish colonial era. As things stand, archaeological and palaeobotanical evidence and methods are inadequate for studying Philippine wheat's introduction, cultivation, and ultimate rejection, despite it being of clear interest to archaeologists studying foodways.

Herein lies the value of archival documents. While they are decidedly less uniform than sediment cores or physical remnants, being subject to their author's social, economic, and cultural perspectives, archival records nonetheless offer a complementary method for tracking the introduction and dispersal of successfully imported species. Moreover, when there is no physical evidence available, they offer the sole means of studying failed imports. In the Philippines, written documents were relatively abundant during the Pacific Columbian Exchange, reflecting both the increasing power of governing institutions and their need to communicate across vast distances. Unfortunately, the colonial administrators and visiting Europeans who composed many of the documents on the seventeenth-century Philippines were not greatly interested in foodstuffs or local farming (there were notable exceptions, as well as numerous clergymen, who wrote on local diets (e.g., Delgado 1892 [1754]:37; Morga 1971 [1609]:251; see also Scott 1999:35–43). Such was not the case for wheat, which proved essential to the colony's operation. Its spread and cultivation throughout the Philippines is the focus of several documents written by some of the most powerful individuals in the colonial bureaucracy. This considerable documentation offers a seldom-seen perspective on imported foodstuffs, permitting us to ask where and why wheat failed to spread despite the apparent support of a colonial administration, directly suggesting the relevance of local geographies, societies, and even individuals in the adoption and rejection of imported cultivars.

Archival Evidence: Wheat Cultivation 1600–1800 CE

Prior to the establishment of the Spanish colony in 1565 CE, there is no indication that wheat was grown in or regularly brought to the Philippines, even though the grain was a fixture of Chinese and Japanese agriculture (Betts et al. 2014:166; Crawford 2011:S337-S339; Long et al. 2018:274–275). The grain, and the sustained need for it, were both introduced abruptly by the Spanish colonizers, for whom wheat was vital. Aside from being a staple in their diets, wheat proved an irreplaceable ingredient of *biscoito*, a twice-baked hardtack and the primary ration on the long voyages between Manila and Acapulco (AGI, Filipinas 193, n. 20). Wheat flour was also the basis for the Host, the body of Christ taken during Communion. In a colony whose continued existence was predicated on the spread and maintenance of Catholicism, wheat's periodic consumption was essential to the Spanish Philippines's identity (Cushner

1971:40; de la Costa 1967:27; Phelan 1967:8). Despite the grain's importance, it was not routinely cultivated in the islands before 1664, 99 years after the colony's foundation, nor, despite its prominence in the Christian canon, was wheat widely grown in every province. And, all evidence suggests, wheat-based foods were not widely incorporated into Philippine diets before the nineteenth century, when local cultivation ultimately seems to have ceased (US Bureau of the Census 1905).

Philippine wheat, then, presents two contradictions. First is the long delay in its initial cultivation, despite its importance to the colony. Second is its lackluster reception and ultimate rejection as a cultivar, despite its ritualistic importance to an increasingly Christianized colony. To understand why, it is essential to acknowledge that Philippine wheat's history is interwoven with the ebbs and flows of an emerging global trade, the internal politics and needs of colonial administrators on three separate continents, and the tastes of diverse peoples and cultures indigenous to the archipelago. To track wheat's historical trajectory in the Philippines, this section uses archival documents to explore the specific confluence of global, regional, and local factors that caused sustained wheat cultivation to begin in 1664. Simultaneously, it will use those same documents to begin studying why wheat was not cultivated at larger scales.

When the Spaniards first arrived in the Philippines, they arrived with wheat. During and immediately after the conquests of the central and northern Philippines, wheat flour was imported from Nueva España (Mexico), where supplying the galleons for their annual voyage became a major industry (Seijas 2016:57, 59–60). This apparently continued into the seventeenth century despite protests from Manila since flour, which was shipped alongside other perishable necessities like rigging and sailcloth, often spoiled during the voyage between Acapulco and Manila (Valdez-Bubnov 2017:244 citing Blair and Robertson 1903–1906, 18:169–188).

Soon after the colony's founding, its budding relationship with Chinese and Japanese merchants provided less expensive and—given the galleons' high rate of failure (Isorena 2015:64; Warren 2015:183)—less risky opportunities to acquire wheat. Soon after the colonial capital's move to Manila in 1571, a robust trade emerged between Ming China, Japan, and the Spanish-American Empire based on the three parties' momentarily aligned interests (Morga 1971 [1609]:59–60; Tremml-Werner 2015:16–17). Ming China was experiencing a severe silver deficit, which was already being partially addressed through trade with silver-rich Japan (Flynn and Giraldez 2002:392, 399, 404; Headley 1995:634–635). Simultaneously, the silver extraction at Cerro de Potosí in the Viceroyalty of Peru was accelerating, and a growing portion of that silver began to travel to Acapulco and then to the Philippines, where it fetched a high price among Chinese merchants (Schurz 2021 [1939]:386–387, 389; Spate 1979:161, 186, 222). Colonists in the Philippines, previously not able to derive significant profits from the conquered portions of the archipelago (Cushner and Larkin 1978:102, 110; Roth 1977:25, 31–32), suddenly had the means to acquire Asian porcelains and silks that were highly valued in Mexico City (Pierce 2016:53–55; Spate 1979:196). In response to this highly profitable trade, Manila and the Spanish Pacific were drawn into what Flynn and Giraldez (2002:392) term the Japanese Silver Cycle, which itself was part of a regional “Triangular Trade” (Tremml-Werner 2015:16,

135–136, 139–141) circulating luxuries, necessities, and individuals between Shogunate Japan, late Ming China, and colonial Manila (Figs. 1 and 2).

Within that larger pattern of exchange, Manila acquired wheat, as well as military resources like iron and saltpeter, through trade with local rulers and merchants (Tremml-Werner 2015:158, 249, 257; for later periods involving other trade partners, see Tremml-Werner 2017:614). This arrangement provided the Spaniards with vital supplies while allowing local merchants and rulers who lacked direct access to precious metals to participate in the highly profitable Triangular Trade. The lords of southern Kyushu (one of Japan's four largest islands and host to Nagasaki) traded wheat to Manila for silver (Tremml-Werner 2015:141, 158). Chinese merchants from Fujian also brought wheat with them to sell in Manila (Tremml-Werner, 2015:158), which was later ground and baked in the city's many Chinese-owned bakeries (Alva Rodriguez 1997:240–241, 259–261; for Spanish anxiety towards these bakeries, see AGI, Filipinas 27, n. 161).

This pattern of trade, specifically the grouping of wheat with military resources, reveals how the Spanish colonial administration understood wheat. To colonial officials, wheat was not viewed as a staple grain that farmers annually strove to cultivate, nor as a critical food for either Spanish or Philippine populations. The early administration's top concern was obtaining sufficient flour for *biscoito* and communion wafers at the lowest price possible, and it otherwise did not encourage or demand the essential grain be acclimated or cultivated in the Philippines. In the Philippines, wheat was perceived as a consumable, strategic resource.

Despite the colonial administration's lack of engagement with wheat or its cultivation, it should be noted that wheat-based breads aside from *biscoito* and communion wafers were routinely produced and consumed in the Philippines in the sixteenth and early seventeenth centuries. Bread remained the colonists' preferred starch, and Spanish Manila's numerous Chinese-owned bakeries as well as the ongoing regional trade in flour suggest steady demand for wheat persisted among the capital city's private residents (Alva Rodriguez 1998:39–41). Nonetheless, historical data also



Fig. 1 Map of the Pacific showing Southeast Asia, East Asia, and the Americas highlighting several settlements. Image was constructed in QGIS using administrative shapefiles available from DIVA-GIS (diva-gis.org)

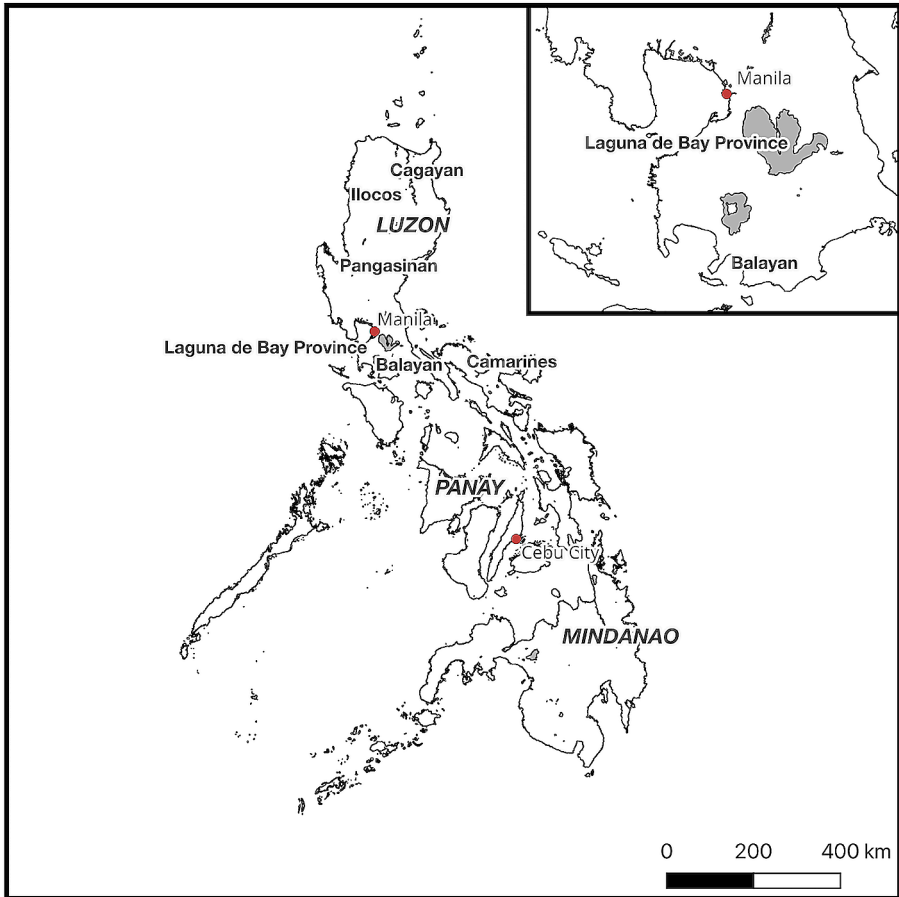


Fig. 2 Map of the Philippine Archipelago. Islands, provinces, and settlements mentioned in this paper are indicated. Image was constructed in QGIS using administrative shapefiles made available from DIVA-GIS (diva-gis.org)

indicate the majority of Spanish and American men and women in the Philippines adopted local diets and regularly consumed Philippine foodstuffs like rice as well as luxuries like betel nut (Alva Rodriguez 1997:36–38; Doran 1993:277–279). Given that colonists adopted local cuisines and there was initially no concerted effort by the colonial administration to start cultivating wheat in the Philippines (unlike in Nueva España as per Machuca 2014:233), it is likely that daily wheat consumption was largely confined to Manila, which had the only substantial population of colonists in the seventeenth and eighteenth centuries (Doeppers 1972:790–791).

As long as regional trade continued and foreign merchants consistently returned to Manila, commerce apparently continued to provide the wheat necessary for *biscoito*, the Host, and any bread Manila's residents desired (Tremml-Werner 2015:318). In the 1620s, though, the aligned interests and political stability that formed the basis of the Triangular Trade began to shift. Ming China's demand for silver ebbed, and the Ming-Qing dynastic transition, specifically the regional instability it produced,

greatly disrupted trade with China (Flynn and Giraldez 2002:405; Tremml-Werner 2017:612–613; Warren 2015:200). Simultaneously, Dutch aggression against Spanish and Portuguese colonies and maritime trade escalated drastically. Dutch blockades and trade practices disrupted regular commerce between Japan and Manila, as did increasing restrictions within Japan, while the eventual capture of Portuguese Malacca (1640–41) and Spanish outposts in Formosa (now Taiwan, 1642) constrained and pressured Manila (de la Costa 1967:399; on Japanese trade restrictions and their varied impacts, see Tremml-Werner 2015:249).

These external developments contributed to growing problems within Manila and the Philippine colony. Dutch aggressions as well as storms caused the galleons' annual voyage to repeatedly fail. At the same time, new royal restrictions on the galleons, implemented after forceful lobbying by Seville's guilds, further limited commerce (Spate 1979:219, 224, 226–228; Warren 2015:201–202). Back in Manila, the 1639–40 rebellion and massacre of as many as 20,000 Chinese merchants deprived the city of a vital source of tax revenue and specialized labor, likely worsening the effects of Dutch aggression (Alva Rodriguez 1997:40, 56, 70–72; Blair and Robertson 1903–1906, 29: 20 vol. 29:1906:208–209). All these developments undermined Manila's status as a regional entrepot and threatened the very existence of the Philippine colony, as suggested by the precipitous decline in colonial revenues in this period (Fig. 3; for a complete discussion of Philippine colonial accounting see Alonso Alvarez 2003:69–75). The Spanish colony's fortunes did not improve, as Manila subsequently endured the massive earthquake of 1645, a failed Dutch naval invasion from 1646–47, and then the threat of invasion from Formosa by the "Pirate King" Coxinga. These emergencies compounded one another, worsening the city and colony's fiscal crisis (Blair and Robertson 1903–1906, 35:223–224, 226–228; Lucena 1984:120, 129–133, 139–140; Merino 1983:243). By 1660, constant wartime mobilization had driven the colonial government's debts to Philippine laborers and tribute payers to astronomical heights, while also removing farmers from their land long enough to create widespread food shortages. All these developments incited general rebellions throughout the islands while contributing to ongoing population decline (AGI, Filipinas 22, R. 7, n. 28, Filipinas 22, R.9, n. 50; de la Costa 1967:342–345, 413, 416, 483–484; Newson 2009:110–112, 251–254, 256–257).

During that period, wheat became increasingly rare and costly in Manila. The first hints of scarcity were Governor-General Juan Niño de Tabora's (r. 1626–32) efforts to promote local cultivation in Laguna Province to Manila's south (AGI, Filipinas 21, R.3, n. 10). This effort, subsequent correspondence suggests, ultimately did not succeed (see AGI, Filipinas Leg. 193, n. 20). A petition to the king made a few years later by Jeronimo de Fuentes Cortés, a Manila resident and captain, also alludes to the growing scarcity of wheat. His letter described a commission he received from the governor-general in 1634 to search Manila and its surrounding neighborhoods for "hidden wheat" allegedly being hoarded by residents and Chinese merchants for the city's "time of greatest need"—a euphemism for siege or famine (AGI, Filipinas 41, n. 59). By the 1640s and 1650s, the price of a *pico* (63.232 kg, as per Alva Rodriguez 1997:39) of wheat in Manila ranged from 40 to 60 pesos (AGI, Filipinas 193, n. 20). For reference, the average foot soldier in that same period was paid 96 pesos per

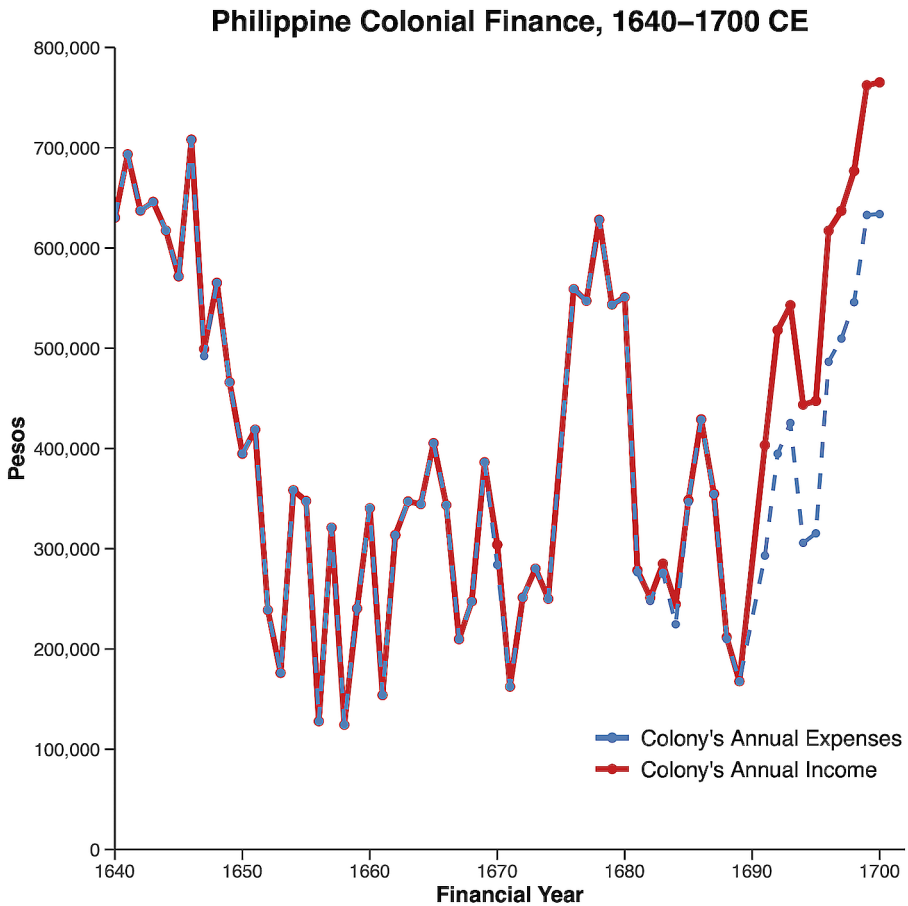


Fig. 3 The Revenue and Expenditures of the Philippine Colony from 1640–1700 CE. Constructed from AGI, Contaduría, 1219–1253

year, if he was paid at all given the colonial government's dire condition (Mawson 2016:108–110). Wheat, it is fair to conclude, had become unaffordable in Manila.

A crucial, and easily overlooked, detail in Jeronimo de Fuentes Cortes's testimony is that he was commissioned to find hidden saltpeter, iron, and lead in Manila as well (AGI, Filipinas 41, n. 59). These simultaneous commissions again confirm that the colonial government viewed wheat primarily as a consumable military resource, something to be actively procured, stockpiled, and safeguarded. This understanding of wheat was firmly held by Governor-General Diego de Salcedo (r. 1663–68), whose policies would ultimately resolve the scarcity crisis and initiate routine wheat cultivation in the Philippines. One of his first letters to the king, dated 1663, summarizes his understanding of the crises confronting the Philippine colony and wheat's role within them:

Because of the inquietudes and other occurrences in the time of my predecessor, I found the trade with neighboring kingdoms momentarily stopped, and without that trade these islands could neither exist nor breathe. After I arrived, I tried by various means to restore it in part to its previous desirable state. Already, one port that is very closed to commerce and the Kingdoms unfamiliar with it... have supplied some good things and good signals. This year some vessels came from them (with letters from their governors permitting trade) bringing various goods and particularly wheat and iron that are most needed, and this came at such a good time as we had neither a *libra* of iron to fix the Galleon, nor a grain of wheat to make *biscoito* (AGI, Filipinas 9, R. 3, n. 40).

The above quote perfectly encapsulates wheat's role within the Philippine colony's fiscal crisis while offering a clear view of Salcedo's chief priority as governor. He identified the lack of regional commerce and resulting loss of taxable revenue as the primary causes of the colony's poverty, so his administration's goal was to resuscitate that trade. To begin doing so, the colony first needed to procure sufficient provisions for the galleons' annual voyage, which remained the only way to transport the American silver desired by Asian merchants to the Philippines. The trade missions to nearby kingdoms, then, were both a form of outreach and a way to guarantee the galleons' next voyage. However, these missions were costly, as another letter from Salcedo from the same year shows: "Having witnessed the penury... of the government owing to the lack of commerce, wheat, and iron, and other necessities for the voyage of the Galleons and the provisioning of the Royal Storehouses... it was agreed to send two *champañes*, paid for by your Majesty's account, to the Kingdoms of Siam and Cambodia... To these vessels was trusted 10,000 pesos... and I gave letters for those Kings soliciting their commerce and, to facilitate said commerce, made to each of them as did my predecessors a present that did not exceed 1,000 pesos" (AGI, Filipinas 9, R. 3, n. 41). That same letter explains precisely what Salcedo meant by "penury". The *Caxa de Manila* (lit. "Lockbox of Manila", the city's saved funds) contained 35,000 pesos, and the estimated annual expenses needed to properly maintain the colony were 650,000 to 660,000 pesos (as per Fig. 3, at this time, the colony's annual income was ~200,000 pesos or less). Given the financial condition of the colony, a 10,000 peso trade mission was a simultaneously trivial and unaffordable expense. Nonetheless, it was necessary since iron was essential to build and repair the galleons, just as wheat was essential to feed their crews (AGI, Filipinas 9, R. 3, n. 41).

In the same letter, Salcedo proposed a solution: "Recognizing the grand importance and necessity there is in these islands for these goods of wheat and iron, as well as the lack of them due to what has passed and that they are not made anymore, it is vital to search for ways to produce them and not depend solely on the Kingdoms from which they come... For this essential point I have arranged and already initiated with the natives of the provinces of Laguna de Bay and Balayan lands for the proposed production of wheat, which they planted... with great hopes for its growth" (AGI, Filipinas 9, R. 3, n. 41). It was expected that these wheat fields, along with iron mines in Paracale in Camarines (see Fig. 2), would permanently guarantee the colonial administration access to these critical resources (AGI, Filipinas 9, R. 3, n. 44, 9, R. 3, n. 49).

Three points emerge from these documents, one by reiteration and two by omission. First, all consider wheat exclusively as a consumable, strategically essential resource. In the same way iron was required for building galleons, so was wheat required for sailing them. Without the annual galleon voyage, there would be no commerce. Without commerce, there was no colony. Second, at no time was wheat considered as food or as a cultivar, even as its cultivation was discussed. Cultivation was the means to obtain the resource cheaply, rather than a way of addressing hunger or desire amongst Manila's previously bread-consuming populace, let alone in the remainder of the archipelago. Corollary to this point, the lack of alternative sources of wheat anywhere in the Spanish Philippines confirms that, as late as 1663, wheat was not being cultivated—at least at any noticeable scale—in the colony. That suggests no wheat products had been integrated into local diets or cuisine, except possibly in Manila. Third, none of these documents makes any mention of the *hostia*. In fact, no details on the clergy and how they were affected by wheat prices are mentioned in any of the governors' letters.

Instead, missionaries' struggles to procure wheat are documented in a series of letters authored in the 1660s by representatives of the Dominicans, Augustinians, and Augustinian Recollects. Each order separately beseeched the king for *limosnas* (royal concessions), claiming they lacked the oil, wine, and flour needed to perform Mass as well as the funds to purchase these items. To justify their requests, each representative included copies of successful petitions by their orders for *limosnas* dating as far back as 1633 (as well as, in one instance, successful petitions made by the colony's Jesuits and Franciscans). These appeals unfailingly requested aid to purchase wine and oil, but only mentioned flour (*harina*) sporadically. Over time, though, flour was mentioned more frequently. By the 1660s, it was raised in nearly every letter (AGI, Filipinas 81, n. 73, 81, n. 99, 82, n. 45, 86, n. 21).

These letters provide a few crucial details, both on the crises facing the Philippines and how wheat products were consumed. First, the clergymen's letters indicate that wheat became progressively scarcer as the interlocking crises affecting the Spanish Philippines worsened. Second, in stark contrast to the governors' letters, the clergymen do not use the word *trigo* when beseeching the king for aid. Instead, they used *harina*, the word for flour. This detail suggests the clergymen purchased flour rather than bushels of wheat. In itself, this is unsurprising as flour preserves better than wheat that has not been threshed and ground. Yet it also suggests the clergy had a different perspective on wheat, or rather its end products, than the colonial administration. *Harina* was the ingredient for the *hostia*. There was not a clear, calculable minimum amount that had to be obtained each year, like with *trigo*. Rather, *harina* needed to be abundant, enough so that the clergy could afford to tend and grow their scattered parishes. For the clergy, wheat was not a strategic resource but an incontrovertible need, and without it the Christian colony was not viable.

Salcedo's initiatives ultimately proved successful, and the start of sustained wheat cultivation in 1664 largely resolved the scarcity crisis. Crucial to this effort, according to sworn testimony he submitted to the King in 1678, was Luis de Matienzo Cordero de Nevaes. Luis de Matienzo was *alcalde mayor* (provincial administrator) of Laguna de Bay, a province immediately south of Manila, during the early years of Salcedo's governorship. In that role, he claimed to have developed a method for

reliably cultivating wheat in the Philippines, an assertion backed by 11 testimonies delivered by ranking members of the colonial administration and Mendicant Orders as well as a bishop. Their sworn statements offer little information on how Matienzo cultivated, or rather led the cultivation of, wheat. They do, however, offer several details on the scarcity crisis and its effects on Manila; the near-instantaneous benefits that Manila and the colony derived from Matienzo's success; and hints as to why wheat cultivation failed to become more widespread in subsequent decades (AGI, Filipinas 193, n. 20).

The letters open with a summary written by Luis de Matienzo and a brief statement from the *reales oficiales* (royal accountants), who provided a succinct overview of the crisis and its resolution: "As per the records of Your Majesty's Royal Accountant of the Treasury, that treasury did not contain nor would it contain any quantity of wheat from the Province of Laguna de Bay or other parts of the islands, until the year of 1664, in which there was measured in said storehouses a quantity of wheat from that province. And it continued to be thus from that point on every year, and said wheat provisioned these storehouses. And it had, in the Galleons that have been dispatched to New Spain in all years prior, been necessary to buy wheat at high prices from the vassals of the neighboring kingdoms that have come for commerce with these islands" (AGI, Filipinas 193, n. 20). The implication, supported by subsequent testimonies, is that the wheat shortage was resolved within years of the first harvest.

The sworn statements from various colonial residents offer additional details, both about the crisis and its resolution, that are not provided in the accountants' circum-spect testimony. An appointed official who lived in Manila until 1649, moved to Nueva España, and then returned to Manila in 1659, claimed that, "Priests would guard and conserve [wheat] for the Host for Mass in years that, by accident or hap-penstance, no ships came with wheat, as happened before" (AGI, Filipinas 193, n. 20). A Franciscan priest, formerly assigned to the municipality of "Mabayhay" (per-haps Majayjay) in Laguna when Luis de Matienzo was *alcalde mayor*, stated that growing wheat there greatly decreased the grain's price in Manila's markets. As of his testimony, the price of a single *pico* was as low as eight, ten, or 12 *Reales*, a bit more than a single *peso*. Additional testimonies supported these assertions, claim-ing that wheat had been vanishingly scarce between 1649 and 1664, that what little remained had to be guarded or conserved for the Host, and that the price of wheat in Manila decreased 40-, 60-, or even 100-fold once sustained cultivation began (AGI, Filipinas 193, n. 20).

Testimonies also indicate that administrators funded other, less fruitful efforts to cultivate or replace wheat. The aforementioned official detailed an unsuccessful attempt to replace *biscoito* aboard the galleons with rice-flour biscuits called *potos* or *pototes*, which quickly spoiled in the holds and caused a voyage to fail. Another tes-timony, offered by a *sargento mayor* named Martin de Texada, described how Gov-ernor Salcedo had previously awarded a "mestizo" living in Manila—whose name Texada could not recall—a grant of 2,000 pesos to try cultivating wheat in Laguna. This attempt ended in failure, which the man reportedly blamed on the soil, a claim Texada argued was disproven by Matienzo's subsequent success (AGI, Filipinas 193, n. 20).

This anecdote is difficult to assess since few details are given about Matienzo's technique, though some testimonies offer hints as to how he succeeded where others apparently failed. Andres de la Talavera, formerly assigned to the town of Pililla in Laguna, said, "With much care, caution, and vigilance, [Matienzo] put in execution the planting of the wheat; a thing that had been impossible as had its production for the land seemed unusable for it. And he made the natives of said Province plant it, putting in place the necessary precautions as he dictated them, because those *yndios* without him would do nothing" (AGI, Filipinas 193, n. 20). Putting Talavera's accusations of indolence to one side, it seems wheat was difficult to cultivate and required constant attention from farmers to maintain precise conditions. This assertion is somewhat supported by testimonies from the Franciscan priest mentioned earlier as well as a *maestro de campo* (master of the field), both of whom mentioned that Matienzo had wheat planted in "pueblos altos" or elevated towns (towns on hills). This may suggest wheat grew best in relatively cooler, less humid regions or on sloped land whose soil was well-drained, at least compared to the flat plains commonly used for wet-rice cultivation (AGI, Filipinas 193, n. 20). The *maestro de campo* also detailed how Matienzo enticed *principales* (the Indigenous leaders of settlements) to assemble laborers and carefully plant wheat by promising them royal favor. Intriguingly, he also mentions that Matienzo's techniques soon spread to neighboring Balayan province (now Batangas), suggesting wheat's cultivation was not limited to a single province or government-monitored area (AGI, Filipinas 193, n. 20; see Fig. 2).

Lastly, it should be noted that several testifiers expected wheat would become commonplace throughout the colony. The same *maestro de campo* who said the technique had spread to Balayan also swore, "And at present this testifier knows and has evidence that the poor natives purchase and eat bread because it is so cheap" (AGI, Filipinas 193, n. 20). Another Franciscan priest, previously stationed in Laguna Province, argued the crop would benefit the local farmers, who would be able to sell it for a profit. A third Franciscan priest's testimony, which stated Manila now exported and sold its ample surplus of wheat to visiting merchants, seems to support that claim (AGI, Filipinas 193, n. 20). Overall, the testimonies assembled indicate the Spaniards still understood wheat, first and foremost, as a consumable, strategic, and vital resource. However, the three testimonies presented immediately above also suggest a new expectation that wheat, now cheap and available, would soon be widely consumed. This understanding of wheat is mechanistic, and reminiscent of today's perceptions of commodity crops. It imagines that if wheat and other foods are interchangeable, price will override any other concern or preference. This perspective was entirely disconnected from the difficulties of growing wheat, the quality of the grain obtained, or how and whether local cultivators were preparing and consuming wheat. This apparent obliviousness also helps explain why so little information was provided about how Luis de Matienzo cultivated wheat. His achievement was not the development of a new or sophisticated method, but rather the fiscal improvement his efforts brought to the beleaguered colony.

Once the scarcity crisis was resolved, wheat largely faded from official correspondence, implying cultivation continued after 1678 in provinces close to Manila and was sufficient to meet the colony's various needs (Delgado 1892 [1754]:41; for

an example of a year when cultivation failed, see Alva Rodriguez 1997:39). Scattered documentary evidence does suggest, however, that wheat cultivation shifted to other provinces over subsequent decades. An anonymous history written sometime between 1765 and 1850 (now stored in the Lilly Library in Bloomington, Indiana) states that wheat was cultivated throughout Luzon and Panay, claiming the surplus produce was sold to visiting Dutch, English, French, and Armenian traders (Lilly Library, Philippine mss. II, Sotheby 521:87). Subsequent histories composed throughout the nineteenth century confirm wheat cultivation spread beyond Laguna and Balayan. Those same histories also contend that local cultivation was not sufficient to meet the colony's needs and that some amount of wheat had to be imported each year from at least 1850 onward (e.g., Buzeta and Bravo 1850:29; Moya y Jimenez 1883:132). Doeppers (2016:282–283) corroborates this assertion, stating that wheat flour was imported from San Francisco by 1862. Another brief line in Doepper's (2016:148) *Feeding Manila* confirms wheat cultivation continued in Batangas Province at an undetermined, but significant, scale until the 1870s, when it “collapsed.” The land was subsequently replanted to mandarin orange trees, somewhat ironically at the behest of Spanish colonial authorities. By 1903, the first US-mandated census of the Philippines made no mention of wheat (US Bureau of the Census 1905), suggesting that wheat cultivation on any appreciable scale had ceased by the start of the twentieth century.

The synopsis presented here suggests that, after 1678, Philippine wheat was cultivated wherever foreign merchants were present, emerging near trade centers like Manila or, by the late eighteenth century, southeastern Panay (Lilly Library, Philippine mss. II, Sotheby 521:87). Some evidence for continuous wheat cultivation in provinces like Batangas is provided by Buzeta and Bravo (1850:171–172) who asserted that Philippine wheat was physiologically distinct from temperate variants, having acclimated to the climate over successive harvests (see also Spencer 1975:13). Although not mentioned in the documents, we may assume that wheat remained the indispensable basis of *biscoito*, the essential ration for the Manila Galleons that continued to be the colony's primary source of wealth until the early nineteenth century. There would, as a result, have been every incentive for the colonial administration to maintain cultivation in the Philippines at least until 1815, when the Manila Galleons were discontinued (Schurz 2021 [1939]). In the years between 1678 and 1815 when, for whatever reason, the harvest failed, the colonial government would have needed to purchase wheat from foreigners, either Chinese traders visiting Manila or any number of regional trade partners. Trade missions, like those undertaken in Salcedo's time, would have been documented and may provide an additional venue for exploring Philippine wheat's role in the region's diplomatic history (see Tremml-Werner 2017).

Largely absent, though, from these Spanish documents is any discussion of Philippine peoples between 1565 and 1815 except either as faceless cultivators or as impoverished and hungry consumers. While archival documents have explained why sustained wheat cultivation did not begin until 1664 and why colonial authorities did not proactively encourage more widespread cultivation, they have not answered why Philippine peoples did not more widely adopt wheat after cultivation began. Given colonized peoples were required to consume the Host during Mass, we know

Philippine peoples were aware of and consuming small amounts of wheat regularly. Furthermore, it is known that Philippine peoples adopted more than 30 crops and trees imported from the Americas in this same period, whether those plants were intentionally or unintentionally distributed by the Spanish (Machuca 2014:233–235). Thus, the question remains, why was wheat not cultivated more widely? Why did Philippine farmers reject this particular cultivar?

Why Not Wheat?

Since the historical documents analyzed do not provide Philippine perspectives, questions about why local populations ultimately rejected wheat cultivation are best answered by comparing the cultivar to other starches and luxury crops imported during the Columbian Exchange. This section will contrast wheat with five crops, four of which were successfully imported from the Americas before being adopted by Philippine populations during the Spanish colonial period: sweet potato, maize, wet-rice, tobacco, and cacao. Contrasting these crops with wheat, this section demonstrates how local circumstances, as opposed to colonial and global dynamics, constrained wheat's ability to spread and successfully fill a niche in Philippine patterns of consumption.

As mentioned at the beginning of this paper, no imported crop strikes a better contrast with wheat than *kamote*, the Philippine sweet potato. Evidence suggests that, compared to wheat, sweet potatoes would have been easy to grow and adopt. Indeed, sweet potato farming spread across the archipelago within decades of the colony's founding, if not faster (Amano et al. 2020:319; see Roullier et al. 2013:2205–2206). As early as the 1570s, Spanish observers noted Visayans were consuming sweet potatoes alongside the yams Philippine farmers traditionally grew (*Dioscorea alata*; Blair and Robertson 1903–1906, 5:31–33; Scott 1999:35, 40). Of course, some caution is necessary when interpreting early accounts since some authors called both yams and sweet potatoes “camotes” (e.g., Pigafetta's account in Blair and Robertson 1903–1906, 33:99; Scott 1999:42–43). However, ethnographic evidence indicates sweet potato could have been readily integrated into traditional Philippine agriculture, being capable of growing in the same shifting fields as yams (Amano et al. 2020:319; Scott 1999:40–43). Furthermore, sweet potatoes could grow at higher elevations and usually yielded more tuber per hectare than yams (Findley et al. 2022:12), though these factors likely did not greatly impact noncommercial farmers' decisions. Rather, it seems likely that the sweet potato's overall versatility and suitability to existing techniques lowered any practical barriers to its adoption, allowing it to spread quickly as Philippine peoples integrated it into their cuisines and agricultural regimes. Wheat, based on the limited evidence available from Matienzo's testimony, was not well-suited to Philippine agricultural techniques or the climate. It required constant attention and had to be planted on specific plots of land. None of this suggest the sweet potato was destined to be adopted or spread faster than wheat did, but it definitely had advantages that wheat lacked.

Mais (maize) exemplifies the point that ease of cultivation did not guarantee rapid adoption. Like sweet potato, maize could be grown using local forms of shifting

cultivation, but until the late eighteenth century it was almost exclusively grown as a garden crop by Philippine farmers (Vandermeer 1967:321). In the subsequent century, though, maize supplanted foxtail millet, which is thought to have been widely cultivated in Cebu prior to 1565 (see Amano et al. 2020), as the most commonly grown grain on that island (Cullianane and Xenos 1998:73; Vandermeer 1967:328). Traditionally, scholars have attributed this shift to demography, arguing millet was not sufficiently productive to feed a growing population and that Cebuanos turned to ground maize as a new staple grain. This scenario represents an intriguing example of dietary regionality since, in Luzon, maize was primarily grown as animal feed or as a supplement to other starches (Cullinane and Xenos 1998:73; see also Amano et al. 2020). Canute Vandermeer (1967:323) contended that colonial mandates requiring farmers cultivate a set amount of maize each year also played a role, even though he called these commands largely “unenforceable.” Meanwhile, J.E. Spencer (1975:13–14, 16) argued food shortages in conjunction with newly imported Chinese mills, dispersed by Cebuanos migrating into the hinterlands, favored the growth and consumption of maize. The point of agreement between these stories is that maize, which could grow on the same land as millet, became more widely adopted as local factors in Cebu changed over time.

Mais’s trajectory does partially parallel wheat, in that colonial regulations played a role in both crops’ expanding cultivation. However, maize was already a garden crop before it became Cebu’s primary cultivated grain, and its wider adoption resulted from conditions specific to Cebu in conjunction with colonial edicts. In comparison, wheat cultivation was difficult and began due to the colonial administration’s immediate needs rather than local demand. The example of maize also raises the topic of milling as a potential barrier to wheat adoption. Unfortunately, no mention is made of wheat milling or flour preparation in any of the documents analyzed for this paper, though the Mendicant Orders’ letters for aid clearly show wheat was ground into flour in the islands. Whether threshing and milling were done by hand using Philippine mortars or by imported machines, immediately after harvest or at some collection point, or whether bakeries purchased and then ground their own flour is entirely unknown. To make reasonable assertions, more information from documents or archaeological fieldwork is necessary.

Although *kamote* and *mais*’s successes were predicated on ease of cultivation, the spread of wet-rice cultivars across the archipelago proves this trait was not essential. The pre-Spanish extent of wet-rice cultivation is unclear, but it is thought to have been more limited in Luzon and Panay, and less common in other Visayan islands (Amano et al. 2020:318; Peterson 2005:146; Scott 1999:35–36). Rather than the predominant staple, rice was a prestige starch with both ritualistic and social significance, with the ability to consume it year-round often serving as a status marker (Acabado 2017:11; Amano et al. 2020:318–319; Scott 1999:36–39). After the Spanish conquest, wet-rice cultivation is thought to have increased due to colonial tribute taxes like the *vandala*, which was often paid in rice, animals, or worked goods (on tribute, see Alonso Alvarez 1998:5, 7; Alonso Alvarez 2003:82, 85; Phelan 1967:99–100). In this period, wet-rice also spread to areas outside of Spanish control, as evidenced by the expansion of wet-rice terracing in the politically independent Ifugao region (Acabado 2012:300–301, 2018:181, 183–184; Acabado et al. 2019:198–200). All forms of

wet-rice cultivation were labor intensive, but the grain's economic and ceremonial importance seemingly outweighed physical impediments (see Bray 1994:13). This is a crucial point, as it suggests colonial policies catalyzed the spread of rice cultivation by aligning with a pre-existing desire for the grain, but did not create a yearning for it.

Of all the crops presented so far, wet-rice and wheat share the greatest similarities. Both were labor intensive grains that came to possess religious significance. Wheat was integral to the Host, and the cultivation and consumption of wet-rice was the basis of several rituals and even societal organization (see Acabado et al. 2018:55, 58; Conklin 1980:1, 12–13). However, the two were consumed on entirely different scales. Through Catholicization, wheat consumption did gradually become characteristic of Philippine lifestyles, but was only eaten as part of an—at most—weekly ritual and in tiny amounts (on Philippine Mass, see Phelan 1967:18, 40–46). That does not compare to rice, which was the basis of ceremonies and the meals of the wealthy. It was, as the Spanish often observed, “the bread of this country,” a comparison that hints at rice's centrality to Philippine societies. It was the primary, desired grain, and wheat could not replace or supplant it. Nor, despite claims made in testimonies supporting Matienzo, was wheat a good complementary crop to rice (AGI, Filipinas 193, n. 20). While wheat could grow between rice harvests, it was labor intensive and difficult to cultivate, whereas root crops like sweet potato were more reliable, fast growing, and less demanding starches. For this reason, many Philippine peoples are thought to have grown *kamote* as a complement to rice (Amano et al. 2020:318; Conklin 1957:77; Scott 1999:35). Nor was there, to borrow a modern phrase, some untapped market of wheat consumers like some testifiers' apparently imagined, meaning that wheat could not be reliably bartered in the provinces, unlike rice. Ultimately, the difference in the two grains' historical trajectories can be reduced to “top-down” and “bottom-up” forces. For wet-rice, local forces happened to align with colonial prerogatives. For wheat, colonial edicts could force production, but not avert consumption.

Because the colonial administration viewed wheat as a strategic resource and understood it in financial terms, it is worth comparing wheat to two luxury crops, tobacco and cacao, that found their own niches in Philippine consumption and agriculture (Clarence-Smith 2000:18–19, 100; de Jesus 1998:2–3). Much like sweet potato, tobacco appears to have spread rapidly without aid, and like maize it thrived in certain regions, particularly the Cagayan River Valley of northern Luzon and some Visayan islands (de Jesus 1998:128, 154, 173). By the mid-seventeenth and eighteenth centuries, “Manila Cigars” were frequently sought by visiting foreign traders, and they were sometimes traded abroad by enterprising Spanish merchants, including one Luis de Matienzo (Quiason 1966:35, 44). Philippine tobacco's commercial appeal was such that, in the concluding years of the Galleon Trade, the colonial government instituted a tobacco monopoly in Luzon to raise revenue. Efforts to enforce that monopoly prompted prolonged resistance and massive smuggling, while logistical concerns and fears of unrest prevented the monopoly from being extended to the Visayas (de Jesus 1998:135–137, 173–174). Clearly, then, tobacco and its cultivation were thoroughly adopted among various Philippine peoples, in stark contrast to wheat. Once again, climatic suitability and relative ease of cultivation, a large market for the crop, and strong local demand all contributed to tobacco's rapid dispersal and

uptake—as, undoubtedly, did its addictive qualities and unique taste (see de Jesus, 1998:130–135; US Bureau of the Census 1905, 4:34–38).

Philippine cacao, whose cultivation began around the same time as wheat and did not spread as quickly as tobacco, provides the more enlightening comparison. Inquisition records include some of the earliest mentions of cacao in the Philippines, with denunciations suggesting it was used in various ways throughout the first half of the seventeenth century (Archivo General de la Nación de México [AGN], Inquisición tomo 355:n.p., tomo 384:354, tomo 442:379). Subsequent records show cacao cultivation began on landed estates owned by missionary orders in the latter half of the seventeenth century, with indigenous garden cultivation starting soon after (Blair and Robertson 1903–1906, 47:154; Machuca 2014:236–238). By the late eighteenth and nineteenth centuries, various forms of chocolate were broadly consumed in the archipelago, with some authors noting the plant grew wild in the islands and particularly in Mindanao (Clarence-Smith 2000:18; Coe and Coe 2013:173–174; Diaz-Trechuelo 1963:201). Cacao trees, however, proved ill-suited to the vast majority of Philippine environments due to the strong winds and typhoons experienced in the northern and central islands (Patero 1872:5–8, 16–17, 19–20). The environmental limits this imposed on cacao's cultivation are reminiscent of the climatic barriers that confronted Philippine wheat, and undoubtedly made cacao a labor intensive crop that required constant attention akin to wheat. However, and this point must not be underestimated, cacao had a distinct, stimulating flavor that wheat, a starch, lacked. This may have made growing it at small-scales worth the risk and labor. Whereas wheat competed with other starches like rice, *kamote*, and *mais*, stimulants like cacao and tobacco could make their own niche in Philippine palates.

To conclude, comparing wheat to sweet potato, maize, wet-rice, tobacco, and cacao identifies several historical factors that potentially affected crops' adoption and dispersal before 1800. At the top of the list are ease of cultivation and suitability to local agricultural practices. Sweet potatoes had both traits, and they were adopted as rapidly as any imported crop across much of the archipelago. Maize and wet-rice, however, demonstrate that neither of these traits determined success. Maize was a garden crop in the Spanish Philippines, but became one of the most important crops in Cebu due to changing demographic circumstances. Wet-rice cultivation spread within and beyond the Spanish colony, even as its cultivation required constructing and maintaining extensive terracing systems in the Cordillera. Both examples emphasize the importance of localized geography, climate, and population dynamics on adoption and cultivation, even within an ostensibly singular political unit like the Spanish Philippines. In addition to these factors, the stimulant crops underscore the importance of more subjective traits like flavor and the rituals of consumption.

Until now this paper, focused as it is on material change and physical impediments to cultivars' adoption, has largely ignored intangible factors like flavor, as well as the deep history of Philippine cuisine. The documentary and physical evidence presented, which largely focuses on production and procurement rather than consumption, does not allow much to be said, aside from this brief comment. As per Doreen Fernandez (1988:219), contemporary Filipino cuisine reflects a mixture of influences, including Chinese, Spanish, Malay, and Pan-American, and cultures that have long resided in the archipelago. The Pacific Columbian Exchange introduced

many ingredients at the core of this cuisine, and present-day meals are suggestive of the ways diverse peoples in the Philippines adapted ingredients, recipes, and the words for them. Philippine tamales substitute rice for corn, likely reflecting local preference, whereas the Tagalog word Spanish missionaries originally used for the *hostia* was *tinapay*, a rice-cake made in the region (Sta Maria 2022a, b; for more on the politics of translation, see Rafael 1993). Additionally, in the eighteenth century, Pampangans were mixing honey with wheat bread dough, which is suggestive of how wheat bread was acculturated outside Manila over time (Sta Maria 2022c). As with the physical factors described above, every detail presented here suggests the overwhelming importance of local factors in cultivation and consumption, even for cultivars introduced through global entities. Our analysis ultimately indicates that cultivar adoption is predicated primarily on time-dependent local factors, and that Philippine agriculture was highly responsive to evolving local needs and preferences during the global Columbian Exchange.

Discussion and Conclusion

Taking all the evidence into consideration, two things are clear. First, while wheat was a rejected cultivar, Philippine peoples did not reject wheat. It was introduced, dispersed, and cultivated at a limited scale in Luzon over an approximately 300-year period, during which time it was ritualistically consumed as the Host by colonized peoples. That cannot be characterized as complete rejection. As to why wheat failed to go further before 1800 CE and become integrated into diets as a staple or luxury food item that was widely cultivated, it is apparent that there is no single explanation. This is an essential point, one that implies wheat's failure to retain a foothold in Philippine fields cannot be reduced to its status as a colonial crop or its general unsuitability to tropical climates. Instead, wheat's successes and failures as an import are owed to a confluence of time-dependent factors best described as global pressures—such as transoceanic commerce, imperialism, and Catholicization—and local dynamics that included Philippine geography, Spanish-Philippine interactions, and the prerogatives of small groups and communities.

Archival documents and comparisons with other crops indicate what those time-dependent factors were. Archival materials repeatedly confirm a crucial detail about Philippine wheat: it was hard to grow. Its growth required careful attention and specific topographies, and it seems to have been incompatible with preferred or traditional agricultural techniques. Unlike the sweet potato and, to a lesser extent, maize, it could not be readily integrated into local agriculture. Comparison to cacao and especially to wet-rice, another labor intensive grain that had sociocultural and ceremonial significance, suggests these were not insurmountable barriers to widespread adoption. Like wet-rice, wheat consumption became widespread during the Spanish period through Catholic rituals. However, the level of consumption differed. Daily rice consumption was a marker of prestige and its cultivation was a matter of ritualistic and cultural import. By contrast, most Philippine peoples probably only consumed a pittance of wheat each week when taking the Host and did not consume bread regularly. Even Manila, the city where the archipelago's most avid wheat consumers

and the traders who valued the grain gathered, had limited need for wheat. Additionally, unlike cacao and tobacco, wheat lacked an addictive quality to fuel demand. Finally, unlike maize in Cebu, neither demographic factors nor novel technologies operating in tandem promoted wheat's widespread cultivation at any point in time. It is easy, given these countervailing factors, to imagine wheat's failure to find broad purchase among Philippine populations was a foregone conclusion. However, the start of wheat cultivation throughout Luzon and Panay to support growing regional trade contradicts that assertion. It seems wheat, like maize, could benefit from changing circumstances that made its cultivation favorable.

This crucial detail leads to the conclusion that there was no singularly prohibitive barrier preventing wheat from being widely cultivated. Rather, it seems wheat's failure is attributable to all the factors described above, a constellation of reasons that never fully realigned in the cultivar's favor. The story of wheat, and the other crops considered here, thus provides a sophisticated framework for assessing why imported foods are adopted or rejected, and even challenges that binary. Rather than imagining a progression, from introduction to cultivation, dispersal, and finally adoption or rejection, wheat in the Philippines emphasizes the importance of "barriers to cultivation." These barriers, wheat and other crops demonstrate, were subject to change over time and could be lowered or raised by colonial policies as well as dynamic local conditions. However, these crops also show that administrators could not create demand, nor force the spread or widespread adoption of specific crops. Globalizing trade and nascent market forces proved more influential than administrative interventions, but even these could not override local conditions like demographic pressures, geography, and preferred cultivation strategies.

Further work could and must be done to better describe these local factors, both in provincial or clerical archives not accessed for this paper and through archaeological fieldwork. In particular, attempts should be made to identify where precisely wheat was cultivated in Batangas and Laguna and to find physical remnants of the cultivar. For documentary evidence, an especially promising resource may be the Archivo Franciscano Ibero-Oriental, which contains records written by members of the Franciscan Order whose members administrated most pueblos in Laguna de Bay and testified in support of Luis de Matienzo in 1678. Paralleling these Franciscan documents, Augustinian records in Valladolid as well as various Spanish and Philippine archives may hold documents detailing wheat production in Batangas. Physical evidence of wheat cultivation will likely be difficult to find for the reasons discussed above. Nonetheless, archaeological excavations could target the settlements administered by the Franciscan priests who testified on behalf of Luis de Matienzo (in particular, Pililla). Given the amount of development Laguna de Bay has undergone in the twentieth century, however, finding physical evidence of limited wheat production in specific pueblos may prove especially challenging, making archival documents the most effective way of understanding the complicated history of this particular cultivar. To complement these investigations, further research on how Philippine cuisines integrated wheat-based foods, such as when specific recipes are first recorded, will also be necessary.

In conclusion, this body of evidence suggests the "barriers to cultivation" were dynamic and formed at the intersection of local prerogatives and global dynamics. As

for wheat, it was introduced to the Philippines by global institutions, it became essential to local cultures, and its history embodies the centuries of negotiation between the two. That dialogue continues to this day, suggesting the barriers to wheat cultivation will continue to shift and that wheat's status as a "failed cultivar" need never be truly settled.

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Declarations

Competing interests The authors have no competing interests to declare.

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