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Royal Land in Ptolemaic Egypt: A Demographic Model

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Abstract: Studies of Ptolemaic agrarian history have focused on the nature of state ownership. Recent work has emphasized the regional differences between the Fayyum, where royal land was prevalent, and Upper Egypt, where private land rights were already established. This study proposes a demographic model that regards communal rights on royal land as an adaptation to risk and links privatization with population pressure. These correlations and their reflection in Demotic and Greek land survey data raise doubts about the common view that patterns of tenure on royal land in the Fayyum can be attributed to more intensive state control over this region than the Nile Valley. Version 2.0 is substantially revised and replaces the earlier version.

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Abstract: Les études relatives à l’histoire agraire de l’Egypte Lagide ont surtout été consacrées à la nature de la propriété étatique. De récents travaux ont mis en évidence les différences régionales entre le Fayoum, où la terre royale était prédominante, et la Haute-Egypte, où la possession de terre à titre privé était plus importante. Cet article propose un modèle démographique qui interprète les droits communaux sur la terre royale comme une stratégie d’adaptation aux risques et met en relation la privatisation de la terre avec la pression démographique. Ces corrélations, attestées dans les documents cadastraux en grec et en démotique, remettent en question le consensus selon lequel l’organisation de la culture de la terre royale dans le Fayoum était soumise à un contrôle étatique plus strict dans cette région que dans la vallée du Nil.

1. INTRODUCTION¹

The Ptolemaic dynasty in Egypt inherited the religious ideology that the pharaoh was the absolute owner of the land. Rostovtzeff’s (1910) influential treatment of Ptolemaic land tenure depicts a despotic state and virtually no private property. Against this view, recent scholarship contends first, that royal control was circumscribed by landholders with established property rights and second, that the cultivators of royal land were relatively free from official control and abuse (Shelton 1976a; Rowlandson 1985; 2003a; Manning 2003a; 2005). The present study contributes to this revision concerning both the limits of royal interference in land tenure and the regional differences between the Fayyum and the Nile Valley. Its central argument is that the early Ptolemaic Fayyum was marked by communal land rights in contrast to private property rights in the Nile Valley and that the economic incentives of peasants in the Fayyum shifted over time from favoring communal to more individual rights as population density increased.

The explanation of the observable differences and changes is deduced from a demographic model of privatization, according to which population growth increases land scarcity, raising its value and the demand for exclusive rights. One should remember that scarcity, as the term is used here, is relative rather than absolute and that any economic resource is scarce inasmuch as it is costly or exhaustible. Resources that are abundant or too costly to measure tend to be open access while scarcer resources tend to become private (Demsetz 1967; 2002).² Within these extremes lie many variations or “bundles” of social relationships and institutional claims with respect to an individual’s property (Hohfeld 1964; Manning 1995; 2003a: 193-7; Stoebeck and Whitman 2000: 1-7). The model suggests that one think about property moving on a continuum between open access and absolute ownership with communal rights as one intermediate category (Libecap 1986: 235; Merrill 2002: 335).

This economic approach to property rights has generated research in both economic history and development economics (e.g. North and Thomas 1973; Hayami and Kirkuchi 1982; Hayami and Ruttan 1985; Haddock and Kiesling 2002). The social relations in

¹ Forthcoming in *JESHO* 50 (2007). I would like to thank Brian Muhs and Olaf Kaper for inviting me to present the original version of this paper in Leiden as well as Luuk de Ligt and Laurens Tacoma for the discussion afterwards. Those who read and commented on recent drafts, especially Christelle Fischer, Joseph Manning, Walter Scheidel, Dorothy Thompson, and two anonymous referees, also deserve my sincerest thanks. Papyrus editions are abbreviated in this article according to Oates et al. (2005), which provides bibliographic information.

² On the significance of measurement costs, which are ignored here for simplicity, see Banner (2002).

which property rights are embedded integrate economic incentives and are not simply determined by cultural beliefs, legal philosophy, or ruler preferences. Economic variables such as food shortages or land scarcity influence social behavior and put stress on traditional institutions and values, leading potentially to changes in property rights. Even in nineteenth-century America, where individualist customs and the notion of private ownership were present, regions such as the Great Plains adopted communal rights to pasture and farmland until population growth made land scarcer and farmers formed associations to manage disputes and to protect their claims from outsiders (Anderson and Hill 1975). Considerable research has focused on sub-Saharan Africa where regions with low population density often developed communal land rights with village elders mediating disputes or redistributing land while regions with higher density developed exclusive property rights both at the level of village norms and formal legal institutions (Platteau 1996; 2003). The privatization of land is part of a broader process of agricultural intensification caused by population growth (Spooner 1972; Grigg 1980; Chao 1986; Platteau 1996; Boserup 2005; cf. O’Conner 1972 for the model applied to ancient Egypt). The theory and the empirical case studies it has generated aim to explain how property rights evolve in complex human societies as disputes over land arise.

Although building on recent work on Ptolemaic land tenure, the model proposed here challenges the still widely held assumption that the prevalence of royal land in the Fayyum reflects more pervasive state control over this region than the Nile Valley. Even the new research on private land rights in Egypt tends to reinforce this regional distinction based on the extent of royal power: “Reclaiming land, rather than seizing it from temples or individuals with preexisting claims, was the path of least resistance... All of this royal activity in and around the Fayyum led to more direct management and a larger amount of royal land under direct authority of the king and leased to the ‘royal farmers’” (Manning 2005: 179). While Rostovtzeff preferred to emphasize the unity of Ptolemaic land tenure, he admits the differences and explains them in similar terms.³ Ptolemaic historians have generally interpreted any signs of privatization, including the development heritable and quasi-transferable rights to the cleruchic estates of soldiers, as symptoms of decline in royal power (Préaux 1939: 463-80; Bingen 1973; 1983; cf. Rathbone 2000: 49-50). The implicit model emphasizes political relations to the exclusion of economic factors in the formation of property rights.

Which factors are more decisive is an important question in light of the debate between the proponents of the economic theory of property rights, whose influence in law and economics is profound, and critics from various social science disciplines who modify or reject its assumptions (Field 1981 with response by Basu et al. 1984; Aston and Philpin 1985; Eggertsson 1990: 249-71; Banner 2002; Levmore 2002). The economic approach offers an alternative to the political explanations that are favored by Ptolemaic historians. It would require a longer treatment to show how the demographic and economic aspects of land tenure relate to the political situation in Ptolemaic Egypt. The demographic model identifies deeper underlying causes that account for regional

³ Rostovtzeff (1910: 29): “Im Neulande Fayum, wo fortwährend seit Jahrhunderten neues Land der Wüste abgerungen wurde, herrschten sicherlich andere Verhältnisse als in der Thebais, dem alten Sitze der Pharaonen- und der Priesterregierung, wo die Ptolemäer in der Gestaltung der Besitzverhältnisse keineswegs ebenso freie Hand gehabt haben wie im Fayum.”

differences based on the available evidence and therefore goes beyond, without necessarily contradicting, the political model of central versus local power.

The next section discusses the ecological context of Egyptian land tenure. Park has compared ancient Egypt with the modern Senegal River Basin and has offered a model of communal property that serves as an ideal-type for the analysis of royal land in the Fayyum in the third section. That section turns to the Ptolemaic evidence, which I argue suggests that royal farmers in the early Ptolemaic Fayyum developed communal institutions for the cultivation of royal land with little interference from the state. An unpublished Demotic land survey from the third century BCE provides new data about royal land in the southern Fayyum village of Tebtunis. The fourth part examines this data in comparison with royal land in nearby Kerkeosiris one century later to identify signs of demographic and institutional change. The fifth part compares the Fayyum with the land-tenure regime in the Nile Valley where royal land was less extensive and private land rights were already well established by the Ptolemaic period. Recent research is used in the sixth part to suggest that the Fayyum was under-populated relative to the Nile Valley, especially in the early Ptolemaic period. The demographic model is consistent with the evidence for both regional differences and historical changes in Ptolemaic land tenure.

2. THE ECOLOGY OF LAND TENURE

Butzer's (1976) classic book, *Early Hydraulic Civilization in Egypt*, demonstrates the importance of demography and ecology for understanding ancient Egyptian civilization. Using a similar approach, Park (1992) evaluates the land-tenure regimes of the ancient Nile Valley and the Senegal River Basin of West Africa in the twentieth century, both of which depended on annual flood-recession agriculture. By comparing the flood levels of the Nile before the Aswan Dam with flood levels on the Senegal before the Manantali Dam, he suggests that both systems were too unpredictable for small independent farms adequately to compensate for risk. Corporate land ownership in the form of communal property illustrates for Park an adaptation to risk in this ecological system (cf. Park 1993). In the Senegal River Basin, communal property was administered by tribal elders. Each year after the flood receded the elders would redistribute the land in response to current conditions. Communal property is nevertheless marked by social inequality as established farmers with greater local influence assert their privileges over newcomers in the distribution of land. Park suggests that landholding by temples and the state in pharaonic Egypt fit well within his ecological model (Park 1992: 105).

Nearly all of the evidence for pre-Ptolemaic land tenure relates to the Nile Valley, especially to Upper Egypt. Land registers from the New Kingdom such as the Wilbour and Harris papyri (Gardiner 1948; Grandet 1994; Warburton 1997: 165-9, 194-216) or the Reinhardt papyrus (Vleeming 1993) from the Third Intermediate period are precursors in the same tradition as the later Greek and Demotic texts discussed below. Based on these early sources, institutional landholding by temples and the king seems extensive, which Park attributes to the risk of individual small plots and the advantages of consolidating scattered areas to create diverse land portfolios. This characterization of the redistributive role of temples and the state accords with the views held by some Egyptologists (Janssen 1979; Lehner 2000: 296-8, 315-8; Eyre 2004: 165-70). However, the dominance of royal and temple estates is an impression based on official accounts,

which reveal little about the terms of tenure for cultivators on these estates or about land outside them. In the New Kingdom land was often conveyed by individuals through sales or inheritance even when certain temples or the king had overarching claims to its revenue (K. Baer 1962; Haring 1998: 82). According to Baer, the price of land was relatively low because land was abundant relative to the population size. Unfortunately, the data from the period needed to test this hypothesis inspire little confidence (K. Baer 1962; Haring 1998: 76-7, 86). The Wilbour papyrus distinguishes two types of land within institutional estates: normal or “non-apportioning” and shared or “apportioning” domains. Royal or temple officials apparently organized and employed agricultural labor for the cultivation of normal domains. However, within shared domains these corporate bodies appear more as the beneficiaries of harvest taxes than as the managers of cultivation and the cultivators more as private owners of their plots than as tenants (Haring 1997: 283-301; 1998: 83-5). Even though the relative importance of institutional cultivation may well have been higher than at other periods in Egyptian history, this evidence suggests that royal and temple landholding in the New Kingdom provides only limited support for Park’s model.

Further problems arise with his comparison between ancient and early modern Egyptian landholding. There is some evidence for annual redistribution in the late eighteenth and early nineteenth centuries in Egypt (G. Baer 1969: 93-7; Eyre 2004: 164-70). The pattern was similar to the Senegal River Basin since Egyptian peasants and village elders responded to the annual inundation by allocating land to those able to cultivate it in that year (Park 1992: 105). Park’s model based on risk-aversion is undoubtedly useful for understanding the economic logic of such practices. However, the selection of ancient and modern evidence creates the impression of an institutionally static environment that is contradicted by significant changes in the landholding system of Egypt over time (Bagnall 1993: 148-53; cf. Bosch 2005: 34, 54). Eyre defends continuity in Egyptian land tenure by regarding individual private estates that were prevalent in Roman Egypt as “management structures” analogous to earlier royal and temple estates and to later communal property in Islamic Egypt (Eyre 1997: 379-80). However, such an interpretation undermines the explanatory power of Park’s distinction between communal and individual rights while underestimating the importance of small and medium-sized private estates in Roman Egypt with less diversified holdings than communal or institutional estates.

Environmental uncertainty that causes communal forms of land tenure to evolve endogenously is by no means limited to regions that rely on flood-recession agriculture (Nugent and Sanchez 1998). However, Park is right to emphasize how flood variability constitutes an underlying factor that distinguishes ancient Egypt from other civilizations. It is sometimes thought that the Fayyum was protected by its irrigation system from the uncertainties of the Nile but the Fayyum also relied on flood-recession agriculture, filling its basins (Grk. περιχώματα) in late summer with the inundation (Crawford 1971: 110-2; Verhoogt 1998b: 107-8; cf. Bagnall 1985: 306). Low floods would leave higher areas without water even when the system functioned properly. Moreover, the failure to maintain canals and dikes, opportunistic diversions of water from downstream farmers, and subtle modifications of the landscape by previous floods would all contribute to uncertainty about whether small individual plots would provide consistent harvests. Hence, environmental risks might favor communal property as much in the Fayyum as in

the Nile Valley, which makes Park's model a useful ideal-type for the analysis of royal land in the next section.

On the other hand, Park's model is inadequate for explaining the regional and historical differences in Egyptian land tenure. It assumes that institutions are determined by constant structural features of the Nile. Park supposes that the hierarchical system of communal property does not change much over time because it has a mechanism in place to deal with population pressure. Surplus population is "sloughed off" into foraging or pastoral occupations until more land is available for their return (Park 1992: 106). Egypt's carrying capacity for semi-nomadic pastoralists would have been severely limited after hyper-arid deserts had enclosed the Nile Valley by about 2500 BCE, making its large population mostly dependent on Nile agriculture (Butzer 1976: 26-7). It seems reasonable to adhere to the demographic model, which suggests that population growth might become a destabilizing influence on land tenure that leads to increasing disputes, whose social costs could be obviated with more secure property rights (Platteau 1996: 34-6). This provides a dynamic variable whose correlation with privatization can in principle be tested by economic historians. The model predicts varying proportions of land under communal arrangements and land conveyed privately both regionally and through time. It retains some of the insights about risk-aversion from Park's communal-property model. However, the uncertainty of the Nile flood remains a constant factor in the both Fayyum and in Nile Valley, which therefore cannot adequately account for either regional differences or for historical change in land tenure.

3. ROYAL LAND IN THE FAYYUM

According to the traditional view, there were three main categories of agricultural land in Ptolemaic Egypt: cleruchic land, which was allotted to soldiers and minor officials, temple land, and royal land. Large gift estates were also awarded by the king to powerful individuals and top-ranking officials. The category of private land was supposedly limited to gardens and orchards (Rostovtzeff 1910: 4-14; Wilcken 1912: 270-87). Cleruchic land receives only a brief discussion at the end of this section. Other categories are addressed in section five, which turns to the new research on the alienability of land and the extent of private land planted with grain crops in the Nile Valley. This section deals with the documentary evidence for royal land in the Fayyum, also known as the Arsinoite nome.⁴ Rostovtzeff (1910: 47-53) argued that the royal farmers who cultivated royal land were the oppressed masses in Egypt, whose land rights were always precarious and tightly controlled by the state. Various aspects of this bleak picture have been modified in more recent studies (Shelton 1976a; 1976b; Rowlandson 1985; 2003a). Some institutions such as the sowing schedule and the loan of seed to royal farmers from the state are no longer thought to be as centrally planned but suggest some manner of dependence and local supervision over planting crops on royal land (Vidal-Naquet 1967; Cuvigny 1985; Mélèze-Modrezejewski 1994; Anagnostou-Canas 2004). There is no doubt that these institutions are relevant for understanding the state's role in the agrarian economy. However, they are not treated further here because the scope is more narrowly limited to land tenure and the extent to which communal and private land

⁴ Nomes are administrative regions in ancient Egypt.

rights can be attributed to an endogenous evolution rather than to centrally implemented policies.

Royal land in the Fayyum was cultivated by peasants called royal farmers whose tenure was perhaps regarded by royal officials as a kind of leasehold and the revenue extracted as the king's rent (Rostovtzeff 1910: 49-53; cf. Habermann and Tenger 2004: 278-81). In other respects, however, the relationship between royal farmers and the king or his officials differs from the relationship between private landowners and tenants. Whereas Rostovtzeff interpreted the institution of "leasing out" (Grk. διαμίσθωσις) as the periodic reallocation of leaseholds to new tenants at prevailing rents by royal officials, it is now recognized that these leaseholds often lasted indefinitely and in practice might even become hereditary as sons took over their fathers' occupation as royal farmers (Shelton 1975; 1976a; 1976b). Individual written contracts of specified, usually one-year duration for royal land were used only in rare and special circumstances (e.g. P.Bürgsch. 1-6; Rowlandson 1985). The royal farmers were represented as a community by village elders with quasi-official duties such as resolving disputes and assisting the village scribe with the survey of land for submission to nome-level officials. San Nicolò suggests that the royal farmers formed legally-constituted professional associations.⁵ Though the status of these associations was probably less formal than he suggests, the evidence he marshals and the well-documented affairs of royal farmers in the Fayyum villages of Kerkeosiris and Oxyrhyncha underscore their communal organization.⁶

While village officials and elders would surely have exercised some control over royal farmers backed up potentially by coercion, the tendency in earlier scholarship has been to stress the chain of command and the responsibility of officials to the king. Tomsin (1952), for example, supposes that, even if the village elders had initially been organized informally for the benefit of the farmers, they became integrated into the administrative hierarchy by the second century BCE (cf. Allam 2002). Other local officials such as the village scribe and the village headman or komarch, who was responsible for mobilizing labor on the dikes, would likewise have to answer to superior officials (Bonneau 1993: 154-74; Verhoogt 1998a: 70-105). However, it should be emphasized that their power would have derived from their local knowledge and ability to mediate between royal interests and those of their own community. It seems fruitful to consider the institutions for the cultivation of royal land at least partly as communal solutions to local problems rather than decisions imposed by the king (Rathbone 2000: 49).

The village scribe and the village elders needed to ensure that as much land as possible was leased out to royal farmers and cultivated. Each tenant was responsible for the rents due on his land, which would contribute to the total assessment on the village. The evidence for the distribution of royal land comes mainly from land surveys drawn up by the village scribes. Even though Greek gradually replaced Demotic Egyptian as the bureaucratic language, the methods used for the land survey and the assessment of royal revenue derive from an Egyptian tradition. Such lists and accounts, especially those

⁵ San Nicolò (1972: I 157-78); cf. the expression "the men of the corporation of the village" (Dem. *n3 rmt.w h tmy*) in the census register, P.Count 2, ll. 146 and 192; Clarysse and Thompson (2006: I 62).

⁶ P.Tebt. I and IV passim; P.Tebt. III passim.

written in Demotic, remain numerous and neglected in papyrus collections worldwide.⁷ Spiegelberg included a photograph and short description of a Demotic papyrus regarded simply as an account in his catalogue of the Cairo Museum published in 1908 (P.Cair. II 31073). It is an early Ptolemaic land survey written by the village scribe of Tebtunis probably in 240 BCE but no later than the end of the third century BCE. A preliminary edition of the text reveals previously obscure facets of tenure on royal land in the Fayyum and forms the basis for the following discussion (Monson 2007).

About eighteen columns survive on the recto and verso as well as seven columns on a separate papyrus. The first three columns of the recto include a summary of the total royal land under cultivation in the village (2,182.69 arouras) and its rent assessment in wheat (12,861.25 artabas) due probably for the year 239 BCE.⁸ This land is sub-divided into various rent categories, whose rates were determined by the type of crop and presumably the quality of the land. The rates suggest that the survey deals only with royal land. The most common rate is about 6.75 artabas of wheat per aroura (charged on 68% of the land), which is higher than in most other surveys where 3-5 artabas is typical for royal land.⁹ These figures are followed by a list of crops with the area of land devoted to each type and ends with the number of farmers (90). In column four begins the survey according to farmer. Each entry is about five lines long and gives the name of the farmer, the size of his farm in the previous and current year, the rates of rent in wheat, the crops planted, and any amounts already paid. On the verso and on a separate papyrus, there are related accounts, including an account in money for fodder crops grown on royal land as well as the badly preserved topographical survey of fields in the village, which gives the farms' dimensions. The separate papyrus mentions thirteen cleruchs, each with an estate of one hundred arouras, and other cleruchs with a smaller-sized estate. The names of some of the hundred-aroura cleruchs, who were probably serving as cavalry-men (Grk. μισθοφόροι ἱππεῖς), are preserved with diagrams of their fields in the topographical survey.¹⁰

The comparison with later Greek texts leaves little doubt that the main text on the recto relates to royal land and royal farmers. One of the distinctive features about Demotic and Greek surveys of royal land from the Ptolemaic period is how farm sizes change annually as plots are redistributed. There are a total of nineteen tenancies preserved on the recto of the Demotic land survey; two of them are partnerships of farmers working the same land. After the name of the farmer, each entry begins with the size of his farm in the previous year. Then there are the additions and deductions of land, for which four possibilities are attested. Land could be received from the village, introduced with the phrase “what is before him among the village men” followed by the amount of land.¹¹ Alternatively, an area of land could be deducted and transferred to the village through these so-called “village men”.¹² Census registers from the early Ptolemaic Fayyum use a similar expression, “the men of the corporation of the village,” which

⁷ Kaplony-Heckel (1994: 191; 1998); those in Green Library at Stanford University are being catalogued in APIS: www.columbia.edu/dlc/apis.

⁸ One aroura was about 2,756 m²; the Ptolemaic artaba was probably 38.78 liters (thus 30 kg of wheat) but other sizes were also in use; Pommerening (2005: 166-73).

⁹ A similar rate of 6.25 artabas is attested in the Herakleopolite nome, BGU XIV 2438.

¹⁰ Part A, inverted verso, cols. 1-3; cf. Clarysse and Thompson (2006: II 93, 148-54).

¹¹ Dem. *nt̄ i-ir-hr=f hn n̄ rmt̄.w-tmy*.

¹² Dem. *r.dl=f (n) n̄ rmt̄.w-tmy*, “what he gave to the village men.”

suggests an association of farmers similar to the one here (P.Count. 2). The other two possibilities recorded in this section of the land survey are that the farmer had obtained additional land from someone else's fields or that he had transferred his own fields to another farmer.¹³ The equivalent phrase in the Greek land surveys from Kerkeosiris is "what is allotted to him from the land formerly of so-and-so."¹⁴ Unlike third-century BCE surveys, the later Greek texts from Kerkeosiris mention only the original holder of any added land and not the recipient of deducted land.¹⁵ In the case of the complete survey of royal farmers for the year 116/115 BCE, it is usually possible to find out what happened to the deducted land by locating the entry where it was added to another farmer.¹⁶ After the additions or deductions in the Demotic land survey, the village scribe calculated the total land for the current year and sub-divided it according to the area charged at different rents and the area of each planted crop as in the Greek land surveys.

There is nothing to suggest that any of the transfers to and from the village were involuntary. The redistribution of royal land seems to have ensured that royal farmers had as much land they were able and willing to cultivate. Unlike recipients of cleruchic or sacred land in the Kerkeosiris land surveys or cleruchs and private landowners in the Herakleopolite texts discussed in section five, royal tenants only cultivate productive land and are not found registered with land that is dry (Grk. χέρσοϛ), flooded (Grk. ἔμβροχοϛ), or salted (Grk. ἄλμυρίς).¹⁷ The reason is probably that farmers could transfer unwanted parts of their land to the village and later receive additional land. In the Tebtunis Demotic text thirteen out of nineteen farmers transferred some land to the village, usually in small amounts. Four of nineteen received land from the village. If nobody wanted the land, it would presumably be turned into common pasture or registered as out of cultivation (Grk. ὑπόλογοϛ). In Kerkeosiris, only two farmers gave land to the village but in both cases the land was unsown and presumably unsuitable for cultivation. Nobody seems to have received any land from the village, though this may be concealed by the relatively sparse Greek formula for additions and deductions. Almost all of the 69.5 arouras held by the royal farmers collectively in Kerkeosiris in 116/115 BCE was used as common pasture (P.Tebt. IV 1103).

The most common method of redistributing land among royal farmers in the Tebtunis land survey was through the private transfers mentioned above. They are also known from the Kerkeosiris land surveys. Shelton (1976a: 152) suggests that such transfers were voluntary and cast doubt on the extent of royal control over land tenure. They would presumably ensure that farmers were not overburdened with land that they could not cultivate effectively or whose rent they could not afford. Variations in the optimal farm size for peasant families may have been linked to fluctuations in the household life cycle, which alters the available labor and the consumption needs according to the age and composition of the household (Gallant 1991: 78-92). The pool of communal lands reassures farmers that if they cede some of their property others will reciprocate and land

¹³ Dem. *nti i-ir-hr=f n n3 3h.w NN*, "what is before him from the fields of so-and-so," and Dem. *r.di=f (n) NN* "what he gave to so-and-so."

¹⁴ Grk. μέ(μερισμένον) ἄπο τῆς (πρότερον) NN, P.Tebt. IV 1103 (116/5).

¹⁵ P.Petrie III 98, a third-century BCE Greek survey of royal land from the north Fayyum, resembles the Demotic land survey showing both additions and deductions from the previous year.

¹⁶ P.Tebt. IV 1103; Shelton (1976a: 118, n. 20) lists each example but those on lines 93, 180, and 227 appear to be mistaken, making a total of 31 rather than 34 transfers, 30 of which have complete data.

¹⁷ P.Petrie III 103 = II 30 might be an exception though the nature of this survey is not fully apparent.

will be available when they need it again. Social networks based on trust might facilitate such transfers within the village or among relatives. There is one private transfer of royal land in the Demotic survey between family members.¹⁸ However, under conditions of population growth and land scarcity, farmers who cede land would find a smaller pool available later, giving them an incentive to hold on to their land even for temporary losses. An alternative available to royal farmers was to sub-lease their plot privately. No such leases actually survive from the Ptolemaic period but they are attested indirectly in other documents and must be distinguished from private transfers (Rowlandson 1985: 334-6; cf. P.Tebt. I 42, III 805).

Only three written examples of transfers of royal land survive. The transaction is called a cession (παραχώρησις). One example comes from the village of Euhemeria, located on the western edge of the Fayyum (P.land. VI 134):

To Peteimouthis, the village scribe of Euhemeria, from Batrachos son of Apollonios: I have ceded (παρακεχώρηκα) 5 arouras of the royal land that is registered to me near the same village to Apollonios son of Harmiysis from year 35 for all time (ἐπὶ τὸν ἅπαντα χρόνον)... [list of the neighboring plots of land] It should be registered over to him, as is appropriate. Farewell. Year 35. Mesore 24.

The document was written on September 1, 83 BCE, just as the flood was at its peak and beginning to recede. At this point the farmers would have a better idea about how much of their land would be productive and how much work they would need to do. The land survey texts were completed later, after the flood had receded and the land was sown with crops. At that time the village scribe was able to record any changes in the size of each farmer's plot from the previous year (Crawford 1971: 24-8; Verhoogt 1998a: 142-8).

The following example was written in the month of January, after the farmer had already invested his labor and expenses (P.Tebt. III 808):

[Beginning lost, then the neighboring plots of land]
I have received from [Ptolemaios] the labor costs (κάτεργον) on the land and the expenses (ἀνηλώματα). I therefore present to you the memorandum in order that you may transfer the 3 arouras to the name of Ptolemaios in the sowing-list of the said year and in the survey according to crops through the usual officials...

As Cuvigny (1985: 52-4) notes, the compensation for the original tenant's investment of labor in the planting suggests that this transaction was made under special circumstances relatively late in the year. Since the third example (PSI XIII 1316) was made in the month of May, it is impossible to judge which of the three times of year was typical for such transfers.

In transfers of royal land there is no indication that the recipient needed to pay the original landholder even if it is conceivable that cessions of property actually concealed an informal or illicit sale of rights. Based on the similarity with cleruchic cessions and especially the duration clause, "for all time" (ἐπὶ τὸν ἅπαντα χρόνον), Youtie (1935:

¹⁸ P.Cair. II 31073, part A, recto col. 6, l. 8.

282) has suggested that cessions of royal land might be evidence for the evolution of private property rights on royal land (cf. Rowlandson 1985: 336-7). In the Roman period, sales of cleruchic land, or katoikic land as it became known, were disguised as cessions.¹⁹ It is worth mentioning here that the Ptolemies used the availability of land in the newly developed Fayyum to award their soldiers and later certain officials with grants of cleruchic land. Though in the third century BCE these were normally reclaimed by the state when one died, they gradually became heritable and even privately transferable to other cleruchic families by means of cession contracts the second century BCE (Crawford 1971: 53-8). As mentioned earlier, Ptolemaic historians have interpreted this *de facto* privatization in relation to the decline of state power (Préaux 1939: 463-80; Bingen 1973; 1983). However, the evolution is also consistent with the demographic model proposed here. In the early Fayyum, land was abundant so grants were large, often one hundred arouras, and it was easier for the state to reclaim and redistribute them. As population grew relative to arable land in the Fayyum, new cleruchic grants became smaller and established cleruchs demanded heritable rights. The adoption of cessions as opposed to sales on royal and cleruchic land suggests the desire to maintain at least the pretense that the land was the communal property of the royal farmers and of the military settlers (κᾰτοικίᾰ) respectively as well as to prevent the liquidation of the group's resources to those outside their community.²⁰ The group identity of Ptolemaic military settlers solidified in the Roman period where they constituted the core of an urban landowning elite (Bowman and Rathbone 1992).

The demographic model suggests that the communal aspects of landholding that were so prevalent in the early Ptolemaic Fayyum diminished as the population grew. By treating royal land as communal property, the royal farmers were able to spread risk and regulate access to land depending on the quality of the flood, as Park's model highlights. There is no reason to think that the cessions mentioned in the third-century Demotic land survey were anything other than what they purport to be, namely, voluntary transfers that made communal property available to other farmers. However, as land became scarcer, one expects that farmers would have been more reluctant to cede it without compensation and would have excluded others more scrupulously by occupation even when they were unable to cultivate it efficiently and would have to bear additional risk or temporary losses in order to ensure access in the future. The formalization of property rights allows compensation to occur openly so that land can be allocated according to its most productive uses and so that exclusion can be enforced by title with less cost than by occupation.

4. COMPARING ROYAL LAND DATA

In the previous section, the evidence was used to show that royal land was treated as the communal property of the village and leased out to individual farmers. This system enabled farmers to discard unwanted land to the village and to accumulate new land when their prospects improved. Royal land, it was argued, also exhibits some of the elements of individualized property rights. The associations of royal farmers were able to manage

¹⁹ See Rupprecht (1994) on the law of cession in Ptolemaic and Roman Egypt.

²⁰ P.Lips. II 124 (137 BCE) for the κᾰτοικίᾰ with collective demands regarding the taxation of cleruchic land; cf. Platteau (1996: 55-60) for peasant resistance to sales of communal property.

disputes and exclude outsiders, which gave the established farmers regular access to individual allotments that they could sub-lease or privately transfer within the community. The land surveys from Tebtunis and Kerkeosiris provide a source of quantitative data for how royal land was used and distributed. The significance of this data is sharply limited by the paucity of comparable evidence from other villages. Papyrologists often avoid quantitative studies and model-building on the grounds that unpublished texts might contradict the results. However, the prospect of falsification should rather be seen as an opportunity to propose and scrutinize comparative models with wider relevance on the basis of documents and accounts that otherwise languish in papyrus collections. Based on the demographic model, some hypotheses are put forth in this section about population pressure and land tenure that might partially explain the differences between these two villages in the Ptolemaic Fayyum.

The most pertinent data for royal land in Tebtunis (240 BCE) and Kerkeosiris (116/115 BCE) based on P.Cair. II 31073 and P.Tebt. IV 1103 are given in Table 1. The introductory summary in the Tebtunis land survey provides useful information about the whole village but for other purposes it is necessary to rely on the sample of nineteen tenancies whose entries survive. The Kerkeosiris evidence for 116/115 BCE includes summary information about the village as well as individual entries. Excluding entries with incomplete data as well as royal land used as pasture (69.5 ar.) or leased to cleruchs (~28 ar.) and temples (20 ar.), there are 103 tenancies in this sample.

	Tebtunis 240 BCE	Kerkeosiris 116/115 BCE
Cultivated Area of Royal Land <i>Sample</i>	2,182.69 ar. 302.88 ar.	1,179.25 ar. 866.89 ar.
Area of Pasture <i>Sample</i>	224.56 ar. (10%) 16.4 ar. (5%)	69.5 ar. (6%) 0 ar. (0%)
Number of Tenancies <i>Sample</i>	90 19	147 103
Mean Farm Size <i>Sample</i>	24.25 ar. 15.94 ar.	8.02 ar. 8.42 ar.
Gini Index <i>Sample</i>	- .310	- .337
Farms with Land Redistributions <i>Sample</i>	- 19 (100%)	- 30 (30%)
Total Area of Redistribution <i>Sample</i>	- ~116.28 ar. (38%)	- ~78.25 ar. (9%)

Table 1: Land Survey Data

There are four hypotheses. First, as the population of royal farmers increases, average farm size *ceteris paribus* should decrease. Aside from the demand for land from outsiders, male children would generally become royal farmers themselves. Increasing the number of royal farmers through changes in fertility, mortality, or immigration would naturally reduce the available pool of royal land for distribution or extend cultivation into marginal areas with diminishing returns to labor. The average farm size in Tebtunis was 24.25 arouras based on the summary or about 16 arouras based on the sample. These data

are comparable to other third-century BCE land surveys where the average farm size on royal land ranges from about 20 to 38 arouras with relatively equal distribution.²¹ In Kerkeosiris, the average farm size was a mere 8 arouras, with most clustered between 8-10 arouras.²² It is estimated that five arouras would have been sufficient for sustaining a household on royal land in the Fayyum (Crawford 1971: 122). As most farms were barely above this limit, many royal farmers sought other income by leasing cleruchic land from soldiers (Shelton 1976a). Obviously, farm size alone is no indication of population pressure because it depends greatly on the allocation institutions, including the role of land grants, markets, inheritance. However, if male children were included in the community of royal farmers, as seems likely, then a positive growth rate coupled with the demand for land from immigrants to the Fayyum or the settlement of soldiers could be expected to make farm sizes decrease and ultimately to drive many royal farmers into private tenancy on cleruchic farms, wage labor, or urban migration.

Second, increasing land scarcity relative to labor (i.e. rising land values) might lead to *de facto* privatization and a more unequal distribution. If access to royal land was partly hereditary or based on local influence, then established farmers and their children would presumably have priority over newcomers and even exclude more vulnerable members of the community whose access to land diminishes as land becomes less abundant (cf. André and Platteau 1998; Bates 2005: 14-7, 27-31). The main statistical tool used to measure inequality is the Gini index. It expresses the degree of concentration of a resource as a decimal between 0 and 1, where 0 equals complete equality and 1 equals complete inequality. Royal land holding in Kerkeosiris was more unequal (.337) than in the Tebtunis sample (.310). Both figures for royal land are low compared with private land based on data for Fayyum villages in the Roman period calculated by Bowman and Bagnall.²³ Bowman (1985: 151-2) cautiously attributes the low Gini index for Kerkeosiris to the Ptolemies' attempt to conciliate the poor after recent civil unrest, implying the seizure and forced redistribution of royal land.²⁴ However, one need not assume centralized planning and intervention to explain why royal land, where property rights were less exclusive, would achieve a more equal distribution than private land distributed through markets and inheritance. Despite the increase of inequality between Tebtunis and Kerkeosiris, the somewhat higher Gini index in one third-century BCE survey of royal land (.406), though still lower than on private land in Roman Egypt, detracts from the hypothesis of any general trend to concentrate royal land from the third to the late second century BCE.²⁵

²¹ Each of the following mean farm sizes are taken from land surveys of one or more villages in the north Fayyum dating to the third century BCE: P.Petrie III 98, based on sizes after deductions from the previous year, 30.23 arouras (n = 5, Gini = .332); P.Petrie III 101, with equal sized farms, 20.25 arouras (n = 5, Gini = .000); P.Petrie III 102, 37.63 arouras (n = 31, Gini = .406). The Gini index here and below was computed using Wessa (2006).

²² See the chart in P.Tebt. IV 1103 intr., for the precise distribution.

²³ Bowman (1985); Bagnall (1992); Schubart (2001); Philadelphia (216 CE) = .516; Karanis (308/9 CE) = .431; Hermopolite nome (c. 350 CE) = .815 but this includes urban landowners only and their holdings over a much larger geographical area so the Gini index is not directly comparable to the village land registers.

²⁴ His calculation of the Gini index for Kerkeosiris (.374) includes both cleruchic and royal land, the latter being more equally distributed.

²⁵ See above, n. 21.

Third, the proportion of land devoted to pastures should decline. Converting pasture to crop use is often a sign of economic distress induced by population pressure (Grigg 1980: 27-8). Pastures sustain the animal population, which intensifies cultivation with less human labor but provides less food for human consumption. As the population grows, labor becomes cheaper and the demand for food greater, causing pasture and animal use to decline. The proportion of land devoted to pastures according to the Tebtunis survey (10%) is nearly double the proportion in Kerkeosiris (6%). The 69.5 arouras of pasture in Kerkeosiris are used by the farmers as common property. Individual farmers devote none of their land to pasture. In Tebtunis, by contrast, nearly all of the nineteen farmers devote some of their own land to pasture, usually about 5% of the farm, the rent for which is at the rate of 3.5 artabas per aroura. Both in Kerkeosiris and Tebtunis farmers devote land to other fodder crops but the disproportionate use of pastures in Tebtunis suggests more animal ownership and intensive cultivation methods. Animal ownership by royal farmers is recorded in other third-century BCE land surveys, where farm sizes are comparable to Tebtunis (e.g. P.Petrie III 101; cf. Clarysse and Thompson 2006: II 206-25). In Kerkeosiris, the investment in animals and the cost of feeding them with pasture land or fodder crops were probably too high for royal farmers since most farms were only slightly larger than necessary for basic subsistence.

Fourth, as land becomes scarce, farmers would be more reluctant to cede their royal land without compensation. Withholding land from the pool of communal property amounts to *de facto* privatization. The royal farmers in third-century BCE Tebtunis show more tendency to transfer their plots than in Kerkeosiris. All of the nineteen farms attested in the Demotic land survey changed their size from the previous year, compared with only 30 of 103 (30%) in the Kerkeosiris sample of farms with complete data. Not only is the frequency higher but the size of the transferred plots and the overall proportion of land redistributed are larger in Tebtunis. Although private cessions between individuals are found in both cases, in Tebtunis they were more common and the Demotic land survey provides the first substantial evidence for transfers to and from the village. As has already been emphasized, a shrinking pool of communal property due to population growth might make voluntary transfers less desirable, causing farmers to retain more land and exclude others by occupation, which in turn only compounds the trend for others to withhold land.

The hypothesis that late Ptolemaic Kerkeosiris suffered from greater demographic pressure than third-century BCE Tebtunis can be tested against estimates of population density based on textual sources. Ancient census data, discussed in the next section, suggest a remarkably low density of about 60 people/km² for the entire Fayyum in the mid-third century BCE, which can be compared with an estimated 129 people/km² in late Ptolemaic Kerkeosiris (Clarysse and Thompson 2006: II 101; Crawford 1971: 124). There is thus an attractive link between population growth and the differences in land use and distribution evident in the survey data. Grigg (1980: 20-8) identifies similar consequences of population growth in pre-modern Europe: smaller and more fragmented farms, rising land values, landlessness, low investment in labor-saving equipment and animals, and decreasing use of pasture and fodder crops. Unfortunately, the evidence presented here is not representative enough to draw firm conclusions about larger trends within the Fayyum. More land survey data need to be published in order to test these hypotheses further. The comparability of Tebtunis and Kerkeosiris for the purpose of

identifying change over time rather than local differences is sure to invite skepticism. However, the villages were of similar size, even if much of the land in Kerkeosiris had fallen out of cultivation by the late second century BCE.²⁶ Moreover, third-century BCE land surveys from the north Fayyum show similar farm sizes and redistributive practices to those in the Demotic survey from Tebtunis. The important question is whether one finds reason to argue that the missing or unpublished data from other Fayyum villages would deviate substantially from these trends. If not, then the changes in tenure on royal land in the Fayyum from the third to second centuries BCE seem to have been more responsive to demographic processes than is usually assumed. If the land-tenure regime in the Fayyum were dictated by royal interests, one would have expected a more continuous pattern than if it developed endogenously.

5. THE FAYYUM AND THE NILE VALLEY

The points raised in the previous sections introduce a number of questions that are easier to address by broadening the inquiry to examine differences between the Fayyum and the Nile Valley. Unfortunately, the Delta must be omitted for lack of evidence and the regional differences within the Nile Valley must be overlooked in the present study. What is distinctive about the Nile Valley and especially Upper Egypt in contrast to the Fayyum is the tradition of private land rights, which is already evident in the New Kingdom sources mentioned above. The main question is whether this development of private land correlates to the demographic factors proposed in the model. The lack of suitable population and land-tenure data from earlier periods prevents a historical analysis of long-term trends. The argument therefore relies on a synchronic regional comparison: in the Nile Valley, where population density was high, private land was more extensive than in the Fayyum, where population density was low.

As explained in the first section, privatization moves on a continuum ranging from open-access to fully exclusive rights. Economic factors such as relative scarcity cause the bundle of property rights to evolve endogenously toward greater specification but the bundle remains embedded in social relations that often fall short of absolute ownership. This approach prompts historians to pay greater attention to the overlapping claims to land in Egypt as well as to conveyance and inheritance practices rather than focus merely on imputed legal categories derived from official terminology, which can only reveal one perspective on property relations (Manning 1995; 2003a: 193-7). Eyre (1997) rightly criticizes the equation of ancient and modern categories of land tenure but needlessly dismisses the heuristic value of theoretical concepts such as property rights, which are essential for meaningful comparison in economic history.

The crucial difference between royal land in the Fayyum and private land in the Nile Valley is that the latter was conveyed by contracts of sale and could be formally inherited (by either sex). The inherited status and occupation of (male) royal farmers in the Fayyum afforded them at best *de facto* succession to their father's land rights but not necessarily to any specific plot. This alienable and heritable private land in the Nile

²⁶ There were 2,182.69 arouras of royal land charged 12,861.25 artabas of wheat in Tebtunis in 240 BCE while in Kerkeosiris in 118/117 BCE there were theoretically 2,427.59 arouras of royal land charged 12,346.67 artabas of wheat but only 1,139.25 arouras could be cultivated and 4,658.08 artabas of wheat collected in royal revenue; see P.Tebt. I p. 558-9, 562.

Valley was not merely devoted to gardens and orchards but used to produce grain and other crops. That includes private land nominally classified as royal land or attached to temples analogous to the shared domains in the Wilbour papyrus of the New Kingdom (Vandorpe forthcoming 2007; Pestman 1969: 148). An indication of both the extent of private land and its institutional differences with royal land in the Fayyum is found in a recently published account from a notary office in Pathyris, which shows the daily registration of sale contracts (Vandorpe 2004). Whereas in the Fayyum royal farmers asserted their rights by occupation and cultivation or transferred them to others, property rights in Upper Egypt could be enforced by law courts based on the possession of written contracts or proof of inheritance verified by witnesses or notary registrations.²⁷ The king and temples often had the right to receive harvest taxes and even to confiscate land when these were not paid but it would be misleading to regard such claimants as owners and the landholders as tenants.

Rostovtzeff and many papyrologists place more emphasis on official terminology found in the papyri than on these social relations. He gives undue weight to the term “grain rent” (σιτικὴ μίσθωσις) for the harvest taxes collected on most arable land in Egypt. He interprets such land as royal property on hereditary lease (Erbpacht) in contrast to private gardens and orchards, which he regards as the only private land.²⁸ Though Rostovtzeff recognized that these hereditary leases were more common in Upper Egypt and differed from royal land in the Fayyum, he and subsequent papyrologists fit them into a general framework based largely on sources from the Fayyum, according to which royal land (cultivated either by royal farmers or on hereditary leases) was distinguished from land “in release”, that is, allotted to soldiers or temples at favorable tax rates in lieu of rent (cf. Shelton 1976b). The idea of hereditary lease is founded on the misinterpretation of land-sale contracts as an exceptional phenomenon. Unfortunately, the term hereditary lease for such land continues to be used in the papyrological literature. The revision of Rostovtzeff’s legal framework for Ptolemaic land tenure has received new impetus from studies based on the Demotic land conveyances (Manning 1998; 2003a; 2005).

The idea of hereditary lease is further undermined by references to grain-producing land as private (ἰδιοκτήτοσ) even in official accounts, a term which earlier scholars thought was reserved for gardens and orchards (Rostovtzeff 1910: 4-14; Wilcken 1912: 270-87). An unpublished land survey in Greek from the Apollonopolite (Edfu) nome corroborates the evidence of land sales and inheritance from Upper Egyptian private archives. The land is divided into three categories – cleruchic land, sacred land, and private land (ἰδιοκτήτοσ) – while royal land is not mentioned. Private land is by far the largest category recorded in the survey, totaling more than 20,000 arouras (P.Haun.inv. 407, 119/118 BCE; Christensen 2002; cf. Rowlandson 2003b: 258). The extensive royal and temple estates mentioned in the Edfu donation text, a hieroglyphic inscription on the wall of the Edfu temple that commemorates land donations to the temple from the king, do not appear in the Greek land survey. This is perhaps partly because the text is

²⁷ For examples of written conveyances of arable land in Greek and Demotic, see Cadell (1994: 300-5) and Manning (2003a: 267-76); for an overview of the legal system, see Manning (2003b).

²⁸ Rostovtzeff (1910: 24-8) based on P.Tebt. I 5, ll. 10ff.; σιτικὴ μίσθωσις may correspond loosely to the Demotic term *šmw*, which is likewise used for rent in private leases as well as for harvest taxes on private land, and to the Greek ἐπιγραφὴ; cf. Vandorpe (2000: 195); Felber (1997: 151-2).

incomplete but most likely because these lands were private despite traditional claims to their revenue from the king and the temples (Meeks 1972; Manning 2003a: 245-66; Vandorpe forthcoming 2007).

A group of Greek land registers from the Herakleopolite nome dating to the late Ptolemaic period provide evidence for both private and royal land. Royal land is attested in several texts, including one survey that reports the changes in each village of the cultivated area since the previous year and the resultant adjustment of royal revenue. Another text mentions 1,042.75 arouras of royal land but it is unclear whether it corresponds to a single village or a wider area (BGU XIV 2438, 2439 l. 8). Most of the registers concern cleruchic land and illustrate both its *de facto* privatization and the frequency with which it was leased to Egyptian peasants (Bingen 1973; 1983; cf. BGU XIV 2435). Two documents give details about other cleruchic land allocated to officials and machimoi (low-ranking soldiers), some sacred land, as well as land classified as private (ἰδιοκτητός). The editor (BGU XIV 2437, 2440) argues that this private land was probably sown with wheat or other crops rather than gardens or vineyards. The land in one of these two registers seems to have been charged both a harvest tax (ranging from 1.6 to 4 artabas per aroura) on the land under cultivation and a land tax in money (150 drachmas per aroura) regardless of cultivation status.²⁹

The harvest taxes on private land are comparable to the rents on royal land in the Fayyum. This undermines one of the key assumptions about greater royal control and fiscal exploitation of the Fayyum. It is often assumed that the king reclaimed the Fayyum in order to convert it into royal land where he could extract higher rents than in the Nile Valley (Rowlandson 1985: 329-30). The unpublished survey of land in the Apollonopolite nome from the late second century BCE shows an average harvest tax on private land (ἰδιοκτητός) of about 5.4 artabas per aroura (Christensen 2002). This is slightly higher than the Herakleopolite rate but similar to the attested rates in other sources, which suggest 4-8 artabas per aroura on private land (Vandorpe 2000: 196; Manning 2003a: 72). The rates are comparable to those on royal land in the Fayyum, which were typically 3-5 artabas per aroura but an even higher rate of 6.75 was most common in Tebtunis in 240 BCE, and these rates were likewise established by the inspection of fields during the land survey. In both cases the rates were probably based on an assessment of the land's productivity. The royal administration may even have regarded the revenue on private land in the Nile Valley as rent (Grk. σιτικὴ μίσθωσις) similar to that charged on royal land in the Fayyum (Vandorpe 2000: 198-91; cf. Habermann and Tenger 2004: 278). Nevertheless, the alienability and heritability of private land stand in sharp contrast to the communal tenure relationships on royal land in the Fayyum.

The high discrepancy between the sizes of private farms in the Herakleopolite land registers and the actual area brought under cultivation highlights one of the dangers of private land rights in Egyptian agriculture. Those who paid land taxes on their entire farm

²⁹ BGU XIV 2437; it seems to have belonged to the category liable for "grain rent" (Grk. σιτικὴ μίσθωσις). BGU XIV 2441, l. 28, and 2447, ll. 12-13, support the hypothesis that land transferred to this category in the Herakleopolite paid land taxes in money (Grk. ἀργυρικοὶ φόροι) in addition to the harvest tax (Grk. ἐπιγροφή); cf. Vandorpe (2000: 197-98), on 198 read BGU XIV 2441 or 2447 rather than 1227.

in addition to or instead of the harvest tax on the cultivated area would especially suffer.³⁰ Royal farmers may have overcome such uncertainties through the redistribution of land by cessions and transfers to and from the village. Only as land becomes scarce do landholders have an incentive to keep their property when others might want it even if it means suffering temporary losses in order to ensure continued access in the future. Increasing population might depress agricultural incomes and create more landless peasants, lowering labor costs and raising rents on private tenancies to the benefit of private landowners. Thus communal property and private ownership might compete with each other as optimal farming strategies in response to the environment. The Herakleopolite nome occupies an intermediate geographical and perhaps also institutional position since its farmers could more easily escape to the neighboring Fayyum.

The only quantitative sources for the proportion of royal land to private land in the Nile Valley come from the Roman period. Though from four different cities and over several centuries, they present a remarkably consistent picture of about 80% private or katoikic land and 20% royal or public land.³¹ Private or katoikic land in the Fayyum constitute usually less than 50% while royal or public land represents the largest area.³² This consistent pattern underscores the differences between the Nile Valley and the Fayyum in the extent of private land and also suggests that they persisted even after the end of the Ptolemaic dynasty. As the next section illustrates, the pattern correlates to the regional disparity in population density according to ancient and modern demographic evidence.

6. THE DEMOGRAPHIC CONTEXT

The relative pressure of population in the Fayyum and the Nile Valley is central to the model presented in this study. This topic has received surprisingly little consideration by previous scholars. Préaux (1939: 492-3) argues for a general depopulation of the countryside in Ptolemaic Egypt. She regards the periodic strikes of royal farmers in the Fayyum as signs of labor scarcity. She also cites a petition from the late Ptolemaic Herakleopolite papyri where the sender claims that the inhabitants have fled his village

³⁰ See the table in BGU XIV, p. 157 and the figures in BGU XIV 2437. The surveys of cleruchic land in Kerkeosiris show a similar pattern of frequent flooding, salting, desertification, and unsown fields on individual estates; in the case of small farms like those of the machimoi bad luck could wipe out the chances of any harvest; Crawford (1971: 148-59).

³¹ Oxyrhynchite nome (SB XVI 12208, Roman period), 81% private and 19% public land, Rowlandson (1996: 63); Naboo in the Apollonopolite Heptakomias nome (P.Giss. 60, 118 CE), 78% private and 22% public land, Rowlandson (1996: 66 n. 124); one district in the Hermopolite nome (P.Ryl. IV 655, early 4th cen. CE), 83% private and 17% public land, Van Minnen (1997: 65 n. 12); Krokodilopolis in the Thinite nome (P.Lond. III 604A, 47 CE), 78% private and 22% public land. Royal land is considered here as public and cleruchic or katoikic land as private except for the private royal land mentioned in P.Giss. 60, which is considered private.

³² Kerkeosiris in the Polemon district (118 BCE), 48% “in release” (mostly cleruchic land) and 52% royal land, Crawford (1971: 103); Theadelphia in the Themistos district (P.Berl.Leih. 5, 158/9 CE), 43% private and 57% public land; several villages in the Herakledes district (P.Bour. 42, 167 CE): Ptolemais Nea, 37% private and 63% public land; Hiera Nesos, 32% private and 62% public land; Karanis (P.Cair.Isid. 11, 308/9 CE), 40% private and 60% public land, Bagnall (1985: 292-3, cf. 291 n. 30 for the 2nd cen. CE). Sacred, prosodic, and imperial estates of the Roman period mentioned in these texts are grouped with public or royal land since they were usually cultivated and taxed similarly.

and he is left alone defending the temple (BGU VI 1835). A similar petition is found in a text from Oxyrhyncha in the southern Fayyum, datable to the late second century BCE, where the royal farmers complain that their number had suddenly fallen from 140 to 40 after recent injustices (P.Tebt. III 803). Such incidents are localized phenomena with no implications for demographic trends. If one wishes to give the argument for depopulation any credence, then the important fact is that the evidence comes from the Fayyum and its immediate vicinity where land was relatively abundant in relation to the population size and the agricultural labor supply.

The reclamation of the Fayyum itself is the first sign of population pressure in the Nile Valley in the early Ptolemaic period. The link between reclamation and overpopulation is both logical and historically well attested (Grigg 1980: 71-3). Bringing new land under cultivation involves an expenditure of resources, the most important of which is labor that must be diverted from other occupations or the cultivation of fields elsewhere. Reclamation under conditions of labor scarcity would not have been feasible and would have lowered rather than increased both aggregate and per capita production. Land scarcity, on the other hand, favors reclamation because landless and poor peasants have low opportunity costs. Manning (2002: 118) plausibly suggests that population pressure in the Nile Valley may have been the underlying cause of the early Ptolemaic reclamation, drawing the relevant parallel with demographic and agricultural expansion in Han China.

The reclamation project undertaken in the Fayyum rapidly expanded the available agricultural land in this region. The Ptolemies probably achieved this by initially stopping the flow of water at the Lahun gap in order to decrease the size of the lake. Butzer (1979: 37-8) estimates that the early Ptolemies tripled the area of cultivation from its pharaonic peak of 450 km² to about 1,300 km². Clarysse and Thompson adopt the figure of 1,500 km² but estimates go as high as 1,600 km² (Rathbone 1990: 110-4; Manning 2002: 107; Clarysse and Thompson 2006: II 90). The king granted large estates to officials and soldiers for development in the Fayyum, leaving the remainder mostly to the villages for royal farmers to lease out and keep under cultivation (Thompson 1998). These projects would have created a huge demand for immigrant labor. Since the settlement of Greek soldiers would not nearly have met this demand, most would have been farmers from the Nile Valley whose origins are reflected in the names of newly established Fayyum villages (Clarysse forthcoming). Various papyri give clues about the inflow of these farmers, including a group from the Herakleopolite nome who corporately managed a large part of the famous Apollonios estate in the northeast Fayyum in the third century BCE (Thompson 1998; PSI IV 422; PCZ I 59118, 59137, II 59292). A Demotic text from the same century is a local report from the southwest Fayyum about hundreds of men arriving and their temporary living conditions (P.Lille dem. 33). Individual incentives for more land and royal incentives for more productivity would converge as the impetus for the foundation of new settlements and the movement of population from the more densely populated Nile Valley to the less densely populated Fayyum (Mueller 2006: 55, 62-3).

The census records from the Fayyum during the third century BCE provide an opportunity to evaluate this assertion with documentary evidence. In their recent study of the Ptolemaic census, Clarysse and Thompson (2006: II 101) estimate a total population for the Fayyum of 85,000-90,000 in the mid-third century BCE and a density of about 60

people/km². Assuming 20,000 km² of arable land, their extrapolation to the whole of Egypt suggests a total population of 1,200,000, far lower than usually thought and lower still if one accepts a smaller figure for arable land (cf. Rathbone 1990: 109-10; Scheidel 2001: 211-2, 221 table 3.5, 223 n. 183). Clarysse and Thompson (2006: II 102) are right to consider the Fayyum unrepresentative of the Egyptian population. Its low population density explains the small size of Krokodilon Polis with apparently just 4,000 inhabitants, which cannot have been typical of other nome capitals in third century BCE (cf. Clarysse and Thompson 2006: II 100).³³ Population densities attested in later Fayyum villages are higher but still too low to be applied to the whole of Egypt.³⁴ Crawford (1971: 124) estimates about 129 people/km² for the village of Kerkeosiris in the late second century BCE. Two villages in the Roman period, Theadelphia and Karanis, produce evidence for a density of about 150 people/km² prior to the Antonine plague (Rathbone 1990: 130-4).

The already improbable notion that data from the Fayyum reflect average population density in Egypt is further undermined by comparison with the nineteenth century. Scheidel (2001: 201-17) reinterprets the modern census data and argues that the population in the early nineteenth century would have been similar to or even smaller than that of Roman Egypt. Based on his calculations of total population and cultivated area, density would have increased from about 300-350 people/km² of arable land in the early nineteenth century, offset briefly by the expansion of cultivation in the middle of the century (Chart 1). Scheidel himself does not use these figures to calculate population density but suggests 300 people/km² as the mean for Roman Egypt, which follows from his estimate of five to seven million inhabitants on 20,000 km² of arable land (Scheidel 2001: 115, 178 n. 137, 223, 246). Clarysse estimates the population of the Apollonopolite nome in the southern Nile Valley during the mid-third century BCE at 70,000 based on revenue from the burial tax, which implies a density of 444 to 511/km² depending on the extent of the arable land (Clarysse 2003: 21 n. 14; Clarysse and Thompson 2006: II 95 n. 20; for the area, Christensen 2002: 111-7; Butzer 1976: 74). While this density may seem high, regional variation is expected and the Apollonopolite nome was mostly likely above the mean. Butzer (1976: 74, 76-80), for example, rates it as the second most densely populated nome in the New Kingdom with about 380 people/km² but his density figures are merely rough inferences drawn from settlement patterns. Even if the estimates for mean density and the density of the Apollonopolite nome represent only orders of magnitude, the contrast with the Fayyum after its reclamation in the Ptolemaic period is remarkable.

Regional differences in population density between the Fayyum and the Nile Valley that are attested in ancient sources mirror those in the late nineteenth-century census data. The total population of the Fayyum province was reckoned at 200,967 in the first modern census of 1882 and 312,157 in the more reliable census of 1897 (Boak 1926: 364). The area of cultivated land in 1882 is estimated at about 1,300 km² (Butzer 1976: 47), lower than what is now assumed for Ptolemaic Egypt. Nevertheless, it indicates population densities of only 155 people/km² in 1882 (comparable to those in ancient Fayyum

³³ The point is underscored by Mueller's (2006: 93-4, 96) unrealistically low estimate of 25,000-75,000 inhabitants for Alexandria in 240 BCE based on its proportion to Krokodilon Polis using the rank-size rule; cf. Scheidel (2004) for discussion of the Alexandrian population during this period.

³⁴ 150 people/km² on 20,000 km² may agree with the population of three million reported by Diodorus Siculus (1.31) but there is no reason to trust his authority for this low figure; Scheidel (2001: 184-6).

villages) and 240 people/km² in 1897.³⁵ These figures contrast with the higher mean density of 400-500 in Egypt overall during the same period as the population was growing rapidly (Chart 1). All of the data discussed here are approximations that must be used with caution and may require further specification. Undercounting in the early Ptolemaic census lists, for example, has hardly been taken into consideration and estimates of arable land in the ancient Fayyum may be too generous. However, the margin of error would have to be enormous for the data not to support the conclusion that the Fayyum was under-populated during the early Ptolemaic period and probably continued to be less dense than the Nile Valley in the late Ptolemaic and Roman periods as in the nineteenth and early twentieth centuries.

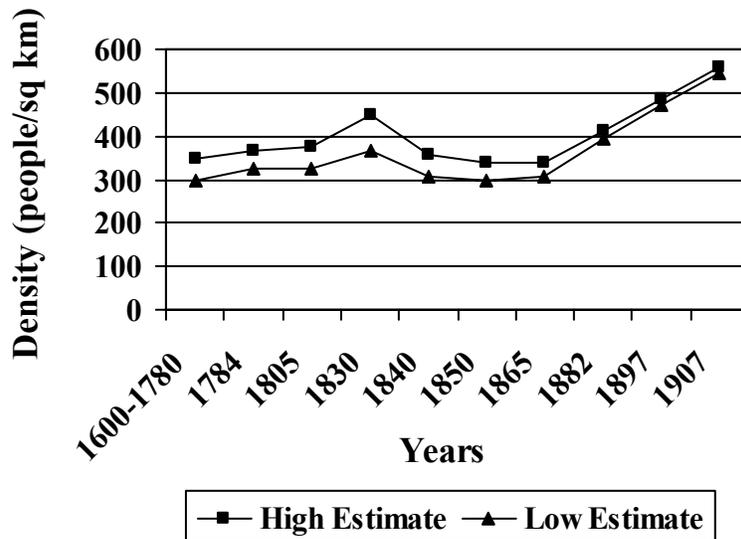


Chart 1: Estimated Population Density in Egypt (after Scheidel 2001: 212, 220-1)

The settlement of the Fayyum in the early Ptolemaic period would have raised population density at first but the region's adverse disease environment might have prevented it from reaching an equilibrium with the Nile Valley. Unlike the Nile Valley, the Fayyum had large areas of standing water. There were artificial irrigation basins, the natural lakes of Moeris and the Ghoran basin, and marshes where papyri grew (Bonneau 1982; Galbrecht 1996). Such an environment constitutes an ideal breeding area for insects carrying malaria and other infectious diseases. Their demographic impact in the Ptolemaic period is not directly known but the high mortality risk of malaria in the Fayyum during recent centuries is well attested and consistent with anecdotal evidence from earlier (Scheidel 2001: 75-91). Population is also limited by per capita productivity, which can be expressed as the agricultural output per unit of labor input. One reason that the Nile could support higher population densities than other pre-modern societies is that its natural basins, inundations, and silt deposits allowed its farmers to expend less energy (Eyre 2004: 160-1). Though the Fayyum likewise enjoyed annual floods, an extensive network of canals and dikes was needed for the flood to reach most areas, which periodically caused severe shortages of water and desiccation of villages that reached their height in the late Roman period (Bagnall 1985). The high harvest taxes on private

³⁵ Cf. Kiser (1944: 386-8) for the Fayyum and the Delta as the least densely populated regions in 1927.

land and reported yields as large as 30 artabas per aroura (compared with the likely rate of 10 artabas per aroura normally) make it conceivable that the Nile Valley was at least in some areas more productive than the Fayyum.³⁶ Differences in labor requirements and productivity might have made farming in the Fayyum persistently less attractive, further offsetting the equilibrium of population density. These considerations call into question the assumption that the Fayyum was populous and highly productive in proportion to its relatively large area of cultivation.

Such demographic constraints may have stopped the Fayyum from reaching and maintaining the limits of cultivation. The struggle to reclaim land and to find cultivators to keep previously reclaimed land productive continued to challenge village officials long after the initial Ptolemaic expansion and into the Roman period when the irrigation system began to deteriorate under the acute shortage of labor. Insofar as land was abundant, farmers had less incentive to demand exclusive rights. The Nile Valley, by contrast, formed a narrow strip of naturally inundated land beyond which the marginal costs of reclamation or artificial irrigation became too high. Extending the irrigation of crops further in response to population pressure would have been prohibited by the environment with the available technology, causing land to become scarcer, agriculture to become more intensive, and those with access to demand more secure property rights.

7. CONCLUSION

Ptolemaic Egypt furnishes a rich case study for the demographic model introduced in section one. Section two emphasized the incentives of communal property and the correlation between population growth and privatization. Park's model is a useful ideal-type for highlighting how corporate ownership and periodic land redistribution can help spread the risk of unpredictable agricultural conditions. He points out that inequalities arise even on communal property, which in the demographic model forms the basis for privatization in response to scarcity. The third and fourth parts showed that royal farmers were able to redistribute land within the community, acting either through village elders or privately transferring plots among themselves. As population increased there was an evolution of communal institutions, increasing the exclusivity of land rights as evident in the survey data from Tebtunis and Kerkeosiris. In section five, royal land in the Fayyum was compared with the developed system of private property in the Nile Valley. The final section highlighted how these institutional differences correspond with the evidence for lower population density in the Fayyum.

Some final comments on the argument and the method are appropriate. Rowlandson's criticism of papyrological historians in the twentieth century points the way toward more engagement with the social sciences in the next generation: "the study of Greco-Roman Egypt remained largely empirical in approach, and little affected by the burgeoning interest in comparative 'peasant studies' and attempts to construct theoretical models of the peasant economy" (2003a: 148). For its immersion in texts and aversion to theory, the

³⁶ Vandorpe (2000: 196 n. 109). The rate of 10 art./ar., which is generally assumed in the papyrological literature, is substantiated by the average annual harvest on state domains in Egypt from 1879 to 1890, which in Ptolemaic measures equals 11.6 art./ar. for wheat, 8.9 art./ar. for barley, and 8.4 art./ar. for beans but then rises substantially in the following decades; figures based on O'Brien (1968: 169); cf. Scheidel (2001: 224-31).

traditional approach is more appropriately characterized as historicism. Rostovtzeff was using an inductive method, drawing mostly on Greek papyri from the Fayyum, to reconstruct the land-tenure regime that the Ptolemies conceived of and implemented. By contrast, this study introduces a deductive model of agrarian change and tests it using papyrological data. Skeptics will continue to maintain that the land-tenure regime of the Fayyum was unique because the king wanted to reserve the land for his army or to increase the royal grain revenue. However, the king's interests in obtaining revenue and land for his army are constants rather than dynamic variables. A causal argument for regional differences or historical change logically requires variables whose presence or absence determine the outcome. It was argued above that there would have been little difference in royal revenue whether harvest taxes were collected on private land or rent on royal land, making this factor constant in determining whether the Fayyum should be cultivated predominantly by private landowners or by communities of royal farmers. Likewise, settling soldiers in the Fayyum depended ultimately on underlying variables such as the scarcity of land in the Nile Valley, its abundance in the Fayyum, and population pressure in the Nile Valley that would provide sufficient agricultural labor without lowering productivity elsewhere. These are variables that potentially account for regional differences.

Other scholars attribute the regional differences to the presence or absence of private and temple landholders whose threatened property rights might prompt them to resist the king's interests. Without denying the relevance of political relations, the demographic model points to more underlying causes. It conceivably explains the ultimate demand for property rights and the source of conflict in the Nile Valley, to which political resistance was only secondary. Recent studies, including Thompson and Clarysse's work showing low population density in the early Ptolemaic Fayyum and Scheidel's reinterpretation of the demographic data from the nineteenth century, challenge many of the prevailing assumptions and invite alternative approaches to Egyptian agrarian history. The Demotic land survey from Tebtunis provides new evidence suggesting that the formation of tenure relationships on royal land had less to do with royal control than with peasant strategies in response to risk. As more papyri are published, particularly the neglected Demotic land surveys and accounts, there will be greater opportunities to test whether the information corresponds to the model proposed here and whether it continues to highlight the deficiencies in the traditional view of Ptolemaic land tenure.

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