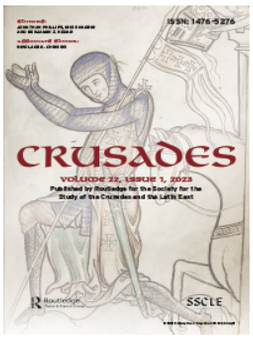

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'With a grain of sugar': native agriculture and colonial capitalism in the Frankish Levant, c. 1100–1300

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ABSTRACT

The Biblical trope of a 'land of milk and honey, abounding in corn, wine and oil and all material goods' is found in medieval works describing the Holy Land and is common in crusading rhetoric. Do these statements, idyllic as they are, reflect the fact that agricultural production rates in the Levant were higher than those in contemporary Europe – and more specifically France, the original homeland of the majority of the European settlers? The article aims to cast a fresh look upon the detailed thirteenth-century account by the Venetian Marsilio Zorzi, to estimate whether crop yields achieved by local peasants were indeed higher than those attained in France, and comparable with other Mediterranean regions, around the same time. Rereading and analysing this account, together with other textual sources, as well as archaeological and palaeoclimatic data, reveals not only that thirteenth-century yields were just on a par with those attained in France, and lower compared with other Mediterranean regions around the same time, but also lower than in preceding centuries in the Levant. This was connected to larger eco-climatic changes in the region on the one hand, and to cultural and institutional factors on the other. Taken together, this paper's analysis offers new insights into the motives that guided European immigrants settling in the Levant, the nature of their society and economy, and wider environmental changes in that region.

KEYWORDS

Frankish Levant; agriculture; crop yields; agrarian capitalism; international trade

Magistro, collegae amicoque meo B.Z. Kedar / למורי, עמיתי וידידי ב"ז קדר

The present study exemplifies how a single (but quite unique) source conceals some vital hints and potentially provides answers to several big questions and long-standing debates related to the Frankish settlement in the Levant in particular, and to the economic history of the Middle East in general. The source in question is an entry on the state of a village of Betheron (in the Tyre hinterland) reported by Marsilio Zorzi, a Venetian *bailo* stationed at Acre between spring 1242 and spring 1244, and

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forming a part of his report on landed estates of the commune in the Tyre region. On the surface, the Betheron entry states, among other things, the quantities of sown and harvested crops. A deeper analysis, however, provides a unique glimpse into agricultural practices, structures and fortunes in the Frankish Levant. In particular, it sheds light onto the following 'big' questions, each of which, in turn, is linked to some ongoing debates:

(1) How productive was agriculture in the Frankish Levant (c. 1099–1291)?
(2) Was it equally or less productive than in the previous centuries?
(3) What prompted European individuals to settle in the Frankish Levant?
(4) How 'colonial' was Frankish settlement and how 'capitalist' was their agriculture (and by extension, their economy)?

The first question has been hardly touched upon by scholars. One exception is Joshua Prawer, who concluded (first in a 1952 article and then in his 1980 *Crusader Institutions*), on the basis of Zorzi's report, that thirteenth-century grain yields in Syria-Palestine were approximately as in the Roman period, but lower than in the early twentieth century, and standing on a par with those in thirteenth-century England.[1] The second question, deriving from the first one, is linked to a debate about the long-term economic decline of the Middle East – particularly, in the context of 'Great Divergence' between the 'West' and the 'rest'. For some economic historians, such as Timur Kuran and Jared Rubin, it was not until the early modern period that the Middle East would start lagging behind western Europe – because of cultural and institutional factors.[2] The agricultural foundations of the economic crisis and decline of the Middle East in the Mamluk period have been analysed by Elyahu Ashtor in 1977 and 1981.[3] More recently, Ronnie Ellenblum delved into the environmental foundations of the crisis in his 2012 *Collapse of the Eastern Mediterranean*, where he identified a period of cold and dry climate dominating between c. 950 and 1072.[4] Ellenblum's arguments have not been accepted favourably by all.[5] By contrast, the question of fitting the Frankish/Ayyubid period, an intermediate era between the Fatimid and Mamluk periods, into this context of long-term agricultural and economic decline has not been explored.

The fact that the Frankish/Ayyubid period has been left out is a great impediment to our understanding of the economic motives of European migrants, primarily from France, to come and settle in the Levant in the course of the twelfth and thirteenth centuries. If there were indeed signs of an economic crisis and decline *before* the Frankish dominance, as suggested by Ellenblum, then how can we explain their migration and settlement? The

[1] Joshua Prawer, 'Étude de quelques problèmes agraires et sociaux d'une seigneurie croisée au XIIIe siècle', *Byzantion* 22 (1952): 1–61, at 49–50; Joshua Prawer, *Crusader Institutions* (Oxford, 1980), 174–80.
[2] Timur Kuran, *The Long Divergence: How Islamic Law Held Back the Middle East* (Princeton, 2010) and Jared Rubin, *Rulers, Religion, and Riches: Why the West Got Rich and the Middle East Did Not?* (Cambridge, 2017).
[3] Eliyahu Ashtor, 'Levantine Sugar Industry in the Later Middle Ages: An Example of Technological Decline', *Israel Oriental Studies* 7 (1977): 226–80; idem, 'The Economic Decline of the Middle East during the Later Middle Ages: An Outline', *Asian and African Studies: Journal of the Israel Oriental Society* 15 (1981): 253–86.
[4] Ronnie Ellenblum, *The Collapse of the Eastern Mediterranean: Climate Change and the Decline of the East, 950–1072* (Cambridge, 2012).
[5] Johannes Preiser-Kapeller, 'A Collapse of the Eastern Mediterranean? New Results and Theories on the Interplay between Climate and Societies in Byzantium and the Near East, ca. 1000–1200 AD', *Jahrbuch der Österreichischen Byzantinistik* 65 (2015): 195–242.

old idea that Frankish immigrants to the Levant during the crusading era were invariably settling in towns and castles, perpetuated, most famously, by Joshua Prawer,[6] has been long dismissed, on the basis of both textual and archaeological evidence, by Ronnie Ellenblum.[7] Much less clear are economic motives of the same 'Franks' for immigration to and settlement in rural Levant. Given the agricultural nature of rural economies, it is tempting to think right away about local opportunities, not available back home: high grain yields, rich vineyards and exotic sugar cane plantations. Does European rural settlement reflect a temporary agricultural improvement during Frankish dominance? If, however, the situation was not better than in the previous century or two, studied by Ellenblum, then what practical factors would attract them to the Holy Land? Certainly, a religious sentiment and chivalric values guiding crusading leaders and nobility during the large-scale military campaigns, like the First Crusade, [8] can hardly explain the motives of a Frankish burgess migrating in relatively peaceful times around, say, 1170 or 1210.

The latter question is strongly connected to the fourth question related to the nature of Frankish society in twelfth- and thirteenth-century Levant. Beginning with Emmanuel Guillaume Rey, Gaston Dodu, Claude Reignier Conder, Louis Madelin, René Grousset, Claude Cahen, and Joshua Prawer, the idea that Frankish settlers were the earliest European colonialists dominated for a long time in historiography and is still a commonly held view in popular and non-specialist perceptions.[9] This 'colonialist' view has been ever since challenged, with some historians distancing themselves from it.[10] One aspect left out in this debate is the nature of economic behaviour, decisions and strategies undertaken by Frankish migrants in the course of their settlement in the Levant. To appreciate that, it is important to consider these against other, later examples of European colonial economies in Asia and Africa. Such comparative analysis can reveal how 'colonial' was Frankish society and how 'capitalist' was their economy. Hopefully, these insights into these four big questions will lay some groundwork for future research.

Christian and Islamicate depictions of agricultural productivity in Syria-Palestine

Before delving into Zorzi's report, it is instructive to look into textual depictions of agricultural productivity in Syria and Palestine by both West Christian and Islamicate authors.

[6]For instance, Prawer, *Crusader Institutions*, 102–3.

[7]Ronnie Ellenblum, *Frankish Rural Settlement in the Latin Kingdom of Jerusalem* (Cambridge, 1997); Ronnie Ellenblum, *Crusader Castles and Modern Histories* (Cambridge, 2007), 49–56.

[8]Jonathan Riley-Smith, *The First Crusaders: 1095–1131* (Cambridge, 1997), 21; Marcus Bull, *Knightly Piety and the Lay Response to the First Crusade: The Limousin and Gascony, c.970-c.1130* (Oxford, 1993), 283–5.

[9]Emmanuel Guillaume Rey, *Essai sur la domination française en Syrie durant le moyen âge* (Paris, 1866); Gaston Dodu, *Histoire des institutions monarchiques dans le royaume latin de Jérusalem, 1099–1291* (Paris, 1894); Claude Reignier Conder, *The Latin Kingdom of Jerusalem* (London, 1897); Louis Madelin, 'La Syrie franque', *Revue des deux mondes* 38 (1916) : 314–58; René Grousset, *L'histoire des croisades et du royaume franc de Jérusalem*, 3 vols. (Paris, 1934–1936); Claude Cahen, *La Syrie du nord* (Paris, 1940); Joshua Prawer, 'Colonization Activities in the Latin Kingdom of Jerusalem', *Revue belge de Philologie et d'Histoire* 29 (1951): 1063–1118; and idem, *The Latin Kingdom of Jerusalem: European Colonialism in the Middle Ages* (London, 1972). The historiography of 'colonialist' and 'non-colonialist' interpretations of Frankish settlement in the Levant is analysed in Ellenblum, *Crusader Castles*, 43–61.

[10]Benjamin Z. Kedar, 'The Crusading Kingdom of Jerusalem – the First European Colonial Society? A Symposium', in *The Horns of Ḥaṭṭīn: Proceedings of the Second Conference of the Society for the Study of the Crusades and the Latin East, Jerusalem and Haifa, 2–6 July 1987*, ed. Benjamin Z. Kedar (Jerusalem and London, 1992), 341–66; and Corliss Slack, 'The Quest for Gain: Were the First Crusaders Proto-Colonists?', in *Seven Myths of the Crusades*, ed. Alfred J. Andrea and Andrew Holt (Indianapolis, 2015), 70–90.

Perhaps no other Christian text reflects the idyllic perception of Holy Land, based on a dichotomy between poverty at home and riches beyond the sea, as clearly as the Clermont speech (27 November 1095) by Pope Urban II, carried amidst a bad crop failure and harsh subsistence crisis all over western and central Europe. According to Robert the Monk's version of the speech, Urban allegedly depicted the Holy Land as a land which 'floweth with milk and honey … fruitful above others, like another paradise of delight' – in sharp contrast with France, whose land was 'too narrow for [its] large population' and having 'scarcely food enough for its cultivators'.[11] Given that this dichotomic trope is found only in Robert's version of Urban's speech, we cannot be certain if the pope said anything similar, or if those words were merely put into his mouth by the chronicler. We may nevertheless assume that they may reflect the expectations of departing crusaders. Importantly, these expectations were not only spiritual ones, imbued in Biblical and quasi-Messianic motifs, but also quite earthly, reflecting the burden that local French landlords and tenants had to bear as a result of a disastrous crop failure of 1095.[12]

Writing of the Frankish East, several authors provide some fanciful details on extraordinary high yields produced by local land. Thus, in his *Chronicon*, William of Tyre alleged that the region around Ascalon, lying uncultivated for fifty years, would produce a sixty-fold yield in the aftermath of the city's conquest by the Franks in 1153.[13] Nothing short of another Biblical trope, based on Matthew 13:8 (the Parable of the Sower), such a figure cannot be taken seriously given that even the most productive agricultural world regions, such as the Yangtze delta, parts of India, Sicily and Egypt, were yielding – in average years – about four times less that figure.[14] Abbot Daniil the Pilgrim of Kiev, visiting the Holy Land in 1104–6, went even further, stating that farmers in the Jerusalem region would harvest 90 or 100 measures of wheat and barley for each sown measure.[15] Elsewhere, Daniil commented on extraordinary soil fertility in the Hebron and Samaria regions.[16] Ironically, those regions mentioned by Daniil must have, in reality, been among the most infertile ones in Frankish Palestine.[17]

This idea of high land fertility is echoed, albeit in much less fanciful manner, in other European pilgrims' accounts. Thus, in his *Libellus de locis sanctis* (c. 1172), Dietrich (or, Theodericus) spoke about an abundance of grain and garden produce in the Judaean valley, and about the fertile soil of Samaria.[18] Similarly, Wilbrand of Oldenburg, visiting

[11] *The Historia Iherosolimitana of Robert the Monk*, ed. D. Kempf and M.G. Bull (Woodbridge, 2013), 6. The agricultural context of the Clermont speech has been discussed in Philip Slavin, 'Crusaders in Crisis: Towards the Re-Assessment of the Origins and Nature of the "People's Crusade" of 1095–1096', *Imago Temporis: Medium Aevum* 4 (2010): 175–99.
[12] Slavin, 'Crusaders in Crisis'.
[13] WT 18.1, pp. 809–10.
[14] Calculated from Kent Deng and Lucy Zheng. 'Economic Restructuring and Demographic Growth: Demystifying Growth and Development in Northern Song China, 960–1127', *The Economic History Review* 68, no. 4 (2015): 1107–31; Stephen Broadberry, Hanhui Guan, and David Daokui Li. 'China, Europe, and the Great Divergence: A Study in Historical National Accounting, 980–1850', *The Journal of Economic History* 78, no. 4 (2018): 955–1000.
[15] 'Khozheniye Daniila Igumena Russkoi Zemli' [The journey of Daniel the Hegumen of the Russian land], in *Kniga Khozhenii. Zapiski Russkikh Puteshestvennikov XI-XV vv.* [Book of journeys. Writings of Russian travelers of the eleventh to fifteenth centuries], ed. N. I. Prokof'yev (Moscow, 1984), 41.
[16] 'Khozheniye Daniila', 53 and 62.
[17] As indicated by some late nineteenth-/early twentieth-century European observers. See, for instance, Leo Anderlind, 'Ackerbau und Thierzucht in Syrien, insbesondere in Palästina', *Zeitschrift des Deutschen Palästina-Vereins* 9 (1886): 1–73, at 49.
[18] *Peregrinationes Tres. Saewulf, John of Würzburg, Theodericus*, ed. Robert B.C. Huygens, CCCM 139 (Turnhout, 1994), 144 and 188.

Jerusalem in 1211–2, noted that local hills produced much wine, oil and wheat.[19] Six or so years later, Thietmar, another German pilgrim, related that wheat grew in abundance on the plains of Moab.[20] Burchard of Mount Sion's *Descriptio Terrae Sanctae*, based on his travels across the Holy Land in 1283–5, describes the soil of the Holy Land as outstanding compared to all other lands, despite some arguments to the contrary, for it was very fertile in wheat, which grew virtually without human labour.[21] That soil around Jerusalem was the best and most plentiful was claimed even in an Old Icelandic Biblical compilation known as *Stjórn* (c. 1300), relying, in turn, on earlier accounts of Icelandic pilgrims and European continental sources.[22] The Biblical trope of a 'land of milk and honey, abounding in corn, wine and oil and all material goods' is found in several pilgrims' works, including a travelogue of Philip of Savona, OFM (1285–9).[23] Most relevantly for this study, William of Tyre spoke about a highly fertile terrain in and around Tyre, blessed with optimal soil, producing plentiful foodstuffs for its inhabitants.[24]

Intriguingly, these idyllic statements are echoed by Islamicate authors, particularly geographers, both before and during the Frankish period. Thus, Ibn al-Faqīh al-Hamadhānī (fl. 902), stated in a generalised manner that Palestine is both vast and rich land.[25] In a much more detailed manner, al-Muqaddasī (945/6–91), outlining agricultural peculiarities of each region in Syria-Palestine, suggested that virtually all regions there were fertile and abundant in arable fields, olive trees, orchards and vineyards. Specifically, he painted Jerusalem as a blessed land of milk and honey.[26] Similarly, Nāsir Khusraw, travelling in the region in 1047, noted the fruitfulness of different parts of the region, and indicated that the Jerusalem region was abundant in all different crops, despite being unirrigated and upland.[27] The agricultural fruitfulness of Syria and Palestine is likewise commented upon in the anonymous *Ḥudūd al-ʿĀlam* (c. 982–3),[28] as well as by al-Iṣṭakhrī (d. c. 957),[29] al- Zayyāt (c. 960–1050),[30] and al-Idrīsī (1100–65/6)[31] Importantly, in *Ṣūrat al-'Arḍh* (977), Ibn Ḥawqal, while praising all districts in the region, stated that Palestine is the most

[19] *Peregrinatores Medii Aevi Quatuor*, ed. J. C. M. Laurent (Leipzig, 1864), 184.
[20] *Magistri Thietmari Peregrinatio*, ed. J. C. M. Laurent (Hamburg, 1857), 35.
[21] *Burchard of Mount Sion, OP. Descriptio Terrae Sanctae*, ed. John R. Bartlett (Oxford, 2019), 74–5, 184–5.
[22] *Altnordische Kosmographie*, ed. Rudolf Simek (Berlin, 1990), 530.
[23] Wilhelm Anton Neumann, 'Drei mittelalterliche Pilgerschriften III: Philippi Descriptio Terrae Sanctae', *Österreichische Vierteljahresschrift für katholische Theologie* 11 (1872): 1–78, at 35.
[24] WT 13:3, p. 558.
[25] *Compendium Libri Kitâb al-Boldân auctore Ibn al-Fakîh al-Hamadhânî*, ed. M.J. de Goeje, *Bibliotheca Geographorum Arabicorum* vol. 5 (Leiden, 1885), 103; *Ibn al-Faqīh al-Hamaḏānī, Abrégé du Livre des Pays*, trans. Henri Massé (Damascus, 1973), 103.
[26] *Descriptio Imperii Moslemici Auctore Shams ad-dīn Abū Abdallah Mohammed ibn Ahmed ibn abī Bekr al-Bannā al-Basshārī al-Moqaddasi*, ed. M.J. de Goeje, 2nd ed., *Bibliotheca Geographorum Arabicorum* vol. 3 (Leiden, 1906), 151–84; *Best Divisions for Knowledge of the Regions: Ahsan al-Taqasim fi Marifat al-Aqalim, al- Muqaddasī*, trans. Basil Collins (Reading, 2001), 128–52.
[27] *Nasir-i Khusraw's Book of Travels [Safarnama]*, ed. and trans. Wheeler M. Thackston Jr. (Costa Mesa, 2001), 16–17, 19, 25–7.
[28] *Ḥudūd al-ʿĀlam: A Persian Geography (372 A.H. – 982 A.D.)*, transl. V. Minorsky, 2nd ed. (London, 1970), 149–50.
[29] *Viae Regnorum. Descriptio Ditionis Moslemicae Auctore Abū Ishāk al-Fārisi al-Istakhrī*, ed. M.J. de Goeje, 2nd ed., *Bibliotheca Geographorum Arabicorum* vol. 1 (Leiden, 1927), 56–61; *The Oriental Geography of Ebn Haukal, an Arabian Traveller of the Tenth Century*, trans. William Ouseley (London, 1800), 40–3.
[30] *El 'Ḏikr al-Aqālīm' de Isḥāq ibn al-Ḥasan al-Zayyāt (tratado de geografia universal)*, ed. and trans. Francisco Castelló (Barcelona, 1989), 158–61.
[31] *al-Idrīsī, Opus Geographicum*, ed. E. Cerulli, F. Gabrieli, G. Levi della Vida, L. Petech and G. Tucci (Rome, 1970), 364–5; *Géographie d'Edrisi*, trans. Pierre-Amédée Jaubert, vol. 1 (Paris, 1836), 339–56.

fertile region of Syria, while Jerusalem is the most fertile region in Palestine, despite its topography.[32] Ibn Ḥawqal's ideas are repeated, at a much later period, by Abū al-Fidāʾ (1273–1331).[33] Ibn al-ʿArabī (1076–1148), living in Jerusalem in 1093–6 (that is, on the eve of the crusader conquest), juxtaposed fruitful Palestine with his impoverished native al-Andalus.[34] In other words, the perception of Syria-Palestine as a land of milk and honey and of Jerusalem (the holy city of all three Abrahamic religions) as an exceptionally fertile region was indeed shared by both Christian and Islamic authors.

Do these statements voiced by both Christian and Islamic writers, idyllic and exaggerated as they are, reflect the fact that agricultural production rates in the Levant were higher than those in contemporary Europe – and more specifically, France, the original homeland of the majority of Frankish settlers? To my best knowledge, the only hint of the level of agricultural productivity in Frankish Syria-Palestine is found in a report of Marsilio Zorzi,[35] a Venetian *bailo* for the Levant stationed at Acre between spring 1242 and spring 1244.[36] During his tenure, Zorzi produced a detailed account that recorded, in addition to Levantine properties of the Venetian commune, also adjacent estates belonging to other local lords.[37] In total, Zorzi reported the state of affairs in 13 villages (*casali*), all in the Tyre region, recording, in a fairly meticulous detail, the names of local household heads, the size of their holdings, crops produced and rents owed. Of all 13 villages, however, the only quantifiable information on local crop yields derives from a single entry on the village (*casale*) Betheron (identified by Maurice Chéhab with Ḍahr Baitaruh = ضهر بيتروه, 33°14'11.91"N, 35°22'58.01"E; 20 km south-east of Tyre),[38] held jointly by the commune and the archbishopric of Tyre.[39]

Zorzi's report has been long known to historians, who used it primarily in conjunction with their studies of thirteenth-century Levantine demography.[40] The only historian to have utilised its potential to shed light on agricultural production levels was Joshua Prawer.[41] Unfortunately, Prawer's calculations suffer from several faults, rendering them both inaccurate and unreliable. The present article aims to cast a fresh look upon Zorzi's entry on Betheron to estimate crop yields achieved by local *fallāḥīn* in the thirteenth century and see if these were indeed higher

[32] *Viae et regna, descriptio ditionis moslemicae auctore Abu'l-Kasim Ibn Haukal*, ed. M.J. de Goeje, *Bibliotheca Geographorum Arabicorum* vol. 2 (Leiden, 1873), 111–6; *Ibn Hauqal, Configuration de la terre (Kitab Surat al-Ard)*, vol. 1, trans. J.H. Kramers and G. Wiet (Paris, 1964), 167–73.

[33] *Géographie d'Aboulféda*, ed. M. Reinaud and M. Mac Guckin de Slane (Paris, 1840), 228–31 (see also other fertile sites described by him on 226–51); *Geographie a'Aboulfeda*, trans. M. Reinaud, vol. 2.2 (Paris, 1848), 3–5.

[34] *Ibn al-Arabi mi-Seviliya. Masa' be-Eretz Israel (1092–1095)* [Ibn al-Arabi of Seville. The journey in Eretz Israel (1092–1095)], trans. Joseph Drory (Ramat Gan, 1993), 111–2.

[35] There are, however, a few scattered references to barley yields in eleventh-century Palestine in some Qaraite documents from the Cairo Genizah, discussed below.

[36] *Der Bericht des Marsilio Zorzi: Codex Querini-Stampalia IV 3 (1064)*, ed. Oliver Berggötz (Frankfurt am Main, 1990) [hereafter cited as *Bericht*], 76–93.

[37] The best (and the only critical) edition of the report is *Bericht*, 101–225.

[38] Maurice Chéhab, *Tyr à l'époque des croisades*, vol. 2 (Paris, 1979), 360 and 756.

[39] *Bericht*, 161–6.

[40] Prawer, 'Étude de quelques problèmes', 41; Prawer, *Crusader Institutions*, 167; Roberto Bachi, *The Population of Israel* (Jerusalem, 1977), 23; Josiah C. Russell, 'The Population of the Crusader States', in Setton, *Crusades*, 5:297–8; Benjamin Z. Kedar and Muhammad Al-Ḥajjūj, 'Muslim Villagers of the Frankish Kingdom of Jerusalem: Some Demographic and Onomastic Data', in *Itinéraires d'orient: Hommages à Claude Cahen*, ed. Raoul Curiel and Rika Gyselen (Bures-sur-Yvette, 1994), 145–56.

[41] Prawer, 'Étude de quelques problèmes', 49–54; Prawer, *Crusader Institutions*, 174–7.

than those attained in France and comparable with other Mediterranean regions, around the same time. Rereading and analysing this entry may, in turn, have implications for our understanding of motives that guided European immigrants settling in Frankish-controlled territories of the Levant and the very nature of their society.

Measuring arable productivity

Before delving into Zorzi's report, it is important to note that there are several measures indicating land productivity and its change over time, utilised by economic historians – all expressed as crop yields. Arguably the single most basic measurement of agricultural performance is ***seed-ratio yields***, that is, the number of grains harvested for each grain sown. Thus, if in a given year a wheat field produced, say, 400 quarters from 100 quarters sown in the previous year, the ***seed-ratio yield*** would be 4:1 (400 quarters harvested/100 quarters sown).

Although ***seed-ratio yields*** have been often used by economic historians as an indicator of agricultural performance, they provide a rather imperfect and abstract measure. Thus, they ignore some important variables, such as seeding densities, labour intensity rates and, most importantly, calorific values. To appreciate the real output levels, it is essential to deploy more direct measurements of agricultural productivity. One method, often used by economic historians, is ***per land-unit yields***, which establish, on the most fundamental level, *how much was produced (in weight or volume) on one unit of sown arable land* (most commonly, bushels per acre or hectolitres per hectare).[42]

Although ***per-land-unit yields*** provide a good indication of *food volume* produced on each land unit, they still cannot be considered as a real measure of food production, owing to considerable variances in food energy value across different crops. Thus, one bushel of wheat yields about 3.6 times more calories than the same volume of legumes and about 1.2 times more than barley.[43] Therefore, to get a much better idea of how much food is really produced on one land unit, I suggest using an alternative measure: ***calorific yields***, calculated by converting the volume of each crop grown on one sown land unit into its approximate energy equivalents (in this instance: bushels harvested from one acre into kcals). Unlike other measures, ***calorific yields*** take into account calorific differences provided by different crops, and hence, show how much ready-to-be-processed food was produced on the same acre.

Seedcorn rates is yet another measure of agricultural performance. In essence, it is a relative proportion of harvest invested as seedcorn in the sowing season following the harvest season. For instance, if a peasant, having harvested 100 bushels of wheat, allocated 10 bushels of the same harvest for seeding, seedcorn rates would be 10 per cent. If, however, the same peasant invested 30 bushels from the same harvest of 100 bushels, then seeding rates would be 30 per cent. One advantage of ***seedcorn rates*** is that it reflects living standards and wealth of rural producers. In any pre-Industrial society, seed was an important form of capital investment, on a par with land, money,

[42]Stephen Broadberry et al., *British Economic Growth, 1270–1870* (Cambridge, 2015), 90–7.
[43]Ibid., 282.

and labour. On the most basic level, the lower the seedcorn rates were, the more marketable surplus would remain at a peasant family's disposal. Conversely, high seedcorn rates would endow it with little or no surplus.

On a deeper level, ***seedcorn rates*** reveal the potential of long-term economic performance across regions. The very existence of marketable surpluses on a household level hints that agricultural produce exceeded the calorific requirements of local producers, and that food supply could be distributed much beyond the local level. This would lead to a foundation and proliferation of food markets that would, in theory, release certain individuals and communities from the need to work the land, and allow them to specialise in and perform non-agricultural tasks. This would facilitate urbanisation and the division of labour (both between the town and the countryside and within the same towns) that it entails. This, in turn, would encourage the growth of complex and sophisticated economic systems, gearing towards developed business institutions, international trade, monopolistic competition, and proto-industrialisation.

Finally, we should also account for ***seeding density rates***, as another indicator of agricultural performance. This measure is positively correlated with ***seedcorn rates*** and negatively correlated with ***crop yields***, be they expressed as ***seed-ratio yields***, or ***per-land-unit yields***, or as ***calorific yields***. Thus, crop producers from regions achieving high yields and investing small proportions of annual harvests in seedcorn would, as a rule of thumb, sow each land unit thinly, and hence practice labour-extensive sowing. By contrast, peasants from regions with lower crop yields and higher seedcorn rates would, invariably, sow densely, whereby practicing labour-intense sowing.

Arable productivity levels in the Tyre region, c. 1242

Where does thirteenth-century Tyre region stand, as far as the agricultural productivity indicators above are concerned? Our point of departure would be Zorzi's statement that in Betheron (1) local tenants of the Venetian holding (*rustici nostri*) would seed annually 12 *modii* of wheat in an arable field and three *modii* of legumes on the fallow (*garitus/terra macatica/terra frata*);[44] and (2) seeding rates stood, invariably across all villages, at 9 *modii* per *carruca* for grains (wheat and barley) and at one *modius* per *carruca* for legumes.[45] In all instances, the *modius* unit in question was the kingdom of Jerusalem *modius* (*modius regalis*), rather than the Venetian *modius*.[46]

First, we need to determine a volume equivalent of one *modius* and an area equivalent of one *carruca*. In his *Crusader Institutions*, Joshua Prawer assumed incorrectly, following Rey, one *modius* to be 176 litres and one *carruca* to contain 35 hectares (~86 acres).[47] In reality, however, one crusader *modius*, as commonly used in Acre, was equal to 166.6 litres (or two Venetian *stai*), as indicated in two commercial manuals from Venice (an anonymous manual from c. 1270 and the so-called *Zibaldone da Canal* from the early

[44] *Bericht*, 165, lines 17–20. To avoid any confusion, I have opted not to translate *modii/modia* as either 'muid' or 'measure', but rather retain the original Latin term as is.
[45] *Bericht*, 52.
[46] Prawer, *Crusader Institutions*, 174.
[47] Prawer, *Crusader Institutions*, 174–5; Emmanuel-Guillaume Rey, *Les colonies franques de Syrie aux XIIe et XIIIe siècles* (Paris, 1883), 242–3.

fourteenth century).[48] The equation of *carruca* with 35 hectares is an even bigger stretch: as Ronnie Ellenblum has shown, on the basis of archaeological evidence, the crusading *carruca* appears to be, more or less, on a par with its European counterpart, whose size would have been in the area of 3–4 hectares (~7.5–10 acres).[49]

(1) Seeding density rates in thirteenth-century Tyre region

Any estimates of arable productivity should begin with the question of seeding density rates. Converting 12 *modii* of wheat annually sown by local tenants of Betheron into their volume equivalent, we arrive at almost 2,000 litres (at 166.6 litres per *modius*), equalling 20 hectolitres, or 55 bushels (one hectolitre = 2.75 bushels). If seeding rates stood at 9 *modii* per *carruca* for grains, then the total area of a wheat field *within the Venetian part of the village*, sown with 12 *modii*, would have been 1.3 *carruce*, equalling 4 or 5.3 hectares (= 9.9 or 13.2 acres), assuming one *carruca* equalling 3 or 4 hectares, as suggested by Ellenblum. Sowing 55 bushels on this area renders seeding rates of either 5.6 bushels per acre (55 bushels/9.9 acres) or 4.2 bushels per acre (55 bushels/13.2 acres). The latter estimate is undoubtedly closer to reality than the former: 5.6 bushels per acre appears to be an excessively high figure, not only for a comparatively fertile region around Tyre, but even to 'Fringe' Temperate North-European Zone (Scandinavia and Scotland), where seeding densities appear to have been among the highest and crop yields among the lowest in the world (ranging from 4 to 5 bushels per acre).[50] Indeed, 4.2 bushels per acre would have been in line with seeding rates of 4.6 bushels per acre (= 4 hectolitres per hectare) in sixteenth-century Syria, as indicated in Ottoman *tahrir defterleri*.[51] It should be noted that these figures are higher compared to seeding rates of about 3 bushels per acre and 2 bushels per acre achieved by Syrian *fallāḥīn* around, respectively, 1800 and 1900, reflecting a piecemeal shift to more extensive farming, owing to various agricultural improvements (primarily, the introduction of new crops and fertilising methods, as well as a switch from a two- to three-field system).[52]

Although seeding rates in the Tyre region appear to be excessively dense compared to both late-medieval Europe and late Ottoman Syria, they appear to be actually somewhat thinner than elsewhere in the Levant. In the Beirut region, local *fallāḥīn* were sowing each *carruca* with four *ghiraras*, equalling about 5 bushels per acre.[53] In a 1257 charter, John of Ibelin, count of Jaffa and Ascalon, stated he would give the Hospitallers 600 *carruce* of land in the Ascalon region, if reconquered, with each *carruca* to be sown with four

[48]David Jacoby, 'A Venetian Manual of Commercial Practice from Crusader Acre', in idem, *Studies on the Crusader States and on Venetian Expansion* (London, 1989), no. VII, 403–28, at 421.
[49]Ellenblum, *Frankish Rural Settlement*, 97–9, 185.
[50]This point will be discussed, in full length, in my forthcoming *Deep Divergence: Economic Development and Inequality from the Palaeolithic to the Present* (scheduled to be published with Cambridge University Press in 2026).
[51]Faruk Tabak, 'Agrarian Fluctuations and Modes of Labor Control in the Western Arc of the Fertile Crescent, c.1700–1850', in *Landholding and Commercial Agriculture in the Middle East*, ed. Çağlar Keyder and Faruk Tabak (Albany, 1991), 135–54, at 143.
[52]Tabak, 'Agrarian Fluctuations', 143–6.
[53]Recalculated from Claude Cahen, 'Notes sur l'histoire des croisades et de l'orient latin. II: Le régime rural syrien au temps de la domination franques', *Bulletin de la Faculté des Lettres de l'Université de Strasbourg* 29 (1950–1): 295; Prawer, *Crusader Institutions*, 177–8.

guarelles (equal to 12 *modii*), that it, approximately 5.6 bushels of grain per acre.[54] Those regional variances may have been linked to regional population densities and, as argued below, to varying land quality and productivity. Intriguingly, this gap in seeding densities between Syria and Palestine continued well into the early twentieth century: at that point, Syrian *fallāḥīn* would sow at the rate of two bushels an acre, compared with 2.75 bushels in Palestine (that is, 1.38 times thinner).[55]

Conversely, legumes appear to have been seeded much more extensively, on a fallow portion of the village, if we follow Zorzi. Converting three *modii* of wheat annually sown by local tenants of Betheron into their volume equivalent, we arrive at 500 litres (at 166.6 litres per *modius*), equalling 5 hectolitres, or 13.7 bushels (with one hectolitre = 2.75 bushels). If seeding rates stood at just one *modius* per *carruca* for legumes, then the total area of a fallow field *within the Venetian part of the village*, sown with three *modii*, would have been about three *carruce*, equalling 9 or 12 hectares (= 22.2 or 29.7 acres), assuming one *carruca* equalling 3 or 4 hectares, as suggested by Ellenblum. Sowing 13.7 bushels per this area renders seeding rates of either 0.62 bushels per acre (13.7 bushels/22.2 acres) or 0.46 bushels per acre (13.7 bushels/29.7 acres). Those thin seeding rates of legumes reflect their high yields (see below) compared to wheat. Interestingly, during the Ottoman era, one witnesses a piecemeal intensification of legume seeding densities in Syria and Palestine – reaching about 3 bushels per acre towards the end of the nineteenth century.[56] This development mirrors inversely the situation within the grain field, where, conversely, seeding densities would decrease, over time. There is no doubt that the two processes were inter-connected, with the intensification of legume cultivation contributing to the increase of soil nutrient via nitrogen restoring and resulting in higher grain yields and, hence, lower seeding densities within the latter sector.

(2) Seed ratio yields in thirteenth-century Frankish Tyre region

Having estimated seeding rates of grains, we may now attempt to establish approximate per land-unit yields, expressed, for the sake of convenience, in bushels per acre. Fortunately, Zorzi reported that out of the previous year's wheat harvest (presumably early summer 1241 or 1242),[57] the commune collected a third part of the wheat and legume (and legume-grain mixture) harvest, amounting to around 20 *modii* of wheat and 10 *modii* of wheat and legume and legume-grain mixture (*de frumento in tercia parte iusta XX modia, et de leguminibus et alio blado iusta X modia*). This implies a total harvest of about 60 *modii* of wheat and 30 *modii* of legumes and legume-grain mixture, with the remaining 40 *modii* and 20 *modii* being retained by local tenants.[58] Hence, the harvest of about 60 *modii* in relation to 12 *modii* sown in the previous year implies a *gross* seed ratio yield of 5:1 (or a *net* yield of 4:1, assuming 48 *modii* of *disposable*

[54]Prawer, 'Étude de quelques problèmes', 53–4; Prawer, *Crusader Institutions*, 177.
[55]Tabak, 'Agrarian Fluctuations', 143.
[56]Calculated from Anderlind, 'Ackerbau und Thierzucht', 49.
[57]In the Levant, grains were sown in late autumn, germinating in winter and spring, and becoming ready to be harvested in late spring/early summer. See, Prawer, 'Étude de quelques problems', 43–9; Prawer, *Crusader Institutions*, 169–74; Yehoshua Frenkel, 'Ha-hevrah ha-kafrit be-Eretz Israel ba-tequfah ha-mamlukit' [Rural Society in Mamluk Palestine], *Cathedra* 77 (1995): 17–38, at 21–5.
[58]*Bericht*, 165, line 21.

Table 1. Estimated sown densities, crop yields and seedcorn rates in thirteenth-century Tyre region.

	Sown densities Bushels/acre	Seed ratio yield Gross	Net	Per-land-unit yield Bushels/acre, gross	Bushels/acre, net	Seedcorn rates As % of harvest
Wheat	4.2	5	4	21.0	16.8	20%
Legumes	0.5	10	9	4.6	4.1	10%

Source: calculated from *Bericht*, p. 165.

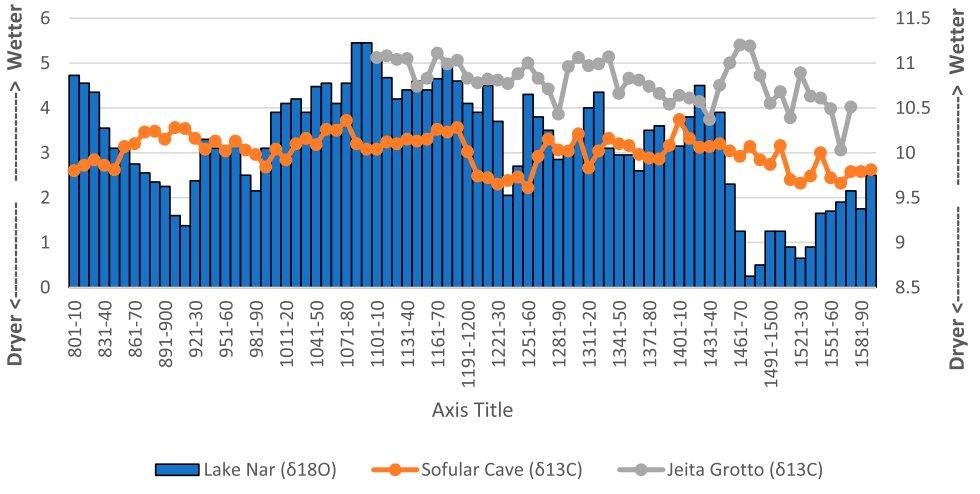

Figure 1. Precipitation levels, reflected in carbonate and oxygen data isotopes from Lake Nar (Turkey), Sofur Cave (Turkey) and Jeita Grotto (Lebanon).
Note: Left axis = Lake Nar values (0–6), Right axis = Sofular Cave and Jeita Grotto values (8.5–11.5).
Source: Jonathan R. Dean et al., 'Eastern Mediterranean Hydroclimate over the Late Glacial and Holocene, Reconstructed from the Sediments of Nar Lake, Central Turkey, Using Stable Isotopes and Carbonate Mineralogy', *Quaternary Science Review* 124 (2015): 162–74; Dominik Fleitmann et al., 'Sofular Cave, Turkey 50KYr Stable Isotope Data', https://www.ncei.noaa.gov/access/paleo-search/study/8637 (accessed August 2022); H. Cheng et al., 'Jeita Cave, Lebanon 20,000 Year Speleothem Stable Isotope Data', https://www.ncei.noaa.gov/access/paleo-search/study/20446 (accessed August 2022).

harvest, *net* of 12 *modii* of seedcorn) for wheat. For legumes and legume-grain mixtures, the figures would be higher, standing at about 10:1 as a *gross* yield or 9:1 as a *net* yield (30 *modii* of the total harvest or 27 *modii* of a *disposable* harvest received from three *modii* sown) (see Table 1). Our assumption here is that the 1241/2 harvest was an 'average' one *for its times*, rather than 'good' or 'poor'. There is no evidence of any environmental or climatic crises in those years, leading to a subsistence crisis, let alone famine.[59] However, as shown below, the period c. 1180–1260 is characterised by dry conditions, with the 1230s–50s particularly standing out (see Figure 1).

[59]Twelfth- and thirteenth-century food crises in Syria-Palestine (and elsewhere in the Middle East) have been systematically studied in Sarah Kate Raphael, *Climate and Political Climate. Environmental Disasters in the Medieval Levant* (Leiden, 2013). Here, she lists shortages and famines associated with droughts (reported in 1118, 1149, 1174–9, 1185, 1199, 1261, 1263 and 1294–7 (p. 22); with locust migration in 1114, 1120, 1152–3, 1174–5, 1223–5 (pp. 174–5); and with earthquakes in 1108, 1114–5, 1117, 1121, 1130, 1135, 1138, 1157, 1170, 1200, 1202–3, 1208, 1212, 1225–6 and 1228 (pp. 124, 132–3). In addition, we should also account for a major subsistence crisis arising from Third Crusade-associated conflict in 1189–91. See also, Magnus Widell, 'Historical Evidence for Climate Instability and Environmental Catastrophes in Northern Syria and the Jazira: The Chronicle of Michael the Syrian', *Environment and History* 13 (2007): 47–70.

(3) Per land-unit yields in thirteenth-century Frankish Tyre region

Seed ratio yields can, however, be a very misleading indicator, as they do not reflect the sheer quantities of grain produced and, by extension, their calorific values. The *gross* yield of 60 *modii* of wheat would imply about 275 bushels, while the *net* yield of 48 *modii* (harvest minus seedcorn) would make about 220 bushels. The respective figures for legumes and legume-grain mixtures would be around 137 and 124 bushels (equalling the *gross* yield of 30 *modii* and the *net* yield of 27 *modii*) As noted above, this amount had been harvested from 1.3 *carruce*, equalling presumably 5.3 hectares or 13.2 acres. If this is true, then Betheron *fallāḥīn* achieved, respectively, the *gross* and *net* yields of about 21 and 16.8 bushels per acre for wheat, and about 4.6 and 4.1 bushels per acre for legumes (see Table 1).

(4) Seedcorn rates in thirteenth-century Frankish Tyre region

While crop yields constitute objective indicators and measures of agricultural performance, there is yet another important measure to be taken into account: seedcorn rates, that is the proportion of each year's harvest invested in seeding. As noted above, unlike other methods, it provides a better indication of economic growth potential beyond the agricultural sector, as it reflects marketable surpluses beyond the calorific requirements of local producers. Assuming that the 1241/2 harvest reported by Zorzi was 'average', it appears that local seedcorn rates stood at about 20 per cent for wheat (12 out of 60 *modii*, amounting to about 4.2 bushels per acre) and 10 per cent for legumes (3 out of 30 *modii*, representing approximately 0.5 bushels per acre) (see Table 1).

(5) Calorific yields in thirteenth-century Frankish Tyre region

The best indicator of land productivity, however, would be calorific yields, estimating the total amount of calories produced from one unit of land. To estimate that, we need to have an approximate idea of a relative share of each crop in the total sown acreage. Zorzi reported that the total size of the Venetian estate at Betheron was 5 *carruce*.[60] Yet, the seeding densities and seedcorn he reported imply that about 1.3 *carruce* would be sown with wheat and a further three *carruce* with legumes, making it the total of about 4.3 *carruce*. What about the remaining 0.7 or so *carruce*? One possibility is that Zorzi under-reported crop production; indeed, surprisingly, Zorzi did not mention barley, another staple crop of Levantine *fallāḥīn* – although he clearly did note its cultivation, without specifying its extent, elsewhere in his account. For instance, he mentioned 20 *carruce* in Batiole (presumably, Batouliye = باتوليه, some 9 km south-east of Tyre; coordinates: 33°13'33"N, 35°15'29"E), with each *carruca* sown annually with 9 *modii* of grain (presumably, wheat) and barley, between them (*quelibet caruca seminantur annuatim inter granum et ordeum novem modiis*).[61] Hence, the omission of a barley field at Betheron from Zorzi's report, possibly corresponding to 0.7 or so *carruce*, remains a possibility. It is also possible that *inter granum et ordeum* meant that wheat and barley

[60] *Bericht*, 165, lines 22–3.
[61] *Bericht*, 152, lines 20–2.

Table 2. Estimated sown densities, crop yields and seedcorn rates in thirteenth-century Tyre region, Mediterranean regions and northern Europe.

	Sown densities	Seed ratio yield	Per-land-unit yield		Calorific yield	Seedcorn rates
	Bushels/acre	Gross	Bushels/acre, gross	Bushels/acre, net	Million kcals	% of harvest
Tyre region	4.1	5.5	22.6	18.5	1.20	18%
Egypt	1.5	15.7	23.4	21.9	1.41	6%
Sicily and S. Italy	1.8	12.9	23.1	21.3	1.44	8%
Spain	2.1	6.0	12.4	10.3	0.71	17%
N – C. Italy	2.2	4.0	8.8	6.6	0.45	25%
France	2.4	5.4	13.2	10.7	0.75	18%
Flanders	1.9	10.6	20.1	18.2	1.14	9%
Germany	2.9	4.1	12.0	9.1	0.60	24%
England	3.4	3.8	12.6	9.2	0.57	27%

Source: as in footnotes 72–78.

would have been sown on the same field in an alternate rotation, rather than together. Hence, when estimating the calorific yields per acre (see Table 2 below), I have added barley, assuming similar seeding densities, but higher yields (about 20 per cent higher than wheat).[62]

To get a possible glimpse into a breakdown of sown acreage in late-medieval Tyre region, an analysis of cadastral surveys would be essential. Unfortunately, Mamluk surveys (*rawks*) for Syria from 1313–4 and 1317 and 1325 have all been lost.[63] The closest thing in time would be sixteenth-century Ottoman *tahrir defterleri*. On the basis of the 1535 *tahrir defter* from the Bilād ash-Shām region, recording hundreds of villages in an area between Sidon and Tyre, it is possible to estimate a relative contribution of each crop in the region – once adjusting the figures slightly, to account for likely under-recording of legumes. It appears that wheat occupied about 70 per cent of all sown acreage, barley about 25 per cent, legumes and sesame about two per cent each, and red millet about one per cent.[64] These figures do not square up Zorzi's account, reporting two *carruce* for grains and three *carruce* for legumes, which yields an unlikely breakdown of 40 and 60 per cent for the two types of crops, respectively. This certainly looks suspicious: to my knowledge, there is no known instance, in any chronological or geographic context with existing data, for such a huge proportion of land devoted to legume cultivation. It is likely, therefore, that the three *carruce* sown with legumes and defined by Zorzi as 'fallow' (*garitus/terra macatica/terra frata*) had, in fact, been sown with cereals in the previous year and left fallow during the year of his inspection. That fallow would occupy a large proportion – about half – of all arable land is hardly surprising: such a situation prevailed in the Levant throughout

[62]The assumption that barley yields were higher than the wheat ones by some 20 per cent derives from: (1) a seventh-century Greek papyrus from Nitzana/Nessana (south-west Negev), where the respective yields of the two grains were 8.4:1 and 6.9:1; (2) later eighteenth- and nineteenth-century Ottoman sources.

[63]Sato Tsugitaka, *State and Rural Society in Medieval Islam: Sultans, Muqta's, and Fallahun* (Leiden, 1997), 135–45.

[64]*401 Numaralı Şam Livası Mufassal Tahrir Defteri (942 / 1535)* [Mufassal Tahrir Defter no. 401 for the *Liva* of Damascus], ed. Ahmet Özkılınç et al. (Ankara, 2011). That millet had been cultivated in the Frankish Levant, seemingly on a limited scale, is reflected in a 1164 grant of Bertrand de Blanchefort, the Grand Master of the Knights Templar, to Nicholas the Prior and canons of the Holy Sepulchre, confirming the formers' right to half tithes from agricultural produce on their rural properties: see, *Revised Regesta Regni Hierosolymitani* (http://crusades-regesta.com/; hereafter *RRRH*), no. 728.

the Ottoman period into the mid-twentieth century.[65] Hence, assuming, still in an arbitrary manner, that the shares of other crops in the Tyre region were not much different in the Frankish period, we may now convert each bushel of crops into their calorific equivalent.

One bushel would yield around 87,000 kcal for wheat, about 71,000 kcal for barley, 24,000 for legumes, and 120,000 for sesame.[66] Importantly, we have to account for losses incurred during harvesting and storage – estimated to be in the area of 10–15 per cent in pre-Industrial farming societies.[67] Deducting (perhaps somewhat optimistically) 10 per cent for each crop, we arrive at about 78,000 kcal for wheat, 64,000 kcal for barley, 21,500 kcal for legumes and 107,500 kcal for sesame. Finally, assigning each crop its relative share in the sown total acreage, we may estimate the approximate calorific yields, standing at approximately 1.2 million kcal per acre, deriving from about 18.5 *net* bushels of 'composite crops' per acre (Table 2).

Agricultural productivity in Frankish Tyre region in a wider perspective[68]

How did Tyrian (and more generally, Levantine) *fallāḥīn* perform in comparison to their counterparts elsewhere in the world – and, more specifically, elsewhere in the Mediterranean world and northern Europe? Table 2, based on agricultural data and estimates from different regions, places agricultural production in the Tyre region into a wider context.

(1) Wider Mediterranean world

Again, any such discussion should begin with the question of seeding density rates. Seeding rates of wheat in thirteenth-century Syria appear to be higher, indeed much higher than elsewhere in the Mediterranean in general. It is possible to estimate, in a crude manner, that seeding density rates in fourteenth-century Iberia stood at about 2.1 bushels (1.8 for wheat and 2.4 for barley), while in central and northern Italy (with the exception of fertile Lombardy), they were around 2.2 bushels per acre around the same time. In Sicily and Egypt, they were only 1.8 and 1.5 bushels per acre, respectively. It appears that seeding density rates were inversely correlated with (1) land productivity and (2) landholding sizes. In the case of Spain, local peasant families held relatively large parcels of land (on average, 20–25 acres in Catalonia and 15 acres in Valencia).[69] Egypt and Sicily, two bread baskets of the Mediterranean, were blessed with remarkably fertile soils, making them among the most productive agricultural regions in the world around

[65]Tabak, 'Agrarian Fluctuations', 146; Carol Palmer, 'Reconstructing and Interpreting Ancient Crop Management Practice: Ethnobotanical Investigations into Traditional Dryland Farming in Northern Jordan' (PhD diss., University of Sheffield, 1994); Bernard D. Weinryb, 'Middle Eastern Agriculture in the Inter-War Years', *Agricultural History* 26 (1952): 52.
[66]Broadberry et al., *British Economic Growth*, 282.
[67]Ibid.; Philip Slavin, *Experiencing Famine in Fourteenth-Century Britain* (Turnhout, 2019), 101.
[68]The question of long-term agricultural development in different world regions (including the Levant) between c. 1300 and 1900, based on vast statistical data, will be fully explored in Chapter 8 of my forthcoming *Deep Divergence* (see note 50). All the estimates brought up in this section are based on that chapter.
[69]Paul H. Freedman, *The Origins of Peasant Servitude in Medieval Catalonia* (Cambridge, 1991), 36–7; Antoni Furió and Ferran Garcia-Oliver, 'Household, Peasant Holding and Labour Relations in a Mediterranean Rural Society. The Valencian Country in the Late Middle Ages', in *Agrosystems and Labour Relations in European Rural Societies*, ed. Erich Landsteiner and Ernst Langthaler (Turnhout, 2010), 50–4.

1300.[70] By contrast, Syrian *fallāḥīn* were blessed with neither exceptionally productive soils, nor with large land plots. Although William of Tyre noted the exceptional fertility of soil around Tyre, his words, as we have seen, should be taken with a grain of salt. If anything, Tyrian soil may have been more fertile in comparison to other regions in the Frankish Levant (as will be suggested below) – but not elsewhere in the Mediterranean. The size of holdings of local *fallāḥ* households and their capacity to produce sufficient food for their members will be discussed below.

As far as legume seeding densities are concerned, they appear to be thinner than elsewhere in the Middle East or the wider Mediterranean world: normally, these would have been in the area of 2.5 bushels in Iberia, 1.5 bushels per acre in Sicily and just under one bushel in Egypt.[71] Unless Zorzi supplied incorrect estimates, such discrepancy in seeding yields between Levantine peasants and their counterparts in the wider Mediterranean can only be explained by the possibility that Zorzi reported fallow that had been sown with grain the year before his inspection and that fallow would be planted much thinner than sown land.

Now to yields. Seed ratio yields were certainly higher in Egypt and Sicily, where local farmers managed to achieve the *gross* yields of 'composite' crops in the region of 16:1 and 13:1 (and about 15:1 and 12:1 for *net* yields),[72] – indeed, much higher than the *gross* composite yields of about 5.2:1 (that is, a 'weighted' average taking into account a relative proportion of the acreage of wheat and legumes, yielding, respectively, the figures of 5:1 and 10:1) or the *net* composite yields of about 4.2:1, in the Tyre region. The latter figures were lower than composite crop yields of about 6:1 (*gross*) and 5:1 (*net*) achieved by Spanish farmers,[73] but higher than those in most regions of northern and central Italy (with the exception of the more productive Lombardy), where local farmers seem to have attained the *gross* yields of only 4:1.[74]

In terms of calorific yields per acre, Tyre-region *fallāḥīn* appear to have performed quite well. With about 1.3 million kcal per acre deriving from 18.5 *net* bushels, they were not quite as successful as their Egyptian and Sicilian counterparts, both achieving about 1.4 million kcal from 21–22 *net* bushels, but certainly more advanced than Iberian farmers with about 0.71 million kcal from about 10.3 *net* bushels, and certainly much more advanced than north/central-Italian peasants (again, not accounting for the more productive region of Lombardy) with only 0.45 million kcals from about 6.6 *net* bushels.

Finally, in terms of seedcorn rates, Tyre region producers fared worse than Egyptian and Sicilian farmers (both achieving remarkably low figures of just 7–9 per cent), standing more on a par with Iberian farmers (about 17 per cent), and certainly boasting lower figures than most north- and central-Italian peasants (about 25 per cent).

[70]Stuart J. Borsch, *The Black Death in Egypt and England: A Comparative Study* (Austin, 2005), 71–8; Henri Bresc, *Un monde méditerranéen. Economie et société en Sicile, 1300–1450* (Rome, 1986), 121–5.
[71]Calculated from Borsch, *The Black Death*, 71–8; Bresc, *Un monde méditerranéen*, 121–5.
[72]Ibid.
[73]Calculated from Ana Rodríguez, 'Spain', in *Agrarian Change and Crisis in Europe, 1200–1500*, ed. Harry Kitsikopoulos (New York, 2012), 178–81; Adam Franklin-Lyons, 'Grain Yields and Agricultural Practice at the Castle of Sitges, 1354–1411', in *Les savoirs des campagnes. Catalogne, Languedoc, Provence. XIIe–XVIIIe siècles*, ed. Catherine Vernam and Pere Benito (Canet, 2013–4), 65–77.
[74]Calculated from Paolo Malanima, 'Italy', in *Agrarian Change* (see note 73), 96–7.

(2) Northern Europe

What about northern Europe? The most obvious point of comparison would be France, the original home of the majority of European settlers in the crusader states. When talking about 'France' within the borders of Louis IX's kingdom *plus* the region around Lille controlled by the counts of Flanders, we have to take into account regional differences in soil fertility, types of crops cultivated and agricultural techniques. Consequently, crop yields would vary from very high in the Lille region, where advanced Flemish cultivation methods were practiced, to low yield across the Atlantic coast and Breton uplands. Taking all the regions together and assigning each crop its approximate relative weight in the total sown acreage, we may estimate the seeding densities of about 2.5 bushels for both wheat and legumes. Seed-ratio yields would, naturally, vary a great deal from region to region, but an approximate composite figure of 5.4:1 for *gross* yields and 4.4:1 for *net* yields – marginally higher or comparably with those in the Tyre region – should not be too removed from reality. Because of thinner seeding rates, an average French acre rendered less than that in the Tyre region: about 10.7 *net* bushels equalling approximately 0.75 million kcal of composite crops. Seedcorn rates appear to have been in the region of about 19 per cent, comparable with the figures from the Tyre hinterland.[75]

Elsewhere in northern Europe – German-speaking territories and England – crop yields were considerably lower than in the Tyre region, with local producers extracting about half the calories from one sown acre, deriving from about 9 *net* bushels of composite crops. In terms of seedcorn rates, these would amount to about one-quarter (or slightly higher) of an average harvest.[76] In a sharp contrast, much higher yields of about 18 *net* bushels rendering about 1.14 million kcal (that is, slightly less than in the Tyre region), were achieved by Flemish farmers. Unlike producers from both the Tyre area and other regions in northern Europe, Flemish peasants managed to get by with very low seedcorn rates, standing at no more than 10 per cent – thanks to their advanced technologies in fertilisation and field systems.[77]

(3) Does arable productivity in the Tyre region reflect the Frankish Levant?

Just as we used sixteenth-century Ottoman *tahrir defterleri* to establish an approximate breakdown of crop shares in the Tyre region, we should do the same for all arable regions of Syria-Palestine, in order to estimate crop yields and production levels there. On the basis of the 1535–6 *defterleri* from the Aleppo and Bilād ash-Shām regions, as well as the c. 1519, c. 1531, 1548, 1557 and 1596 *defterleri* from different regions of Palestine (Gaza, Nablus, and Jerusalem), together recording thousands of villages, it is possible to estimate that wheat occupied about half of all sown acreage, barley about 42 per

[75]Calculated from George Grantham, 'France', in *Agrarian Change* (see note 73), 73–4.
[76]Calculated from Klaus-Joachim Lorenzen-Schmidt, 'Northwest Germany 1000–1750', in *Struggling with the Environment: Land Use and Productivity*, ed. Erik Thoen and Tim Soens (Turnhout, 2015), 309–38; England: calculated from Broadberry et al., *British Economic Growth*, 90–9.
[77]Calculated from Guy Dejongh and Erik Thoen, 'Arable Productivity in Flanders and the Former Territory of Belgium in a Long-Term Perspective (from the Middle Ages to the End of the Ancien Régime)', in *Land Productivity and Agro-Systems in the North Sea Area. Middle Ages - 20th Century. Elements for Comparison*, ed. Bas van Bavel and Erik Thoen (Turnhout, 1999), 30–64.

cent, sorghum (*durra*), millet, legumes and sesame about two per cent each.[78] It is unlikely that sorghum had been cultivated in the Tyre region around 1240; around the same time, it had been only recently introduced into Egypt, on a very small scale, as a staple food of the poorest. Indeed, a 1245 Ayyubid cadastre from the Faiyum region did not mention *durra* at all.[79] Hence, it is unlikely that by the time of Zorzi's report, the cultivation of this crop had spread into Syria-Palestine. Assuming, in a totally arbitrary manner, that the shares of other crops were not much different in the Frankish period, we may speculate that around the time of Zorzi's report, an approximate 'average' proportion of the sown crops was 50 per cent for wheat, 43 per cent for barley, 3 per cent for legumes and 2 per cent for sesame and millet, respectively.

Now, we have to bear in mind that the Tyre region was among the most fertile ones in Syria-Palestine. Indeed, this agrees with William of Tyre's comment on a remarkable soil fertility in and around Tyre.[80] The fact that Tyre-region *fallāḥīn* in the Frankish period achieved higher yields than their counterparts elsewhere in Syria-Palestine is also hinted at in the fact that seeding densities around Tyre were about 1.2 times thinner than in the Beirut region and about 1.33 times thinner than in the Ascalon hinterland, as stated above. The comparative fertility of the Tyre region is noted by late-nineteenth and early twentieth-century observers, such as Leo Anderlind, Arthur Ruppin and Fritz Grobba. Taken together, these late reports reveal that on the eve of WWI, the Tyre and Damascus regions would achieve at least twice as high a yield as those in Palestine.[81] In this sense, these regions were the most fertile ones, second only to the Hauran region, blessed with exceptional fertility thanks to natural lava deposits in soil. These gaps, however, could well be a product of a regional dimension of agricultural improvements in the eighteenth and nineteenth centuries, with Syrian agriculture growing faster than the Palestinian one – as indeed reflected in gaps in yields and seeding densities, reported by European observers. If that is the case, then back in the Frankish era, these regional gaps in yields were not nearly as pronounced and it is possible that the 'average' composite yields in Frankish and Ayyubid (and later Mamluk) Levant may have been perhaps 10–30 per cent below the Tyre region figures. Table 3 establishes three hypothetical scenarios for average composite yields across all arable regions, in relation to the Tyre region estimates: (1) seed ratios were 10 per cent lower, but seeding densities were 10 per cent higher; (2) seed ratios were 20 per cent lower, but seeding densities were 20 per cent higher; (3) seed ratios were 30 per cent lower, but seeding densities were 30 per cent higher. According to these estimates, with seed-ratio yields between 3.7 and 4.8 and seeding densities between 5.1 and 4.3, bushels per acre and seed-ratio yields between 4.8 and 3.7, an 'average' Levantine *fallāḥ* would have achieved anywhere

[78]Calculated from Bernard Lewis, 'Studies in the Ottoman Archives – I', *Bulletin of the School of Oriental and African Studies* 16 (1954): 469–501; Wolf-Dieter Hütteroth and Kamal Abdulfattah, *Historical Geography of Palestine, Transjordan and Southern Syria in the Late 16th Century* (Erlangen, 1977), Map 5; Haggay Etkes, 'Nomads and Droughts, Challenges to Middle Eastern Economic Development: The Case of Early Ottoman Gaza (1516–82)' (PhD thesis, Hebrew University of Jerusalem, 2008), 25; *397 Numaralı Haleb Livâsı Mufassal Tahrîr Defteri (943/1536)* [Mufassal Tahrir Defter no. 397 for the *Liva* of Aleppo (943/1536)], ed. Ahmet Özkılınç et al. (Ankara, 2010); *401 Numaralı Şam Livası Mufassal Tahrir Defteri (942 / 1535)* (see note 64).

[79]Yossef Rapoport and Ido Shahar, *The Villages of the Fayyum: A Thirteenth-Century Register of Rural, Islamic Egypt* (Turnhout, 2018).

[80]WT 13:3, p. 558.

[81]Anderlind, 'Ackerbau und Thierzucht', 48–51; Arthur Ruppin, *Syria: An Economic Survey* (New York, 1917), 3; Fritz Groba, *Die Getreidewirtschaft Syriens und Palästinas seit Beginn des Weltkrieges* (Hanover, 1923), 140–5.

Table 3. Hypothetical sown densities, crop yields and seedcorn rates in thirteenth-century Syria-Palestine.

	Sown densities Bushels/ acre	Seed ratio yield Gross	Per-land-unit yield Bushels/acre, gross	Bushels/ acre, net	Calorific yield Million kcals	Seedcorn rates % of harvest
Tyre region	4.10	5.50	22.55	18.45	1.20	18%
Syria-Palestine (<10%)	4.30	5.00	20.50	16.20	1.09	21%
Syria-Palestine (<20%)	4.70	4.58	18.79	14.09	1.00	25%
Syria-Palestine (<30%)	5.10	4.23	17.35	12.25	0.92	29%

Source: as in footnote 81.

between 14 and 16.5 *net* bushels per acre, producing between about 0.9 and 1.1 million kcal per acre – investing between 21 and 27 per cent of annual harvests in seedcorn.

Even the lowest estimate, assuming that the Tyre region yields were about 30 per cent higher than elsewhere in Syria-Palestine, implies that local *fallāḥīn* extracted about 1.26 times more calories from one acre than French and Iberian peasants, about 1.60 times more than German and English farmers and twice as much as their Italian counterparts. Yet, it was achieved at a much higher labour cost. Incredibly dense seeding rates practiced by Levantine *fallāḥīn* meant that each acre had to be sown much more intensively than in Europe. Although there is no hint or evidence about labour productivity rates in medieval Levant, anthropological work from northern Jordan, conducted in the 1960s, has shown that an average local *fallāḥ*, still using traditional (pre-Industrial) methods of cultivation, was ploughing, on average, about 0.5 acres a day – slightly less than 0.6 acres per one man-day achieved by Greek farmers and 0.7 acres by Sicilian and south-Italian peasants in the late nineteenth and early twentieth century.[82] By contrast, an average English peasant around 1300 was ploughing about one acre a day – comparable with figures achieved by Prussian and Austrian farmers c.1800.[83] The same work has also found that an average local *fallāḥ* would reap about two bushels of wheat per man-day – more than about 1.5 bushels done by a Greek farmer c.1900, but much less than 5 bushels done by an English peasant c. 1300.[84]

The comparatively low labour productivity rates in traditional Levantine agriculture were connected to both technological and environmental factors. Local *fallāḥīn* (and other crop producers in the Mediterranean and Red Sea regions) have been relying on the traditional man-pulled light plough, continuously prevalent in the Levant since the fifth century BCE, and on the sickle for reaping. By contrast, north-European peasants were using a heavy-wheeled plough driven by horse- or ox-teams, both faster and more powerful than the Mediterranean plough. In addition, we witness the first signs

[82]Northern Jordan: Palmer, 'Reconstructing and Interpreting Ancient Crop Management', 102–3; Carol Palmer, '"Following the Plough": The Agricultural Environment of Northern Jordan', *Levant* 30 (1998): 129–65; Greece, Sicily and South Italy: Lin Foxhall, 'Cultures, Landscapes and Identities in the Mediterranean World', in *Mediterranean Paradigms and Classical Antiquity*, ed. Irad Malkin (New York, 2005), 81–5.

[83]England: Gregory Clark, 'Labour Productivity in English Agriculture, 1300–1860', in *Land, Labour and Livestock: Historical Studies in European Agricultural Productivity*, ed. Bruce M.S. Campbell and Mark Overton (Manchester, 1991), 211–35; Gregory Clark, 'Yields Per Acre in English Agriculture, 1250–1860: Evidence from Labour Inputs', *Economic History Review* 44, no. 3 (1991): 445–60; Prussia and Austria: Jerome Blum, *The End of the Old Order in Rural Europe* (Princeton, 1978), 134–7.

[84]Palmer, 'Following the Plough'; Foxhall, 'Cultures, Landscapes and Identities'; Clark, 'Labour Productivity'; Clark, 'Yields Per Acre'.

of a shift from sickle to scythe in England on the eve of the Black Death. No less important is a climatic factor: Levantine climate is considerably drier and hotter than in northern Europe. Even if ploughing in medieval Syria-Palestine started with the beginning of a rainy season in autumn,[85] some October days can still be quite hot in that region. By contrast, harvesting occurs in hot days of May-June. This, in turn, may explain why agricultural work hours were shorter in the Levant and why labour productivity of local *fallāḥīn* was lower than that of north European peasants. Bearing this in mind, together with very thick seeding densities, we may safely conclude that even though one acre yielded more calories in Syria-Palestine than in most European regions, production costs of each calorie and, hence marginal costs of agricultural production in general, were higher – indeed considerably higher – in the former than the latter.

Going back to Urban II's Clermont speech on 27 November 1095 (carried amidst a bad crop failure and a harsh subsistence crisis all over western and central Europe), one may ask if the pope promised his audience too much when he portrayed the Holy Land as a land which 'floweth with milk and honey', in contrast with France, depicted as poor and infertile?[86] Yes and no – and much depending if Zorzi's evidence from a single village from the Tyre hinterland indeed reflects a situation in a 'normal' year, and if our extrapolation of 'average' levels of Levantine productivity are not too far off. On the one hand, one acre in Frankish Syria-Palestine may have produced considerably more calories – between 1.3 and 1.6 times more – than in northern/central France. But such high calorific yields were not a result of high seed-ratio yields: as we have seen, the composite seed-ratio yields were about the same as in France. Rather, it was thanks to very high seeding densities within the grain sector, standing at 4–5 bushels per acre, and, consequently, very intense and potentially costly arable labour. Whether such high seeding densities were linked to small arable land plots of local *fallāḥ* households (possibly reduced as a consequence of the expansion of commercial viticulture and sugar-cane cultivation by Frankish lords as argued below), or to local agricultural customs remains to be studied. What is especially important is that in terms of seedcorn rates, both France and Syria exhibited similar figures, reflecting, at least in theory, the same potential for urbanisation, regional division of labour and long-term economic growth. Yet, as we know, both regions would march at a different economic pace and reach different economic heights during the so-called 'Great Divergence' of the early modern period.

Did Levantine *fallāḥīn* have enough land?

What do the arable production estimates above tell us about the capacity to provide food for local *fallāḥ* households? The information about the size of local landholdings is extremely scarce. In fact, our only glimpse into the topic is Zorzi's report recording that local *fallāḥ* households held about two *carruce* of land (namely, about 6–8 hectares or 15–20 acres of land). At first, these figures appear to be large enough, on a par with the situation in Iberia. However, if family landholding size around Tyre reflects the situation elsewhere in Syria-Palestine, then why were local *fallāḥīn* sowing so densely, as far as wheat is concerned – indeed, twice as densely as their Iberian counterparts? One possibility is that

[85]Prawer, *Crusader Institutions*, 172–3; Frenkel, 'Ha-hevrah', 23–4.
[86]The agricultural context of the Clermont speech has been discussed in Slavin, 'Crusaders in Crisis'.

some proportion (perhaps about half) of all their arable land was lying fallow each year – as indeed reflected in a large share devoted to fallow (*garitus/terra macatica/terra frata*), thinly sown with legumes. But another possibility is that local Muslim (and presumably East Syriac) nuclear families were larger than their Iberian Christian counterparts. Thus, the size of a late-medieval Catalan family has generally been assumed to have consisted of five people.[87] Comparable information on family size of Levantine *fallāḥīn* is extremely scarce and inconclusive. On the one hand, according to Zorzi's report, an average male household head had 2.2 sons, which, assuming the same number of daughters, translates into 4.4 children, rendering a family of about 6.4 souls (parents and 4.4 offspring).[88] Some families may have been larger still: an average household of the Banu Qudāma tribe, fleeing from the Nablus region to Damascus between 1156 and 1173, consisted of about 7.5 souls on average.[89] The idea that some local families may have been larger than their Christian counterparts in the western Mediterranean is reflected in *sharī'a* court minutes from Aleppo for the period 1746–71, where an average deceased father had about 4.8 children.[90]

However, these examples may not be reflective at all. In the case of Banu Qudāma refugees, their tribe was headed by a Ḥanbali jurisconsult – undoubtedly a prominent and better-off individual – meaning that these families were anything but 'average' ones.[91] After all, we do not know how many of the family heads practiced polygamy. In the mid-eighteenth century, Aleppo was still a wealthy city, engaged in long-distance trade with both Europe and other regions of the Ottoman Empire, and it was not until the 1760s–1770s that we see clear signs of the city's economic decline.[92] Moreover, large families in eighteenth-century Aleppo and, consequently, a demographic growth in Syria were a product of various technological and structural improvements in local agriculture, discussed above. Finally, some of Aleppo court entries indicate clearly that some of the surviving children were from previous marriages. Therefore, using these records could be something of a red herring.

A few surviving Mamluk-era demographic records may provide a better hint. Thus, evidence from late Mamluk Jerusalem, deriving from Ḥaram *waqf* inventories for the period AH 774–98 (1372/3–1395/6CE), that record possessions of local deceased, reveals a much smaller number of children per family: 2.7 on average.[93] Similarly, usually three, and rarely more than four children per family were mentioned in *waqf* documents from the Damascus region on the eve of the Ottoman conquest in summer 1516.[94] Unlike Zorzi's account, *waqfiyyas* recorded children of both sexes and hence it is unlikely that they would massively, if at all, under-record the number of children.

[87] Jeff Fynn-Paul, *Family, Work and Household in Late Medieval Iberia. A Social History of Manresa at the Time of the Black Death* (New York, 2017), 226.
[88] Kedar and Al-Ḥajjūj, 'Muslim Villagers', 146–7.
[89] Ibid., 147–51.
[90] Abraham Marcus, *The Middle East on the Eve of Modernity: Aleppo in the Eighteenth Century* (New York, 1989), 200–1.
[91] Certainly, the story of the Banu Qudāma exodus was deemed to be important enough to be written as an historical work by the exiled leader's grandson, and partially copied by Ibn Ṭūlūn, a sixteenth-century Damascene author: Kedar and Al-Ḥajjūj, 'Muslim Villagers', 147.
[92] Jean Sauvaget, *Alep: essai sur le développement d'une grande ville syrienne des origines au milieu du XIXe siècle* (Paris, 1941), 203; Marcus, *The Middle East on the Eve of Modernity*, 6, 48, 138, 141–3, 149–53.
[93] Huda Lutfi, *Al-Quds Al-Mamlûkiyya: A History of Mamluk Jerusalem Based on the Haram Documents* (Berlin, 1985), 255–8.
[94] Michael Winter, 'Mamluks and their Households in Late Mamluk Damascus: A Waqf Study', in *The Mamluks in Egyptian and Syrian Politics and Society*, ed. Michael Winter and Amalia Levanoni (Leiden, 2004), 308–16.

One explanation for such a low number of children is that in both contexts, that is late fourteenth-century Jerusalem and early sixteenth-century Damascus, there were recurrent plague outbreaks at different intervals.[95] Likewise, late nineteenth- and early-twentieth-century Ottoman *Nüfūs* registers, vilayet yearbooks (*salname*) and regional cadastres for Syria and Palestine suggest that an average household consisted of 5–6 people.[96] Both Zorzi's report and late Ottoman registers were compiled in plague-free periods, with the former some 100 years before the beginnings of the Second Plague Pandemic and with the latter some 40 years after the disappearance of the Second Plague from the Levant. Therefore, Zorzi's figures, assuming to have reported only half of the children, may not be too far from reality, and local *fallāḥ* families were larger in size than their counterparts in Christian Iberia. In this case, the same 15–20 acres held by an average both Valencian and Tyre-region family may have been sufficient for the former but not for the latter – which may, in turn, explain the remarkably high seeding densities of wheat by Betheron *fallāḥīn*. As we shall argue later, the situation may have been compounded further by the expansion of vineyards and sugar cane plantations, leaving even less land for the cultivation of basic foodstuffs by local farmers. If anything, family size in the Tyre region may have been actually larger than elsewhere in the Frankish Levant – owing to favourable agricultural conditions, which may have produced higher yields than elsewhere, as suggested below.

Let us, in absence of additional data, stick to the estimate of 6.5 individuals per *fallāḥ* household and assume that such 'average' household would hold 15–20 (say, for the sake of convenience, 18) acres. It is unlikely, however, that the entire area of these holdings would be utilised for arable cultivation. At least some proportion would be occupied by buildings and, presumably, used as pasture for livestock. Hence, we may deduct, in an arbitrary manner, at least several acres – let us say, four. Of the remaining 14 or so acres, about half would, as argued above, be lying fallow each year (occasionally thinly sown with legumes, thus producing very little), leaving about 7 acres, sown with grains, yielding collectively about 8.4 m kcal, net of spoilage, a year (about 1.2 m kcal per acre). These amounts would equal about 23,000 unprocessed kcal per day, or about 20,000 processed kcal per day (assuming that wheat milling, sieving and baking would entail a calorific loss of about 20 per cent, [97] and that barley was converted into pottage, rather than baked or brewed). In this case, each household member would have been endowed with about 3,000 daily kcal. This appears to have been more than needed: as evidence from mid-seventeenth century Damascus indicates, bread would have contributed around 70 per cent to the total food intake of local workers, with the remainder made up of beef, fish, dairy, olives and vegetables.[98] If the ratio was similar in thirteenth-century Syria, then local *fallāḥīn* would have, in theory, about daily 4,300 kcal per capita. These figures, however, are unrealistic: around 1300, an 'average'

[95]Thus, around the time of the *Haram waqfiyya* documentation, Syria-Palestine experienced plague outbreaks in 1373–5, 1380–1, 1388 and 1393: see Michael W. Dols, 'The Second Plague Pandemic and Its Recurrences in the Middle East: 1347–1894', *Journal of the Economic and Social History of the Orient* 22, no. 2 (1979): 162–89, at 169; Boaz Shoshan, 'Notes sur les épidémies de peste en Égypte', *Annales de démographie historique* (1981): 387–404, at 401; Lutfi, *Al-Quds Al-Mamlûkiyya*, 76. On the eve of the Ottoman conquest, Syria experienced outbreaks in 1492, 1497–8, 1503 and 1512–4: Dols, 'The Second Plague Pandemic', 169; Shoshan, 'Notes sur les épidémies', 403.
[96]David Grossman, *Rural Arab Demography and Early Jewish Settlement in Palestine* (New Brunswick, 2011), 89–98.
[97]Broadberry et al., *British Economic Growth*, 282.
[98]James Grehan, *Everyday Life and Consumer Culture in Eighteenth-Century Damascus* (Seattle, 2007), 67–68, 120–3.

English peasant, suffering from rural congestion and low living standards, may have had twice as little to eat.[99] Unlike England (and other parts of northern Europe), there is no evidence of overpopulation in the Frankish Levant, implying that local *fallāḥīn* would have been better fed than their English counterparts. But even assuming a per-capita consumption of 3,000 kcal – on a par with mid-eighteenth-century Damascenes – we still end up with a surplus. Hence, two mutually inclusive possibilities remain: (1) the proportion of sown land was smaller than assumed above; (2) *fallāḥīn* would market a non-negligible proportion of their annual grain harvests to neighbouring cities, towns and castles. The remits of the present paper do not allow to delve deeper into this question.

European exaggeration of crop yields: a 'colonial' fascination with exotic lands?

If seed ratio yields in the Frankish Levant were either on a par or lower than those in some regions of Europe, and if production was both slower and costlier, why, then, Frankish authors, such as William or Tyre, and European pilgrims, such as Daniil of Kiev or Burchard of Mount Sion, provide such fanciful and misleading descriptions of local yields and productivity? As we have seen, their statements are based on Biblical and quasi-Messianic tropes, reflecting partly their euphoric state of mind, in conjunction with their sojourn in the Holy Land. But in addition, these statements also reflect a fanciful European perception of far and exotic lands as rich in good land and plentiful in harvests. This excessive optimism was linked, at least in part, with the legend of Prester John, emerging in the early twelfth century. Thus, in a letter, fabricated c. 1165–70, most likely in Germany, the enigmatic king stated that his land flows with honey and abounds in milk, and that in a certain province Lord rains manna abundantly twice a week, feeding local communities.[100] Recollecting his travels via central Asia into China (1271–5), Marco Polo talked about 'a great abundance of crops and every kind of grain' in the City of *Cinguy* (most likely, Chuzhou in eastern Anhui province),[101] out of which *Caramoran* (Yellow River) flows into the land of Prester John.[102] The 'milk and honey' trope is even found in *Kirjalax Saga*, an early fourteenth-century Old Norse fictional romance. Here, Kirialax, the main protagonist, and his companions, having sailed from the Holy Land for India, found honey dew on grass smeared in local fields.[103]

Similar descriptions full of superlative adjectives and unrealistically exaggerated numerals are found in later travelogues of European travellers to Asian and African lands during early-modern and colonial eras. Ethiopia – a land often associated by Europeans with Prester John – was perceived as a region of outstanding agricultural abundance. Some early nineteenth-century European visitors, including French Pierre Ferret and Joseph Galinier (early 1840s), Theophile Lefèbvre (1839–43), British Douglas

[99]Broadberry et al., *British Economic Growth*, 288–90; Slavin, *Experiencing Famine*, 100, 236, 246, 375.
[100]*Prester John: The Legend and Its Sources*, ed. and trans. Keagan Brewer (Abingdon, 2015), 70, 72 and 95–96.
[101]For the association of *Cinguy* with Chuzhou, see Stephen G. Haw, 'Marco Polo: From Hangzhou to Quanzhou', *Asiatische Studien - Études Asiatiques* 74 (2020): 485–512, at 500.
[102]Marco Polo, *Le Devisement du monde*, ed. Philippe Ménard, vol. 4 (Paris, 2005), 106–7.
[103]*Kirialax saga*, ed. Kr. Kålund (Copenhagen, 1917), 75.

Graham and Charles Beke, and German Wilhelm Eduard Rüppell (1830), commented on the remarkable abundance of local land produce. In particular, Beke alleged that local farmers achieved on average 100-to–150-fold yields, and sometimes as high as 400:1, while Rüppell reported sorghum yields of 2,000:1.[104] In reality, grain yields in nineteenth-century Ethiopia seem to have been in the area of 10–20:1 and sometimes less.[105] Similarly, Johann Wilhelm Müller, a Lutheran missionary visiting the kingdom of Fetu on the Gold Coast (today's Ghana) in 1668, alleged that local yields of millet and maize stood at 100:1.[106] Several Portuguese and Italian travellers, visiting west Africa between the late fifteenth and seventeenth centuries, recorded that local farmers would produce abundant harvest with a little labour, using their hoes.[107] In reality, as evidence from Senegambia from 1820s–40s suggests, local composite crop yields were not higher than 40:1.[108] In the same vein, Carsten Niebuhr, a Danish-German explorer travelling all over the Arabian peninsula in 1761–7, alleged that sorghum yield in the Yemenite highlands stood at 140:1, while in the Tihama region (the west coastline of the desert) they reached 200–400:1.[109]

The same fanciful perception was shared by European visitors to the Holy Land. Even William of Tyre, although a native of Jerusalem, was European through and through, showing very little to no sign of cultural assimilation into his native Levantine world, as evidenced by his very limited-to non-existent knowledge of the Arabic language (and indeed anti-Muslim bias).[110] Rather, his views on Levantine agriculture was not different from those of contemporary European pilgrims to the Holy Land or, say, nineteenth-century travellers to Ethiopia. One may also add that as an individual standing at the very forefront of high politics of the kingdom of Jerusalem – serving as chancellor and archbishop of Tyre at the peak of his career – William was somewhat 'detached' from the realities of everyday life. It should be noted that unlike their Christian counterparts, Muslim writers, while widely commenting on land fertility of Syria-Palestine, avoided mentioning any fanciful figures related to crop yields and harvests.

Clearly, the same 'colonial' fascination of European writers and travellers with the fertility and riches of the Holy Land mirrors their fascination with spices. Here, too, spices were associated, in medieval European imagination, with heavenly lands, Paradise, situated in the distant, alluring, magnificent and – importantly – plentiful East.[111] Again, this exotic commodity, highly regarded and valued in Europe, was linked to the kingdom of Prester John. Already in the fabricated letter of c. 1165–

[104]Donald Crummey, 'Ethiopian Plow Agriculture in the Nineteenth Century', *Journal of Ethiopian Studies* 16 (1983): 1–23, at 2 and 12.
[105]Crummey, 'Ethiopian Plow Agriculture', 12; James C. McCann, *People of the Plow. An Agricultural History of Ethiopia, 1800–1990* (Madison, 1995), 125–7.
[106]Johann Wilhelm Müller, *Die Afrikanische auf der guineischen Gold Cust gelegene Landschafft Fetu* (Hamburg, 1673), 191–7.
[107]John Thornton, 'Precolonial African Industry and the Atlantic Trade, 1500–1800', *African Economic History* 19 (1990–1991): 6–7.
[108]Klas Rönnbäck and Dimitrios Theodoridis, 'African Agricultural Productivity and the Transatlantic Slave Trade: Evidence from Senegambia in the Nineteenth Century', *The Economic History Review* 72, no. 1 (2019): 209–32.
[109]*Carsten Niebuhr und die Arabische Reise 1761–1767*, ed. Stig T. Rasmussen (Heide, 1986), chapter 131.
[110]This point will be dealt with in a detail in chapter 5 of Benjamin Z. Kedar's forthcoming book on the cultural history of the kingdom of Jerusalem. I am grateful to Prof. Kedar for kindly sharing his work-in-progress with me.
[111]Paul Freedman, 'Spices and Late-Medieval European Ideas of Scarcity and Value', *Speculum* 80 (2005): 1209–27; Paul Freedman, *Out of the East: Spices and the Medieval Imagination* (New Haven, 2008), chapter 3.

70, the king boasts about pepper grown in abundance in one of his provinces.[112] The same association of Prester John with spices is found in other accounts, including that of John Mandeville (writing c. 1360), Bertrandon de la Broquière (travelling in the Holy Land in 1432–3 and writing in 1457), and Francisco Álvares (writing in 1526/7).[113]

Arable productivity in the Frankish Levant: a long-term deterioration?

While the discussion above may explain the idyllic depiction of local agricultural fertility by European observers, it surely does not explain similar narratives by Muslim authors both before and during the Frankish dominance. It should be borne in mind that the majority of Islamic geographers and travellers discussed earlier wrote in the pre-Frankish period, while later authors, such as al-Idrīsī and Abū al-Fidāʾ borrowed from their predecessors.[114] Could it be that their narratives reflected an earlier and better reality compared with that of Zorzi?

Some Cairo Genizah documents may provide valuable hints. Fortunately, there are a number of Qaraite fragments discussing the state of arable fields in Palestine, at least three of which mention barley yields as estimated by local *fallāḥīn*, around the time of *aviv* (spring) harvest. According to one, the 1027 barley harvest in Gaza region yielded 6 *qafīz* from 0.5 *qafīz*, thus rendering the seed ratio of 12:1.[115] According to a 1052 document from the same region, barley yields stood at 20:1 (deriving from 20 *qafīz* harvested in relation to just one *qafīz* sown in the previous year).[116] Finally, an undated fragment from the first half of the eleventh century (whose provenance could not be determined) notes thirty *qafīz* harvested from two *qafīz* sown (thus, the yield ratio is 15:1).[117] These figures are considerably higher (2.5–4 times) than those implied by Zorzi's report. Even assuming that barley yields were usually higher than the wheat ones as some sources hint, the gap could not have been that wide.[118] Although the Tyre region was, as we have seen, among the most fertile regions in Syria-Palestine, the Gaza hinterland may have been as fertile. The Franciscan Francesco Suriano, travelling in the Holy Land in 1481–4, described it as a region 'most abundant in crops'.[119] Remarkably, Meshullam of Voltera, an Italian-Jewish merchant, visiting the Holy Land at the same time (1481), noted Gaza as a 'fine and fertile land', rich in bread and wine.[120] The Ottoman *defterleri* of c. 1519, c. 1531, 1548, 1557 and 1596 indicate that wheat occupied, roughly, half of all

[112] *Prester John: The Legend and Its Sources*, 70, 72.
[113] Ibid., 197, 215, 218.
[114] For instance, Abū al-Fidāʾ drew upon Ibn Ḥawqal's idea that Palestine was the most fertile region of all the province of Syria, while Jerusalem was the most fertile region of Palestine.
[115] Nadia Vidro, '*Aviv* Barley and Calendar Diversity among Jews in Eleventh-Century Palestine', *Journal of Jewish Studies* 72 (2021): 288–92.
[116] Cambridge University Library, Taylor-Schechter Genizah Research Unit 12.147, digital images available at https://cudl.lib.cam.ac.uk/view/MS-TS-00012-00147/1 (accessed August 2022). The document is printed in Moshe Gil, *Eretz Israel ba-Tequfah ha-Muslemit ha-Rishonah (634–1099)* [Eretz Israel in the first Muslim period (634–1099)], vol. 2 (Tel Aviv, 1983), 543–5, no. 302.
[117] Cambridge University Library, Taylor-Schechter Genizah Research Unit 12.646v, digital images available at https://cudl.lib.cam.ac.uk/view/MS-TS-00012-00646/1 (accessed August 2022).
[118] For the suggestion that barley yields may have been about 20 per cent higher than the wheat ones, see footnote 62 above.
[119] *Il trattato di Terra Santa e dell'Oriente*, ed. Girolamo Golubovich (Milan, 1900), 173.
[120] *Masa' Meshulam mi-Volterra be-Eretz Israel bi-shenat RM"A (1481)* [The journey of Meshullam of Volterra in Eretz Israel in the Year 5241 (1481)], ed. Avraham Ya'ari (Jerusalem, 1949), 64.

arable crop acreage in the region, with some villages sowing up to 70 per cent of their tilled land with wheat – indicating the fertility of the region's soil.[121] Finally, Anderlind (1886) estimated very high yields of both wheat and barley (anywhere between 5 and 30:1 and 20 and 120:1, respectively) in the Philistine Plain.[122] The conundrum, however, becomes all the more difficult when we consider a seventh-century Greek papyrus from Nitzana/Nessana (south-west Negev), recording the wheat and barley yields of nearly 7:1 and 8.5:1.[123] Unlike Gaza, the Negev is an arid desert region, where crop yields, even with the help of irrigation, could not have possibly been higher than those in the Tyre region.[124]

To appreciate why Zorzi's figures do not square up with either the Genizah or the Nitzana/Nessana papyrus ones, it is essential to consider both climatic and anthropogenic factors. Let us start with the former. The eleventh-century climatic deterioration in the Eastern Mediterranean, leading to various demographic, socio-economic and political crises, has been studied in depth by Ronnie Ellenblum.[125] Although textual references to dry conditions analysed by Ellenblum are at odds with the palaeoclimatic record deriving from isotope data from Sofular Cave (north-western Anatolia), suggesting the tenth through twelfth centuries as a somewhat humid period, isotopes from sediments in Lake Van (the Armenian highlands) indeed corroborates textual evidence.[126] Moving on to the Frankish period, the isotopes from both Sofular Cave, coupled with those from Lake Nar (central Turkey) and speleothems from Jeita Grotto (about 20 km north-east of Beirut) all suggest the period of the 1230s–50s as pronouncedly dry, while Sofular Cave suggests a long-term dry period in the 1180s–1260s (Figure 1). Given that Syria and Palestine (except the southern regions of the Dead Sea, Negev and Arabah) were relying on dry cultivation of arable crops, rather than irrigation (which was reserved for sugar cane and cotton plantations),[127] prolonged dry spells could have some negative implications for crop yields. At the same time, if this

[121]Etkes, 'Nomads and Droughts', 25; Wolf Dieter Hütteroth and Kamal Abdulfattah, *Historical Geography of Palestine, Transjordan, and Southern Syria in the Late 16th Century* (Erlangen, 1977), Karte 5; Jeffrey A. Blakely and Yaakov Huster, 'The Wadi el-Hesi Region in 1256/7: An Interpretation of John of Ibelin's Contract with the Hospital of Saint John', *Crusades* 15 (2017): 51–2.

[122]Anderlind, 'Ackerbau und Thierzucht', 50.

[123]Casper J. Kraemer Jr., *Excavations at Nessana, Volume 3: Non-Literary Papyri* (Princeton, 1958), 237–40, no. 82.

[124]Remarkably, recent excavations at nearby Haluza (Elusa, al-Khalasa), just 40km north-east of Nitzana, reveal a long-term crisis and decline, between the late sixth and late eighth centuries, by which point the site had been abandoned: Christian A. Schöne, Florian Jordan, Tali Erickson-Gini and Michael Heinzelmann, 'Haluza', *Hadashot Arkheologiyot. Excavations and Surveys in Israel* 134 (2022) (https://www.hadashot-esi.org.il/Report_Detail_Eng.aspx?id=26120&mag_id=134). The process of aridisation in early medieval (late Byzantine/early Muslim) Fertile Crescent has been studied, on the basis of textual evidence and pollen data, in Benjamin Z. Kedar, 'The Arab Conquests and Agriculture: A Seventh-Century Apocalypse, Satellite Imagery, and Palynology', *Asian and African Studies* 19 (1985): 1–15; idem, 'Ha-Kibushim ha-'Arviyim ve-ha-Haqla'ut: Apokalipsa min ha-Meah ha-Shevi'it, Dimutei Laviyan ve-Palinologiya', in Benjamin Z. Kedar, *Mehqarim be-Historiya 'Olamit, be-Qorot ha-Yehudim ve-Eretz Israel* (Jerusalem, 2019), 137–50. At the same time, archaeological evidence from some other early-medieval sites in today's Israel and Palestine – including the Negev – indicate a period of prosperity and even expansion: Gideon Avni, *The Byzantine – Islamic Transition in Palestine: An Archaeological Approach* (Oxford, 2014), 356–7 on Negev sites.

[125]Ellenblum, *Collapse of the Eastern Mediterranean*.

[126]Preiser-Kapeller, 'Collapse of the Eastern Mediterranean', 236–8.

[127]David Jacoby, 'The Economic Function of the Crusader States of the Levant: A New Approach', *Relazioni economiche tra Europa e mondo islamico. Secc. XIII-XVIII - Europe's Economic Relations with the Islamic World 13th–18th Centuries. Atti della 'Trentottesima Settimana di Studi' 1–5 Maggio 2006*, ed. Simonetta Cavaciocchi (Prato, 2007), 163–4, 170. On irrigation in pre-Frankish/Ayyubid southern Palestine, see Yossef Porat, 'Haqla'ut Shelahin Qeduma ba-Ezorim ha-Shehu-nim shel Eretz-Israel' [Ancient irrigation agriculture in the arid zones of Eretz Israel] (PhD diss., Tel Aviv University, 1985); Gideon Avni, 'Terraced Fields, Irrigation Systems and Agricultural Production in Early Islamic Palestine and Jordan: Continuity and Innovation', *Journal of Islamic Archaeology* 70 (2020): 111–37.

change happened, it was anything but dramatic or extreme: between 1200 and 1260, I was unable to find any textual reference to any subsistence crisis in Syria-Palestine caused specifically by drought (as opposed to one caused by locust migration or earthquake, both recorded on several occasions in that period).[128] Thus, the figures of the 1241/2 harvest may have been a product of a *persistent* dry reality of the early thirteenth century, rather than a *short-term* weather anomaly. In any event, the existing palaeoclimatic record for later-medieval Eastern Mediterranean in general and Syria-Palestine in particular is extremely scarce, allowing only very tentative insights into local climate conditions.

With all its unquestioned importance, Nature has never been a single cause of any historical phenomenon, simple or complex. It is essential, therefore, to consider anthropogenic factors triggering structural changes. Let us turn to non-grain sectors of agriculture in the Frankish period – which is the topic of the remaining part of the article. As we shall see, it was wine and sugar, rather than farinaceous crops that seem to have attracted European settlers, both lords and burgesses, because of their economic profits. In the course of the twelfth and thirteenth centuries, vineyards and sugar cane plantations expanded considerably in both area and importance, at the expense of the shrinking arable sector. The under-investment and lack of interest in the arable sector is reflected in increasing reliance on grain imports from Sicily, south Italy and the Black Sea littoral. Is it possible that the same under-investment and lack of interest led to negligence and mismanagement of arable fields by Frankish producers, their tenants and farm workers? This would be in stark contrast with early eleventh-century Qaraite landowners, whose documents, cited and discussed above, reveal a remarkable attention to micro-management of local fields by agricultural workers, which included field inspection, evaluation and classification of different grain stalks, as well as estimation of pre-harvest crop yields.[129] As some studies of late-medieval English agriculture have shown, efficient management and investment were the keys to improvements and high productivity – and the other way around.[130]

There is another factor to consider. The converse process of the piecemeal expansion of sugar cane plantations and vineyards and shrinkage of arable fields would imply that local *fallāḥīn*, with less land in hand, may have had to intensify their grain cultivation methods – as indeed reflected in high seeding densities. The possibility of boosting up yields by increased manuring may not have been an option, because of persistent deficiency of livestock – a sector separated from arable farming (unlike the mixed farming system of north-western Europe, whereby both arable and livestock husbandry are practiced on the same farms and are closely integrated into each other).[131] Intensification would imply increasing workloads, decreasing efficiency and soil overexploitation, leading inevitably to diminishing returns. The only way to avoid poverty, overpopulation and socio-economic crises, according to Ester Boserup, is to develop agricultural

[128]Raphael, *Climate and Political Climate*, 22, 124, 132–3, 174–5.
[129]Vidro, '*Aviv* Barley and Calendar Diversity'.
[130]David Stone, *Decision-Making in Medieval Agriculture* (Oxford, 2005); Chris Briggs, 'Monitoring Demesne Managers through the Manor Court before and after the Black Death', in *Survival and Discord in Medieval Society: Essays in Honour of Christopher Dyer*, ed. Richard Goddard, John Langdon, and Miriam Müller (Turnhout, 2010), 179–95.
[131]Prawer, *Crusader Institutions*, 185–6.

improvements via technological innovations[132] – something that neither Frankish lords would nor local *fallāḥīn* could do. If such a sad reality prevailed in the thirteenth-century Levantine countryside, then it may echo a similar situation in northern Europe, where a sustained population growth in c. 1000–1300 led, with some notable exceptions of some regions like the Low Countries and east England, to intensification of agriculture, falling yields, declining living standards and ensuing economic crises some 50–80 years before the Black Death.[133]

Importantly, long-term decline in agricultural productivity in the pre-Industrial world is not something unheard of. Thus, c. 1300 Sicily, Egypt and India boasted considerably higher crop yields than they did c. 1800 or 1900.[134] But no other region exemplifies this phenomenon as clearly as Mesopotamia. In the Early Dynastic Period (c. 2900–2350 BCE), local farmers, relying on irrigation and labour-intense cultivation, are reported to have achieved 84-fold barley yields. During the Old Babylonian (c. 2000–1600 BCE) period, the figures fell to 20:1, then to 9:1 and lower in fifteenth- and fourteenth-century BCE Nuzi (south-west of Kirkuk), while in the early nineteenth century, the yield of 6:1 was standard in Iraq.[135] If our interpretation of patchy data is correct, then much the same process can be detected in the Levant in the period under study.

Colonial agriculture: vineyards and sugar cane plantations

While the perception of European pilgrims was exaggeratedly biased because of the combination of quasi-Messianic euphoria and ignorance of local conditions, the same thing cannot be said about the vast majority of Frankish immigrants to the Levant – both landlords and *burgesses*. The fact that many of them chose a long-term settlement (oftentimes spanning several generations) in a rural environment, meant that they knew and understood local agricultural conditions well – with neither illusion nor exaggeration. If Levantine crop yields were faring hardly better than back in France, what did, then, attract Frankish immigrants in the course of the twelfth and thirteenth centuries?

[132]Ester Boserup, *The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure* (London, 1965); eadem, *Population and Technological Change: A Study of Long-Term Trends* (Chicago, 1981).

[133]Michael M. Postan and Jan Titow, 'Heriots and Prices on Winchester Manors', *Economic History Review* 11 (1959): 392–411; J.Z. Titow, *Winchester Yields. A Study in Medieval Agricultural Productivity* (Cambridge, 1972); Michael M. Postan, *Essays on Medieval Agriculture and General Problems of the Medieval Economy* (Cambridge, 1973). On agro-technological progress in East Anglia, despite the crisis, see Bruce M.S. Campbell, 'Agricultural Progress in Medieval England: Some Evidence from Eastern Norfolk', *Economic History Review* 36 (1983): 26–46; for Flanders, see Erik Thoen and Tim Soens, 'The Low Countries, 1000–1750', in *Struggling with the Environment: Land Use and Productivity*, ed. Erik Thoen and Tim Soens (Turnhout, 2015), 236–40, 249.

[134]Deriving from and calculated from: (a) Sicily: Bresc, *Un monde méditerranéen*, 121–5; Orazio Cancila, *Baroni e popolo nella Sicilia del grano* (Palermo, 1983), 101–6; John Paul Russo, 'The Sicilian Latifundia', *Italian Americana* 17 (1999): 40–57, at 43–4; (b) Egypt: Rapoport and Shahar, *Villages of the Fayyum*; Borsch, *Black Death in Egypt and England*; Patrick O'Brien, 'The Long-Term Growth of Agricultural Production in Egypt, 1821–1962', *Political and Social Change in Modern Egypt: Historical Studies From the Ottoman Conquest to the United Arab Republic*, ed. P.M. Holt (Oxford, 1968), 162–95; (c) India: Dasharatha Sharma, *Early Chauhān Dynasties: A Study of Chauhān Political History, Chauhān Political Institutions, and Life in the Chauhān Dominions, from 800 to 1316 A.D.* (Delhi, 1959), 318–9; Shireen Moosvi, *The Economy of the Mughal Empire c. 1595. A Statistical Study*, 2nd ed. (Oxford, 2015), chapters 2–3; Stephen Broadberry, Johann Custodis and Bishnupriya Gupta, 'India and the Great Divergence: An Anglo-Indian Comparison of GDP per capita, 1600–1871', *Explorations in Economic History* 55 (2015): 58–75 (Table 4b); George Blyn, *Agricultural Trends in India, 1891–1947: Output, Availability, and Productivity* (Philadelphia, 1966).

[135]Deriving from and calculated from Elizabeth Rosemary Ellison, 'A Study of Diet in Mesopotamia (c. 3000–600 B.C.) and Associated Agricultural Techniques and Methods of Food Preparation' (PhD diss., University College London, 1978), 85–9; Carlo Zaccagnini, 'The Yield of the Fields at Nuzi', *Oriens Antiquus* 14 (1975): 181–225; Keiko Kiyotaki, *Ottoman Land Reform in the Province of Baghdad* (Leiden, 2019), 83–4.

In 1095–6, a great multitude – tens of thousands – of Europeans left their homes to take part in what is known as the First Crusade. As we have seen, this movement occurred in the context of an agrarian crisis. Yet, with Jerusalem fallen to the crusading army on 15 July 1099, the vast majority of the First Crusade survivors opted to return home. Less than ten thousand – possibly as few as 5,000 Europeans, including perhaps 600 men-in-arms – stayed behind.[136] Why did they not remain in the kingdom? On the one hand, it is possible that having fulfilled their 'divine mission', they felt no need to settle there, entrusting the state of affairs to the nascent Frankish elite. But it could also be that they simply got disillusioned with local agricultural opportunities, which were not better than those back home. The number of Frankish settlers grew – albeit slowly – and in the 1120s Fulcher of Chartres, did his best to encourage European migration to the Holy Land.[137] In any event, the population did grow in the course of the twelfth century and by c. 1200, most available land seems to have been claimed by Frankish migrants, as indicated in some sources.[138] What attracted these migrants to settle in the Levant – especially if crop yields were either already low or progressively deteriorating? Of course, we can theorise that sometimes crusading propaganda, depicting the idyllic conditions discussed above, did its trick and some Europeans fell for it, migrating to the Levant. But what attracted them to stay there, once they realised that local grain yields were not any better than back home? If economic factors were indeed a driving force, then local opportunities attracting new immigrants must have been lying within the non-grain sector – namely, viticulture and sugar cane cultivation.

One pronounced impact that the crusading conquest of the Levant had on local economies and landscapes was a drastic expansion of vineyards throughout the country. References to local vineyards are plentiful in both pilgrims' accounts and charters.[139] In particular, Syrian wine from the Lebanese coastal region was renowned for its excellent quality (and noted by several pilgrims, including Wilbrand of Oldenburg and Burchard of Mount Sion),[140] and exported to Europe in large quantities. Ernoul's chronicle narrates how Jerusalem burgesses would fill portable basins with abundant quantities of wine to be distributed, together with large quantities of bread, among local paupers, during Lent.[141] When accompanying Louis IX in the Holy Land (May 1250-April 1254), Jean de Joinville purchased as many as 100 tuns (about 21,000 gallons = 95,550 litres) to keep the royal retinue going.[142] Genoese merchants were exporting as many as ten tuns (about 2,100 gallons = 9,550 litres) of Syrian wine on a single ship from

[136]John France, *The Crusades and the Expansion of Catholic Christendom, 1000–1714* (Abingdon, 2005), 90; FC 2.6, p. 389.
[137]FC 3.37, p. 748.
[138]*Corpus iuris canonici*, ed. Emil Friedberg (Leipzig, 1879), 2: 593. I am grateful to Prof. Kedar for this reference.
[139]For instance, see Wilbrand, Ch. 1.7 (coastal Lebanon) and 2.4 (Jerusalem hills): *Peregrinatores Medii Aevi Quatuor*, 168 and 184; Thietmar, Ch. 6 (the Damascus region): *Magistri Thietmari Peregrinatio*, 18–19; Burchard of Mount Sion, Ch. 93 (the Bethlehem region and Rephaim Valley): *Burchard of Mount Sion, OP. Descriptio Terrae Sanctae*, 158–61; Philip of Savona (the Sea of Galilee): Neumann, 'Drei mittelalterliche Pilgerschriften III', 32. A quick search of the keyword 'vineyard' at the *RRRH* database yielded 100 results, for both genuine and forged charters (http://crusades-regesta.com/). On wine production in the Frankish Levant, see Judith Bronstein, Elisabeth Yehuda and Edna J. Stern, 'Viticulture in the Latin Kingdom of Jerusalem in the Light of Historical and Archaeological Evidence', *Journal of Mediterranean Archaeology* 33.1 (2020): 55–78; and Rabei G. Khamisy, 'Frankish Viticulture, Wine Presses, and Wine Production in the Levant: New Evidence from Castellum Regis (Miʿilyā)', *Palestine Exploration Quarterly* 153 (2021): 191–221.
[140]Wilbrand, Ch. 1.7, in *Peregrinatores Medii Aevi Quatuor*, 168; Burchard of Mount Sion, Ch. 16, in *Burchard of Mount Sion, OP. Descriptio Terrae Sanctae*, 24–5.
[141]*Chronique d'Ernoul et de Bernard le Trésorier*, ed. Louis de Mas Latrie (Paris, 1871), Ch. 11, 124–5.
[142]Jean de Joinville, *Vie de Saint Louis*, ed. Jacques Monfrin (Paris, 1995), Ch. 503, pp. 248–9; Bronstein et al., 'Viticulture', 69, where they interpreted Old French *tonnaius* as 'barrels' rather than 'tuns'.

the port of Tripoli as late as 1302, that is thirteen years after its fall to the Mamluks.[143] Such large volumes, exported in the early Mamluk era, certainly hint that viticulture must have been practiced on a large scale in the Frankish period, when the numbers of both domestic producers and consumers were undoubtedly much greater before the mass exodus of European settlers after the respective falls of Tripoli (1289) and Acre (1291). That wine trade was a profitable enterprise in the Frankish Levant is reflected in a 1153 royal charter related to the royal estate of Casal Imbert (near Acre). According to the charter, King Baldwin III imposed a rent of one-quarter on the fruit of the vineyards on local tenants, but granted them a tax-free privilege in wine trade in Acre.[144]

The reconquest of parts of the Holy Land by Saladin in the aftermath of the battle of Hattin (4 July 1187) resulted in a shrinkage of the scale of wine production, as some vineyards were destroyed by incoming Muslims lords, as indicated by Burchard of Mount Sion. Conversely, some Muslim landowners opted to continue wine production for consumption by their Christian neighbours. Intriguingly, both Burchard and Thietmar report that some Muslims would covertly drink wine, in defiance of their law.[145] The fluctuations in viticultural economy are clearly reflected in the palynological record from coastal Syria, showing that *Vitis* cultivar accounted for about 7 per cent of the total pollen sample in the period c. 1100–1250, in contrast with about 3 per cent during the late Fatimid era and no cultivation during the Mamluk and Ottoman periods.[146] It is clear, however, that the decline of wine production in Mamluk Syria was piecemeal rather than abrupt: as we have seen, Genoese merchants were still exporting Syrian wine from Tripoli thirteen years after its Mamluk conquest.[147]

But it was sugar plantations, rather than vineyards, that made the economic prospects of Frankish settlers truly appealing. Sugar cane, although cultivated in the Levant since its initial introduction from India in the eight century, seems to have expanded greatly with the arrival of European colonisers from the early twelfth century on. Although cultivated in small pockets of southern Europe – Sicily and south Italy from c. 900 and Andalusia from c. 950 – sugar was largely an unknown commodity to early Frankish settlers, in contrast with wine, produced in different regions of France.[148] Once in the Levant, it did not take long for the Franks to take over the existing sugar plantations and start new ones, at the expense of arable fields.[149] On the basis of both textual and archaeological evidence,

[143]Jean Richard, 'Agricultural Conditions in the Crusader States', in Setton, *Crusades*, 5: 260–1.
[144]Mayer, *Urkunden*, 1: 419–22, no. 228; Bronstein, 'Viticulture', 67–8.
[145]*Burchard of Mount Sion, OP. Descriptio Terrae Sanctae*, 158–61; *Magistri Thietmari Peregrinatio*, 18–19.
[146]David Kaniewski et al., 'Medieval Coastal Syrian Vegetation Patterns in the Principality of Antioch', *Holocene* 21 (2011): 254 and 260.
[147]Richard, 'Agricultural Conditions', 260–1.
[148]Tim Unwin, *Wine and the Vine* (London, 1991), 143–50.
[149]On sugar production in the Frankish Levant, see Eliyahu Ashtor, 'Levantine Sugar Industry in the Later Middle Ages – An Example of Technological Decline', *Israel Oriental Studies* 7 (1977): 226–80; Brigitte Porëe, 'Les moulins et fabriques à sucre de Palestine et de Chypre', in *Cyprus and the Crusades. Papers Given at the International Conference 'Cyprus and the Crusades', Nicosia, 6–9 September, 1994*, ed. N. Coureas and J. Riley-Smith (Nicosia, 1995), 430–46; Edna Stern, 'Ta'asiyat ha-sukar be-Eretz Israel ba-tequfot ha-Tsalbanit, ha-Ayubit veha-Mamlukit leor ha-mimtza ha-arkheologi' [The sugar industry in Palestine during the crusader, Ayyubid and Mamluk periods in light of the archaeological finds] (MA thesis, Hebrew University of Jerusalem, 1999); Anat Peled, *Sukar be-Mamlekhet Yerushalayim. Tekhnologiya Tsalbanit bein Mizrah le-Ma'arav* [Sugar in the kingdom of Jerusalem. A crusader technology between East and West] (Jerusalem, 2009); Hamdan Taha, 'The Sugarcane Industry in Jericho, Jordan Valley', in *The Origins of the Sugar Industry and the Transmission of Ancient Greek and Medieval Arab Science and Technology from the Near East to Europe. Proceedings of the International Conference, Athens, 23 May 2015*, ed. Konstantinos D. Politis (Athens, 2015), 51–77; Edna J. Stern,

at least 43 sugar-producing sites across Frankish, Ayyubid and early Mamluk Palestine have been identified (with the number rising to 63, if we account for 20 additional 'dubious' sites).[150] The main foci of production were situated along the Mediterranean coast, Galilee, and the Jordan valley.[151] Just as with vineyards, sugar cane plantations are frequently mentioned in both travellers' accounts and local charters.[152]

Sugar cultivation had numerous advantages over arable farming. Apart from high yields and immense financial profits, conditioned by a growing demand and high prices in Europe, sugar cane production was, according to local customs, tithe-free – in contrast with grains and livestock, and much to the disadvantage of local church authorities. Thus, in 1228, the Hospitallers (one of the most important sugar producers in the Frankish Levant, alongside other military orders and the Venetians) found themselves in trouble with the bishop of Acre for creating sugar cane plantations on fields previously sown with wheat and barley at *Beroeth* (Al-Birwa = البروة ; 32°54′19″N, 35°10′49″E) and *Coketh* (near *Kawkab Abu al-Hija* = كوكب أبو الهيجا ; 32°49′50″N, 35°14′55″E), both in Galilee, thus evading tithe payments.[153] The benefits of sugar cultivation and trade were taken up by Joscelyn III of Edessa, who in 1185 successfully obtained a royal privilege to duty-free trade and export of sugar and honey.[154] In 1228, the commune of Venice was granted a similar privilege (alongside with spices and other luxurious goods) by John of Ibelin, Lord of Beirut.[155]

Although the available evidence for the Frankish Levant is frustratingly thin, the fact that sugar was exported on a large scale can be inferred from several references. Firstly, both Benjamin of Tudela, sojourning in the Holy Land in 1169–73, and William of Tyre, writing between 1170 and 1184, reported that high-quality sugar, produced in the Tyre region, attracted foreign merchants, who would export it from the local port into various lands.[156] An additional indirect witness is the impressive sizes of joint-capital investments by Venetian and Genoese traders. For instance, one such *compagnia* of 1204 involved four of the wealthiest Venetians (including Giovanni Dandolo) investing no less than the princely sum of £2,500 Venetian in sugar-trade voyages to Tyre and Alexandria, for the duration of five years. The 1204 *compagnia* grew out of an earlier business venture contract of 1196, created for the same purpose, on a smaller scale.[157] In Sicily, one prominent Messinese merchant, Petronio

Nimrod Getzov, Anastasia Shapiro and Howard Smithline, 'Sugar Production in the 'Akko Plain from the Fatimid to the Early Ottoman Periods', ibid., 79–112; Judith Bronstein, Edna J. Stern, and Elisabeth Yehuda, 'Franks, Locals and Sugar Cane: A Case Study of Cultural Interaction in the Latin Kingdom of Jerusalem', *Journal of Medieval History* 45 (2019): 316–30. For sugar production in Jordan around the same time, see R. Jones and A Grey, 'Some Thoughts on Sugar Production and Sugar Pots in the Fatimid, Crusader/Ayyubid and Early Mamluk Periods in Jordan', in *Multidisciplinary Approaches to Food and Foodways in the Medieval Eastern Mediterranean.* ed. Yona Waksman (Lyon, 2020), 191–207. For the sugar industry and trade in the medieval Mediterranean more generally, see J. H. Galloway, 'The Mediterranean Sugar Industry', *Geographical Review* 67, no. 2 (1977): 177–94; and Mohamed Ouerfelli, *Le Sucre. Production, commercialisation et usages dans la Méditerranée médiévale* (Leiden, 2008).

[150]Stern, 'Ta'asiyat ha-sukar', 18–22. See also Porëe, 'Les moulins et fabriques'.

[151]Ibid., 191–5.

[152]A quick search of the keyword 'sugar' at the *RRRH* database yielded 25 results, with the earliest reference to Frankish-owned sugar plantation from 1116 (*RRRH* no. 163).

[153]For the identification of these placenames, see Salomon E. Grootkerk, *Ancient Sites in Galilee: A Toponymic Gazetteer* (Leiden, 2000), 171, Map 14–20.

[154]*RRRH*, no. 644.

[155]*RRRH*, no. 957.

[156]*The Itinerary of Benjamin of Tudela*, ed. Marcus Nathan Adler (London, 1907), 20–1; WT 13.3, pp. 589–90.

[157]Raimondo Morozzo della Rocca and Antonino Lombardo, *Nuovi documenti del commercio veneto dei sec. XI-XIII* (Venice, 1953), 102–4; Ouerfelli, *Le Sucre*, 427, 436.

de Puteo, owing a quarter share of the ship *St. Johannes*, used to travel regularly between his city and Acre, importing wine and exporting sugar, spices and luxury textiles, until his death in Acre in, or shortly before, 1279.[158] Apart from obvious markets, such as Venice and Genoa, we also hear about Levantine sugar (and other luxurious goods) being marketed in Apulian towns – Bari, Barletta and Trani, in the late thirteenth century.[159]

Remarkably, and in spite of the 1291 papal ban (followed by a series of similar bans issued by royal governments) on trade with the Mamluks after the fall of Acre, western merchants kept going to Syrian and Egyptian ports for trade in the last decade of the thirteenth century and the first decades of the fourteenth.[160] Thus, in 1308, the Venetian government instructed the captain of local galleys departing for Alexandria to buy as much sugar as possible.[161] In some instances, they managed to acquire special dispensational privileges; in some other instances, they breached the papal ban.[162] The fact that they were still willing to travel there, risking to get in trouble with both Christian and Mamluk authorities (after the 1291 ban, the latter could no longer guarantee merchants' safety), implies how remarkably profitable those ventures were.

There can be little, if any, doubt that the expansion of sugar cane acreage at the expense of the grain one was encouraged by the buoyant long-distance trade in sugar between the Mediterranean and Europe, with Italian merchants playing a central role as middlemen investing, buying, shipping, and distributing the luxury commodity. This was nothing new: Amalfitan (and, to a lesser extent, Pisan) merchants had been active in Muslim Spain, Maghreb, Egypt, Syria-Palestine, Anatolia and Constantinople since the late tenth century, buying both basic and luxury goods.[163] In the course of the twelfth century, Venetian and Genoese merchants overcame the competition of their Amalfitan and Pisan counterparts and became the dominant force in long-distance trade between Europe and Asia – both along Mediterranean maritime routes and trans-Asian inland routes (commonly, but problematically, referred to as the 'Silk Roads'), in the course of the following century. Their activities were characterised by a 'progressive' entrepreneurial mentality, willing to take various risks by investing considerable capital and travelling long, and sometimes hazardous, routes – believing in eventual returns, very high indeed by comparison to the initial investment.[164] Put differently, it was the principle of 'deferred gratification' that

[158]David Abulafia, 'The Merchants of Messina: Levant Trade and Domestic Economy', *Papers of the British School at Rome* 54 (1986): 196–212, at 199–201.

[159]Eliyahu Ashtor, *Levant Trade in the Middle Ages* (Princeton, 1984), 15; Domenico Forges Davanzati, *Dissertazione sulla seconda moglie del re Manfredi* (Naples, 1791), LXXVIII; Giovanni Battista Carta, *Dizionario geografico universale* (Naples, 1843), 782–3.

[160]Ashtor, *Levant Trade*, 41.

[161]Ibid., 24.

[162]Ashtor, *Levant Trade,* 17–44. On the papal embargo, see David Jacoby, 'Venice and the Papal Embargo against Mamluk Egypt, 1291–1344', *Thesaurismata* 45 (2015): 137–54; Stefan K. Stantchev, *Spiritual Rationality: Papal Embargo as Cultural Practice* (Oxford, 2014).

[163]On Amalfitan commerce, see: Armand O. Citarella, 'The Relations of Amalfi with the Arab World before the Crusades', *Speculum* 42, no. 2 (1967): 299–312; David Jacoby, 'Amalfi nell'xi secolo: commercio e navigazione nei documenti della Ghenizà del Cairo', *Rassegna del Centro di Cultura e Storia Amalfitana* 36 (2008): 81–90; Patricia Skinner, *Medieval Amalfi and Its Diaspora, 800–1250* (Oxford, 2013). On Pisan merchants, consult Marco Tangheroni, 'Pisa e il regno crociato di Gerusalemme', in *I Comuni Italiani nel regno crociato di Gerusalemme: Atti del colloquio 'The Italian Communes in the Crusading Kingdom of Jerusalem'*, ed. Gabriella Airaldi and Benjamin Z. Kedar (Genoa, 1986), 497–521; David Jacoby, 'Pisa and the Frankish States of the Levant in the Twelfth Century', in *Communicating the Middle Ages: Essays in Honour of Sophia Menache*, ed. Iris Shagrir, Benjamin Z. Kedar and Michel Balard (Abingdon, 2018), 91–102.

[164]This point will be discussed in chapters 11–12 of my forthcoming *Deep Divergence* (see note 50).

prompted Venetian and Genoese merchants to engage in long-distance trade in exotic and luxurious goods, including Levantine sugar.

To appreciate this risk-taking mentality guided by the principle of deferred gratification, it is essential to estimate the actual profits deriving from sugar trade (Table 4). Unfortunately, I was unable to find any reference to sugar prices in the crusader states. Our nearest point of reference in space and time is Mamluk Egypt in the second half of the thirteenth century. On average, the selling price in the local Cairo and Alexandria markets stood at 3.78 dinars per 100 lbs, as Table 4 indicates.[165] In Europe, the only available price data for sugar for the same period comes from England. Here, the prices in London and other southern towns fluctuated between 0.9 and 1.42 shillings (10d. and 17d.) per pound, that is at 1.125 shilling (13.5d), on average.[166] Converting Mamluk dinars into their shilling Sterling equivalent (on the basis of precious metal contents and weights, rather than 'exchange rates' implying hidden interest rates), we arrive at the ratio of about one dinar to 2.47 shillings or 29.65 pence.[167] Thus, 112.5 shillings per 100 lbs would be equal about 45.5 dinars, implying that the value of sugar in England was about 12 times higher than in Egypt, in the late thirteenth century.

A glimpse into later sugar price entries from various regions in Europe reveals not only the fact that these remained high in the fourteenth and fifteenth centuries (notwithstanding the expansion of sugar production in Cyprus and Sicily), but also how a ratio between prices of sugar sold in Mamluk markets in Egypt and Syria and those marketed in Europe changed, in accordance with a physical distance from the Middle East. As Table 4 shows, around 1370, prices of native Sicilian sugar in Palermo markets were still 20 per cent higher than those in Egypt – but the ratio would be reversed in the early fifteenth century, with the expansion of sugar industry in Sicily.[168] Around the same decade, sugar prices were approximately five and 6.5 higher than in the Levant, in the markets of, respectively, Venice and Barcelona. In southern France – as evidence from Avignon and Montpellier demonstrates – they were approximately 10 times higher than in the Levant.[169] In England, the ratio between local and Levantine prices stood at 11–12:1.[170]

[165]Calculated from the *Global Price and Income History Group* 'Egypt 1250–1517 Prices' dataset (http://gpih.ucdavis.edu/Datafilelist.htm) (accessed February 2022).

[166]Calculated from Gregory Clark's 'England Prices and Wages since the 13th Century' dataset (http://gpih.ucdavis.edu/Datafilelist.htm) (accessed February 2022).

[167]Around 1250–80, one Mamluk dinar contained 4.25 grams of pure gold; one silver shilling Sterling (= 0.05 £ Sterling = 12 pence Sterling) had an equal value of 1.72 grams of pure gold. Calculated from *Global Price and Income History Group* 'Egypt 1250–1517 Prices' dataset.(http://gpih.ucdavis.edu/Datafilelist.htm) (accessed February 2022) and John Munro's 'English Mint Outputs: Gold and Silver' and 'Values of English and Flemish Coins' datasets.(https://www.economics.utoronto.ca/munro5/MoneyCoinage.htm) (accessed February 2022).

[168]Calculated from the *Global Price and Income History Group* 'Egypt 1250–1517 Prices' dataset (http://gpih.ucdavis.edu/Datafilelist.htm) (accessed February 2022); Bresc, *Un monde méditerranéen*, 233–4; Ouerfelli, *Le Sucre*, 334–5. On the growth and expansion of Sicilian sugar industry, especially from c.1330 on, see Bresc, *Un monde méditerranéen*, 232–5.

[169]Calculated from the *Global Price and Income History Group* 'Egypt 1250–1517 Prices' dataset (http://gpih.ucdavis.edu/Datafilelist.htm) (accessed February 2022); Ouerfelli, *Le Sucre*, 338–47. Around 1370, the approximate precious metal ratio to one Mamluk dinar was as follows: 1.25 florin/ducat; 3.29 shilling Sterling; and 0.77 £ Barcelona: calculated from *Global Price and Income History Group* 'Egypt 1250–1517 Prices' dataset (http://gpih.ucdavis.edu/Datafilelist.htm) (accessed February 2022); Peter Spufford, *Handbook of Medieval Exchange* (London, 1986), 1–25, 81 and 139–46.

[170]Calculated from Gregory Clark's 'England Prices and Wages since the 13th Century' dataset (http://gpih.ucdavis.edu/Datafilelist.htm) (accessed February 2022).

Table 4. Sugar prices (per 100 lbs) in Egypt and select European regions.

	Cairo/Alexandria	Sicily	Venice	Barcelona	South France	South England
1. In Mamluk dinars						
c.1250–80	3.78					45.53
c.1370	3.23	3.91	16.05	21.02	33.00	36.68
2. Ratio to Cairo/Alexandria						
c.1250–80	1.0					12.0
c.1370	1.0	1.2	5.0	6.5	10.2	11.4

Source: as in footnotes 165–170.

While there is no doubt that the Venetian and Genoese communes in the Frankish Levant were the most paramount sugar businessmen, acting *both* as long-distance merchants and local producers, they were not the only ones exhibiting the same spirit of entrepreneurial mentality based on profit, deferred gratification and, at times, risk. Frankish landholders were anything but a homogenous group. The patchy references, mentioned above, indicate that sugar cultivation was taken advantage of by other seigniorial groups, such as lay lords (exemplified in the cases of Joscelyn III of Edessa in 1185 and John of Ibelin in 1228), military orders (especially the Hospitallers, but also the Teutons and the Templars),[171] monastic houses (including St Mary of the Latins of Jerusalem and the St Mary and All Saints nunnery in Acre),[172] hospitals (such as St John in Nablus),[173] and ecclesiastic dignitaries (for instance, the archbishop of Tyre).[174] The same lords would seek to boost the profitability of their landed enterprises by relying on a combination of customary labour services (*corvée*) and hired labour, on both vineyards and sugar plantations,[175] indicating that they were willing to invest in additional labour supplementing seigniorial dues and services. This must have been especially vital in the context of agricultural labour shortage in the twelfth century.[176] Likewise, the expansion of sugar cane plantations implied investment in irrigation – and the same should be said about cotton production, not discussed in the present article.[177] One may argue that the same lords did not invest in the irrigation of arable fields precisely because of their lack of interest in this sector, which was anything but profitable.

Although there is no doubt that these lords, both lay and religious, reaped some handsome profits, they certainly paled in comparison to these generated by Italian merchants: after all, cultivating sugar on local plantations was much less risky and complicated than transporting it to Europe. Still, the incredibly high value of sugar in northern Europe hints that cultivating sugar canes was still a very profitable enterprise – as reflected in the expansion of its acreage, discussed above. Intriguingly, the choice to augment the relative share of sugar acreage within the total agricultural area is reminiscent of a very similar situation in a much later colonial period. The British takeover of Burma

[171]Peled, *Sukar be-Mamlekhet Yerushalayim*, 131–8.
[172]*RRRH*, no. 163 (1116); 2309 (1137).
[173]*RRRH*, no. 634 (1159).
[174]As implied in *Bericht*, 149–50.
[175]Prawer, *Crusader Institutions*, 171, 194–9; WT 13:8, p. 595. See also, for instance, *RRRH* 57 (1154), 571 (1155), 2309 (1237).
[176]Prawer, *Crusader Institutions*, 116–26.
[177]On cotton production in the Frankish Levant, see Eliyahu Ashtor 'The Venetian Cotton Trade in Syria in the Later Middle Ages', *Studi Medievali* 17 (1976): 675–715; Maureen Fennell Mazzaoui, *The Italian Cotton Industry in the Later Middle Ages, 1100–1600* (Cambridge, 1981), 23–36; Jacoby, 'Economic Function', 164, 172–3.

from 1830 onwards and the French conquest of Indochina from the late 1850s onwards resulted in a considerable expansion of rice acreage, to meet the frantically growing demand in Europe. Similarly, the kingdom of Siam, albeit never conquered by any European power, expanded the rice acreage, at the expense of yams and legumes. By 1900, rice covered more than 90 per cent of all arable area in Burma and Thailand.[178] In the Gambia, a British colony since 1821, the proportion of peanuts grew from about 17 to 40 per cent, at the expense of the declining shares of maize and sweet potatoes, reflecting a fast-growing demand for peanuts in western Europe.[179] Hence, it may be argued that Frankish sugar producers were no less capitalistic in their outlook than their Venetian and Genoese contemporaries, or the nineteenth-century European colonisers. This may conceptually lend some affirmation to the view that crusader states in the Levant presented at least some aspects of a colonial society, at least as far as economic profitability goes.[180]

Naturally, the expansion of sugar plantations at the expense of arable fields, together with population growth in the twelfth and thirteenth centuries, implied there was an increasing pressure on locally produced grain resources – the most basic foodstuffs of both Muslim and Eastern Christian natives, as well as of Frankish settlers. This pressure could well explain the unusually high seeding densities of grain practiced by local *fallāḥīn*. To address the issue and ensure sufficient grain supply, the Frankish Levant had to resort to grain from southern Europe – primarily from Sicily and south Italy, but also from the Black Sea littoral. Levantine dependence on foreign grain is reflected in late thirteenth-century statistics indicating huge volumes of grain entering its ports.[181] Between 1269 and 1284, royal authorities in Sicily initiated annual exports of, on average, about 4,000 *salme* (= 3,780 quarters or 30,240 bushels) of grains and legumes (on average, 2,775 *salme* = 2,620 quarters of wheat, 1,075 *salme* = 1,016 quarters of barley and 88 *salme* = 83 *quarters* of legumes) (Figure 2).[182] Those annual figures were enough to feed under 4,000 people, allowing an annual intake of one quarter of grain per capita.[183]

Obviously, these sums were just the tip of the iceberg, as we do not know the full extent of grain imports into the Frankish Levant, made up of private commercial initiatives. For instance, in 1283, Bonagiunta di Scarlata, a Messinese merchant, exported 300 *salme* (= 284 quarters) of grain to Acre, on board a Pisan ship.[184] In 1290, a Genoese ship called *St. Mattheus*, owned by four businessmen, left Caffa (today's Feodosia in Crimea) with 5,000 *minae* (= 2,237 quarters) of wheat, to be

[178]James C. Ingram, *Economic Change in Thailand since 1850* (Stanford, 1971), 36–74; Teruko Saito and Lee Kin Kiong, *Statistics on the Burmese Economy: The 19th and 20th Centuries* (Singapore, 1999), 42–61, 75–83.
[179]Rönnbäck and Theodoridis, 'African Agricultural Productivity'; George E. Brooks, 'Peanuts and Colonialism: Consequences of the Commercialization of Peanuts in West Africa, 1830–70', *The Journal of African History* 16, no. 1 (2009): 29–54.
[180]Ellenblum, *Crusader Castles*, 43–61; Kedar, 'The Crusading Kingdom of Jerusalem', and Slack, 'The Quest for Gain'.
[181]John Pryor, '*In Subsidium Terrae Sanctae*: Exports of Foodstuffs and War Materials from the Kingdom of Sicily to the kingdom of Jerusalem, 1265–1284', *Asian and African Studies* 22 (1988): 127–46; David S.H. Abulafia, 'The Levant Trade of the Minor Cities in the Thirteenth and Fourteenth Centuries: Strengths and Weaknesses', *Asian and African Studies* 22 (1988): 183–202, at 196–7.
[182]Calculated from Pryor, '*In Subsidium Terrae Sanctae*', 144.
[183]The figure of one quarter per capita a year has been assumed for late-medieval England (Slavin, *Experiencing Famine*, 226). Given a different dietary portfolio of Levantine communities, this approximate equation may not stand.
[184]Ashtor, *Levant Trade*, 16.

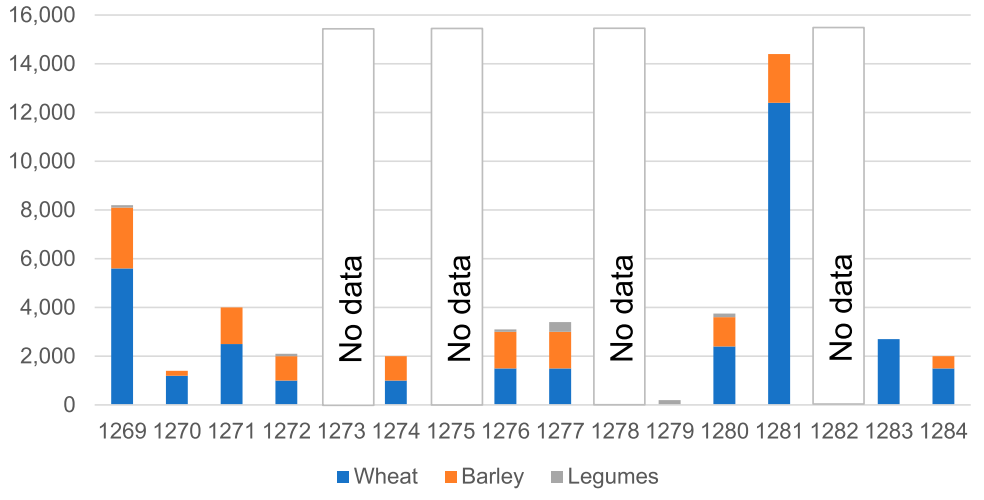

Figure 2. Annual exports of Sicilian crops to the Frankish Levant (in salme), by royal orders, 1269–1284. Source: Pryor, 'In Subsidium Terrae Sanctae', 144.

sold in Syria, Tunis, Genoa, Pisa and Provence.[185] To the Venetian, Genoese, Pisan and Messinese traders we should also add their Catalan colleagues.[186] Arguably, local Frankish lords may have been mimicking Italian republics, where, with local *contadi* (rural hinterlands) not having enough capacities to cater for fast-growing urban populations, grain imports (from Sicily, south Italy, Egypt, north Africa and Catalonia) came to the rescue, as a long-term viable strategy (with the exception of some food shortage episodes).[187]

Conclusions

A careful analysis of Zorzi's 1242–4 report reveals several fascinating and interrelated facts, all linked to big questions and ongoing debates. First and foremost, productivity levels within the arable sector of Levantine economy were not higher than those in Europe – and certainly much lower than in some other regions of the Mediterranean, such as Sicily and Egypt. Seed-ratio yields were, more or less, on a par with those in France, and while one acre of land would produce more calories than in most European regions, this would be achieved with very high production costs, because of high seeding densities, high seedcorn rates and low labour productivity. Contemporary chroniclers' and pilgrims' assertions of incredibly high yields and remarkably fertile soil in the Holy Land reflect not only their Biblical and quasi-messianic spirit, but also a fanciful perception of far and exotic lands with fertility, abundance, and riches – a cognitive and literary *topos* that would recur in European travellers' accounts and diaries for centuries to come, reaching well into the late nineteenth century. This narrative was at least partly rooted in the legend of Prester

[185] *Les actes de Caffa du notaire Lamberto di Sambuceto, 1289–1290*, ed. Michel Balard (Paris, 1973), 368–70, no. 886.
[186] Ashtor, *Levant Trade*, 16.
[187] See, for instance, Marie D'Aguanno Ito, 'Orsanmichele - The Florentine Grain Market: Trade and Worship in the Later Middle Ages' (PhD diss., The Catholic University of America, 2014); George Dameron, 'Feeding the Medieval Italian City-State: Grain, War, and Political Legitimacy in Tuscany, c. 1150–c. 1350', *Speculum* 92 (2017): 976–1019.

John and the dream to discover his kingdom inhabited by 'lost' and 'ancient' Christians of the East and abounding in exotic and luxurious goods.

While it is easy to understand what guided Christian authors to write their idyllic depictions of agriculture in the Holy Land, much more puzzling are similar descriptions by Muslim authors. As noted, most Islamic accounts discussed here were written by pre-twelfth-century geographers and travellers, while later authors would rely on and paraphrase their predecessors. Hence, it is possible that their narrative may reflect the fact that arable productivity was indeed higher in the pre-Frankish period. The scattered references to crop yields in early eleventh-century Genizah fragments, taken together with a seventh-century Nitzana/Nessana papyrus and palaeoclimatic data, corroborate this hypothesis. If this interpretation is correct, then it suggests that the long-term economic decline of the Middle East, dated by Elyahu Ashtor to the Mamluk period – and particularly after the Black Death of 1348–9[188] – may, in fact, have started during the Frankish period, triggered by a combination of natural and anthropogenic factors. It is true that international trade, especially in exotic goods, was booming in the twelfth and especially the thirteenth century, but it meant very little, if anything, to ordinary *fallāḥ* families, such as those of Betheron under Venetian lordship. It is true that the same *fallāḥ* families had enough food to eat (and sell), but its production came at the cost of very intense labour. If so, then we may consider this early decline as yet another *fundamental* factor contributing to the Great Divergence between the 'West' and the Middle East (in addition to cultural-institutional and technological ones), whose chronological framework should be rethought.[189]

Going back to the dream of Prester John, one may argue that it was the same dream that laid the foundations of West-European geographic and commercial expansion from the twelfth century onwards – and indirectly influenced the emergence of late-medieval and early-modern colonialism and eventually imperialism. This geographic and commercial expansion was strongly triggered by a capitalist mentality of risk taking, deferred gratification, but eventual profitability. At the very heart of this geo-commercial expansion stood long-distance trade in, predominantly, exotic and luxury goods, whose raw agricultural production would invariably expand in regions colonised by European venturers – something that may be labelled as 'colonial capitalism'. Indeed, the idea of unimaginable land fertility and plenty, eventually leading Frankish colonists to focus on sugar cultivation and trade, was closely related to the cognate idea of spices. Both ideas were linked with the far, mysterious and heavenly East, where the glorious kingdom of Prester John was allegedly situated.

Both sugar trade and spice trade were economic foundations of early European geographic expansion and colonial capitalism. Frankish settlement in twelfth- and thirteenth-century Syria-Palestine may be seen as, arguably, the earliest example of colonial capitalism, preceding early sixteenth-century Portuguese conquests of spice-trading coastal outposts of India, south-east Asia and the Arabian peninsula. However, unlike the Portuguese conquests of spice-trading coastal outposts of Goa (1510), Hormuz and Muscat (1515), Bahrain, Qatar and Kuwait (1521), Chittagong (1528), as well as the Malacca peninsula (1511), all small-scale and fragmentary in nature, the military conquests of large parts of Syria and Palestine by crusading armies allowed Frankish settlers to pursue a full-fledged territorial colonisation,

[188]Ashtor, 'Levantine Sugar Industry'; idem, 'Economic Decline of the Middle East'.

[189]On the Great Divergence between the two regions, see Kuran, *Long Divergence*; Rubin, *Rulers, Religion, and Riches*. Both studies take an institutionalist approach to the phenomenon, leaving the agricultural performance and decline outside their scope.

allowing them to act as both producers and traders.[190] In this regard, the large-scale expansion of vineyards and, especially, sugar (as well as cotton, not discussed in this study), at the expense of arable fields producing basic foodstuffs for the everyday diet of local communities, mimics similar agricultural trends we see in nineteenth-century west Africa and south-east Asia, where the expansion of, respectively, rice and peanut production was triggered by the growing demand in Europe and the Americas on the one hand, and high profits that the same demand would confer upon colonial producers and merchants, on the other. In the same vein, the remarkably high profits from sugar production and trade (as reflected in regional price statistics discussed above) may have been one of the main driving forces of Frankish immigration and settlement in the Levant. However, local sugar producers did not reap their profits without cost. As argued, sugar production clearly required investment in irrigation in an otherwise dry agriculture environment – as well as hiring additional working force. This stood in sharp contrast with the cereal sector, considered unprofitable and thus remaining underinvested and shrinking. In light of all that, Frankish communities in the Levant – or, at least, better-off producers and merchants among them – may be regarded, at least to a certain extent, as a colonial society (despite some claims to the contrary) practicing colonial capitalism.

It should, however, be made clear that this 'colonial capitalism' mentality was not born with the arrival of the First Crusaders in 1099. As Riley-Smith and Bull have convincingly shown, expectations of material reward profitability were probably the last factor that drove early crusaders to the Levant. If anything, it was a religious sentiment and chivalric values that guided crusading leaders and nobility,[191] and, arguably, the crisis of 1094–5 that pulled commoners.[192] It is also possible, in light of the discussion above, that agricultural productivity c. 1100 was higher than it was some 140 years later, and hence, the first generation of European settlers may have indeed found more fruitful land parcels and enjoyed better grain harvests than back home.

Whether the crop yields c. 1241–2 were lower than those c. 1100 or not, it is clear that the acquisition of 'colonial capitalism' mentality was a product of a gradual socio-economic development of Frankish settlement in the Levant. Prior to their encounter with sugar outside of Tripoli in May 1099, Europeans knew nothing about sugar and its economic potential.[193] As time went by and the young kingdom grew, its European inhabitants found themselves getting increasingly acculturated into various aspects of everyday life in local environments,[194] both urban and rural – as much as they found themselves getting engulfed into a system of international trade in the greater Mediterranean region, where Italian and Sicilian merchants played a leading role as middlemen between Frankish and Muslim producers on the one hand and European consumers on the other. It was these

[190]On early Portuguese conquests of these posts, see Charles R. Boxer, *The Portuguese Seaborne Empire, 1415–1825* (London, 1969); Anthony J.R. Russell-Wood, *The Portuguese Empire 1415–1808* (Baltimore, 1998); Malyn Newitt, *A History of Portuguese Overseas Expansion, 1400–1668* (London, 2005); Shihan de Silva Jayasuriya, *The Portuguese in the East: A Cultural History of a Maritime Trading Empire* (London, 2008); Liam Matthew Brockey, ed., *Portuguese Colonial Cities in the Early Modern World* (Farnham, 2008); Sanjay Subrahmanyam, *The Portuguese Empire in Asia, 1500–1700: A Political and Economic History*, 2nd ed. (Chichester, 2012).

[191]Riley-Smith, *First Crusaders*, 21; Bull, *Knightly Piety*, 283–5.

[192]Slavin, 'Crusaders in Crisis'.

[193]This episode is famously told by Albert of Aachen: AA 5.37, pp. 388–9.

[194]The topic of acculturations in everyday life will be explored in great detail in chapter 2 of Benjamin Z. Kedar's forthcoming book on the cultural history of the kingdom of Jerusalem. I am grateful for Prof. Kedar for kindly sharing his work-in-progress with me.

two parallel processes that bred a 'colonial capitalist' mentality among Frankish settlers, where sugar production and trade played a central role. This, by itself, is a fascinating topic in global economic and cultural history that certainly merits much further research.

Disclosure statement

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