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THE ORGANISATION OF INSTITUTIONAL AGRICULTURE IN MARI

BY

FRANS VAN KOPPEN*

Abstract

The archives from the time of Zimri-Lim (1678-1664 BC) found in the palace at Mari allow a reconstruction of the accounting practises associated with institutional agriculture. Both the local relations of production and the political goals of the state are assessed in determining land use. The central government restricted itself to the distribution of a variety of resources to its rural estates and to the organisation of supplementary labourers. The "farmer" (*ikkarum*) managed the basic work unit, plough teams, in order to meet production goals, but his simultaneous contracts with directors of different estates both allowed for his investment (and private gain) and stimulated efficient employment of the palace's resources. This practice provided flexibility for the central government's management of its agricultural estates.

Les archives de l'époque de Zimri-Lim (1678-1664 BC) exhumés dans le palais de Mari permettent une reconstruction de la système de comptabilité de l'agriculture institutionelle. Les moyens de production disponibles et des considérations politiques déterminaient l'emploi des terres. Le gouvernement se bornait à la distribution des ressources et à l'organisation de la main-d'œuvre supplémentaire. Le "cultivateur" (*ikkarum*) dirigeait les unités de base de l'agriculture, les charrues, afin de produire une récolte fixée. Il investissait des ressources privées (et pourait en profiter) et dirigait des charrues dans des domaines agricoles differentes, que permettait un emploi economique de resources du palais. Cette pratique fournissait de la flexibilité dans un régime dirigé de façon centralisée.

Key words: Mari, agriculture, land use, accounting, labour

It is obvious that the regular supply of large quantities of field crops was a prerequisite for the survival of complex social organisations in ancient Mesopotamia, and the kingdom of Mari during the reign of Zimri-Lim (17th century BC) is no exception to this rule.[1] It is therefore not surprising that circumstances

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This article has grown out of a chapter of my MA thesis supervised by K.R. Veenhof and G. van Driel of the University of Leiden. Thanks to the hospitality of D. Charpin and J.-M. Durand I had access to unpublished epigraphic material from Mari for the preparation of this thesis, and I would like to thank them for this opportunity. I also wish to thank G. van Driel and K. Radner for reading a preliminary draft of this article and for their useful suggestions and N. Yoffee for his valuable editorial remarks. Obviously, the responsibility for the views expressed in these pages is entirely my own.

[1] The reign of king Zimri-Lim of Mari concurs with years 18 to 32 of Hammurabi of Babylon, which correspond, according to the new chronology proposed by Gasche et al.

threatening the regular supply and the appropriate counter measures found ample discussion in letters of the responsible subordinates to the king. These sources, in combination with information from a number of administrative texts and the results of a survey of the Middle Euphrates region, provide details that have been used repeatedly to describe the general setting of agriculture in Mari. The important article of Durand (1990) and the recent summary of Lafont (2000) provide important information on the natural environment, soils, and irrigation techniques of Mari agriculture.

The fertile lands of the kingdom of Mari were located along the middle course of the Euphrates and the lower course of one of its contributors, the Habur. Since rainfall and other means of watering, like drainage from wells or wadis, were often insufficient for growing field crops, artificial irrigation with river water was necessary for large-scale agriculture. For this purpose Yahdun-Lim and his predecessors constructed an extensive irrigation system to distribute water over the valley, the maintenance of which is well documented during Zimri-Lim's reign. The fertile lands along the Euphrates are enclosed in a valley carved out of the plateau, and at many places a rigid distinction between agricultural land and the surrounding steppe can be observed. This geographical setup of the central part of the kingdom, along the Euphrates, limited the maximal expansion of the cultivated area to the territory inside the valley, but the availability of sufficient fertile land does not seem to have been a major constraint on agricultural expansion during Zimri-Lim's reign. In the northern part of the kingdom, along the Habur River, precipitation conditions were slightly different. Humidity rises as one travels north, and along the middle course of the Habur marginal cultivation dependent on rainfall must have been possible, but artificial irrigation is also well documented for this area.

1998, to 1678-1664 BC. He ruled fourteen years, but his regnal years 3-14 are still designated as years 1′-12′, a relic from the days when the absolute length of his reign was unknown. Occasionally his predecessors will be mentioned: Samsi-Addu and his co-regent Yasmah-Addu (ca. 1688-1678 BC), Sumu-Yamam (ca. 1690-1688 BC) and Yahdun-Lim (ca. 1705-1690 BC). The lengths of these reigns are not known, and these dates can only serve for general orientation.

There is no recent synthesis on Mari during the Amorite period. The three volume set of letters from Mari in translation by J.-M. Durand (1997, 1998, and 2000), with introductory remarks to all topics covered by the epistolary corpus, provides an accessible introduction. For older text editions of letters (up to volume XVIII of the series *ARMT*) the new translations by J.-M. Durand must be consulted. Unless explicitly stated in footnotes, the present writer follows his reading of the texts.

The measurements mentioned are the surface measure iku, of unknown size (probably more that 3600 square metres, see below) and the capacity measure gur. All references are to the Mari gur of 120 sìla-units, probably less than 120 litres (96 litres or slightly more, see below).

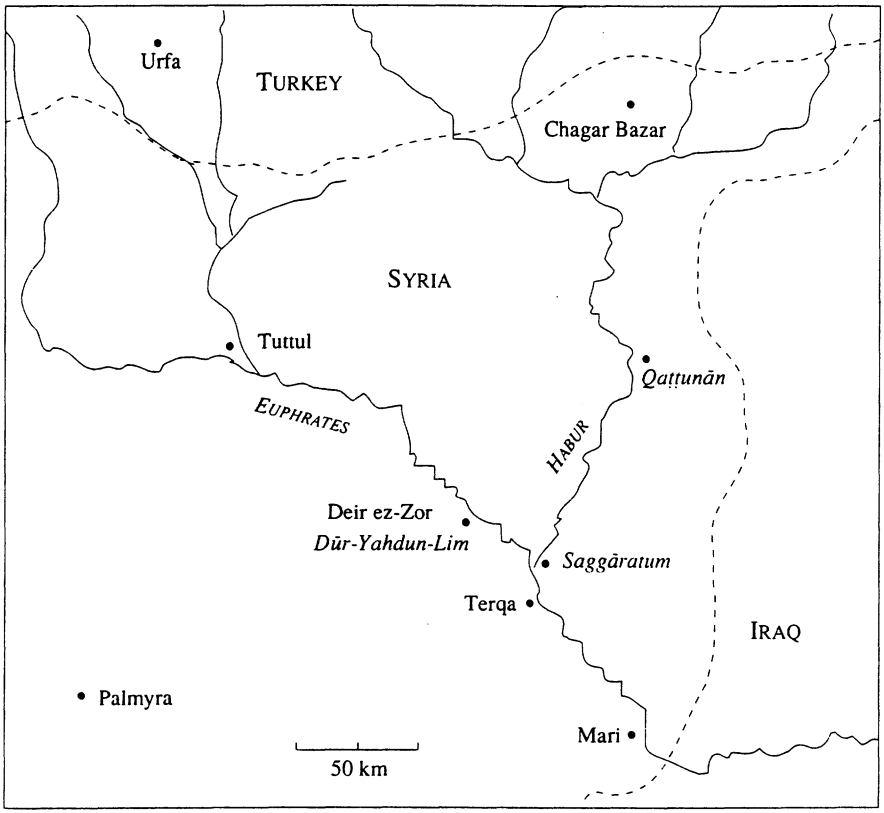

Figure 1: Map of the area of Mari. Place names of uncertain location are given in italics.

The present article aims at furthering our understanding of the organisation of institutional agriculture at Mari during Zimri-Lim's reign. Though the present writer cannot free himself from unarticulated prejudices on the functioning of ancient society (Van De Mieroop 1999: 106-109), this essay is not written along a specific theoretical line of thought, but under the guidance of M. Civil's insight that the positivistic reader of ancient texts might easily miss essential facts, since they were obvious to the ancient writer and reader, and therefore never put in writing (Civil 1980). His dictum has been taken up by M. Van De Mieroop (1997), and this essay will start with some thoughts along similar lines, but restricted to the topic under discussion, by examining the value of the palace archive for the study of Mari agriculture.

THE SOURCES

The functioning of a bureaucratic body, and the circumstances of its termination, affect the quantity and quality of its documentation available for historical research. In the Mari area, the palace archive is the only substantial body of texts available, and what has been found there, and what is not recovered, is conditioned by historical circumstances, which can be specified by means of the following questions. 1) Which tablets were kept in the palace? 2) How did the end of the administration, in this case the Babylonian conquest and the dislocation of part of the archive, affect the available sources? 3) What was recovered during excavations? The answer to the last two questions is relatively simple. It has been shown that the Babylonians were mainly interested in the diplomatic correspondence of Zimri-Lim (Charpin 1995), and probably in literary and technical texts (Durand 1988: 63). Secondly, the palace has been completely excavated, and one can assume that all tablets left inside this building (either in their original depository, in secondary location, or reused as construction filling) have been recovered. But the storage facilities adjoining the palace complex have not been excavated, and these rooms might have housed other administrative archives (Durand 1987: 74-75). In order to answer the first question it is important to stress that the archive of the palace is the archive of the king, containing his legal texts, his correspondence, and administrative texts drafted to record transfers of his property. The extent of documentary coverage of transactions involving institutional resources will be treated below.

The quality of the available textual data is conditioned by the purpose it served for accounting and reporting to higher authorities. Both administrative and epistolary documents were drafted with specific aims in mind, and record only data that was relevant to meet that demand. Administrative texts were registered in order "to justify the activities of an administrator to higher authorities" (Van De Mieroop 1997: 9), and letters of officials were aimed at providing the king with full details of their domain of competence (Durand 1991: 56-65), but simultaneously to sustain the senders' flawless and loyal reputation at the court. Their obligation to provide "complete reports" (*ṭēmum gamrum*) bears particularly on informing the king about details relevant to politics and security, but did not encroach on the static conditions of the domestic economy. This part of an official's responsibility is summarised in the formulaic opening of the letters of most local administrators such as, "the city Terqa (or another district capital) and the district are well," immediately followed by "another matter," introducing the specific events the administrator deemed important to report. What details were revealed, and what was left aside, was motivated by the administrator's tendency to portray himself as obedient, competent, and

energetic, coupled with his inclination to pass all risky decisions to a higher authority.

Administrative texts

The administrative texts from the palace encompass a large variety of different text types drafted to serve an equally wide range of different bureaucratic ends, but the corpus can roughly be divided into two categories. The first consists of records pertaining to activities of different groups of craftsmen and specialists working with various materials and comestibles for the needs of king and court. The second category consists of diverse types of documents relevant to the human and financial resources commanded by the king, for example, surveys of (military) personnel and lists of oaths, and notably the administration of the royal treasury, consisting of receipts and disbursements, and lists of objects, all concerning precious metals. Most texts of the first group date to the first half of the reign of Zimri-Lim, whereas texts belonging to the second group are attested for all years of the reign. It has been proposed that this imbalance can be explained by the absence of the king and his entourage from the palace during the second part of the reign (Durand 1987: 41, 82; Durand 1997: 82).[2] However, since the royal correspondence and the administration of the royal treasury covering the whole length of the reign have been preserved in the palace, and since no explicit reference to a royal move has yet been published, an alternative explanation might be considered. One might envisage that the craftsmen and specialists, for whom the administrative texts of the first category were drafted, kept these records themselves. At certain intervals the palace settled the accounts with these craftsmen and took over their tablets in the process. The last settlements of accounts in Mari would therefore have taken place in the middle of the reign of Zimri-Lim, and the tablets absorbed by the palace administration in this procedure have been recovered during excavation. All administrative texts concerning craftsmen and specialists which were issued after this operation never reached the palace archive, because no further account settlements took place until the interruption of accounting following the Babylonian conquest and the subsequent destruction of the palace.[3] In contrast to this,

[2] This issue has recently been discussed by N. Ziegler (1999: 17-19), who has shown that at least part of the female palace population is attested in the palace during the whole length of the reign.

[3] Note that the text types used to establish the presence of king and court in the palace or their absence from it, namely distribution lists of oil and wool for the female palace inhabitants and the expenditures of food for consumption by king and court, belong to the first category of administrative texts, whose distribution in the archaeological record is conditioned

the incoming correspondence was preserved in the palace, and the book keeping of the royal treasury and other texts of the second category were likewise drafted and kept there; therefore, these sources are attested for all years of the reign.

Most administrative texts found in the palace relate to the control of assets present inside or produced for the royal household, but transactions involving institutional resources located outside the palace building are only patchily documented. This state of affairs is caused by distinct accounting procedures. The structural separation of the book keeping of assets inside the palace from the book keeping of royal assets outside of its walls is clearly illustrated by a letter dating to the period shortly after the conquest of Mari by Samsi-Addu. The new sovereign installs two officials to supervise the institutional resources as a replacement of the old administrators. The first official is ordered to accept as an additional workload the supervision of the "outside" (*kīdum*), which is explained as the fields, plough teams, and grain silos, and the organisation of the periodical settlement of accounts of these government departments. The second official must supervise the "inner city" (*libbi ālim*), which is explained as the storage facilities, administrative quarters, craftsmen, workshops for manual labour, and the workplaces for animal fattening (*ARMT* XXVI/2 300: 8′-19′). The text does not indicate that the second official should also supervise the periodical accounting of this sector of the royal domain.

A similar organisational division underlies the management of institutional resources during Zimri-Lim's reign, and the difference in responsibility for the final accounting between the two sectors explains what types of administrative texts have been recovered. The first category of administrative texts, those concerning craftsmen and specialists, belong to that part of the organisation which the letter refers to as the "inner city," and these texts have been recovered because the palace itself supervised its periodical account settlement. The administration of the "outside" is normally not documented by administrative texts from the palace, because the relevant documents were kept by the responsible executive, or by the official who was in charge of the periodical account settlement of royal property outside of the palace.

Various heads of the exterior section of the palace organisation are attested during Zimri-Lim's reign. Ḫaqba-aḫum (ca. ZL 3′-5′),[4] Yasīm-Sūmû (ca. ZL

by accounting procedures. Their chronological distribution is therefore an insufficient indicator to determine royal presence.

[4] This can be concluded from the letters *ARMT* XIV 81: 33-35, XXVII 25: 19-21; 45: 20-35. The last reference shows that Yasīm-Sūmû was the successor of Ḫaqba-aḫum. Ḫaqba-aḫum subsequently executed diplomatic tasks, see Birot 1993: 146.

5′-11′) (Maul 1997), and Ṣidqi-Epuḫ (ca. ZL 11′-12′) are well attested successive holders of this function, and several others, like Tebi-gerrišu (*ARMT* XXVII 1: 3-6) and Asqudum (*ARMT* XXVI/1 62, 76, XXVII 1: 7-8), executed similar tasks during the early years of the reign. Since high officials often performed various duties and could on occasion represent others, other officials might be documented with similar responsibilities.

The number of administrative texts available for the study of agriculture in Mari is therefore limited, and what is available has been preserved due to specific circumstances. For example, all dated tablets with details about field surfaces and harvest output date to the same month of the same year of Zimri-Lim, and therefore constitute a single group, which was drafted and kept by the palace administrators for reasons which are not articulated in the texts (Lafont 2000: 142). Another incident is the inclusion in the palace archive of texts documenting the inspection of assets in the agricultural estates of Sammêtar by state functionaries. The historical background explaining their presence has been reconstructed (van Koppen in print), and these texts provide valuable details on the plough teams. Though the king delegated supervision of the "outside" sector of the palace economy to the responsible officials, he could occasionally be interested in some specific operation, and his interference can explain the presence of isolated texts in the palace archive.

Letters

Letters provide important details on institutional agriculture. The senders can roughly be divided in two categories: state officials in charge of distribution and supervision of resources on the one hand, and provincial governors and other local administrators on the other. The state officials brought various issues beyond their own problem-solving competence to the attention of the king, and this type of report is preserved in the letters of the royal accountant Yasīm Sūmû (Maul 1997), and in the unpublished correspondence of his successor Ṣidqi-Epuḫ (see for the moment Durand 1998: 514-515, 534), and in letters of various other officials.

The corpus of letters originating from the governors and other administrators of the districts of Mari, Terqa, Saggarātum, and Qaṭṭunān during the reign of Zimri-Lim is large, but the value of this corpus is restricted by the prerequisites of the epistolary genre. Issues concerning local agriculture were normally not discussed in letters to the king, unless problems had emerged and counter measures and instructions from the central authorities were needed. As long as the necessary tasks could be fulfilled with the resources available locally, interference by the king was unwelcome. If reference to agriculture was made at all,

short statements claiming that the work has been executed successfully sufficed. Secondly, letters were only written if oral communication with the king was excluded. Baḫdi-Lim, governor of the district of Mari, had regular access to Zimri-Lim whenever they both resided in Mari. Most of his letters to the king therefore date to periods of temporary absence of the king from Mari, and in these letters he mainly discusses political issues. Baḫdi-Lim supervised institutional farming of the fertile lands of his district (*ARMT* XIII 39: 14′-17′), but the few references to agricultural work in this correspondence appear in the margin of reports on political issues, written when the king was absent from the kingdom and therefore uninformed of the progress of the agricultural cycle.[5] And finally the authors describe the situation at hand in succinct style, leaving out details of labour organisation below the level of the households they represent. They only refer to subordinates if their actions can serve to justify the senders' disobedient behaviour towards the king. For example, in letters of Kibri-Dagan, governor of Terqa, the farmers are only mentioned because their need for more land suits the governor's desire to justify his opposition to the king's intention to abandon palace land (*ARMT* XIII 125), or because their incorrect report explains the governor's negligence in matters of canal maintenance (*ARMT* III 5). Otherwise, his letters are rather poor in details on agricultural work: "I started to harvest the barley of the palace which forms my assignment" (*ARMT* III 32) is the full content of one of his letters, and another letter contains his response to a royal order: "I will prepare draught oxen and will assign good workmen as my lord ordered me, and they will plough as much field as my lord ordered with our own ones (i.e., plough teams)"[6] (*ARMT* III 33).

Maintenance of irrigation channels, however, is repeatedly discussed at great length in letters from the governors of Mari, Terqa and Saggarātum. The repair

[5] *ARMT* VI 37 and 65, and perhaps 47, date to the period of Zimri-Lim's trip to Ugarit during the first half of year 9′. Simultaneously short references to agriculture appear in letters of the governor of Terqa (*ARMT* III 17; probably also III 30) and Saggarātum (*ARMT* XIV 104+).

[6] Reviewers and the *Chicago Assyrian Dictionary* interpreted *i-na ni-i-ia-tim* in line 14 as an independant possessive adjective, which corresponds in gender and number to *epinnātum*, "plough teams"; J.-M. Durand (1988: 179-180) interpreted it as a geographic name, which is otherwise attested as *ni(-i)-ia-tim bu-ur-tim*. This name type seems to be reserved for settlements watered by wells (compare *bu-ug-re-e bu-ur-tim*, a road station on the way from Babylon to Mari, see van Koppen 1997: 421), and it seems surprising that plough teams (as the presence of oxen indicate) from the palace in Terqa would be engaged in cultivating marginal lands outside of the river valley. Furthermore, the context of *ARMT* XXVI/1 41 seems to indicate that Ni'ātum burtum was located to the south of Mari, outside of the administrative area of the governor of Terqa.

of breaches and removal of silt sediments and reed obstructions demanded the mobilisation of large labour forces and close co-operation between the officials who administered the different districts though which the canal flowed. The maintenance of the irrigation system is a prerequisite for large-scale arable farming, as Yaqqim-Addu of Saggaṛātum poignantly indicates: "If the work on that canal will not be executed, the plough teams of the palace will be idle, and the civilian population will starve" (*ARMT* XIV 14), but will not be elaborated in this article, since recent studies of J.-M. Durand (1990; 1998: 578-638) deal with this topic in detail.

One might conclude that abundant epistolary information is only available when abnormal situations occurred. The unemployed plough teams of Dūr-Yaḫdun-Lim are mentioned in no less than three letters of Yasīm-Sūmû (*ARMT* II 125, *FM* II 10-11), and the arrangements for the threshing of the barley harvest of Terqa and Saggarātum are discussed by three different senders (*ARMT* VI 23 of Baḫdi-Lim at Mari, *ARMT* XIV 48 of Yaqqim-Lim at Saggarātum, and *FM* II 10 of Yasīm-Sūmû). The abundant references to agricultural topics in letters of the governors and military officials stationed at Qaṭṭūnān must be explained accordingly. The installation of large-scale institutional agriculture organised in plough teams was a new phenomenon in this area. The administrators increased the surface under cultivation by the palace in the course of years, and the district suffered simultaneously from locust-inflicted devastation, and both processes put pressure on the available workforce. The organisation of additional labourers demanded co-operation with other government officials and therefore detailed reporting to the king, which will be discussed in Appendix 4.

ACCESS TO ARABLE LAND: TYPES OF EXPLOITATION

The thorny question of which forms of access to land coexisted in Mesopotamia has long haunted Assyriological debates, and the issue has not passed unnoticed in Mari studies. Institutional land, alternatively called "land of the palace" or "land of the king,"[7] existed side by side with non-institutional land

[7] For "field of the palace" = "field of the king" see *ARMT* VIII 85+M.10905, Charpin 1997: 344. Nevertheless, there are indications that some land holdings were reserved for the benefit of the king only. Among the suppliers of foodstuffs for king and court, the "houses" of Tukla and Mutu-bisir occur frequently, but they are otherwise unattested in the documentation. The first is often considered a toponym, the second is the house of a high military commander from the period of Samsi-Addu. Furthermore, the house of Tukla is the only source of barley for royal consumption, apart from some deliveries of barley from the houses of high officials, which all coincide with the dissolution of their estates, and constitute the reception of confiscated goods by the king (van Koppen in print). It seems, therefore, likely

holdings, which the texts refer to as "land of the *muškēnum*."[8] For the latter category sale contracts document the existence of individually as well as collectively owned land, and the palace received an agricultural tax called *šibšum* from non-institutional land holdings, but otherwise little information is available on the organisation of non-institutional agriculture.

Institutional land is that part of the available fertile land surface which was considered property of the palace, which means that the king or his delegates decided who was allowed to use it, and under what conditions. The size of the institutional landed property fluctuated, as sale of palace land to individuals (*ARMT* XIII 38: 17-18; Villard 1992: 196 note 9) and redemption of land from foreign occupation by paying silver (during the time of Yahdun-Lim, see Charpin 1992) are attested. Political developments influenced the extent of the institutional domain. A notorious incident of land acquisition by the palace, and its subsequent restoration to its former owner, is the case of the land of the Yaminite rulers. In the wake of military actions against these rulers, who had risen against the sovereignty of Zimri-Lim, their lands were expropriated and cultivated by the palace and state officials, and later released to their original owners as a consequence of the newly established client relationship. Problems surrounding their restitution are documented in several letters, as the institutional authorities were often reluctant to give up these fields. The peasants working there complained to their former lord that the rent due from their fields had doubled since the palace took control (*ARMT* II 61). Yasmaḫ-Addu, ruler of the Yaminite tribe Yariḫu, was informed that the king had released some of his land holdings, and sent his servant there, who upon arrival discovered that he first had to oust the plough teams of the palace from the fields before he could regain control and impose an oath of allegiance on the farmers (*ARMT* II 55). The same Yasmaḫ-Addu presented himself to the governor in Saggarātum and claimed, however without proper authorisation, that the king had given him several land holdings in the area. Since parts of these land holdings were in use

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that the produce of these two land holdings was reserved for royal consumption, and that the king enjoyed exclusive privilege to the fruits of these holdings. The house of Mutu-bisir might be the confiscated estate of a servant of the previous rulers, but the background of the house of Tukla is unknown. It is difficult to explain why some deliveries from the house of Tukla are qualified as *šibšum*, an agricultural tax imposed on non-institutional land (*ARMT* XI 42, XII 104).

[8] The term *muškēnum* is here translated "civilian" for the sake of convenience. In Mari, the term *muškēnum* designates that part of the population that did not belong to an institutional household, though they could perform work or military service for the palace. See Stol 1997 and the literature cited there.

as grazing fields for the oxen of the palace, the governor was reluctant to renounce the use of these lands, and asked the king for further instructions (*FM* II 37). Yasīm-Sūmû warned the king that the palace would loose its investment in preparatory work on sesame fields if they were now released to the Yaminites (*ARMT* XIII 39).

The generally accepted paradigm for the institutional domain is a threefold division of land use: 1) land cultivated by the palace; 2) land given out in exchange for rent; 3) land given out in exchange for service to the crown (van Driel 1998: 34-36; Lafont 2000: 139-140). The distinction between various categories of land use was sometimes blurry. Various regimes of cultivation coexisted in the same area, and a given piece of land could go over from one cultivation regime to another. This point is well illustrated by a passage in a cadastral text, where a certain field is described as follows: "During Samsi-Addu the plough teams cultivated it, but now the civilians have it under cultivation" (Charpin 1992: 32), implying that the plot was formerly directly cultivated by the palace, but afterwards given out on lease to tenants. Subsistence fields and fields under direct cultivation by the institution are situated in the same area, and Asqudum is unable to organise enough land for new plough teams in Terqa because the inhabitants are unwilling to forfeit their rights to use the same land as subsistence fields (*ARMT* XXVI/1 62: 27-36).

The most important factors that determined how land was used were availability of resources on the one hand, and social and political goals of the state on the other. Land without access to the necessary resources to put it under cultivation is of restricted value only, and the amount of available resources for the palace determines how land was put to use.

Direct exploitation

If sufficient resources were available, land was cultivated directly by the institution. Direct exploitation of arable land is best documented in connection with institutional households. Agricultural estates were subordinated to institutional households of various types, like royal palaces in district capitals and other regional centres, and the households of high functionaries and members of the royal family. Part of the labour force of the household performed agricultural work, and this workforce was divided in smaller production units, the plough teams, which cultivated an assigned field surface and were expected to produce a prearranged amount of produce. These plough teams were managed by *ikkarum*-farmers, who were answerable to the household supervisor (either the governor or another administrator, or the high functionary or his majordomo), but who did not belong themselves to the household staff.

Other groups of plough teams operated outside of a household structure, and were headed by high ranking farmers who were directly answerable to the central authorities (and not to a household administrator). The best example is offered by *ARMT* XIII 38, a letter of Yasīm-Sūmû to the king asking for royal arbitration in a conflict between the farmer Sāmum and the landholder Yabînum. Yasīm-Sūmû permitted Sāmum, whose primary land holdings lacked adequate water supply, to take possession of 160 iku of fields in the vicinity of Mišlān for his plough teams,[9] but Yabînum protested and claimed that 20 iku field out of this plot were his private property. Other farmers probably shared Sāmum's position (the farmer Mašum is a likely candidate, see below), but the available sources are insufficient to prove this.

The central authorities, represented by the high-ranking officials overseeing the extra-palatial segment of the royal domain, attributed land assignments to the various productive units. It is often impossible to establish whether the field surface mentioned is the full assignment, or an addition to an existing primary attribution. Several authors have assembled the few available attestations on land assignments per plough team (Birot 1993: 11; Stol 1995: 188-189), but for most attestations, it remains undecided whether the surfaces mentioned are a partial or full assignment for each plough team.[10] One text seems to offer an unequivocal number for primary land assignments. In *ARMT* XXVI/1 76 Enlil-īpuš asks his superior Asqudum where to put the draught animals and farmers under his care to work, since their present land holdings are inaccessible due to enemy activity. He underlines the urgency to employ these teams by stressing that, although Asqudum himself originally assigned 70 iku of field to be ploughed by each team, the king demanded every team to till 100 iku's, implying that every team should meet a corresponding production target. To meet this demand, the teams must urgently assume work elsewhere. Only in the case of the palace of Qaṭṭunān it is possible to perceive a normative field assignment of 150 iku field per plough team (Appendix 4). The number of problematic inci-

[9] Sāmum receives sheep fat for four plough teams (Appendix 1), but the letter does not indicate how many of his plough teams were put to work on these 160 iku.

[10] The term used is *iškarum*, "quota," in agricultural contexts referring to the quantity of land, the quantity of expected work output, or the quantity of expected yield produce. See the following attestations: *ARMT* XIII 37: 5-6 states that for each plough team a surface of 80 iku of sesame field is being harvested, referring primarily to the amount of work per team. *ARMT* XIII 39: 18′-20′ likewise refers to an amount of work performed during a period of time. Yasīm-Sūmû states that each plough team can plough and sow 50 iku of sesame field during the time he is waiting for Zimri-Lim's reply to this letter. In *FM* II 11 four plough teams of Dūr-Yaḫdun-Lim receive 130 iku field, probably as an enlargement of their insufficient primary attribution.

dents concerning land assignments to plough teams reported in letters is small, implying that the quantity of available land normally did not set the limit of what institutional agriculture could achieve. This same lack of reports restricts knowledge about normative land attributions to plough teams, but it is probable that a standard quantity, perhaps similar to the one attested for the Qaṭṭunān plough teams, underlies institutional plough teams elsewhere.

The sources do not permit the identification of absolute numbers for the institutional effort. The palace in Qaṭṭunān cultivated 450 iku field at first, doubled in three years to 900 iku field (Appendix 4). Otherwise only isolated references to large numbers can be given. The letter *FM* II 12 of Yasīm-Sūmû mentions a land surface of 2750 iku of barley fields as the total institutional cultivation in the vicinity of Gūru-Addu in the Mari district during the previous year. The surface under cultivation has apparently doubled since, which would imply a surface of ca. 5000 iku, equalling the efforts of ca. 33 plough teams at an individual surface of 150 iku.

Indirect exploitation and subsistence fields

If insufficient means were available for direct cultivation by the palace, land was given out on lease, either to state officials or to tenants who were not attached to the palace organisation. Renting out fields implied a diminished return for the institution, but allowed the palace to economize on exploitation costs. Renting out of state fields is rarely attested in the sources, since the relevant texts can be expected to be found in the archives of the administrators who acted as lessors.

An administrator in Suḫûm in his letter to Yasmaḫ-Addu classifies the barley income of the institution in the following categories (*ARMT* XXVI/1 265: 20-25):

> The barley of the *šibšum*-tax has been completely collected. The barley of the threshing floors is collected and half of it has been transported.[11] But the transportation of the barley for rations (constituted by) the production obligation of the farmers of the upper district has not yet begun.

Though predating the reign of Zimri-Lim and describing the circumstances in a region south of the central districts of the kingdom of Mari, the text indicates that different production modes typical for Mesopotamian institutional agriculture coexisted in the same place, and similar coexisting modes must have been

[11] Lines 22-23 to be read as *ka-mi-iš i-na za-ba-lim/ma-ši-il* according to the photograph on the microfiche.

in use during Zimri-Lim's reign. First the barley levy imposed on civilians (*šibšum*) is mentioned, secondly the barley that tenants handed over to the field owner on the threshing floor,[12] and finally the barley produced by farmers working directly for the institution. The barley of the last category is described as še-ba, literally "barley ration," implying that the barley produced in this way was subsequently distributed as rations for the workforce of the institution.

Both direct exploitation and leasing out of land provided the palace with produce. An alternative use of land was its assignment to royal servants as remuneration for different forms of service. In addition the user often paid silver or other commodities to the palace. Subsistence fields for soldiers and labourers were assigned to ethnic groups, who also paid silver to the palace for the right to cultivate institutional land. An instructive letter from an administrator in Qaṭṭunān shows that he installed a state official to cash silver from the group, since no member was willing to commit himself to produce the silver they collectively owed the palace (*ARMT* XXVII 107). The size of the parcels varied: the letter from Qaṭṭunān indicates that both in the central part of the kingdom and in the Qaṭṭunān district soldiers held 5 iku and labourers 3 iku. The size of the plots mentioned in the few published examples of administrative lists of subsistence fields varies between 1 to 10 iku per person (*ARMT* IX 283, XXIV 6). The size of such fields reflects the position of the user in the administrative hierarchy, and figures of 50 iku and 60 iku are attested for generals and governors (*ARMT* II 28, XIV 81) and 80 iku for Yasīm-Sūmû himself (Durand 1998: 534).

Usufruct of these holdings was linked to the exercise of an office, and when officials vacated their positions, they gave up their land holdings in favour of their successors. When Yaqqim-Addu was nominated governor of Saggarātum, he faced an argument over his subsistence field with Partum, wife of his predecessor Itūr-Asdû, who had found a powerful spokeswoman in queen Damḫurāṣim, the wife of Zimri-Lim. Yaqqim-Addu's letter of complaint to the king is informative about land tenure conditions in the district of Saggarātum, and deserves a full translation (*ARMT* XIV 81: 17-54).[13]

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[12] Delivery of field rent in produce on the threshing floor is often prescribed in contemporary field lease contracts.

[13] See the new translation and notes in Durand 1998: 537-541 number 752. Some remarks: Line 22: [1 *šu-ši* iku a-šà *ṣa*]-ʳ*bi*ˀ-[*it*]: the number of iku-units is suggested by "like his predecessor" in lines 21-22: the fields are located at different places, but are similar in size. The reading *ṣabit* instead of Durand's *iṣbat* is suggested by the traces in the copy. Line 27 and passim: For *i-na ṭú-bi* see the pertinent remarks by J.-M. Durand. "Rightfully" is adopted here as a convenient translation, though the expression bears the nuance "the way it should be." Line 36: Emend to *a-na i-si-ik-ti*<-*ia*>? But see *ARMT* III 77: 18 and the remark in Durand 1998: 652 note a) to number 834. Lines 45-46: The restoration proposed in Durand

> Sumḫu-rabi exercised the governorship in the district of Saggarātum and held 60 iku field in Bīt-Akkakka. Then Itūr-Asdû was appointed and held like his predecessor 60 iku field in Zibnatum. Now I received 60? iku field, and my lady Dam-ḫurāṣim wrote to me as follows: "Do not come close to my field!" I (answered) as follows: "In the past Sumḫu-rabi was appointed and he rightfully held a field. Then Itūr-Asdû was appointed and he likewise rightfully held a field. But now, (what about) me?" I have compensated her for her servants, her servant girls, and any other loss, and now she writes me this. As my predecessors rightfully received fields, I likewise rightfully want to hold a field! When Aqba-aḫum went to Bīt-Akkakka, he brought the field quota of three plough teams to full strength. Has on that occassion any field been assigned to me? 1400 iku of field are remaining, which the high functionaries and civilians are cultivating. Let my lord now ask his servant Aqba-aḫum whether the governor who preceded me did hold that field. I added gifts (*igisûm*) upon gifts for my lord. Now Partum has even addressed the queen, Dam-ḫurāṣim, my lady, and has spoken inappropriate things about me, and repeatedly refers to me before my lady. It is through her plotting that my lady sent me this letter. But more than my predecessors I act according to her wishes! I write to my lord concerning that field. Let my lord be informed.

Yaqqim-Addu is unable to use his subsistence field, since the order of the queen prohibits any action in that respect. In this eloquent defence of his rights, he explains that Partum is behind the queen's interference, but that Partum does not have the right to call in any claim to this field. Yaqqim-Addu is the rightful successor to her husband in the office, and is therefore entitled to use the accompanying land holdings. Furthermore, he has compensated Partum for all her investments in the field. He additionally stresses that during a recent reassessment of institutional land in Bīt-Akkakka by Ḫaqba-aḫum, the supreme authority of the extra-palatial segment of the royal domain, no fields were assigned to him, even though sufficient land was available, and Ḫaqba-aḫum's opinion will confirm his rights to the disputed field. He has likewise always honoured the king with the gifts appropriate for a palace land beneficiary, and is finally an ever loyal servant of the queen. Having stated his case, he leaves the matter for the king to decide.

Yaqqim-Addu's letter gives us an interesting insight into field attributions at Bīt-Akkakka in the Saggarātum district. The government representative has attributed sufficient land for the three institutional plough teams working there, which will have approached a surface of ca. 450 iku field. The remaining 1400 iku field are under cultivation by civilians and high officials, either as subsistence fields or on lease.

High state officials enjoyed much larger land holdings, and both Sammêtar and Asqudum had large tracts of land at their disposal, which were cultivated

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1998: 539 note 16 is problematic, since *ṣabātum ana ṣēr* PN is not attested in the dictionaries. Probably restore [*a-wa-tam*] at the end of line 46, with *ana ṣēr* as emphatic form for simple *ana*.

in a household set-up. Asqudum is rumoured to have had 1000 iku of field (*ARMT* II 28), and at least 9 plough teams operated on the agricultural estates connected to Sammêtar's households in Terqa and Zurubbān. To this number the unknown number of plough teams at his house in Mari must be added, and the total area under cultivation by these teams could easily approach the round number of 1000 iku field reported for Asqudum (Appendix 2). Such holdings mirror in size and economic importance institutional households like the palace of Qaṭṭunān and its land holdings.

The sources show that the plough teams working on Sammêtar's fields were institutional property, but are not explicit about the ownership of the fields. One might assume that these fields were institutional property, though it is also possible that Sammêtar and his family had strong claims to the ownership or long term use of land holdings, since his pedigree goes back to the old ruling family at the city of Terqa, and landed property must have accompanied this social status. There are no clear links between Sammêtar's functions and his land holdings, since while he was promoted from the post of governor of Terqa to a high position at the court in Mari, he held extensive land in both Terqa and Mari at the end of his life.

In addition to land, the palace occasionally made other resources available for subsistence field holders. Institutional plough teams cultivated the fields of high state officials, and the motives to invest scarce resources in the cultivation of fields of royal subordinates, and the profits to be expected, deserve consideration. The plough teams which cultivated the fields of institutional households handed the net harvest yield over to the palace. Similar plough teams cultivated the fields of the estates of high state officials, but here the officials benefited from their full output. It is unknown whether institutional teams were put to work on all large subsistence fields, or only on the big estates like those of Sammêtar, for which unequivocal proof for their activities is available, but it is clear that the palace devoted a significant amount of its resources to the wealth amassment of the ruling class.

High officials and members of the royal family paid regular revenues to the king. These payments are designated with the words *biltum* and *igisûm* and consist of animals, silver, and textiles, and must be seen in the context of gift presentation to the king; notably the latter term has strong cultic connotations. The content of revenues under both headings often appears in fixed quantities, and the combination one ox, six sheep, one mina of silver, and six pieces of textile, or the double amount of all items, for each taxpayer occur frequently. In some instances links between the activities of a given official and the composition of his revenues can be observed, but most often this is not the case. The taxpayer

generated these revenues through his various economic activities, be it the administration of a district, the collection of local taxes, the sale of surplus produce, or other tasks. Most, if not all, of these taxpayers had institutional land and resources at their disposal, and the produce of these fields contributed to the compilation of their revenues. Users of agricultural estates of the palace likewise delivered food products from their fields to the palace for consumption by king and court.[14] Payments and gifts to the palace accompanied all land holdings, from the modest subsistence fields of soldiers and labourers to the estates of the king's magnates.

It is evident that available resources and political considerations determine who uses what palace field, who performs the work, and who enjoys the yield. With insufficient resources available, surplus land is leased out to tenants who invest the necessary work in return for their harvest share, or issued as subsistence fields to dependants. Subsistence fields are essential to bind the army to the king and maintain the labour force. Likewise, the conveyance of larger tracts of land to officials serves to tie the upper levels of government to the crown. In transferring its personnel and equipment to fields held by officials, the palace relinquishes the output of its resources in favour of magnates whose support to the ruler is vital for the political stability of the kingdom. The size of land holdings of members of the royal family and state officials is a reflection of royal favouritism, but likewise an indication of the price the king is willing to pay for the support of influential persons, who acted as state officials but additionally exercised considerable political influence on their followers. Sammêtar, scion of a ruling family at Terqa, was certainly one of them.

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[14] Ilukān is the official who oversaw receipt and expenditure of foodstuffs in the palace. Many notes for receipt and disbursement of foodstuffs from his administration have been published in *ARMT* IX, XI, and XII, and permit the compilation of a list of suppliers of comestibles to the court. Members of the royal family, high state officials (the category of officials referred to as *awīlū wēdûtum* in contemporary texts), craftsmen, farmers (Appendix 1), and royal estates (house of Mutu-bisir and house of Tukla, see above note 7) appear. The delivered produce are high quality grains like *burrum* (a refined quality of barley, see Krebernik 1993: 53; 2001: 4 note 17; Ziegler 1999: 104-105) and *zīzum kinêtum*, but unprocessed barley appears rarely (see footnote 7 above). The suppliers of the first four categories delivered these comestibles to the king as part of the obligation of a tenant towards the landlord. *ARMT* X 89 permits to deduce that the delivery of foodstuffs was designated as *piqittum*, "provisions," and that the obligation to deliver provisions was coupled with the right to use royal land (the sender explains her failure to provide the king with foodstuffs by referring to her status as a *muškēnum*, implying that she did not have use of institutional fields, see Durand 1991: 21 note 18). The same obligation is amply documented at Sippir, where tenants of *nadītum*-lessors provided their landladies with *piqittum*-provisions.

THE PLOUGH TEAM

Functions

The basic unit of institutional agriculture was the plough team, designated with the term for its main tool, the plough (^{giš}apin, *epinnum*), and used to refer to a complete work team, including labourers, draught animals, and tools. The head of a plough team is the *ikkarum*, translated here as "farmer," and written with the same cuneiform sign (lú-engar and lú-^{giš}apin are attested simultaneously).[15] Various terms for functions in a plough team occur, and most of these terms relate to activities during sowing. Sowing is only one of the tasks performed by a plough (Potts 1997: 84-86), but it was apparently felt to be the most important activity, and the members of the team derive their internal hierarchy from their tasks during the sowing season. In Table 1 the constitution of the plough teams of the estates of Sammêtar is shown, with two additional plough teams from the Terqa region as comparative data. The following functional designations appear in these lists:

– *mukīlum*, the "holder," short for *mukīl epinnim*, "holder of the plough" (*ARMT* I 44).[16] This is the man holding the handles and steering the plough, as often depicted on seals (Wiggermann 2000: 228). Every team has one handle-holder, who was the taskmaster of the team, since he always appears at the head of the enumeration of its members.

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[15] Note the reading of the sign APIN in the following construction:

A) personnel, oxen, etc.
(*ša* 1 or 2 ^{giš}apin)
APIN PN

The first sign of the final line lacks the determinative, and can therefore be read (^{giš})apin, "plough," or (lú-)engar "farmer." M. Stol (1995: 186 and 205 note 78) suggested that APIN, read apin, and ^{giš}apin in these contexts must be translated "plough team." For this meaning only *ARMT* XXIV 13 was available to him. In the unpublished plough team surveys the following expression is attested:

B) personnel, oxen, etc.
ša x ^{giš}apin (*ša* GN)
ugula PN

This formula is the summary of x summaries of type A), and mentions the responsible supervisor of a number of plough teams and farmers. His function is indicated with a designation ugula, "overseer," preceding his name. This suggests that APIN in the final line of formula A must be read engar, and translated as "farmer." For professional designations at the beginning of the line, compare na-gada, "shepherd," preceding personal names in administrative texts from Sippir (Kraus 1984: 375, 377, 382).

[16] See also *mukīl ḫarbi*, "holder of the deep-going plough," in an unpublished text from Sippir (Stol 1995: 192).

– *zārûm*, the "seeder." In every enumeration one seeder follows the handle-holder. His task was to drop the seed corns in the seeder funnel, likewise depicted on seals. His presence shows that the seeder plough was generally used for sowing in Mari.
– *mušaqqûm*, the "irrigator." In most plough teams two *mušaqqûm* are present. They provide additional irrigation to the field, as suggested by M. Birot (1960: 333) and F. Joannès (Bardet et al. 1984: 109), and confirmed by *ARMT* XXII 15, a document from the time of Yahdun-Lim in which "irrigators" (*ša-qú-ú*) are grouped together with "weeders" (*ka-sí-mu*), clearly illustrating that they are occupied with fields, and not with animals, as the translation of the *Chicago Assyrian Dictionary* s.v. *mušaqqû*, "person who gives water to animals," indicates.
– *kullizum*, "ox-driver." All plough teams command three or four ox-drivers. They guide the draught animals during plowing and look after the animals.
– *kāsimum*, "weeder." The number of weeders per plough team varies between zero and five. They prepare the field by removing weeds that obstruct ploughing. A letter from Qaṭṭunān indicates the importance of weeding as preparation to ploughing (*ARMT* XXVII 1).
– *mupaššišum*, "lubricator." Luricators do not appear in every plough team, and their number is always restricted to one workman per team only. His task is the application of animal fats to various tools of the plough team, like the lubrication of the axis of carts[17] and the maintenance of leather parts of the plough.[18] His superior, the farmer, receives sheep fat from the palace authorities for the work.[19]
– *sāmidum*, "groats grinder;" *sāmittum*, "female groats grinder;" *ṭē'ittum*, "female flour miller." These functions designate persons engaged in food preparation.

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[17] For the use of animal fat to grease the axis of wagons, see for example *Chicago Assyrian Dictionary* s.v. *lipû*, where attestations of fat for chariots in Nuzi and fat for wheels in a literary text are quoted.

[18] For leather parts of the plough see the Farmer's Instructions line 20 and the commentary by Civil 1994: 73-74. Leather goods were used to protect draught animals against injuries, see Potts 1997: 84.

[19] The file concerning sheep fat was published in *ARMT* XXI and XXIII and was studied by B. Lafont (Bardet et al. 1984: 303-316). The farmers appear among the various recipients of the expended fat. They receive sheep fat "for the maintenance of carts" (*ana šūresîm ša* ^{giš}mar-gíd-da) and for an unknown purpose (*a-na li-KI-ba-tim* / *a-na li-KI-ba-at* lú-engar-meš). The word *likibatum*, or *liqibatum*, is unattested elsewhere, and B. Lafont (Bardet et al. 1984: 315-316) proposes to identify it as a ritual at the beginning of the new year, based on the dates of its three attestations (two in month xii and one in month i), and on the *inūma*-clause appearing in *ARMT* XXIII 418, an expenditure of sixty minas of sheep fat for *li-KI-ba-tim* to (the farmers of) an irrigated area (a-gàr), "when the king received the tithe." The content of *inūma*-clauses in administrative texts does not always serve to justify the recorded

The two roots indicate two different techniques of grain preparation: grinding of barley into groats to be consumed as porridge, and milling of barley to flour, suitable for baking bread. In general, teams received barley rations, though occasionally provisions of prepared food for plough teams are attested (*ARMT* IX 25). Groats grinders are either male or female, flour millers always female. In the studied sample, there are flour millers present in each plough team, with one single exeption supplemented with groats grinders. Most teams command two labourers for food preparation, but sometimes up to four labourers are attested.

– The lists *ARMT* IX 25 and 26 enumerate a *guzalûm* among the members of a plough team who receives substantially higher rations than the other workers. According to F. Joannès (Bardet et al. 1984: 109), he was the taskmaster of the team, but the evidence concerning other plough teams indicates that the presence of a *guzalûm* is atypical. Furthermore, he does not appear at the head of the list, and his function remains elusive.

Number of labourers

The designation of labourers with different functional terms indicates the work specialisation during the ploughing season, and their differentiation probably reflects differences in their hierarchical position and wages. It seems evident that all workmen also performed unskilled labour, like harvesting, transport, and threshing, during the rest of the agricultural cycle. In many instances, only reference is made to the numerical strength of a plough team, without further details about the labour specialisation of the individual workmen.

The set-up of the plough teams of Sammêtar, of some other estates, and of some of the plough teams of the palace in Terqa is given in Table 2. These figures can serve as a representative sample of the personnel strength of institutional plough teams, and show that the average number lies between 14 and 16 workers. Furthermore, some fixed numbers appear. The plough teams attached to the same household often employ identical numbers of workers. The norm for the personnel strength of the plough teams working at the estates of Sammêtar at Zurubbān and Terqa is 14 workers per team (A). The teams of

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transaction, but often serves, as an elaboration to the date, to indicate the juncture at which the transaction took place. Furthermore, a farmer receives fat for both cart maintenance and *li-KI-ba-tim* in *ARMT* XXIII 415, suggesting that the term does indicate some kind of practical application.

In Chagar Bazar, the authorities handed out pig lard to farmers, likewise for the maintenance of the tools in their plough teams (Talon 1997 no. 10).

Table 1: The composition of plough teams

text	A1				A2					B	C
mukīlum	[1]	1	1	2	[1]	1	1	[1]	1	[1] / [0]	1
zārûm	[1]	1	1	2	[1]	1	1	[1]	1	[0] / [1]	1
mušaqqûm	[o]	2	2	0	[2]	2	2	[2]	2	2	2
kullizum	[o]	3	3	5	4	4	[o]	4	4	4	4
kāsimum	[o]	2	4	0	3	1	[o]	2	[o]	5	3
mupaššišum	[o]	1	[1]	0	0	1	[o]	1	[o]	1	1
sāmidum	[o]	1	0	1	0	0	[o]	0	[o]	0	0
sāmittum	1	0	1	1	1	1	[o]	1	[o]	0	1
ṭē'ittum	1	2	1	2	1	1	[o]	1	[o]	2	2
other	0	1 PN	0	0	0	0	[o]	0	[o]	1 gu-za-lá	0
summary	7 men, 2 women of 1 plough the farmer is Ami-ešuḫ	12 men, 2 women of 1 plough, the farmer is Yanṣibum	12 men, 2 women of 1 plough, the farmer is Abi-Addu	10 men, 3 women of 2 ploughs, the farmer is Yaḫwi-Ašar	11 men, 2 women of 1 plough, the farmer is Ilī-idinnam	10 men, 2 women of 1 plough, the farmer is Zunibala	[. . .]	11 men, 2 women of 1 plough, the farmer is Yamraṣ-El	[. . .]	14 men, 2 women of 1 plough team	12 men, 3 women of 1 plough, plough team of Ilī-mālik
	total 41 men, 9 women of 5 ploughs of the house of Sammêtar of the house at Terqa										

A. plough teams of the estates of Sammêtar at Terqa (A1) and Zurubbān (A2) (van Koppen in print).

B. *ARMT* IX 25 and 26 are a ration list and a personnel list respectively of an unknown household in Terqa, see Table 2 group B. Both lists open with the personnel of one plough team. The beginning of the list is broken. One can restore either 1 *mukīlum*, or 1 *zārûm*.

C. M.7451a+12305+12560 is an unpublished eight-column account of the personnel of 24 plough teams in the Terqa area. The plough team of Ilī-mālik appears in column viii.

Ami-ešuḫ and Yaḫwi-Ašar are understaffed (13 and 11.5 labourers, respectively). This can be explained by the fact that these farmers employed a small number of institutional labourers (smaller than the numbers in Table 2), and hired additional labourers themselves to bring their teams to strength, but not enough to match the round numbers of the teams of their colleagues (Appendix 2). The norm of 14 workers per team is here only valid for those plough teams which are staffed solely with institutional personnel. 16 workers appear in the personnel inventories of two related households in Mari and Terqa (B), and the number of 15 workmen recurs for the plough teams of the palace at Terqa (G). The same number seems to have been the norm for the plough teams of the palace in Qaṭṭunān (*ARMT* XXVII 1: 9-10).

The number of women in the plough teams is limited. In most teams their number is limited to two or three, and they are exclusively attested as groats grinders and flour millers. In the district of Terqa, the percentage of women is higher (G), and women form here 23% or 24% of the total workforce (calculations based on the Zurubbān subtotal and grand total, respectively), but due to damage of the preceding columns of the text it is not possible to say what tasks they performed. The presence of male and female children (tur and munus-tur) is likewise restricted, and the attested percentages for the Terqa area are 5% and 3% (calculated for Zurubbān subtotal and grand total, respectively). The labour output of women and children is smaller than that of adult men, and the exceptionally large number of 19 labourers in the plough team of Iddinum (E) is explained by the large number of women and children in this team. The assignment of personnel to plough teams was the responsibility of officials of the central government, and they were often inclined to reduce the number of workers as a result of the general labour shortage in the institutional households. The administrators of these households were opposed to these reductions, and one of them, the governor of Qaṭṭunān, explains his dissatisfaction with the decisions of the central government in his letter to the king (*ARMT* XXVII 1: 7-19):

> When Asqudum inspected the palace, he assigned 12 workmen for one plough team, but they were not sufficient, since 15 men are barely sufficient for one plough team. There is much weeding work (to be done) in front of the ploughs, and the inspectors established the fact that the weeding work is substantial. Now the inspectors have arrived here (again), and they assigned 10 men for each plough team. How is it possible that 10 men are now sufficient for one plough team, whereas in the past 12 men per plough did not suffice? Is it correct that my lord sets me up with insufficient personnel?

A file of ration lists from an unknown household in the Terqa region covering six years of the reign of Zimri-Lim has been preserved (C), and permits to follow the reduction of agricultural personnel and draught animals attached to

this household. These workers and animals probably constitute one plough team. In year 1′, 19 labourers and 8 oxen belong to this team, reduced to 11 labourers and six oxen in year 5′, subsequently reduced to 10 workers with an unknown number of oxen in the final months of year 5′ and in year 6′. These ration lists cannot answer the question why the work force was reduced. Either the surface under cultivation was reduced, or the workload of the individual workman increased. One notes that the size of the monthly barley rations for most workers decreased simultaneously (Appendix 3). This suggests that the administrators of this household were forced to cultivate its lands with minimal application of its human and nutritious resources. In the early part of Zimri-Lim's reign there was a government policy to reduce the size of agricultural work teams, as the letter of the governor of Qaṭṭunān indicates, and this trend may likewise have affected the resources available at this household. When the number of workers in a plough team was insufficient, it could not deliver its estimated harvest yield. This was the case for the household of Asqudum in Qaṭṭunān, where only three men and four women were available to harvest the sesame fields cultivated by its plough. The governor of Qaṭṭunān managed this household and asked the king for reinforcements of the team in order to meet its expected production norm (*ARMT* XXVII 38: 10′-16′).

Status of agricultural personnel

The social status of semi-free agricultural personnel has often been the subject of debate. It is clear that the receipt of rations does not indicate subordinate status, and that the terminology used cannot be employed for diagnostic purposes. In the ration lists and personnel surveys of two related households in Mari and Terqa (Table 2 group B), and in the ration lists of an unknown household in Terqa (Table 2 group C), the agricultural workers are designated *ālik eqlim*, "those who perform labour on the fields," which is a functional designation to separate the workers on the fields from the workers inside the house. The term recurs for the agricultural workers who receive oil from palace officials (*FM* III 93: 1-3, 95: 6), and here the *ālik eqlim* receive the additional qualification *kinattū*, "menials, persons of servile status attached to a household, doing agricultural and other work under supervision," according to the corresponding entry in the *Chicago Assyrian Dictionary*.[20]

[20] Note that the 833 workers "who perform labour on the fields" (*ālik eqlim*), divided in 13 teams of ca. 32 workers each, are designated as "slaves" (sag-ìr) in the large personnel register A.3562 dating to Sumu-Yamam's reign (Talon 1983: 50).

Table 2: Number of workers per plough team

	location	farmer	number of ploughs	male adults	female adults	boys	girls	total per plough
A	Terqa	Ami-ešuḫ	1	11	2	0	0	13
		Yanṣibum	1	12	2	0	0	14
		Abi-Addu	1	12	2	0	0	14
		Yaḫwi-Ašar	2	20	3	0	0	11.5
	Zurubbān	Ili-iddinam	1	12	2	0	0	14
		Zunibala	1	12	2	0	0	14
		Yamraṣ-El	1	12	2	0	0	14
B	Mari	not stated	(2)	31	1	0	0	16
	Terqa	not stated	1	14	2	0	0	16
C	Terqa	not stated	1	17>9	2>1	0	0	19>10
D	unknown	not stated	1	12+x	1	1	0	14+x
E	unknown	Iddinum	1	12	4	1	2	19
		Altiš-qallu	1	12	3	0	0	15
F	unknown	Yamlikum	1	11	2	0	1	14
		subtotal	4	50	9	1	3	15.8
		[. . .]	1	11	2	1	1	15
G	Zurubbān	Rabiu	1	12	3	0	0	15
		Ili-mālik	1	12	3	0	0	15
		subtotal	8	100	25	1	5	16.4
	Terqa district	total	24	263	78	6	7	14.8

A. For the farmers at Terqa, the original number of workers, including hired additional workers, is given. For the farmers at Zurrubān, the total number of workers, including those missing at the moment of inspection, is given. See Table 5 and 4 in Appendix 2, respectively.

B. In room 5 of the palace, two tablets concerning a "house" in Mari (*ARMT* IX 24, 27) and two concerning a "house" in Terqa (*ARMT* IX 25, 26) have been found, with a ration list and a survey of personnel for each house. The "house" in Mari was the estate of an anonymous high official (but see Ziegler 1999: 20), who appears as the "master" (*awīlum*) together with his wife Rubatum in the ration list. The owner of the "house" of Terqa is unknown. Three ladies, some of whom are known from other texts (Ziegler 1999: 14), head the female textile workers of this house. The plough teams at both houses have the same number of workmen, and this argument, together with the fact that all four texts are dated to the same month of the same year and have been found together, underlines the link between these two houses. These texts were drafted, or taken to the palace, on the same occasion, probably the inspection of these estates, perhaps after the death of the "master."

Table 2 (*Cont.*)

C. A file of ration lists and other texts concerning an unidentified household have been published in *ARMT* XXIII and XXIV (F. Joannès in: Bardet et al. 1984: 105-118). The number of workers of the plough team decreases during the documented period, indicated with an arrow > (for details see Appendix 3).
D. *ARMT* XXIV 247 is a fragmentary personnel survey of a household (date broken).
E. M.5579+12721 is an eight-column tablet containing a personnel inventory of a household (date broken). Two plough teams are listed in the preserved part of column vii.
F. M.12422+12500 is a six-column tablet (date broken). The preserved part of column iv contains the personnel inventory of the plough team of Yamlikum, which is the last of a group of four teams, the summary of these four plough teams (headed by Mašum), and the inventory of the first following plough team. The name of the farmer heading this last team is broken.
G. M.7451a+12305+12560 is an eight-column tablet with an inventory of 24 plough teams of the Terqa district (date broken). Column viii contains the personnel inventory of the final two plough teams of the Zurubbān section, the total of the Zurubbān section (headed by Dagan-ašraya), and the grand total of the Terqa district.

The labourers whom the government provided to the agricultural domains and plough teams belonged to a category of unfree workmen, whom the palace considered as part of its assets. The farmers of the house of Sammêtar in Zurubbān are obliged to reimburse the institution for persons who were absent from their teams at the moment of inspection of the house (Appendix 2). Their absence might be due to flight or death, and results in a financial obligation of their superior towards the government. Reimbursement of the institution by officials for missing personnel under their responsibility is well attested at Mari and elsewhere (van Koppen 2001: 216-217). Unfree menial labourers were drawn from a variety of social backgrounds, and their number was increased by various processes, like taking prisoners of war, insolvency of debtors, and conviction of criminals, but was constantly below the desired level, and both the king and his generals strived to supply the palace with new influx while campaigning.[21] Two farmers employed prisoners of war in their work teams, and they were subsequently freed against ransom (P. Villard in Bardet et al. 1984: 492-493). Notwithstanding this example, it seems likely that most prisoners of war and other forced labourers were put to work in closed workshops, where their freedom of movement could be efficiently restricted. Several instances of escaping workers by tunnelling through mud brick walls (*ARMT* X 150) or scaling enclosure walls (*FM* II 1 and 2)[22] are recorded, and bear witness to the coercive measurements necessary to control them.

[21] See *ARMT* X 140 for the situation at the beginning at Zimri-Lim's reign, and *ARMT* XXVI/2 408 testifies that about a decade later the intention to refurbish the palace workshops with prisoners was still valid.

[22] These two letters treat the same incident, and demonstrate the fluidity of terminology for categories of labourers. Yar'ip-Dagan describes the two refugees as 2 lú-m[eš *we-d*]*e-nu*,

Employment of forced labour in agriculture was far more difficult to control, since fieldwork offered ample opportunity to escape. It seems therefore likely that unfree agricultural labourers were people from the region, who because of unpaid debts or other obligations were subjected to the authority of the palace. J.-M. Durand (2000: 198-199) underlines in his commentary to *ARMT* VI 40 a major social distinction in Mari: free civilians liable to military and other service were distinct from the dependent workforce of the palace, who were not obliged to do temporary service, but worked all year round for the institution. Both categories lived together in villages with their families (van Driel 2001). The set of ration texts from Terqa (Appendix 3) proves that they were employed all year round. They received wages, and obviously cared for their own field or animals on the side. The fact that a handle-holder (*mukīlum*), one of the functions in a plough team, who is explicitly designated as "palace slave" (*warad ekallim*), was caught with the wife of a merchant by the betrayed husband (Durand 1988: 524), testifies to their freedom of movement. The letter *ARMT* XIV 54 of the governor of Saggarātum to Zimri-Lim offers another glance at the living conditions of the dependent workers. The king has ordered the governor to question a certain Kaspu-Ištar, a workman under the authority of a subordinate of the governor,[23] because the king suspects Kaspu-Ištar of hiding one of his sons who has escaped from service in Mari. Kaspu-Ištar answers during questioning that both his sons are doing their duties: one has been assigned to the plough teams of Dēr, while another is with Ḫaya-Sūmû, king of Ilān-ṣurā, probably serving as a soldier. He simply has no other son who might have taken shelter with him. Both Kaspu-Ištar and his two sons form part of the permanent workforce of the palace, but have ended up in different places serving in various positions.

Farmers employed hired labour in addition to the personnel the palace assigned to them for their task. The inspectors of the plough teams working at the household of Sammêtar at Terqa separate institutional labourers from additional labourers and an inspection text indicates that this supplementary labour

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"isolated men," i.e. workers without fixed assignment, otherwise often written lú-didli, whereas Yasīm-Sūmû and Manatān describe them with the broader term "palace slaves" (sag-ìr-meš *ša* é-gal-*lim*). The same category of unfree institutional workers is otherwise referred to as *kinattū*, discussed above, and also as *ṣābum* (*ARMT* VI 39), "troops," a term in use for all categories of workforce or military, whether drafted, hired, or employed full time.

[23] Contra Durand 1998: 656 note b) to number 838, there seems to be no reason to question the identification of Būr-Nunu in this letter with the steward (*abarakkum*) and subordinate of governor Yaqqim-Addu (*ARMT* XIV 42 and 56), who was at least temporarily stationed in Dūr-Yaḫdun-Lim (*ARMT* XXIV 35, *bur-*^{d}*nu*$^{!}$*-nu*$^{!}$ of Dūr-Yaḫdun-Lim parallel to Sîn-mušallim of Saggarātum in year 12').

originates from two different sources (Appendix 2). Firstly, the farmers employ workers from other institutional households, who they provide with rations and for whom they probably also compensate their original employers, but secondly they also hire labourers for whom no provenance is indicated. These hired labourers must be unaffiliated free men, who offer their labour in exchange for wages.

Draught animals and tools

The only draught animals mentioned in the texts are oxen and cows. Only fully grown animals that have been trained appropriately are employed, and these animals are often qualified as "plough oxen."[24] One or two animals are sufficient to draw the plough, as is indicated by graphic depictions (Wiggermann 2000: 228), and the individual pulling force of each animal decreases when more animals are tied to the yoke. Employing more than two animals is only efficient if the density of the soil, or the intended depth of the furrow, compels their use (Potts 1997: 83-84). Mesopotamian plough teams therefore often have a large number of draught animals at their disposal (Stol 1995: 189-191), though the maximum number of animals employed simultaneously was probably four, and Akkadian and Sumerian designations for the first up to the fourth animal are known (Potts 1997: 83, Stol 1995: 190-191). Draught animals were also employed for pulling transport carts and threshing the crop plants to release the grains. Most institutional plough teams in Mari command seven oxen,[25] and eight oxen are also frequently attested.[26] Smaller numbers are rare, the only examples are the plough teams of Yaḫwi-Ašar, farmer of Sammêtar's estate at

[24] gu_4 *ērišūtum* in *ARMT* III 33: 9, XXIII 505: 6, XXV 620: 10; gu_4 *ērišū* in M.11598 and at Chagar Bazar (van Koppen 1999-2000: 338a text category B.3).

[25] Attestations: *ARMT* XXIV 44, inventory of the oxen and donkeys of the house of Šamaš-nāṣir, major-domo of the palace of Terqa, established after his death (see likewise *ARMT* IX 287). Among the oxen, seven are qualified "for ploughing" (*ana erēšim*), which probably indicates, that they constitute the animals of one plough team; seven oxen for the plough team of the farmer Ami-ešuḫ of Sammêtar's estate at Terqa (Appendix 2); the unpublished texts M.11598 (three teams) and M.12368 (more than eight teams) list the animals of various institutional plough teams, and attribute in every instance seven oxen to each plough team. M.12368 contains additional data on the age of the animals, and in this text every plough has six full grown oxen, simply designated as gu_4, plus one younger animal, either a three, two, or one year old ox (gu_4 mu-3, gu_4 mu-2, gu_4 mu-1). The plough teams inventorized in this text recur in M.12422+12500, a text in which their human resources are listed (see table 2 group F).

[26] Attestations: eight oxen for the plough teams of the farmers Yanṣibum and Abī-Addu of Sammêtar's estate at Terqa (Appendix 2); eight oxen for the plough team of Iddinum as described in M.5579+12721 column vii, see table 2 group E.

Terqa (Appendix 2), and of the household studied by F. Joannès, where the original set of eight oxen is reduced to six, and was probably subjected to further downscaling afterwards (Appendix 3). Two farmers of Sammêtar have each one cow in their plough teams. In one instance a larger number of oxen is attested: the farmer Altiš-qallu employs no less than 11 plough oxen in his team.[27]

Little information is available about the tools used for agriculture. Isolated instances of carpenters specialized in fabrication or repair of the plough are known,[28] and leather workers were involved as well, but their products do not appear in the inventories of agricultural personnel and material. Different types of ploughs existed, such as the simple plough used for preparatory ploughing (the so-called ard), and the seeder plough used for sowing (Potts 1997: 73-80), but their value was too little to merit the administrator's attention. Only carts and metal digging-tools used by the plough teams of the estates of Sammêtar are recorded in the inspection texts (Appendix 2). The smiths of the palace produced bronze and copper sickles with a standard weight of 15 shekels (ca. 120 grams) (*ARMT* XXII 193, 194, 201, 216, 229; XXV 320, 562), which were distributed to agricultural domains (*ARMT* XXV 320, receipt of sickles by the administrators of the plough teams of Zurubbān and the palace of Qaṭṭunān).

THE FARMER

The central figure in Mari agriculture is the "farmer" (*ikkarum*), who is responsible for deploying the institution's personnel and draught animals in the plough teams he manages. In order to establish his function inside the system, the available data is presented in Appendices 1 and 2. This data and the preceding discussion can be used to construct the following picture of the role of the *ikkarum*-farmer in Mari agriculture.

1) He is not a dependant menial worker, because in contrast to his personnel he does not appear in personnel inventories and ration lists. He therefore does not belong to the workforce of any institutional household. In Chagar Bazar, some years preceding the reign of Zimri-Lim, the situation was different, and here farmers and their families receive barley rations from the institution (Talon 1997 nos. 66 and 70).

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[27] In M.5579+12721 column vii, see Table 2 group E.

[28] "Sakra-Haddu, the carpenter, who produces seeder ploughs and *mašqartum*-implements," Charpin 1992: 30-32: ii 4-6. See also the inclusion of carpenters (lú-nagar) among the workforce of the plough teams of the Zurubbān-subdivision in M.7451a+12305+12560 viii: 27 and 29 (table 2 group G).

2) He is not the leader of the workforce of a plough who participates in the work, since the "handle-holder" fulfilled this role. The farmer manages one or more plough teams, and is responsible for their output. His plough teams could be active in different agricultural estates. Zunibala had one plough team working at the estate of the household of Sammêtar in Zurubbān, and another in Sammêtar's estate in Mari. Ilī-idinnam had one plough team in Sammêtar's estate in Zurubban, but receives sheep fat for three teams. Sîn-rēmēnī receives fat for five plough teams, and Mašum for eight, which is the maximum number so far attested.

3) There are hierarchical differences between persons with the common designation "farmer." Mašum, for example, is attested as a farmer at Dēr, but appears in plough team inventories as the head (ugula) of four plough teams, each with their own farmer (Table 2 group F; for the construction see footnote 15 above). It was discussed above that most farmers operated within the structure of an institutional household, but that the farmer Sāmum represents a type of high-ranking farmer who managed field exploitation in direct subordination to the central authorities.

4) During the time of Samsi-Addu, new farmers are selected from the ranks of the dependent workforce of the palace. In *ARMT* I 44, Samsi-Addu instructs his son to send him five of his farmers for the increased number of ploughs in Ekallatum, and to substitute these farmers with members of the menial staff of his palace (*awīlūtum*, "workforce"). One other instance of social mobility is attested: the farmer Sîn-rēmēnī is promoted to the function of major-domo of the palace in Terqa. The farmers during Zimri-Lim's reign proclaim their subordination to the king in their seal legends: "servant of Zimri-Lim" (Appendix 1 *sub* Ilī-idinnam, Yantin-Eraḫ, and Yar'ip-Dagan). Furthermore, the loyalty of some of these farmers is verified by means of divination (Appendix 1 *sub* Altiš-qallu, Ana-Dagan-taklāku, Sāmum, and Sîn-rēmēnī). They participate in gift exchange between ruler and subordinates (Appendix 1 attestation category C), and deliver comestibles for royal consumption (Appendix 1 attestation cate-gory A). Occasionally, farmers perform other administrative tasks (for example, Mutu-Dagan collects *šibšum*-tax from non-institutional lands).

The *ikkarum*-farmer in the period of Zimri-Lim is an intermediary between the head of a household and the agricultural workforce. He is responsible for the exploitation of the agricultural estate of the household with the help of the resources of the household at his disposal (personnel and animals) to meet a prearranged production goal of field crops, and is accountable for this task to the head of the household. *ARMT* XXIV 5 is the sole surviving example of an administrative text illustrating the financial relation between the farmer and the head of the household (actually, a state official replacing the household's head),

and shows that the farmers of Sammêtar's estate in Zurubbān were obliged to produce a pre-calculated amount of produce (Appendix 2). Their recompense lies in the margin by which the actual production would normally exceed this pre-calculated sum. Extra investment and higher productivity increased their profit, and because of this, the institutional farmers of Mari can be defined as tenants, and not as sharecroppers, under whose lease arrangement, with proportional division of the yield, extra investment would foremost benefit the landowner. By setting a negotiated absolute production goal for the farmers, the household's head left all further initiative to the management skills of the farmer.

When the harvest failed or too little labour and land were available to meet the production goal, pre-calculated production quota constituted a financial risk for the farmers. The farmers in *ARMT* XXIV 5 produced a negative balance, and the outstanding sum formed a personal liability to be reimbursed in the future. Several letters mention the debts of farmers. The letter *ARMT* XXVI/1 265 from the reign of Yasmaḫ-Addu was already mentioned above, and the sender states that "the year was hard and the farmer have incurred deficits. When my lord will come, he will hear (the matter of) their production obligations." The letter *FM* II 11 of Yasīm-Sūmû is richer in detail and deals with four plough teams of the palace in Dūr-Yaḫdun-Lim. The palace imposed fixed production goals (400 gur of barley for each plough team in the previous year), while the field attributions of the teams were insufficient to realise this yield.[29] The farmers revolted and threatened to loot the goods of their superior, Nabû-nāṣir, to pay their debts, and Nabû-nāṣir pleaded to Yasīm-Sūmû for additional field assignments for these teams. Remission of delivery deficits due from state contractors was included in redress decrees issued by the kings of Babylon (Kraus 1984), and similar measures were probably also required in Mari to keep the system functioning, but are so far not attested.[30]

The means available for each household, and each plough team in its employ, to reach the set production goal were assigned by government officials, who were, in view of the nation-wide demands for the same resources, eager to cut down on investments. A structural tension between the local demand of agricultural means of production and the centrally directed supply was therefore unavoidable. The head of the household bargained with the central authorities to increase their investment in the household, but resources often proved

[29] The "tablets of the oxen" in line 10 of *FM* II 11 can be read (in accordance with the copy): dub-*pa-at* gú-hi-a, *tuppāt bilātim*, "tablets (containing) production obligations."

[30] The known attestations for royal redress decrees in Mari (Charpin 1990) only refer to the restitution of private property and release of debt slaves.

insufficient. Here the unattached position of the farmer filled a structural niche inherent in the system. Since farmers were not incorporated in a single household, but often managed multiple plough teams employed in different estates, they were in the position to shift resources horizontally from one estate to the other as specific needs dictated. Furthermore, some farmers were men of independent means who were in the position to invest their private funds in the exploitation of institutional land, as exemplified by Ami-ešuḫ in Sammêtar's estate in Terqa (Appendix 2). The conditions under which Ami-ešuḫ (or other farmers in comparable positions) entered into a contract with the institution are unknown, but his position coincides well with G. van Driel's definition of an agricultural entrepreneur (van Driel 1999: 213-214). The farmer's technical skill, his ability to move the assets at his disposal around, and his capacity to invest were important properties in order to remedy shortcomings resulting from the structural weakness of a centrally directed allocation of resources.

The *ikkarum*-farmers in Mari must therefore be considered agricultural managers, who were not attached to a specific household, but assumed responsibility for the exploitation of soil, personnel, and animals of one or more institutional households. To this end, they had access to other institutional resources in their care at other agricultural domains, and invested private means. The seal legends, participation in royal gift exchange, and loyalty examinations discussed above suggest that at least some of them were fully incorporated in the institutional administration. Nevertheless, it is possible that others, like Ami-ešuh, were in fact independent entrepreneurs belonging to the non-institutional segment of society, but this assumption cannot be corroborated with the available data.

Note that the title *ikkarum*, translated here as "farmer," is not necessarily indicative for the type of managerial entrepreneur operating within the institutional system. The *ikkarum*-farmers attested in North Mesopotamia in the period preceding the reign of Zimri-Lim obviously held various positions, from the ration-receiving farmers working with their families attested at Chagar Bazar to the three farmers in Tuttul who were responsible for the production of one of the largest harvest yields so far attested in the Mesopotamian North.[31] Furthermore, the *ikkarum* was an agricultural labourer of low status in contemporary Southern Mesopotamia (Stol 1995: 192), and here persons with the title *iššakkum* contracted to manage arable farming on behalf of the institutions

[31] See the text published by Krebernik 1993 and his remarks in Krebernik 2001: 4 note 17. More information about these farmers can be expected from the forthcoming publication of the texts from the Tell Biʿa excavations.

or individuals (Charpin 1987: 113-120; Burggraaff 1995). One can conclude that in different areas, different tasks were executed by persons with the title *ikkarum*, but that all *ikkarum*-farmers attested in Mari during the reign of Zimri-Lim seem to fit the role of agricultural managers.

PRODUCTION AND RETURNS

Barley was in Mari, like everywhere else in Mesopotamia, the main bulk product of institutional agriculture. Sesame was another important crop, and was processed into oil in palace workshops. The sesame and oil balanced account *ARMT* XXII 276 lists the receipt of 885 gur of sesame as the produce of 34 plough teams of the district of Mari.[32] Since sesame is a summer crop, and barley a winter crop, the same plough teams were probably engaged in both types of cultivation in the course of the agricultural year.

The high barley returns of Mari agriculture, with numbers based on a handful of so-called surface-yield texts, have baffled Assyriologists. Recorded yields vary, and B. Lafont (2000: 142) argues that the yields fall in three categories in comparison to Southern Mesopotamian yields: low (0.7-1.7 gur/iku), standard (4.9-5.9 gur/iku), and excellent (6.0-9.4 gur/iku), but he excludes attestations of even higher yields, because the purpose of the texts is unclear. A major setback for understanding these texts is that the administrative purpose is never stated. Nevertheless, it is possible to divide the texts in the following functional types (Table 3):

Table 3: Surface-yield texts

	text	date	purpose	yields (in gur/iku)
1	*ARMT* XXIII 426	20-i-ZL 7′	description; district of Mari	0.7-1.7 (3x)
2	*ARMT* XXIII 591	25-i-ZL 7′	description; district of Našer	4.9-5.9 (3x), 7.5 (1x)
3	*ARMT* XXIV 3	[. . .]	description; Zaqum, Bāb-naḫlim, Dēr	6.0-8.0 (2x)
4	Ziegler 1999: 49 note 300	ZL 8′	description; fields of princesses	7.5-9.3 (4x)
5	*ARMT* XXIII 464	ZL 7′	tax calculation of civilians	9.4 (1x)
6	*ARMT* XXIII 69	[. . .]	estimate; district of Saggarātum	[. . .]
7	*ARMT* XXIV 2	[. . .]	estimate; district of Terqa	7.6 (1x), 9.3 (1x), 12.0-14.5 (5x), 17.6 (1x)

[32] Lines I 1-4, with collations Durand 1984: 263 note 18.

Texts 1, 2, and 5 are dated to Zimri-Lim year 7′, and must have been drafted on the same occasion. It seems likely that the first four texts offer descriptions of the actual harvested amounts of barley. Most returns are standard or excellent according to B. Lafont's categorisation. One incident of low returns is explained in text 1 by reference to water damage.

Text 5 describes the yield of a huge surface cultivated by civilians. The return is impressive, and equals the highest excellent returns obtained by institutional agriculture. The text was drafted on the same occasion as texts 1 and 2, and relates to the same area as text 2. It is unlikely that the authorities had detailed knowledge of the total amount of harvest yield produced by the civilians, and the exact yield figure given in the text must be interpreted differently. The yield of civilians was relevant for the authorities as a source of agricultural tax income, and the text probably served to calculate the amount of tax (*šibšum*) to be collected from all non-institutional land holdings in a large area. The recorded total amount of produce might therefore have been the outcome of calculations based on unknown numerical relations between surfaces of various types of field and their standard yields, or might have been deduced from last year's tax income. The authorities were certainly inclined to estimate the civilians' harvest as high as possible in order to increase the tax income, and the recorded return cannot be accepted at face value as an indication for the efficiency of non-institutional agriculture.

The last two texts give field surfaces and amounts of barley with the remark si-lá in combination with geographic name. As B. Lafont (2000: 142) has already observed, these texts are different from the other surface-yield texts, and the meaning of the construction si-lá with a geographic name is not clear. This construction normally appears in personnel rosters, and signifies the number of workers or soldiers that the administration of a settlement provides with rations, and was expected to supply to the central authorities on demand (B. Lafont in Bardet et al. 1984: 323). One can therefore suggest that these texts prescribe the amount of barley that the agricultural domain in the given settlements was expected to produce. Text 6 is too broken to be used for return calculations (Luciani 1997), and text 7 contains more entries than appear in the table provided by B. Lafont (2000: 141). Many numbers in this text are damaged, but sufficient signs are preserved to see that most returns in this text approximate 13 gur/iku, but returns deviate from the average: the maximal return is 17.6 gur/iku (lines 1-3), and the minimum return is 7.6 gur/iku (lines 9′-11′). The amounts of barley for each entry are given in precise detail, and, like in the case of text 5, it is not clear what types of calculations lie behind these sums. Nevertheless, it is evident that the production estimates often prescribe higher yields than occur in the descriptions of actual harvest yields, and one is inclined

to suspect that these estimates are production goals set by high-ranking administrators, but seldom achieved by the executives in the field.

The harvest descriptions indicate that yields of 5 to 9 gur/iku occurred frequently, which are substantially higher than the average yields of Southern Mesopotamian agriculture (Lafont 2000: 142). Explanations are still lacking, as only a few technical details of Mari agriculture are available. Irrigation was intensively practised, the seeder plough was widely used,[33] and the large numbers of draught animals suggest intensive soil preparation. Information on the fallow system is absent, and sowing rates are also unknown, except for an isolated text which seems to indicate two rates of 35 and 50 sìla (litres) of seed per iku (*ARMT* XXIII 466). It is therefore tempting to expand the size of the Mari iku to explain the supposedly high yields. As G. van Driel (2000: 271-272) and B. Lafont (2000: 141) have noted, the absolute size of capacity and surface measures in the North is still a matter of debate. Notably the absolute size of the surface measure iku remains unknown. Metrological considerations fail to increase its size, since for that, one would have to assume a similar relation between iku and cubit in Mari as in the Southern Mesopotamian metric system. The Mari cubit is either of the same size as the southern one, or smaller, but certainly not larger (Bry 2000 and references). If one, however, abandons the metrological link, there are arguments to assume that the Mari iku was indeed larger than the Southern Mesopotamian one of 3600 square metres. The harvest work assignment in Qaṭṭunān is one iku per person per season (Appendix 4). F. Wiggermann (2000: 189) suggests that a surface of 1.5-2 hectares is a likely seasonal harvest output per worker in the Balikh area. Southern Mesopotamian texts also indicate that the harvest output per harvester exceeded one Southern Mesopotamian iku per season (Van Driel 2000: 269 note 11). The sowing rate of 35 or 50 sìla per iku either indicates dense sowing in Mari, or strengthens the case for a larger iku, since it is high in comparison to Southern Mesopotamian standards (13.3-16.6 sìla/iku, see Potts 1997: 80), and even to Northern Mesopotamian rates attested in Middle Assyrian texts (30-35 sìla/iku, see Wiggermann 2000: 181; but see the remarks by van Driel 2000: 273). This does not help to establish an absolute size for the larger Mari iku, but strengthens the argument to explain the high results by presuming a larger surface unit than previously assumed.

[33] The seeder plough was not used exclusively: *ARMT* XXVII 3: 10-11 shows that, at least in periphery areas, broadcast sowing (for sesame) existed side by side with furrow sowing by means of the seeder plough (van Driel 2000: 287).

Beyond the surface-yield texts, insufficient data is available on returns. One notes, however, that various numbers of resources studied above seem to be interrelated. 150 iku is the standard field surface of one plough team, 15 men is its personnel, with half that number (seven or eight) of draught animals (correct the numbers given by van Driel 2000: 288). Furthermore, the text *ARMT* XXIV 5 concerning the production of Sammêtar's farmers in Zurubbān stipulates an expected production of 1500 gur of barley per plough team (Appendix 2). This suggests that the normative yield for one iku was ten gur of barley, which is slightly above the documented average return.[34] It seems therefore reasonable to assume that the following norms for the resources and performance of plough teams were maintained: 150 iku field (probably more than 54 hectares) worked by 15 labourers and half that number of draught animals produced 1500 gur of barley (ca. 1440 hectolitres).[35] In reality, deviations from this normative model must have been countless, but its existence in the bureaucratic mind seems evident.

If these numbers do indeed reflect the administrative norms for plough team operated agriculture, and if the Mari iku was larger than the southern iku, then one must assume that the plough team as a single work unit is an administrative fiction. Several ploughs are needed to prepare a surface of that size for sowing, and it is tempting to assume that the 15 workers and seven or eight oxen of one plough team represent in reality three or four ploughs with two oxen and three or four men each (van Driel 2000: 288), which is the type of plough team attested in scenes on seals. One could object that the functions in one plough team (see above) indicate tasks for one plough only, but these

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[34] Note that ten gur-units are designated as one *ugārum* in the Mari metric system. The term *ugārum* is otherwise known as a designation for a (large) agricultural area. Powell 1990: 486-488 has proposed to integrate the volume measure *ugārum* in a Northern Mesopotamian metric system, and concluded tentatively that one *ugārum* of seed barley was nominally enough to sow 90 iku-units of land, and that this surface would be identical to one *ugārum* as a surface measure. This is not the place to examine his arguments in detail, but it must be stressed that little of this system can actually be detected in the texts from Mari. Notably the amount of seed barley per iku that the system requires (13 1/3 sìla) is far below the attested sowing rates, and would imply an unlikely 90-fold return to obtain a nominal harvest yield of ten gur of barley per iku.

The term *ugārum* is attested in the Mari sources as a larger agricultural area containing multiple fields (see notably the field descriptions in *ARMT* XXII 328). Perhaps the term acquired secondarily the meaning "normative yield of a well described field plot of such-and-such size," which would then be identical to one iku, resulting in the meaning "ten gur-units," but this remains mere speculation.

[35] 180000 sìla-units correspond to 1440 hectolitres if the content of the Mari sìla was ca. 0.80 litres (Powell 1990: 502 and van Driel 2000: 272). But the content of this unit might have been slightly larger than this.

designations might primarily reflect scales of hierarchy and payment. Furthermore, it is possible that only the sowing operation, which marks the completion of the ploughing season, required the effort of the largest part of the team in order to operate the labour-intensive seeder plough.

It is unknown whether the plough team of *ARMT* XXIV 5 actually had 150 iku of field at its disposal as the model prescribes. Parcels smaller than 150 iku are recorded for the farmers of Zurubbān, but it is not clear whether these fields form their full land assignment. Furthermore, it seems evident that the authorities treated the farmers of Sammêtar's estate as an exceptional case, and creatively manipulated the norms. They allowed generous deductions from the expected bulk production for the grazing of the master's horses and the draught animals on the fields. The text stipulates that the farmer is allowed to deduct 20 gur of barley per iku of grazing field from the total production goal. The surface-yield texts indicate that this amount cannot be considered the produce obtainable from one iku of field, and the equivalent one iku = 20 gur of barley must be a disguised support to farmers in distress. The production goal of 1500 gur per plough team might very well reflect the planning of an overly optimistic official, which resulted in production deficits of the farmers that were subsequently reduced by creative calculations of a more pragmatic bureaucrat.

CONCLUSION

In line with G. van Driel's general thesis on land use in Mesopotamia (1998), Mari agriculture does not lack sufficient land, except for isolated cases in Dūr-Yaḫdun-Lim and Terqa, both situated at the narrow part of the river valley, where the soil was presumably well watered and hence in demand. The bottleneck for successful agriculture was the organisation of sufficient capital in the form of personnel and other necessary resources. This, in combination with the notorious political unrest of the period, must have been the reason why the palace was sometimes short of barley and turned to the market for additional acquisition (B. Lafont in: Charpin et al. 1988: 516-519). Field exploitation seems to have been marked by the extraction of maximal performance from subordinates, and central allocation of resources. The *ikkarum*-farmer functioned as the accountable party for arable farming vis-à-vis the head of the household or the state, but sufficient economic incentives must have existed to encourage him to invest private means. His independence of the household enabled him to provide the necessary flexibility in a centrally directed regime. Insufficient data are available to understand production and yield, but some administrative normative quantities seem to have been operative.

The new data about Mari agriculture have relevance for the study of other agricultural systems in Mesopotamia. Mari agriculture shares characteristics with other Northern Mesopotamian agricultural regimes, such as the dominant role of palace estates and officials' households and the absence of temple estates, but its heavy dependence on irrigation also allows comparison with the situation in the Southern alluvium. Any comparative approach to Middle Bronze Age institutional farming in Mesopotamia faces the challenge to compare dispersed textual (and archaeological) data coming from a variety of organisations, each of which was shaped by its specific environmental characteristics and administrative habits. The available bodies of texts document field cultivation from different and almost mutually exclusive perspectives: from the viewpoint of a calculating provincial administrator in the case of the Ur III provinces, from the point of view of the city-based contractor in the case of the early second millennium sources from the Southern alluvium, or from the perspective of the central authorities in the case of Mari. Although work organisation and accounting procedures certainly varied in different areas and periods, common solutions to shared challenges easily go unnoticed due to the qualitative differences of the source material. The perspective offered by the Mari sources, "from the top down," can occasionally be used to answer questions of general relevance.

Every institution struggled with how to ensure maximal performance, how to call the men in the field to account and how to solicit capital investment. Economic performance can be assured by applying standard yields or by binding the executive by means of a legal contract. The rudimentary normative model for agricultural performance in Mari, which is never explicitly articulated, but can nevertheless be detected by its recurrent numbers, is reminiscent of the (much more elaborate) normative model for land use and returns used by Ur III bureaucrats (van Driel 2000: 286). The system presupposes that the executives were personally responsible in a financial manner for the functioning of their resort; their capital investment was necessary, and they either profited from their function, or were liable to reimburse shortfalls. Administrative normative yields were often set near or even slightly above realistic production levels, and in order to attract and keep suitable candidates for the job, flexibility in accounting was asked for. Mari bureaucrats displayed creativity in handling the norm-prescribed yields for the benefit of the *ikkarum*-farmers, and later the kings of Babylon opted to repair the gap between norm and actual performance by means of redress decrees.

Another structural stress factor was the organisation of extra labour for peak activities in the agricultural season. The case of Qaṭṭunān (Appendix 4) shows

that military commanders played an important role in the organisation of extra harvest labourers. In the Southern alluvium, a local authority called *rabiānum* acted as intermediary for hiring extra hands. Ethnic groups played an important role in the army, and it seems likely that the *rabiānum*, a word also used for leaders of ethnic groups, recruited labourers from similar social systems. Furthermore, Mari letters can be used to study the social background of the labour force, and its outcome might be used for the study of forced labour in other periods. The epistolary corpus constitutes the true strength of Mari for the study of Mesopotamian economic history. It is a basic tool for the study of the impact of political and social processes on economic life, and allows the appreciation of the influence of ethnic groups and their representatives, the local elites, in shaping the land use regime in the area.

If one compares the image conjured up from the texts with the model established by T.J. Wilkinson (1994), significant differences appear, but these are mainly due to the different types of sources used. Archaeology-based calculated models like Wilkinson's focus on groups of individuals, or nuclear households, and their impact on the landscape. Texts deriving from institutional archives focus on the structures that the central authorities impose on the population to extract surplus yield. In essence, the state encourages the nuclear households to drop part of their own field cultivation in exchange for rations in order to participate in large-scale institutional agriculture supporting the elite. Institutional farming with its plough teams entailed high capital investment beyond the reach of nuclear families or village communities, but left little distinctive traces in the archaeological record. The only identifiable traces are the remains of the elevated irrigation canals, which show the institutions' ability to mobilise the population in order to improve the water supply to the fields. Recently F. Wiggermann (2000) published a calculated model of a single settlement based on landscape observation and textual data. In the kingdom of Mari, where most centres were situated along easily navigable rivers and canals, the "catchment limitation" established by Wilkinson is not significant. Cheap bulk transport by boats, elaborate use of writing to transmit orders and exercise control, and high mobility of resources stimulated interregional interdependency. However, the proposal to incorporate non-archaeological data of this interregional system is far beyond the reach of this paper; it has to be postponed until more texts are published, and their data are better understood.

APPENDIX 1

Prosopography of farmers

A full prosopographical study of Mari agriculture cannot be made until the various unpublished sources have been made available. But the massive increase of published sources over the last decades offers ample opportunity to update the prosopographical study undertaken by J. Sasson in 1976. In the following list, the references to the attested farmers during Zimri-Lim's reign are brought together. Diagnostic is both the title "farmer" (*ikkarum*), and attested responsibility for one or more plough teams. Unpublished material is excluded, except when it sheds additional light on farmers known from elsewhere, or when its data has been incorporated in Table 1 or 2 above. References to farmers often cluster in texts were other persons appear in the same capacity, but who are otherwise not attested as farmers. These persons are not included in the list. All relevant references to a given individual are grouped together under the same entry, which causes the risk of merging references to different but homonymous officials.

The references are divided in the following context categories:

A) Farmers appear as deliverers of foodstuffs to Ilukān and other officials administrating food supply for the court. Furthermore, farmers are attested as suppliers of sesame to the palace.
B) Farmers appear as recipients of sheep fat, see footnote 19 above.
C) Farmers appear in lists of gifts of textiles and metal objects. It is not clear whether they furnished these gifts to the palace, or received them from the palace. The quality of the objects appearing in some texts (precious textiles in *ARMT* VII 249 and XXI 372, silver axes in VII 249) suggests that the palace produced and distributed them. *ARMT* XXI 56 is a list of sheep and textiles with the names of the governor and major-domo of Terqa, and various persons, often in combination with toponyms in the Terqa district. In this case the movement of goods might be inversed.
D) One text (*ARMT* XXIII 495) contains a list of names of persons whose loyalty is examined by means of divination. This text belongs to a file of similar documentation drafted in year 1′ of Zimri-Lim, see Durand 1991: 36-46, especially pp. 38-39.
E) Ten farmers are attested at the estates of Sammêtar. These references are discussed in Appendix 2.
F) Various administrative texts and letters.

The abbreviations n.d., d.b., and n.y. signify not dated, date broken, and no year, respectively. GN is added to the more obscure geographic names. If the inscription of the seal of the farmer has been preserved sufficiently, it is quoted at the end of the entry.

Abī-Addu
E) farmer of the estate of Sammêtar in Terqa.
Abī-dan
B) recipient of sheep fat for three ploughs, *ARMT* XXIII 397: 16-18 (15-xii-ZL 1′).
Ad-d[a-. . .]
E) farmer of the estate of Sammêtar in Mari.
Altiš-qallu
C) gifts, *ARMT* VII 249: rev 5′ (d.b.);
D) subjected to divinatory test, *ARMT* XXIII 495: 7;
F) personnel of his plough team, see Table 2 group E; responsible for the restitution of a missing ox of the household of the princess Inibšina, *ARMT* VII 120 // M.11416 (8-xii-ZL 6′) (van Koppen in print).
Ami-ešuḫ
E) farmer of the estate of Sammêtar in Terqa.

Ammi-tanu
F) prisoners of war under authority of Ammi-tanu, *ARMT* XXII 262: i 46 (ZL 4′).
Ana-Dagan-taklāku
A) deliverer of *burrum*-cereals, *ARMT* XI 40 (8-iii-ZL 2′) (incorporated in summary text IX 237: i 13-16 [14-ix-n.y.]), XII 141: 10-12 (17/18-ix-ZL 4′), XI 189 (4-v-ZL 5′) (*burrum*-cereals and broad beans [*ḫallūrum*]); deliverer of sesame ("farmer of Dizum (GN)"), *ARMT* VIII 97 (19-ix-n.y.);
B) recipient of sheep fat for two ploughs, *ARMT* XXIII 397: 13-15 (15-xii-ZL 1′);
D) subjected to divinatory test, *ARMT* XXIII 495: 1.
Atti-Mer
A) deliverer of *burrum*-cereals, *ARMT* IX 234: i 6-11 (11-iii-n.y.).
Baḫšum
B) recipient of sheep fat for one plough team, *ARMT* XXI 148 (21-xi-n.y.).
Bāla-El
F) prisoners of war under authority of Bāla-El, *ARMT* XXII 262: i 31 (ZL 4′).
Ḫunnān
B) recipient of sheep fat, *ARMT* XXIII 392: 1-2 (24-xii-ZL 1′).
Iddî
B) recipient of sheep fat for one plough team, *ARMT* XXIII 397: 10-12 (15-xii-ZL 1′).
Iddinum
F) oxen and personnel of his plough team, see Table 2 group E; "servant" of queen Addu-dūrī (Ziegler 1999: 51 note 319); three oxen of the house of queen Addu-dūrī are transferred to Iddinum, M.11744: 3-4 (10-iii-ZL 5′) (van Koppen in print).
Iddin-Annu
A) arrears of sesame delivery due from Iddin-Annu and three other persons ("men of Mišlān"), *ARMT* XXI 138: 39′ (d.b.);
E) farmer of the estate of Sammêtar in Zurubbān.
Ilī-idinnam
A) deliverer of *zīzum kinêtum*-cereal ("farmer of Aḫlamu? (person or GN?)"), *ARMT* XI 79 (27-iii-ZL 4′); deliverer of sesame ("farmer of Abullāt (GN)," "from the sesame which he cultivated in Dēr"), *ARMT* XXI 135 (29-ix-Kaḫat [= ZL 2]);
B) recipient of sheep fat, *ARMT* XXIII 397: 4-6 (for three plough teams) (15-xii-ZL 1′), *ARMT* XXIII 401 (24-xi-ZL 1′) (+ seal);
E) farmer of the estate of Sammêtar in Zurubbān;
F) personnel list (together with Sāmum and Mutu-Dagan) *ARMT* XXI 405: 8′ (d.b.).
Seal: *ì-lí-i-*[*di-nam*]/dumu *qí-iš-*[*ti-*o o o]/[ìr] *zi-im-ri-*[*li-im*].
Ilī-mālik
F) personnel of his plough team in Zurubbān, see Table 1 group C and Table 2 group G.
Ilī-turaya
A) deliverer of *burrum*-cereal, *ARMT* XII 553 (not sealed) = XII 554 (sealed by Ilukān) (7-ii-ZL 6′);
C) gifts *ARMT* VII 249: 12′ (?) (d.b.), XXI 372: 4 (d.b.).
Mašum
A) deliverer of sesame ("farmer of Dēr"), *ARMT* XXI 137 (23-ix-n.y.);
B) recipient of sheep fat for eight plough teams, *ARMT* XXIII 415 (13-xii-ZL 1′) (+ seal);
C) gifts, *ARMT* VII 249: 6′-7′ (d.b.);
F) head of four plough teams, see Table 2 group F; Šarrum-nūr-matišu receives barley from Mašum in Dēr, *ARMT* IX 47[36] (9-v-^{d}iškur *ša Ḫalab* = ZL 1′); note concerning rings and axes, *ARMT* IX 272 (n.d.); account of salt, *FM* III 18: 1 (15-iv-ZL 4′); Māšum was stationed in Dēr south of Mari and is quoted as a source of information in letters of polit-

[36] Read engar *ma-šum*, not é *ma-šum* in line 6, see copy.

ical content (*ARMT* XIII 31),[37] and involved in administrative matters (*ARMT* VI 57-58). Texts originating from his private archive remain unpublished (Durand 1992: 123).
Seal: *ma-šu-um* / [. . .].

Mut-Ramêm

A) arrears of sesame delivery due from Mut-Ramê and three other persons ("men of Hiddān (GN)"), *ARMT* XXI 138: 50′ (d.b.);
F) Legal text: Mut-Ramêm, farmer of Šuri-Ḫammû, Yaminite ruler of Zarri Amnān (GN), pledges responsibility for presence of a woman and her daughter, *ARMT* VIII 67: 3-5 ([..]-ZL 6′?).

Mutu-Dagan

A) deliverer of *burrum*-cereal ("farmer of Gūru-Addu"), *ARMT* VII 155 (sealed by Ilukān) = XII 559 (not sealed) (13-ii-ZL 6′);
B) recipient of sheep fat, *ARMT* XXIII 409 (22-i-^{d}iškur *ša Ḫalab*^{ki} = ZL 1′), XXIII 392 (24-xii-ZL 1′), XXI 148: 1-3 (of four plough teams) (21^{+}-xi-n.y.);
C) gifts, *ARMT* VII 249: 1′ (d.b.), XXI 372: 1 (d.b.);
F) personnel list (together with Sāmum and Ilī-idinnam) *ARMT* XXI 405: 7′ (d.b.); appears in a memorandum in relation to *šibšum*-tax collection (Joannès 1985: 111-112).

Rabiu

F) personnel of his plough team in Zurubbān, see Table 2 group G.

Sāmum

B) recipient of sheep fat, *ARMT* XXIII 392: 4 (24-XII-ZL 1′), XXIII 409 (name broken) (22-i-^{d}iškur *ša Ḫalab*^{ki} = ZL 1′), XXI 148: 4-6 (for four plough teams) (21^{+}-xi-n.y.);
D) subjected to divinatory test, *ARMT* XXIII 495: 3;
F) personnel list (together with Mutu-Dagan and Ilī-idinnam) *ARMT* XXI 405: 6′ (d.b.); note concerning rings and axes, *ARMT* IX 272 (n.d.); cultivates 160 iku in the vicinity of Mišlān, *ARMT* XIII 38: 7-12.

Sîn-rēmēni

A) Napsuna-Addu delivers *burrum*-cereal, the *šibšum*-tax of Sîn-rēmēnī, *ARMT* XI 184 (5-iii-ZL 5′) (incorporated in summary text IX 234: i 1-5); deliverer of *burrum*-cereals, XII 296 (3-xii-ZL 7′);
B) recipient of sheep fat for five plough teams, *ARMT* XXIII 390 (10-xi-ZL 1′), XXIII 397: 1-3 (15-xii-ZL 1′);
C) gifts, *ARMT* VII 249: 4′-5′ (d.b.), XXI 372: 3 (d.b.);
D) subjected to divinatory test, *ARMT* XXIII 495: 10;
F) four pieces of textile for the cloth rations of four ox-drivers of Sîn-rēmēnī, *ARMT* VII 147 (20-ix-ZL 6′) (+ fragmentary seal); list of salt, *FM* III 18: 9 (15-iv-ZL 4′).
Sîn-rēmēni succeeded Sîn-nāṣir as major-domo of the palace in Terqa after the latter's death in the early part of ZL 7′, see *ARMT* VII 196: 2′ (d.b.), XXI 56: 2 (n.d.), XXIII 237: 13 (13-vi-ZL 10′). The name of Sîn-rēmēnī's father is unknown.

Šamaš-ili

B) Recipient of sheep fat, *ARMT* XXII 283 (24-ii-n.y.) (letter order sealed by Yasīm-Sūmû);
F) 21 oxen (the equivalent of three plough teams) of Yasīm-Sūmû transferred to him, M.7776 (21-[. . .]-ZL 1′).

Yaḫṣur-Dagan

B) recipient of sheep fat, *ARMT* XXIII 389 (28-x-ZL 1′).

Yaḫwi-Ašar

C) gifts, *ARMT* XXI 56: 11 (n.d., ZL 7′ or later) ("of Ilum-muluk");
E) farmer of the estate of Sammêtar in Zurubbān.

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[37] Read probably in line 23-24: [*ša-ni*]-*tam am-ša-li ma-šum* ⌜lú-engar⌝, [*ša de*]-*er*^{ki} *ki-a-am iš-pu-ra-am*, see copy of traces at the end of line 23 on p. 180 of *ARMT* XIII.

Yamlikum
F) personnel of his plough team, see Table 2 group F.
Yamraṣ-El
E) farmer of estate of Sammêtar in Zurubbān.
Yanṣibum
C) gifts, *ARMT* VII 249: 2′-3′ (d.b.), XXI 372: 2 (d.b.); XXI 56: 7 (read *ia-an-ṣ*[*í-bu-um*], "farmer of Terqa") (n.d., ZL 7′ or later);
E) farmer of the estate of Sammêtar in Terqa;
F) informs Sammêtar on political activities of the Yaminites, *ARMT* XXVI/1 150.
Yantin-Eraḫ
B) recipient of sheep fat for four plough teams, *ARMT* XXIII 397: 19-21 (15-xii-ZL 1′); Yantin-Eraḫ appears as intermediary in sheep fat transfers for other farmers, see *ARMT* XXIII 409 (fat for [PN], [Sāmum], Mutu-Dagan, 22-i-^{d}iškur *ša Ḫalab*^{ki} = ZL 1′), and his seal is impressed on *ARMT* XXI 148 (fat for Mutu-Dagan, Sāmum, Baḫšum, 21^{+}-xi-n.y.), XXIII 390 (fat for Sîn-rēmēnī, 10-xi-ZL 1′) and 392 (fat for Ḫunnan, Mutu-Dagan, Sāmum, 24-xii-ZL 1′);
F) list of salt, *FM* III 18: 17 (15-iv-ZL 4′);
Seal: *ia-an-ti-in-e-ra-aḫ*/dumu *a-ḫu-*[. . .]/ìr *zi-im-ri-li-im.*
Yar'ip-Dagan
E) farmer of the estate of Sammêtar in Mari;
F) recipient of agricultural produce, *ARMT* VIII 90 (17-ix) (+ seal); receipt of barley authorised by the seal of Yar'ip-Dagan, *ARMT* IX 5 (30-vi-ZL 3′) (+ seal); plough oxen of the household of Sîn-nāṣir transferred to Yar'ip-Dagan, *ARMT* XXIV 44 (22-iv-ZL 7′); letter of Yar'ip-Dagan to Šunuḫra-Hālû concerning two escaped menial labourers (*FM* II 1); Yar'ip-Dagan wrote another letter concerning the same topic to Yasîm-Sūmû and Manatān (*FM* II 2: 14).
Seal: *ia-ar-ip-*^{d}*da-*[*gan*]/dumu puzur$_4$-^{d}*ma-*[*ma*]/ìr *zi-im-ri-*[*li-im*].
Yatar-Sūmû
A) deliverer of *burrum*-cereal from the house of Mutu-bisir, *ARMT* XII 161 (14-xi-ZL 4′) (incorporated in summary text XII 164: rev 1′-4′); XII 433 (6-iv-ZL 5′); deliverer of *burrum*-cereal, *ARMT* IX 125 (14-vii-ZL 5′); XII 455 (14-vii-ZL 5′) ("in Azzal? (GN)"); XII 456 (14-vii-ZL 5′) ("from the *burrum*-cereal of Dēr");
F) administrative note: "Out of 1450 litres of sesame—(measured) with the receipt-measure of 180 litres—they sieved 10 litres of sesame: (it contained) 2 1/2 litres of earth. The farmer is Yatar-Sūmû, the verifying official is Abdum, the man of Urbat" (Michel 1990: 188 and 198) (n.d.).
Yaṣraḫ-Addu
B) recipient of sheep fat for one plough team, *ARMT* XXIII 397: 7-9 (15-XII-ZL 1′);
F) three oxen of the house of queen Addu-dūrī are transferred to Yaṣraḫ-Addu M.11744: 1-2 (10-iii-ZL 5′) (van Koppen in print); two unpublished records of deliveries of sheep by Yaṣraḫ-Addu in ZL 11′ (Guichard 1997: 174 note 30); letter of Šubnalû to queen Šiptu asking for intervention. The governor (of Mari) refuses to release the female hostage that the farmer Yaṣraḫ-Addu left behind in the palace when he and other farmers went to Ḫaṭṭā to collect salt, because Yaṣraḫ-Addu has committed a mistake, *ARMT* X 160 (Guichard 1997: 173-178).
Zunibala
E) farmer of the estates of Sammêtar in Terqa and Mari.

APPENDIX 2

The farmers of the estates of Sammêtar

At least ten *ikkarum*-farmers were active in the exploitation of the agricultural estates attached to the households of Sammêtar in Zurubbān (in the vicinity of Dura Europos, see Durand 1990: 120 note 69), Terqa, and Mari. At the end of month iii of Zimri-Lim year 6′, government officials inspected these households following the death of Sammêtar, and drafted a number of texts containing surveys of goods and personnel of these households. The inspectors assessed the available institutional resources in view of the subsequent dissolution of the households and the redistribution of their resources, and the tools and personnel at the disposal of the farmers are well documented in this text group (van Koppen in print). In the following tables the data concerning the farmers of Zurubbān and Terqa are brought together.

Table 4: The farmers at Zurubbān

	personnel	missing personnel[a]	draught animals[b]	carts	tools[c]	fields
Iddin-Annu	[12]	2	[x]	3	?	80 iku[d]
Ili-idinnam	13	1	[x]	2	?	[x]
Yamraṣ-El	13	1	[x]	2	?	65 iku
Zunibala	12	2	[x]	2	?	50 iku

a summary: "6 men, deficit of the farmers of Sammêtar of the house of Zurubbān, the matter will be verified in the personnel roster, and this tablet will be broken", (6 lú lá-u-ḫi-a lú-engar-meš *ša sa-am-me-e-tar sa* é *zu-ru-ub-ba-an*^{ki}, *wa-ar-ka-as-su-nu, i-na* dub-*pí i-gi-de-em, ip-pa-ra-ás-ma,* dub-*pu-um an-nu-um, iḫ-ḫe-ep-pé*).

b summary: "27? oxen and one cow of four plough teams of the house of Zurubbān", [20+] 7? gu_4-ḫi-a 1 áb, [*ša*] 4 ^{giš}apin-ḫi-a, [*ša* é] *zu-ru-ba-an*^{ki}).

c text not preserved.

d consisting of 30 iku land adjoining the river course (*usallum*), and 50 iku in the valley (*ḫamqum*).

Table 5: The farmers at Terqa

	personnel	additional personnel[a]	draught animals	carts	tools [b]	fields[c]
Ami-ešuḫ	9	4 hired men	7 oxen	none	none	?
Yaḫwi-Ašar (2 ploughs)	13	10 transferred labourers	12 oxen, 1 cow	2	1 *p.*-axe 1 bronze *ḫ.*-axe	?
Yanṣibum	14	none	8 oxen	[x]	1 bronze *ḫ.*-axe	?
Abi-Addu	14	none	8 oxen	2	1 bronze *ḫ.*-axe	?

a summary: "total 14 hired men, which the farmers engage at their own expense. Of the house of Sammêtar" (šu-nígin 14 lú *ag-ru*-meš, ša lú-engar-meš *i-na ra-ma-ni-šu-nu i-ga-ru, ša* é *sa-am-me-e-tar*).

b *pāšum*-axes and *ḫaṣṣinum*-axes are two different types of metal tools.

c text not preserved.

For the estate at Mari no inspection surveys of material have been preserved. Personnel at the disposal of the farmers Zunibala, Yar'ip-Dagan, and Ad-d[a-. . .] appear in personnel registers of this estate, but their numbers do not add up to complete plough teams.

The tables reveal fixed numbers of resources at the disposal of farmers: 14 heads of personnel, seven or eight draught animals, and two carts per farmer are recurring numbers. The numbers presented in the tables are solely the institutional resources in the care of the farmers, since the officials only recorded those goods for which the farmers were accountable and which were suitable for subsequent redistribution. It is apparent that the farmers were not equally provided with institutional resources. The farmers of Zurubbān did not invest their own assets in their teams, but at Terqa both Ami-ešuḫ and Yaḫwi-Ašar hired additional labour and paid for them with their own funds. Ami-ešuḫ hired four labourers, for whom no background is given, and Yaḫwi-Ašar engaged ten institutional employees (*samiḫum*), whom he procured from other institutional households in Ilum-muluk and Samānum. These two categories are summarised as "hired men" (*agrum*), indicating that the farmers remunerated them with wages.

The position of Ami-ešuḫ is atypical compared to his colleagues in Terqa. He is the only farmer to hire additional free labourers, and the only one to lack carts or metal tools provided by the institution. This implies that he brought in substantial means of his own. The administrators registered his farmhands, because they checked all personnel present at the moment of inspection in their effort to catch unauthorised absence (see the text concerning absentees at Zurubbān), but did not record his carts and tools, since these objects were not institutional property.

At Zurubbān the inspectors established that some male adult labourers were missing, and they drafted a note with the number of absentees and the responsible farmers. This data would be compared with the details of the original attribution of resources to these farmers before an official demand for compensation could be issued.

One small tablet has been preserved which gives land surfaces and the names of the farmers of the estate in Zurubbān. No summary lines are preserved, and it is therefore not possible to determine whether these surfaces constitute the complete land assignment to the farmers, or only part of it.

One piece of evidence has been preserved concerning the accounting of the farmers of Zurubbān. The text *ARMT* XXIV 5 was drafted when the palace, represented by the royal accountant Yasīm-Sūmû, took over the responsibility of a landlord towards these farmers after the death of Sammêtar. In this text the production deficits of these farmers are calculated. In the fragmentary text only one entry out of (presumably) four has been preserved, but this entry suffices to understand the structure of the document. For each farmer a simple balanced account is drafted. In every case the estimated production norm in barley is given as debits, followed by the amount delivered and the expended amounts of barley for which deduction was permitted as credits. The delivered and expended amounts of barley subtracted from the estimated production equals either a positive or negative balance. In the single entry preserved in the fragment, the calculations runs as follows:

out of 1500 gur production norm (*iškarum*) of one plough team:
927 gur barley (harvest yield);
140 gur of barley, corresponding to 7 iku of grazing field, for 14 donkeys and horses;
20 gur of barley, corresponding to 1 iku of grazing field, that the oxen of one plough team ate;
(total:) 1087 gur of barley delivered;
413 gur [deficit];
[the farmer is PN.]

The farmer was responsible for the production of 1500 gur of barley. Slightly more than 60% of this amount was actually harvested, and he could furthermore deduct a sum of barley for allowing the horses and donkeys of Sammêtar to graze on part of his land, and for feeding the draught animals. But the total of the harvest production and the allowed deduc-

tions lies below the expected norm, and he is responsible for an outstanding amount of barley registered as his personal debt.

The name of the farmer is broken; as the preceding entry of *ARMT* XXIV 5 deals with Ilī-idinnam, this implies that the farmer of the entry under discussion was either Iddin-Annu, Yamraṣ-El, or Zunibala, and these farmers cultivated (at least) 80, 65, and 50 iku field respectively. Note, however, that the figures provided in *ARMT* XXIV 5 do not seem to correspond to the actual production of each individual farmer. The final lines of the entry of Ilī-idinnam are preserved, and also Ilī-idinnam seems to be responsible for the same outstanding sum as the farmer in the entry discussed above.[38] Perhaps Yasīm-Sūmû divided the total balance of the agricultural estate by four and assigned an equal deficit to each of its four farmers.

APPENDIX 3

Rations in an agricultural estate

The administration of a small rural estate is documented by a file or ration lists and expenditure notes for seed grain (see above Table 2 group C). The number of labourers and oxen of the single plough team of the estate developed as follows in the course of six years:

8 oxen, 19 workers (17♂, 2♀)	*ARMT* XXIV 14	11-vii-ZL 1′
	ARMT XXIII 106	15-ix-ZL 1′
	ARMT XXIII 107	[. . .]-[. . .]-Zl 1′
	ARMT XXIV 15	[. . .]-[. . .]-[. . .]
6 oxen, 11 workers (10♂, 1♀)	*ARMT* XXIII 113	2-iii-ZL 5′
	ARMT XXIV 16	2-iii^{bis}-ZL 5′
	ARMT XXIII 114	2-iv-ZL 5′
	ARMT XXIII 115	[. . .]-v-Zl 5′
	ARMT XXIV 17	2-v or vii-ZL 5′
	ARMT XXIII 116	1-ix-ZL5′
	ARMT XXIII 119	[. . .]-[. . .]-ZL 5′
2,5 oxen, 11 workers (10♂, 1♀)	*ARMT* XXIII 117	2-x-ZL 5′
0 oxen, 10 workers (9♂, 1♀)	*ARMT* XXIII 118	[. . .]-xi-ZL 5′
	ARMT XXIV 18	[. . .]-[. . .]-ZL 5′
	ARMT XXIII 120	[. . .]-[. . .]-ZL 6′

Every ration list opens with one workman (originally Šamaš-tappê and after ZL 1′ Yabni-El) who is also attested as the recipient of seed grain for the team and must be identified as the team's head. His title is not given, but it must have been "handle-holder" (*mukīlum*). When Šamaš-tappê was heading the team, Yabni-El occupied the third position, following Anna-aḫum, who throughout the documented history of the team occupied the second position, and can therefore be identified as the "seeder" (*zārûm*). He is once attested as recipient of seed grain (*ARMT* XXIII 124). The rations of Šamaš-tappê were higher than those of the other workers, but Yabni-El did not receive a pay raise when he was promoted to head of the team.

Around month x of Zimri-Lim year 5′, the rations were reduced and ration list *ARMT* XXIII 117 is atypical. In the following diagram the rations of the team members appearing in this list are compared with their rations before and after this date. The functions of the workers are indicated as far as possible. All rations in litres (sìla) of barley monthly.

[38] Line 2′ can be read: 20[+20]+1 a-gàr 2+[1.0.0 gur lá-u].

	before	*ARMT* XXIII 117	after
Yabni-El, handle-holder	90	0	60
Anna-aḫum, seeder	90	0	60
Yantin-aḫu —	90	60	90
Atal-ewri —	90	60	60
Aḫam-arši —	90	60?	gone
Ana-Šamaš-taklāku —	80	[. . .]	80
Kannan —	80	[. . .]	60
Ilī-atpalam —	80	[. . .]	60
Ilī-mutapli —	60	60	60
Išališ-El —	60	60	60
♀Ina-pî-lušallim, miller or grinder	40	40	40

In month x of year 5′, all rations for male workers were reduced to 60 litres. This amount must have approached subsistence levels of nutrition, since the lowest rations (60 litres for men and 40 for women) were not subjected to further reduction. The "handle-holder" and the "seeder" did not receive any rations at all, probably due to their temporary absence. The barley provisioning during this month was problematic, and the director of the estate diminished the monthly rations from that moment on as far as could be achieved in order to counter future shortage. After this month, most rations stayed at this reduced level, but two labourers were apparently able to negotiate higher rations than their superiors, the "handle-holder" and the "seeder."

Each ox is given 10 litres of barley daily (F. Joannès in: Bardet et al. 1984: 108). At Chagar Bazar, oxen for fattening (without additional grazing) ate 10 litres of barley daily, and plough oxen ate 3 litres of barley daily (compare text category B.5 with B.3 as listed in van Koppen 1999-2000: 338a). In fact, 10 litres of barley fodder for one (plough) ox is far too much, see Stol 1995: 196. This was confirmed by F.W. van Koppen, cattle breeder in Overschie (The Netherlands). He also stressed that cattle need nutritious food in combination with fibrous forage. An exclusive barley diet increases the animal's fatty biomass (ideal for consumption animals), but will decrease the animal's condition for traction. All draught animals therefore must have had access to grazing and part of the large amount of barley fodder must have been used for other, unknown, purposes. In month x of year 5′ the oxen also received less fodder. Their number is not indicated, but the amount of barley corresponds to fodder for 2,5 oxen at 10 litres of barley daily. After this month, no fodder for the draught animals appears in the lists.

APPENDIX 4

Management of labour: the case of Qaṭṭunān

During the final phase of the barley production cycle, the harvest and grain processing demanded the effort of a much larger labour force than the plough teams could supply. The organisation of this seasonal work was a structural constraint on Mesopotamian agriculture, and palace dependants and civilians liable for labour service usually provided this additional labour in Mari. At some point, their labour performance failed to work out for the palace in the city of Qaṭṭunān, a district capital at the middle reaches of the Habur river, and the panic-struck letters of its administrators provide valuable details on the organisation of agriculture. The two dominating agricultural themes in this correspondence are the locust invasions and the organisation of additional manpower. The publication of the corpus by M. Birot in 1993 stimulated detailed examinations of the first topic (Heimpel 1996; Lion and Michel 1997; Ziegler 1999-2000: 329-330), but it is clear that the locust invasions and the shortage of manpower were interrelated and occurred simultaneously. Establishing chronological coherence in a corpus of undated letters is hampered by "a knotted complex of identical themes of differ-

ent events and different descriptions of identical events" (Heimpel 1996: 101). Nevertheless there are several letters containing a retrospective description of the circumstances of the past two years in order to argue in favour of an intervention in the present year. A secure relative sequence of harvest arrangements of three succeeding years can be constructed, designated A to C in the overview of the content of these letters in Table 6. These letters are written by two senders: Zakira-Ḫammû, governor of Qaṭṭunān between year 4′ and 10′, and Zimri-Addu, a military commander stationed occasionally in Qaṭṭunān to assist or replace the governor. The consecutive years A to C can be linked to the years of Zimri-Lim by the incorporation of the plough team of Asqudum in the palace teams in year C. The incorporation must postdate the death of Asqudum, who died sometime before month i of Zimri-Lim year 8′ (Durand 1988: 77; Lion and Michel 1997: 712). Year C therefore equals Zimri-Lim year 8′, or, alternatively, year 7′.[39] Both W. Heimpel (1996: 107-111) and B. Lion and C. Michel (1997: 712-713) proposed a chronological sequence for the letters dealing with locust invasions, and this sequence can be linked with the sequence A-C established in Table 6. Assuming that year C equals year 8′ of Zimri-Lim, the following sequence of events can be proposed. Note that A to C are harvest seasons, which took place in the first months of the corresponding regnal year, but might have started in the last months of the preceding year. The alternative scheme that harvest C equals year 7′ would imply that the events took place in years 4′-7′ of Zimri-Lim.

Year 5′ The first locust invasion inflicts massive damage to the crops. There is no harvest work for farmhands and unattached workers, and they start to leave the district, and the governor is, despite royal orders, unwilling to stop them (*ARMT* XXVII 26; for date see Heimpel 1996: 107).

Year 6′ (A) Another locust invasion, counter measures (filling canals with water) fail, the governor mobilises the district to trample the insects. The civilian population is weakened by last year's plague and considers the possibility to leave. The governor is unwilling to demand their labour, since they must secure their own harvest, and asks the king for extra harvesters (*ARMT* XXVII 27-29).[40] Simultaneously, he writes to general Yassi-Dagan and state official Sammêtar with the same request (*ARMT* XXVII 30), and finally an army division headed by Ilī-maṭar arrives to assist in the harvest work during month ii (*ARMT* XXVII 33-35, *FM* II 69-70).

year 7′ (B) No more mention of locust threat. The havoc of the last years has decreased the number of available civilian workers, but the surface under cultivation by the palace has increased. The palace therefore lacks sufficient labourers to meet the harvest demands, and the governor asks the king for harvesters, and a mixed group of institutional labourers from Mari, Terqa, and Saggarātum arrive.

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[39] Year C cannot equal Zimri-Lim year 9′ or any later year, because Sammêtar is involved in the organisation of the army interference for the harvest of year A (in month ii). He dies at the end of month ii of Zimri-Lim year 6′ (F. Joannès, quoted in Durand 1988: 576-577), or in the second half of the next month (van Koppen in print), which permits his involvement to take place in month i of this year.

[40] Heimpel 1996: 111 assigns *ARMT* XXVII 27 on the one hand, and the group *ARMT* XXVII 28-29 on the other to two different years. This is not convincing, since all four letters *ARMT* XXVII 27-30 exhibit common phraseology and closely related subject matters (Lion and Michel 1997: 712; Ziegler 1999-2000: 329b), and notably the recurrence of the governor's advice to the king not to "trust" in the manpower of his district (*ARMT* XXVII 27: 31-32, 29: 28-29) is striking. W. Heimpel's main argument, the absence of any reference to the king's order in *ARMT* XXVII 27, can be invalidated by assuming that this is the first letter of the year, preceding the king's answer containing his order.

Table 6: Four letters from Qaṭṭunān

	ARMT XXVII 36: 7-22 Zakira-Ḫammû to Šunuḫra-Ḫalû (// XXVII 37).	*ARMT* XXVII 37: 27-55 Zakira-Ḫammû to Zimri-Lim (// XXVII 36).	*ARMT* XXVII 100: 5-44 Zimri-Addu to Zimri-Lim.	*ARMT* XXVII 102: 3-35 Zimri-Addu to Zimri-Lim (sequel to XXVII 100).
year A work assignment harvest arrangement	—	In the past. Field of four plough teams. The king sent 300 workers commanded by Ilī-maṭar and they harvested the palace fields together with the civilians. Threshing and transport of the harvest executed by civilians.	The year before last. 450 iku palace field. The division of Ilī-maṭar came and harvested and transported 300 iku field. The palace personnel and the civillians harvested and transported 150 iku field.	The year before last. 450 iku palace field. The troops of the division of Ilī-maṭar came and harvested and transported the fields.
year B work assignment harvest arrangement	Last year. Field of four plough teams. The work force came and harvested the fields of the palace.	Last year during Zimri-Addu. —— The king sent reserve workers (lú-diri-ga-meš) and they harvested the palace fields.	Last year. 600 iku palace field Work force, reserve workers and unattached workers (*ṣabum*-meš egir ù lú-didli) of the districts of Mari, Terqa, and Saggarātum came, harvested and transported the yield of 400 iku field, and the palace personnel and the civilians harvested and transported the yield of 200 iku field.	Last year. 600 iku palace field. Reserve workers, unattached workers and extra workers (lú-egir-meš lú-didli-meš *ù* lú-diri-ga-meš) came, harvested and transported the barley.
year C work assignment	Now. 1000 iku field of six plough teams including the team of Asqudum.	Now. 1000 iku field of six plough teams including the team of Asqudum	This year. 900 iku palace fields.	Now this year. 900 iku palace field.
harvest arrangement	The work force is not sufficient to harvest the palace fields of this district. Request to the king for harvesters. Request for intervention by addressee on behalf of sender.	The civilians of the district complain that the work load is too heavy; there is insufficient personnel in the palace.	Zimri-Addu calculates: the palace personnel and the civilians will harvest and transport the barley of 400 iku field; for the work on the remaining 500 iku field he has written to the governors and major-domos asking for additional labour. The king must do likewise.	Zimri-Addu calculates: the palace personnel and the civilians will harvest and transport the barley of 400 iku field; for the work on the remaining 500 iku field he asks the king for additional labour.

These harvesters are headed by Zimri-Addu ("last year, when Zimri-Addu (was here)," *ARMT* XXVII 37: 36).[41] Apparently, no pertaining letters of Zimri-Addu are known.

year 8′ (C) The surface under cultivation has again increased. Zimri-Addu is still present and extracts maximum performance by the local workforce and organises additional labour from elsewhere.

One notes that in *ARMT* XXVII 26, the only letter identified as pertaining to the first invasion, the outflow of the labour force is the main topic of the letter. There are no counter measures against the vermin described, and the locust damage is only mentioned as an explanation for the governor's reluctance to stop the emigrants. At the risk of using an implicit argument, the lack of more reports pertaining to the first locust invasion seems to indicate that a one-year catastrophe was not considered a major setback. Problems only became serious when the locusts returned the year after, and the harvest had to be brought in quickly while the civilian population was weakened and the labour force drained. In this disaster year A, the army intervened after desperate letters of the governor, while the palace workers and civilians achieved their working low of a mere 150 iku field harvested.

In year B the king and his administrators were warned by last year's catastrophe, and sent the army commander Zimri-Addu to Qaṭṭunān to take the matter in hand. He organised the intervention of additional harvesters without any recorded problems. The general's ability to solve problems was significantly larger than the governor's competence, and the difference in the extent of their powers is evident in the letters written to organise the harvest of year C. The governor cannot do more than ask the king again for harvesters, while Zimri-Addu calculates the maximum work output the available local manpower is capable to perform, and writes to the heads of other institutional households for extra workers. The expansion of the institutional arable farming from 450 to 900 iku took place while Zimri-Addu was in Qaṭṭunān, and doubtlessly with the aid of additional resources the general was able to arrange. Possibly the increase of the area under cultivation by the institution was due to an effort of its administrators to keep the fields of the civilian population that had fled in previous years under cultivation.

During the office of Zakira-Ḫammû's predecessor Ilšu-nāṣir (year 1′ to 3′), the palace maintained three plough teams (*ARMT* XXVII 2: 15) working on an unknown field area. In year A, an additional team was created, and these four plough teams cultivated an area of 450 iku. In the next year, these four teams brought 600 iku field under cultivation. In year C, the number of plough teams had increased to six, including the feeble team of the abolished household of Asqudum (see above), and they cultivated a total surface of 900 (Zimri-Addu) or 1000 iku (number given by Zakira-Ḫammû, probably rounding up) field. One notes a recurring number of 150 iku field per plough team (Table 7). This suggests that the 450 iku attested for year A is the original land assignment of the three plough teams of Ilšu-nāṣir, and that the fourth team of year A is a new addition, for which no new land has yet been made available.

Table 7: The expansion of the institutional area in Qaṭṭunān

time	number of ploughs	surface in iku's
office of Ilšu-nāṣir	3	[450]
Zakira-Ḫammû year A	4	450
Zakira-Ḫammû year B	4	600
Zakira-Ḫammû year C	6	900 (/1000)

[41] Contra Ziegler 1999-2000: 328b there is no reason to assume that *ARMT* XXVII 37 dates to Zakira-Ḫammû's first year of office.

The labour performance of the local manpower of Qaṭṭunān, consisting of the palace personnel and the civilian population liable for service, is 150 and 200 iku field in year A and B, respectively. Zimri-Addu proposes in year C that they perform a double workload ("If they perform day and night heavy work," *ARMT* XXVII 102: 15-16), which results in a double labour output of 400 iku field. The normative surface harvested by each workmen per season is one iku field (compare the number of soldiers commanded by Ilī-maṭar and their output, and the civilians' complaint in *ARMT* XXVII 37: 42-43), and this implies that the complete labour force at the disposal of the palace at Qaṭṭunān did not exceed 150 to 200 workers (see Table 8).

Table 8: Harvest labour performance of manpower (surface in iku's)

time	palace personnel and civilians		extra harvesters	
year A	[workers 150]	surface 150	workers 300	surface 300
year B	[workers 200]	surface 200	[workers 400]	surface 400
year C	[workers 200]	surface 400	[workers 500]	surface 500

The question how these 150 to 200 labourers relate to the total population of Qaṭṭunān deserves some consideration. The number and identity of the palace workers must have been known, but it is not clear who of the civilian population was summoned for work. It is not possible to estimate how many civilians were exempt from labour service, but it seems feasible that the authorities tried to minimize their number, in view of the perilous situation of the district. The risk of losing part of the harvest constituted a public emergency, and the authorities will therefore have extracted maximal labour service from the population. But it is not clear what this implies. One might consider that the authorities demanded one person from each household, and two in year C, but, alternatively, it is also possible that they called up every available male, or even every adult. If one assumes as a hypothesis that one harvester was summoned of every family, and take the somewhat random number of five persons as the average size of a nuclear family, the number of 150 to 200 male adult harvesters implies a minimal population of 750 to 1000 persons in Qaṭṭunān. Comparable data is lacking, except for a valuable detail in a letter of Kibri-Dagan (*ARMT* III 3), who states that the total workforce of the city of Terqa at the disposal of the palace is 400 male adults. Multiplication by five results in a total population of 2000 inhabitants of Terqa (Durand 1998: 602).

According to the letters from Qaṭṭunān, the rounding off of the harvest consisted of the following stages (see notably *ARMT* XXVII 37): harvesting, transport of the ears to the threshing floor, threshing, and transport of the barley to the city's granaries by means of carts. Large cattle were often used to trample the ears, and the mobilisation of enough heads of cattle for threshing was also a cause for discord between administrators, and is therefore covered in the correspondence. The governor Zakira-Ḫammû requests the sending of threshing cows of the king (*ARMT* XXVII 26), and Yasīm-Sūmû promises him on another occasion to send cows for the threshing of the harvest yield of four plough teams, while the civilians with their animals must thresh the barley of the remaining two teams (*ARMT* XXVII 39).[42]

In *ARMT* XIV 48, Yasīm-Sūmû clashes with the governor of Saggarātum over a similar employ of the oxen of the civilians. The king has promised the civilians to exempt them from further labour demands for the duration of a military campaign for which they have been drafted, and the governor refuses on that ground to execute Yasīm-Sūmû's order to use their animals. The letter demonstrates that Yasīm-Sūmû does not have the authority to command

[42] This letter probably dates to a later phase of the harvest of year C.

the civilians without the governor's co-operation. A parallel command structure existed: Yasīm-Sūmû and other officials in charge of the extra-palatial royal domain had full authority over the provincial palaces and other households and their personnel and other resources, but could not command the civilian population. The governor, on the other hand, was able to command, through the local authorities in the villages (the *sugāgum*-officials), the civilian population, but could not interfere in Yasīm-Sūmû's decisions pertaining to the palace domain.

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