Agriculture of the Old Babylonian Period

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1. Introduction
A discussion of agriculture in ancient Mesopotamia must still begin with the consideration advised by F. Hrozný in the introduction to his monograph, Das Getreide im
alten Babylonien (Wien, 1913), 3:

Aus der zur Zeit schon geradezu unübersehbaren Menge der babylonischen Verwaltungs- und Privaturkunden, die sich mit dem Getreide, dessen Kultur und Verwertung befassen, ersehen wir deutlich, welche gewaltige Rolle die Landwirtschaft in dem zwischen zwei mächtigen Strömen gelegenen, kanalreichen Babylonien spielte. Trotz dieser Fülle von Quellen ist mangels einer Bearbeitung derselben unsere Kenntnis des babylonischen Ackerbaus äußerst gering. Die meisten termini technici sind noch unerklärt.

Bearing Hrozny’s remarks in mind, we here deal exclusively with Old Babylonian agricultural techniques as recorded in documents, letters, in ana ittišu, and in literary compositions (such as Georgica Sumerica, which, according to S. N. Kramer, is dated ca. 1700 B.C.). It should be recognized that this discussion gives only an imperfect picture of agricultural methods since the texts differ in age and provenience.

2. Brief Review of the Most Important Literature

W. Schwenzner provided a detailed study of rural conditions in the OB period in “Zum altbabylonischen Wirtschaftsleben,” MVAG 19/3 (1915), 52–95. He dealt primarily with questions regarding seed input in relation to harvest, as well as with issues concerning the leasing of fields, gardens, and orchards. A fundamental outline of agricultural procedures was given by B. Meissner in Babylonien und Assyrien I (Heidelberg, 1920), 184–227. Although he fails to distinguish between periods, Meissner deals with land cultivation and its dependence upon climate, soil quality, and water supply. He mentions methods, agricultural products, and the processing thereof.

B. Landsberger deals extensively with agricultural methods in his commentary on tablet IV of ana ittišu. The order of the described methods in ana ittišu was partially dictated by the collection of formulae, and the author explains these methods by consulting other OB texts and documents. He also devotes a special section to the date-palm.

J. G. Lautner examined the problems of the hired laborer in his monograph Altbabylonische Personenmiete und Erntearbeiterverträge (Leiden, 1936). The original text

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1 The OB period is customarily designated as the period from the end of Ur III to the conquest of Babylonia by the Hittite king Muršili I; see D. O. Edzard in E. Cassin, J. Bottéro, J. Vercoutter, eds., Fischer Weltgeschichte. Die altorientalischen Reiche (Frankfurt, 1966), 2:165.
2 Text edition and commentary by B. Landsberger, MSL I (Rome, 1937).
4 Where possible I have provided date and origin of the texts in parentheses.
6 For further material see M. Weitemeyer, Some Aspects of the Hiring of Workers at the Time of Hammurabi (Copenhagen, 1962).
material, however, allowed for few conclusions about the agricultural methods performed by these workers.

In 1949 Landsberger partially reexamined a few agricultural issues in his article “Jahreszeiten im Sumerisch-Akkadischen,” JNES 8, 248–97. D. Cocquerillat published an article in JESHO 10 (1967), 161–223, dealing mainly with date-palms and their cultivation. In the same year Landsberger’s book The Date Palm and Its By-Products (= AfO Beiheft 10) appeared. In the appendix (pp. 56–61) he reconsidered the terms šakānu, šukunnā, šākinu, šākinūtu, and šakkīnu, which are relevant to the date-palm economy. In 1937 he had treated these terms from a different perspective.

In 1968 A. Salonen published Agricultura Mesopotamica nach sumerisch-akkadischen Quellen—Eine lexikalische und kulturgeschichtliche Untersuchung (Helsinki). In the sixth part he presents an overview of agricultural procedures dealing with the seasons and the order of the agricultural tasks: Georgica Sumerica, irrigation, plowing and sowing, harvesting and threshing. In the following section he considers labor, both human and animal.

In her demographic study Ancient Sippar (Leiden, 1975), R. Harris discusses the rural worker.

Extensive materials, mainly based on texts from Ur, were published by K. Butz in his articles “Konzentration wirtschaftlicher Macht im Königreich Larsa: Der Nanna-Ningal-Tempelkomplex in Ur,” WZKM 65/66 (1973/74), 1–58—in which he dealt with sheep- and cattle-breeding, wool and milk production, organization of the herders, and barley production; and “Ur in altbabylonischer Zeit,” Orientalia Lovaniensia Analecta 5 (1979), 257–409(where he touches on the problem of salinization and where he further mentions sesame, barley, reed, dates, fishing, and cattle-raising.


3. Cultivation of the Land

The most basic requirement for land cultivation is proper soil, the character of which determines the selection and treatment of appropriate crops. The four main components of
good soil are sand, clay, lime, and humus, and depending on the proportions of these components, the following types of soil can be distinguished: sandy, clay, marly, calcareous, humus, and stony. Regarding soil conditions in Iraq nowadays E. Wirth writes:

Entgegen der weit verbreiteten Annahme, das unterirakische Tieftand bestünde ausschliesslich aus schweren Tonen und Lehmen, schwankt die Bodengüte von Latifiya Estate auf engem Raum ziemlich stark: In nächsten Nähe des Euphrat sind zwar fruchtbare, schwere Tonböden vorherrschend. In Flussferne finden sich aber auch Lehmboden und lehmige Sandböden, teilweise sogar Kiese mit einer Korngrösse bis zu 1 cm.11

The texts of the OB period, however, say very little about soil quality. We find the expressions ‘good field’ (eq̂lum damqum)12 or ‘where it is good’ (ašar damqatu),13 ‘excellent’ (mādiš damiq),14 and ‘bad’ (mussukum).15 The other terms that are found in connection with a-šā16 (Akk. eq̂lum)17 ‘field, land’ and Šiškiši6 (Akk. kirūm) ‘orchard’,18 serve only for localizing and describing the state of cultivation.

3.1. Soil Improvement

Land cultivation is achieved to a certain extent by nature alone—water, air, light, warmth, cold, rain. In order to effect necessary soil improvement human technology is required. Soil can be improved by a favorable combination of chemical, physical, and biological relationships, the goal of all land cultivation. Such a condition may be achieved by:19

1. loosening the soil
2. turning
3. mixing
4. compacting and smoothing.

The special tasks of land cultivation are:20

12 AbB. 4, 1; 114; OBTR 308.
13 AbB. 4, 77.
14 AbB. 5, 212.
15 OBTR 308.
17 Normally it was written as a Sumerogram during the OB period. The only phonetic Akkadian writing known to me is that in AbB. 8, 108:9.
18 For the list of fields, cf. MSL 11, 4–7 (= Mr 20), 50–51, 97–101 (NfI), 129–31 (OBF 1), 136–40 (OBF 2–6), 169 (FrS), 170 (FrB), 171. For the names of fields in the Neo-Sum. period cf. Pettinato, Untersuchungen. For field and plot names in OB Sippar cf. R. Harris, Ancient Sippar (Leiden, 1975), 371–79.
19 For this meaning, cf. M. Powell, ZA 62 (1972), 191 with n. 61.
20 Cf. Landwirtschaftslehre, 3.
1. fertilization
2. production of a favorable seed-bed and sowing
3. weeding
4. cultivation during the period of growth.

3.2. Irrigation and Drainage

The regulation of the water supply is of great importance in land cultivation since an over- or undersupply of water is harmful. As we can readily learn from Georgica Sumerica, irrigation\(^\text{\textsuperscript{21}}\) was a fundamental aspect of land cultivation. We read there that fields should be irrigated three times, and perhaps even a fourth time. Irrigation was produced by a series of canals, which was feasible only by diverting water from the Euphrates.\(^\text{\textsuperscript{22}}\) Water was diverted from a major canal (\textit{nárum}, Sum. \textit{i₇})\(^\text{\textsuperscript{23}}\) to a smaller one (\textit{atappum}, Sum. \textit{pa₅}), which irrigated a whole district or orchard or into an \textit{ikum} (Sum. \textit{e}), which supplied a field.\(^\text{\textsuperscript{24}}\) The fields themselves were watered by irrigation furrows.\(^\text{\textsuperscript{25}}\)

The work connected with irrigation and maintenance of the canal system involved primarily cleaning and dredging.\(^\text{\textsuperscript{26}}\) This occurred in late summer\(^\text{\textsuperscript{27}}\) in order to remove deposits and to insure that enough water was available for the fields at the end of the canals. The canal system could be enlarged to irrigate more surface. This could also be attained by extending old canals or by the addition of new canal branches. It was also necessary to strengthen dikes and dams. The canal workers were mainly hired laborers (Akk. \textit{agrum}, Sum. \textit{lú-hun-gá}).\(^\text{\textsuperscript{28}}\) According to \textit{LE} §§ 7-11, each earned one shekel (\textit{gin}) of silver per month or one \textit{sUa} (about one liter)\(^\text{\textsuperscript{29}}\) of barley per day. This suggests that the canals were under official control since such matters are often dealt with in the letters of Hammurapi.

Another way to irrigate the land was by drawing water. The term for it in \textit{ana ittišu} is \textit{dilútu}, but in the OB field-renting contracts dated under Samsu-iluna it is \textit{dilum}. Drawing was necessary when the field was higher than the canal.\(^\text{\textsuperscript{30}}\)

\(^{21}\) F. Christiansen-Weniger, \textit{Ackerbauformen im Mittelmeerraum und Nahen Osten dargestellt am Beispiel der Türkei} (Frankfurt-am-Main, 1970), 180-83, 269-96; K. Kreeb, \textit{Ökologische Grundlagen der Bewässerungskulturen in den Subtropen. Mit besonderer Berücksichtigung des Vorderen Orients} (Stuttgart, 1964) have occupied themselves with the problems of irrigated fields.

\(^{22}\) The Euphrates can be considered a desert river. The Tigris, on the other hand, is a mountain river. According to Wirth, \textit{Agrargeographie des Irak}, 186, the land along the Tigris can be distinguished from the land along the Euphrates by the following important point: "Die Agrarlandschaften entlang dem Euphrat sind vorwiegend alt, traditionell und gewachsen, die dem Tigris entlang dagegen jung, modern und gegründet. Für den Euphrat sind alte Wasserräder und Gopelschöpfwerke charakteristisch, für den Tigris Motorpumpen."

\(^{23}\) This word also has a double meaning—river/canal—in other Semitic languages.


\(^{25}\) Cf. Landsberger, \textit{MSL} I, 157; and for Ur III see Pettinato and Waetzoldt, \textit{Saatgut und Furchenabstand}, 272.


\(^{27}\) According to M. Kupper, "Le calendrier de Mari," in M. A. Beek et al., eds., \textit{Symbolae Böhl} (Leiden, 1973), 269–70, it occurred during the summer. This is true for Mari because these measures could only be undertaken about two or three months after the Tigris and the Euphrates receded from their highest level.


\(^{29}\) For the exact capacity of one \textit{sUa} during the different periods, cf. I. J. Gelb, \textit{JAOS} 102 (1982), 588-89.

\(^{30}\) This was probably the case for fields near the Tigris.
Concerning drainage the texts mention nothing. But it must be postulated that it was done in order to prevent salinization. This was also proposed by Russel,\textsuperscript{31} though it was then negated by Th. Jacobsen.\textsuperscript{32} More recently Jacobsen seems to have accepted this proposal and has gathered the references to draining swamps in the time of Uru-KA-gina and Urnammu.\textsuperscript{33} The procedures for draining are draining and leaching. For draining the Old Babylonians probably used irrigation canals, as today.\textsuperscript{34} Leaching, which may not have been carried out in Middle and Northern Babylonia because of the lower water level,\textsuperscript{35} was, according to Butz, absolutely necessary in the South.\textsuperscript{36}

3.3. Special Tasks

As mentioned above, fertilization and the production of a favorable seed-bed are necessary for soil improvement. In this study I refer to fertilization, fallowness, and cultivation.

3.3.1. Fertilization

The produce during the OB period may have been about 20 to 30 kor of barley per bur.\textsuperscript{37} To produce such yields supplementary soil nutrients were probably necessary.\textsuperscript{38} These could have been brought with the flood-waters. But the nutritive value of the Euphrates and the Tigris is not that of the Nile.\textsuperscript{39} It is therefore likely that additional mineral fertilizers were used. The procedure of fertilization, which was also postulated for Mesopotamia by Butz,\textsuperscript{40} is not attested in the texts. But there are some hints that underline this hypothesis. In support of fertilization one may cite the letters \textit{AbB. 3:65} and \textit{110} (both from Lagaba) and \textit{AbB. 7:90}, which request that fertilizer be supplied and collected.

Fertilization may also be produced by grazing livestock (see CH §§ 57–58). This may increase the yield of barley shoots. In addition to manuring, one may also consider green

\textsuperscript{32} Loc. cit.
\textsuperscript{33} Cf. \textit{Bibliotheca Mesopotamica} 14 (1982), 66.
\textsuperscript{34} Fernea, \textit{Shaykh and Effendi}, 148, writes: "In the past, the canals constructed by the tribesmen did not hold water all year. They were filled by the use of temporary dams in the Daghara, and when the cultivation cycle did not require water the canals were allowed to drain, a vital process for this low-lying soil as it permitted excess water to drain from the land."
\textsuperscript{36} Butz, \textit{Orientalia Lovaniensia Analecta} 5 (1979), 269–72. An indication of this may be found in \textit{AbB. 5}, 198:16 a-saši-ši-ši-it, if it is derived from šaḫātu-um as M. Stol, \textit{JEOL} 25 (1977–78), 53, suggests. The term makārum must also be taken into consideration; cf. \textit{CAD M/l}, 126b: "The term makāru denotes the flooding of an entire field, whereas šaqū seems to refer to a method of irrigation which uses small ditches or furrows."
\textsuperscript{37} These results are to be derived from B. Kienast, \textit{Die altbabylonischen Briefe und Urkunden aus Kisurra} (Wiesbaden, 1978) = \textit{Freiburger Altorientalische Studien} 2, text 97, where the yield was 20 kor; and text 115, where the proportion is 1:1 and 1:2, 5 (pertaining to seed and yield). The same result is found in \textit{TCL I}, 230. On the reverse of the tablet we find between 22.5 and 29 kor of barley, including rent (there must be a scribal error in line 40). Excluding rent, we have between 18 and 20 kor of barley: I disagree with the conclusions of Butz, \textit{Orientalia Lovaniensia Analecta} 5 (1979), 296–98.
\textsuperscript{38} The transcription which is used for measuring volumes and surfaces follows the system used by M. Powell, ZA 62 (1972), 165–221: 1 ikū = 0; 0.1; 1 šeš = 0; 1.0; 1 bur = 1; 0.0; 1 sīla = 0.0.0.1; 1 bān = 0.1.0.0; 1 nigida = 0.1.0.0; 1 gur = 1.0.0.0.
\textsuperscript{39} Note that in modern Iraq one often does without additional fertilization; cf. Fernea, \textit{Shaykh and Effendi}, 41.
\textsuperscript{40} Butz, \textit{Orientalia Lovaniensia Analecta} 5 (1979), 305.
fertilization. Planting legumes was probably cheaper than the above-cited methods of fertilization. This is suggested by the sequence: *ana še še-giš-la ā gū-tur* "for barley, sesame, and chickpeas," which is found in *esēp-tabāl*41 documents from Susa. Another important text is *YOS 12,1 (Si)*, describing the receipt of barley and *sahlū.*42 *Sahlū* must be a legume, used as a preparatory crop for barley.

3.3.2. Fallowness

Fallowness is indicated in the OB period by the terms *apītum* (only *AbB.* 3:79, Lagaba), *nidītum,* and *terīqtum.*43 One left land fallow to prevent progressive salinization, to develop nutritive elements, and to destroy weeds. One may distinguish a semantic difference among the terms for fallowness: *apītum* denotes 'wasteland'; *nidītum* is sometimes attested in connection with sustenance fields, though only in Babylonia proper; and *terīqtum* signifies fallowness.44 That fields were left fallow is further suggested by the leasing and purchasing of stubble-fields, which was customary in the Isin-Kisurra-Nippur region.

3.3.3. Cultivation

The type of cultivation termed *teptītum,* which took between two and three periods of tillage, demands extra effort in order to produce the desired microflora. This was taken into account, and tenants were charged a lower rate of interest or were given an arable field for their own use. To make a field arable required the following steps: construction of new canals, grubbing, grading, and breaking up. These activities are apparently subsumed by the verb *petītum* 'to open, to develop'.

3.4. Techniques

Techniques of soil cultivation have been arranged in the following sequence:45

1. (majjārī) *mahāšum;* 2. (parākum)-marārum; 3. *šakākum;* 4. *šebērum;* 5. *šalāšum;* 6. *šipram epēšum;* 7. *šir'am* (*abšennam*) *šakānum;* and 8. *erēšum.* Items (1) through (6) are activities the precede drill-plowing.46 Items (7) and (8) are two different expressions for

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41 For this type of document, cf. P. Koschaker, *Griechische Rechtssurkunden* (Leipzig, 1931), 90–98. Contrary to the common belief that these are derived from frozen forms of the imperative, I would derive them from the infinitive.

42 *AHw.*, 1009b, suggests "Kresse?" but according to *AbB.* 7, p. 7 ad note a., this translation is incorrect. Butz, *Orientalia Lovaniensia Analecta* 5 (1979), 315, considered it as lentil vetch; but now he would not venture a translation (oral communication). In texts from Boghazkoi *sahlū* (*Sum. za-ab-lišar*) is used in some passages to designate the grass which grows up over ruins and uncultivated fields. It is also used in medical texts, and the seeds are associated with ailments; cf. H. Hoffner, *Alimenta Hethaerorum* (New Haven, 1974) = *AOS* 55, 110–11.

43 According to *AHw.*, 1349a *terīqtum* is the Akkadian equivalent of Sumerian *KI.KAL.* The term *kankal₄₅* for *KI.KAL* (cf. B. Landsberger, *JNES* 8 [1949], 277, n. 92) is in my opinion used for virgin land.

44 Fallowness is not only discussed in the newer literature, as Butz, *Orientalia Lovaniensia Analecta* 5 (1979), 317, has maintained. It already appears in Landsberger, *MSL* 1, where Christiansen-Weniger (pp. 151, 159) assumed six months of summer fallowness. Jacobsen wrote: "A yearly fallow gave the fields rest, replenished them, and allowed shoq and agul to dry them deeply" (*Sumer* 14 [1958], 82).

45 This consequence is given partly in *ana ittišu* and was compiled by Landsberger (*MSL* 1, 152, 6). It is added by the author because the expression *šipram epēšum* includes activities (1) through (5). This can be seen by comparing CH §§ 43–44 to §§ 62–63 and various documents; cf. Landsberger, *MSL* 1, 160. For example, in the letter *PBS 7, 103 erēšum* occurs following *šipram epēšum.*

46 Cf. Landsberger, *MSL* 1, 153.
drill-plowing.

3.4.1. majjāri mahāṣum ‘to deep-plow’

Deep-plowing was performed in the fall\(^{47}\) with the harbu-plow or the majjāri-plow (Sum. apin-šu-gur\(_{10}\)\(^{48}\)). We do not know the distance between furrows nor the depth of the plowing.\(^{49}\) Texts indicate that this plow required twice as many oxen as the seed-plow.\(^{50}\) For stealing a harbu-plow one had to pay three shekels of silver (CH §260) instead of the five silver shekels one would have to pay for stealing a seed-plow (ibid. §259). We may explain this in two ways: first, the harbu-plow was very heavy and was more difficult to steal; second, its construction was simpler than that of the seed-plow.

The term majjāri mahāṣum is also mentioned in CH § 44 in a passage concerning the non-cultivation of virgin land: ina rebum šattim eqlam majjāri imāḥās imarru u išakkak “In the fourth cultivation period\(^{51}\) he (the tenant) will deep-plow, break up, and harrow.” The text does not limit the procedure to virgin land,\(^{52}\) It is simply some sort of cultivation: the plants receive more nutritious aliments; root development is improved; the soil absorbs more rain; weeding is easier; and the soil can be more intensively fertilized. This procedure meant more intense use of the soil and accordingly demanded a higher investment (such as the renting of a span of oxen plus laborers).

3.4.2. pariikum/mariirum ‘to cross-plow/to break up’

After the act of majjāri mahāṣum ‘to deep-plow’ follows the act pariikum ‘to cross plow’—that is, one plows perpendicular to the preceding furrows. Only texts from Larsa\(^{53}\) mention this method. The operation was identical to deep-plowing.\(^{54}\) Another term that describes the act following majjāri mahāṣum is marārum. Until now there are only two references to this from North Babylonia, CH § 44 and LFDB 10. The meaning of marārum is not yet clear (see AHw. and CAD, s.v.), but marārum must denote the same procedure as pariikum, that is, breaking up. The difference between the two may be that pariikum was done with a plow, while marārum—because of the location of the field—was performed

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\(^{47}\) Cf. Landsberger, JNES 8 (1949), 279, n. 104.

\(^{48}\) Cf. MSL 5, 16:123–24 (= Hh 7). According to Landsberger (MSL 1, 161), the only equivalent of giš-apin-šu-gur\(_{10}\) is harbu, since majjāri appears in OB only in the phrase majjāri mahāṣum or iniš majjāri; for references, see the dictionaries. In Georgica Sumerica 1. 31, however, a giš-bardil is mentioned before giš-apin\(_{1}[-šu-gur\(_{10}\), which equals majjāri according to Hh 5, 107 (= MSL 6, 15). A harbu-plow was constructed with a peg and a plowshare; cf. Salonen, Agricultura Mesopotamica, 65.

\(^{49}\) The text PBS 8/2, 134 (Si, Nippur) gives the measurements for length, width, and area. After this follows apin-šu-gur\(_{10}\) (ll. 5, 26, 28, 29), but I cannot draw any conclusions from it.

\(^{50}\) Cf. LFDB 7, 10, 15; and Georgica Sumerica 1. 23.

\(^{51}\) The translation results from the recognition that by renting a field one has to think of one year of cultivation and one year of fallowness. For Pre-Sargonic times this was demonstrated by S. Yamamoto, Acta Sumerologica 2 (1980), 176. For the NA period it is proved by the texts themselves; see the references in CAD K, 206f., s.v. karaphu. This practice can be found even nowadays in central Anatolia; of this Christiansen-Weniger writes: “In manchen Gegenden wird der Pachtberechnung nicht das Kalender-, sondern das Erntejahr zugrunde gelegt, man fasst also Brache-Anbau zu einem Doppeljahr zusammen für das die Pacht zu entrichten ist” (Ackerbauformen, 316).

\(^{52}\) Cf. Salonen, Agricultura Mesopotamica, 68.

\(^{53}\) Abb. 4, 68 (Hammurapi to Šamaš-šašīr); Riftin, SVAJD 53 (R.-S., Larsa); TCL 11, 236 (undated, Larsa); YOS 12, 560 (Si, possibly Larsa).

\(^{54}\) This is shown by Riftin, SVAJD, 53:11: 15.0.0.0 gur ša-gal 2 giš-apin-gu₄ ša ma’a-a-ri im-ša-šāu-ri-ku “15 kor of fodder for two plow-oxen, who plowed deep and across.”
with a hand implement.

3.4.3. *šakākum* 'to harrow'

After the plow has loosened, mixed, and turned the soil, the harrow smooths and levels it. The harrow itself consisted of several sections;\(^{55}\) it had 66 teeth, according to *YOS* 2:4,\(^{56}\) and a tongue.\(^{57}\) It was drawn by a span of yoked oxen. A field worked in this manner was called *šikkatum*.

This procedure, which is found in the lexical lists\(^{58}\) and Georgica Sumerica 1. 32, is always mentioned before *šebērum* and *šalāšum*. This connection occurs quite seldom in the texts.\(^{59}\) The association of *šakākum* and *šebērum* is more frequent, and *šakākum* is attested more often than *šebērum*. This might suggest that *šebērum* was not an absolutely essential procedure before seed-plowing.

3.4.4. *šebērum* 'to break up'

Landsberger\(^{60}\) deduces from *TCL* 11:149 (Ḥa, Larsa; see above) that the activity of breaking up clods could be dispensed with. The breaking up could, however, be identified as the rolling that was performed (Ḥb 5:109–90) with implements bearing the Akkadian names *buduššu* and *argugu*. The texts mention nothing of this procedure.

3.4.5. *šalāšum* 'to harrow'

This procedure, which is very seldom mentioned (see 3.4.3. above), means literally 'to do for a third time'. With respect to soil cultivation, it refers to a second harrowing.

3.4.6. *šipram epēšum* 'to fulfill the work'

All the above-mentioned techniques are included by the expression *šipram epēšum*.\(^{61}\) In addition, it could denote completion of the remaining work, as in contracts and letters—though not in lists—no more than three procedures are mentioned. Whether it might encompass sowing, too, is an open question. Curiously, sowing is not found explicitly in texts in which *šipram epēšum* occurs.

3.4.7. *šīr'am šakānum* 'to drill'

Once the field has been prepared, seed furrows are made. The procedure is called *šīr'am šakānum* (Sum. ab-sīn gar) and also means 'sowing'. The expression *šīr'am šakānum* was used only until the time of Samsu-iluna and was apparently not employed in the regions of Sippar, Dilbat, and Kiš. Furrows for the winter seeding were made in the months from Elūl to Araḥšamna (the sixth to eighth months).\(^{62}\) For the summer crop the furrows were

\(^{54}\) MKJ 9:13:3 *giš-um-giš-gān-ūr*.

\(^{55}\) *CAD* M/1, 368, gives the further reference *UCP* 10, 141, no. 70:22, but its reading is incorrect (see *AHw.* , 628).

\(^{56}\) The term *emšum* (*BE* 6/2, 137, undated, Nippur), lit. 'abdomen', refers to the front of the harrow (so Salonen, *Agricultura Mesopotamica*, 108).

\(^{57}\) Cf. *ana itīšu* tablet 4, i:35–38; *SLT* 211, iii:15–17.

\(^{58}\) *BIN* 7, 56; *TCL* 1, 174 (implies gardening); *YOS* 2, 151 (Larsa), *šalāšum* is always used in the D-stem.

\(^{59}\) *MSL* 1, 163–64.

\(^{60}\) Sometimes *epēšum* is used without *šipram*; e.g., *AbB.* 4, 154 (Ḥa); *OBTR* 297, 309.

\(^{61}\) From the sixth to the seventh month: *VS* 13, 69 (R–S., Uruk); *OECT* 8, 15 (Ḥa, Larsa); *TCL* 11, 152 (Ḥa, Larsa); *YOS* 12, 332 (Ṣi), 336 (Ṣi), 530 (Ṣi). In the seventh month: *TCL* 11, 188 (Ḥa, Larsa). From the sixth to the eighth month: *YOS* 12, 176 (Ṣi). *AbB.* 4, 154 may apply to the eighth month.
tilled following the winter harvest, a practice still in use in modern Iraq.

Seeding was done with a seed-plow. Furrows were usually 75 cm apart, and one-sixtieth of the seed was used per nindan x ab-sin, according to PBS 8/2, 134 (Si, Nippur).

3.4.8. erēšum ‘to seed-plow’

In contrast to the other Semitic languages, the stem hr-t in Akkadian has the special sense ‘to seed-plow’. Akkadian has no special word for ‘sowing’. The use of erēšum to specify seed-plowing—a technique that minimizes seed loss—reflects the advanced state of Mesopotamian agriculture. The period of seed-plowing ended by the eighth month (giš-apin-du₈-a), according to the month-name in the Nippur calendar. It was to begin in the sixth month, and, according to BIN 7, 192, two spans of oxen were to be supplied no later than the tenth of the seventh month. By contrast, TCL 17, 5 (Tell Sifr) says that seed-plowing should be finished during the eighth month, while TCL 18, 78 (Tell Sifr) says that it should not be finished before the twentieth of the ninth month.

The same plow that was used to plow a seed furrow (epinnum, Sum. apin) served for seed-plowing. Following the description of Christiansen-Weniger, it consisted of a plow-beam, earth-boards, handles, and a seed-funnel. It was drawn by a span of oxen, and its operation required three persons—one for the plow, one for the oxen, and one for filling the funnel. According to TCL 1, 230 (Aṣ', North Babylonia) and 239, a hectare took about 85 liters of seed (zerum, Sum. še-numum).

3.5. The Growing Period

Sowing was mainly performed in the fall. The summer, when spotted barley (šegunum, Sum. še-gu-nu) was probably sown, figured less importantly with respect to sowing. Otherwise barley (še'um, Sum. še) with flat heads was sown. This type was less productive

63 AbB. 6, 173, in connection with petûm ‘to open’.
64 Cf. R. McC. Adams, Land Behind Baghdad (Chicago, 1965), 16.
65 For the distance between seed-furrows in the Neo-Sumerian period cf. Pettinato and Waetzoldt, Saatgut und Furchenabstand, 159–90.
66 Cf. B. Landsberger, OLZ 29 (1926), 764.
68 Cf. Aro, loc. cit. He explains that in Akkadian it coincides with the word ‘to winnow’, zarûm; cf. CAD Z, 71b. He thinks that in all Semitic languages ‘to sow’ and ‘to seed’ derive from a similar, but not identical, root. Fronzaroli, Studi sul lessico, 310, distinguishes between a root dra’ ‘to sow’ and dar’ ‘to seed’; cf. ibid., 293–94, 317.
70 G. Conti, Rapporti tra egiziano e semitico nel lessico egiziano dell’agricoltura (Firenze, 1978), 75, explains that apin denoted a ‘break-up plow’ until Ur III; thereafter it meant ‘seed-plow’.
72 Pettinato and Waetzoldt, Saatgut und Furchenabstand, 270–71 with n. 18.
73 In contrast, zērānu according to CAD Z, 87b means “fee paid by a tenant for (additional) seeding.”
74 Cf. W. Schwenzer, MVAG 19/3 (1914), 61. Landsberger was skeptical about this calculation because he thought it was the amount of seed for each of several persons, rather than the amount for one person.
75 Cf. Landsberger, JNES 8 (1949), 285.
than barley with round heads, but it had larger grains. The most common grain was barley, because it was much more resistant than spelt (kunāšum, Sum. zīz) and nude wheat (kibtum, Sum. ĝīg). The seed (zērum, Sum. še-numun) either was produced by the tenants themselves—that is, they took it from the crop yield—or it was purchased by them. This additional purchased seed is termed zērānu, which is attested for barley, sesame, chickpeas, and—once—sahlu. The texts do not say whether the grain was treated in any special manner prior to seeding. It might, for example, have been prepared against the Samanadisease, blight.

The following operations were performed during the growing period. They were reconstructed by Landsberger, MSL 1, 165, according to ana ittišu, tablet 4, i:26–34; TCL 1, 174 (As); and the letter VS 16, 179 (= AbB. 6, 179):

1. pi šer'i ussupu 'to hill' (?)
2. eki esēpu 'to hill' (?)
3. kirbannā laqātu 'to pick up clods'
4. kaddara lamā 'to fence in'
5. šabīta kuššudu, erīta dekā 'to drive away the gazelle, to shoo away the locust'
6. šibāra dekā 'to drive off the sparrow(?)
7. mē šaqi/dašā 'to water/draw water'

Landsberger interpreted the first procedure (MSL 1, 166) as 'to heap up', that is, to hill. This gives support to the plant, loosens the soil during the growing period, assists radication, and also eliminates weeds. The second task, which is only found in TCL 1, 174, concerns work connected with the irrigation system: 2 erēn e-si-ip eḫ-[a](1. 3). The third procedure, according to Landsberger (ibid., 167), prescribes that big clods remaining on the fields be carried away by hand, by hired men or boys. An alternate method of removing big clods is to break them up with a pick (heptām; TIM 4, 40; CT 48, 15). The tool (akkullum, Sum. giš-nīg-gul) was used mainly in Ur III and at Nuzi, though it is mentioned in OB, too. The fourth task is only mentioned in ana ittišu. It is followed by the extermination of pests (items 5 and 6). Ana ittišu also represents this stage by reference to Sum. buruš and Akk. eribu 'raven, crow' (also TCL 1, 174) and iššāruštu 'birds'. In YOS 2, 115 (Larsa) we find in this context the cricket (ṣāṣīrum) and in ana ittišu the sparrow. The
The various procedures for harvesting have been compiled by Landsberger in MSL 1, 169–70. OB has three different expressions for ‘harvest’. The most general term is ebūrum (Sum. buru₁₄) which, according to its use in AbB. 6, 173, refers to the harvest of the winter grain. From a statistical point of view, the next term is esē̄dum ‘cutting harvest’ (see ARDēr 80), and the third hurpu ‘early harvest’, that is, the harvest that took place before the grain was completely ripe. Sometimes we find a special type of crop—sesame or barley—in connection with ebūrum.

The first harvest event is cutting (esē̄dum) with the sickle (unudusu-gur₁₀). Afterwards stalks of grain were collected (ḥamāmum) into sheaves. Once the sheaves were bound (rakkusum, an expression found only in lexical texts), they were piled in loose stacks. The stalks were dried naturally and spread on the threshing floor (ana maškani šulū/tabāku) by the zābilum. OB references to this activity are known only from the time of Samsu-iluna. The sheaves were then untied (petūm) and threshed. Threshing was accomplished by trampling (dāšum) and flailing (nardānu). Salonen had thought it might have been done with a threshing sledge, but Landsberger had already refuted that possibility. Threshing separated the grain from the chaff, which is termed either zukkūlm or zarūm. Because Sum. se-hi or al-(la)-e is equated with zarūm, se-lā must mean to winnow (with a fork). After winnowing the grain lay separate from the chaff (ina marri subalkutu ‘to winnow with a shovel’). A further cleaning operation could be performed by sieving (nahālum). What procedures are indicated by ana ḫattī šunīlū ‘to lay out with a stick’ and pašārum ‘to separate’ is unknown. The final harvest activity was the storing of the grain in bins (ana našpaki šulūšapāku).

The harvest was a time of economic boom, as the increased number of contracts for harvest workers suggests.

86 At harvest time the loans had to be repaid.
88 Cf. Salonen, Agricultura Mesopotamica, 268, for the sheave binder—which is poorly documented in the texts.
89 Salonen, loc. cit., notes the further labors as tab, še kar tab “Garben gegeneinander (zum) Trocknen aufstellen,” šu ur “nivillieren,” še ti-(vig) “Ähren sammeln,” še il, še gā(gā)/zabālu “Gerstegarben tragen,” še ma-a qāda/sadādu “Gerstegarben mit dem Boot (auf die Tenn) schleppen,” maškana dummuqu “die Tenn in Dreschordnung bringen.”
90 Salonen, loc. cit., inserts before še a-ta du₈ “Gerste vom Wasser befreien.” The conclusions of Landsberger, MSL 1, 137, are irrelevant because the opening relates to the sheaves and not to the ears.
91 Landsberger, MSL 1, 171.
92 Landsberger, ibid., 173–75 considers these expressions but can give them no plausible definitions.
93 Cf. J. G. Lautner, Altbabylonische Personenmiete und Erntearbeiterverträge (Leiden, 1936) and Weitemeyer, Some Aspects of the Hiring of Workers.
4. Special Fields and Their Produce

4.1. Field Produce

4.1.1. Grain

First among field produce are the cereals, which belong to the family of grasses. Because of its strong resistance to salt the most frequently cultivated cereal was barley (*še'um, Sum. še; see above). Rare subspecies of barley are also found: *šegunnūm* ‘spotted barley’, *šeguššum*, a kind of barley,96 and *saḫharum* ‘speckled barley’.97 We also have terms for specific types of grain in addition to the general *uṣṭetum: kibṭum* (Sum. *gig*) ‘wheat’ and *kunāšum* (Sum. *zīz-an-na*) ‘spelt’, for example. The meaning of *burrum*98 and *napšartum* is not clear. Besides this, there was a distinction between early and late grain, *ḫurpum* and *ušṭetum* respectively.

Grain was also cultivated for fodder, if the definition of *tabriuš* as “Futtergerste”99 is correct.100 The procedures for cultivating grain have been delineated above.

4.1.2. Legumes

About the cultivation of legumes we have no information. The texts mention only some of the varieties of legume: *kakkūm* (Sum. *gū-tur*) ‘lentil’ or ‘small bean’ and *hallurum* (Sum. *gū-gal*) ‘chickpea’, which are attested in texts from Elam together with barley and sesame.

4.1.3. Fodder Plants

Little can be said about the cultivation of fodder plants. Only *lapūtum* ‘turnip’101 and numun *šambalītim* ‘fenugreek’102 are mentioned. *Adamatum*103 and *kunāšum*104 are glossed as “(blood-colored) plant.” For *tabriuš*, see above.

4.1.4. Oil Seeds

Oil was extracted mainly from sesame (*šamaššammum, Sum. še-giš-i*)105 and, at Mari, from olive trees (*serdu*)106 as well.

The cultivation of sesame was treated by F. R. Kraus in JAOS 88 (1968), 116–18. The steps in its cultivation are:

1. *mahāhum* ‘to soak’

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94 Hrozný dealt with this theme extensively in *Das Getreide*.
96 *AHw.*, 1209a.
98 Cf. *AHw.*, 140a; *CAD* B, 330b.
99 *AHw.*, 1299b.
100 According to *CAD* B, 337a, this word refers to a kind of meadow.
101 *AbB.* 3, 11; *TCL* 18, 87.
102 *OBTR*, 38.
103 *TCL* 10, 100.
104 *RA* 15, 135.
105 Kraus, *JAOS* 88 (1968), 114, does not accept the translation “linseed.”
106 The incomplete text *TCL* 17, 62 from Larsa hardly supports von Soden’s reading *[še]-e?-er?-da?-am (l. 18); cf. *AHw.*, 1037a.
Before sowing, the seed was soaked. According to AbB. 3, 65 this should not be done before the appearance of Sirius.107 After sowing, the sesame field was leveled. Even in texts dealing directly with sesame there is no information giving planting instructions.108 The harvest procedure is termed nasāḫum ‘to pull out’. We do not know the degree to which the sesame was left to ripen. Afterwards, the field was deep-plowed. Procedures 5–7 above comprise the steps taken after the harvest. The list omits hoeing (rapāqum), but it is attested in CHJ:HE 123 (Si, Larsa).

About sesame yield we have no information,109 but the steps in producing sesame oil are delineated in CT 8, 8e (Ad) and 36c (Ad).

4.2. Pasture Land

The expressions that seem to designate a field of grass or herbs are, for ‘meadow’, dišūm (YOS 10, 9), which at Mari (ARM 6, 23) refers to pasturing, and possibly usallum,110 which is sometimes translated as a river meadow. More precisely, it refers to the fertile strip along a river or canal.

Pasture-land proper is designated by rīțum and perhaps laskum,111 and nawūm is the name for an enclosed pasture.112

5. Fruit and Vegetable Growing

5.1. Fruit

Fruit growing is almost exclusively limited to the cultivation of the date-palm (see below). The texts sometimes mention other fruit-bearing trees, such as hašḫurum ‘apple’ (TCL 18, 87); kamiššarum ‘pear’ (ARM 4, 42); armannum ‘apricot’ (OBTR 33; ARM 12, 201); bāḥḫum113 ‘plum’; and tittum ‘fig’ (AbB. 7, 187; ARM 9, 282; 12, 573, 738; OBTR 146). The texts go into much greater detail concerning the planting and cultivation of date-palms.114 These are listed not only in ana ittišu (tablet 4, iii:18–56) but also in CH §§ 64–66.
According to *ana ittišu* (tablet 4, iii:22–24), a gardener (*nušāmitum*, Sum. *nu-šartum*) or garden supervisor (*šandanakku*, Sum. *šadan*) was allotted three years to oversee the planting and care of a new grove of date-palms. During this time the palm shoot (*ligišu*; TCL 11, 158), which had grown for three years on the mother tree, was planted. Nothing is said about the interval between the planted shoots. The grove had to be enclosed by a mud wall and watered. Then the gardener had to arrange for their cross-pollination. He was also responsible to protect the trees. The yield of dates was initially unpredictable and depended upon the percentage of fertile (female) palms in the grove.

Little is known about harvest procedures. The time of the harvest is given as *u₄-burul₄-zū₂-lum* “at the time of the date harvest” and took place in the North in the fifth and sixth months and in the South during the seventh and eighth months. After the harvest came drying.

The harvested dates had the following designations: *suluppum* (Sum. *zū₂-lum*) ‘date’ in general; *kimri* ‘green, bitter, immature, inedible’; *halal* ‘(lit.) sour, yellow, reddish, already mature’; *ratāb* ‘full of sap, brown’; *tamar* ‘dry’ (the quality familiar to us).

### 5.2. Vegetables

The terminus technicus for vegetable cultivation is either *mušarim* or *šikin mušarim*; the activity was performed by a gardener. The following vegetables were cultivated: *šumun* ‘garlic’; *šamakīlum* ‘onion’; *gešānum* ‘a kind of leek’; *karašum* ‘leek’; *qiššum* ‘cucumber’. The meanings of *samīnum*, *nagappum*, *ezīzum*, *nahutum*, *sahlām* (see above), and *zarzarum* are not quite clear.

According to *ana ittišu* and TCL 1, 174, the procedures of vegetable cultivation are as follows:

<table>
<thead>
<tr>
<th><em>ana ittišu</em></th>
<th>TCL 1, 174</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. rapāqum</td>
<td>- - -</td>
</tr>
<tr>
<td>2. šakānum</td>
<td>maḥāhum</td>
</tr>
<tr>
<td>3. pašārum</td>
<td>pašārum</td>
</tr>
<tr>
<td>4. - - -</td>
<td>šullušum</td>
</tr>
<tr>
<td>5. erešum</td>
<td>ḫarašum + zarūm</td>
</tr>
<tr>
<td>6. šaqūm</td>
<td>- - -</td>
</tr>
<tr>
<td>7. dalūm</td>
<td>dalūm</td>
</tr>
</tbody>
</table>

The first step, *rapāqum*, is performed with the *allu*-hoe. The harrowing could have been done with the *maškakātum*-harrow, which was used in other field work. Next came soaking down (*maḥāhum*) the garden and loosening the soil with the *napšārum*, which was also perhaps a kind of harrow. Like the fields, the garden, too, could be leveled a third

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115 Cf. Landsberger, *MSL* 1, 193.
116 For VS 7, 27 (Si, Dilbat) and VS 13, 18 (Ḫa, Sippar?), cf. Cocquerillat, *JESHO* 10 (1967), 220.
117 Cf. Landsberger, *MSL* 1, 201.
118 M. Powell, *ZA* 62 (1972), 191 with n. 62, considers *šar/mušarā* as a garden plot or vegetable garden.
119 Cf. CAD *M* 2/2, 262a.
120 In accordance with J. Bottéro, *RLA* 3, 342, and contrary to *AHw*.
121 Cf. Landsberger, *MSL* 1, 186.
123 For a description of this hoe, cf. C. Wilke, *RLA* 4, 33.
time. Seed-furrows were then made, sometimes with the *mahrašum*, apparently a planting stick. The expressions *erēšum* and *harāšum* both clearly show that certain vegetables had to be sown and others planted. In this connection *zarūm* means ‘to sow’; for its use ‘to winnow’, see above. Finally, when the seed-bed was completed it had to be provided with an adequate supply of water. No other procedures of garden work are mentioned.

6. Summary

In this article I have tried to show how agriculture, excluding the breeding of livestock, was performed in the Old Babylonian period. After presenting an overview of the most important literature on the subject, I turned to the cultivation of the land. Beginning with the tasks which a farmer/tenant had to fulfill before he was able to proceed with the cultivation itself, I delineated the practical techniques and labors that a farmer would perform during the growing period and at harvest time. In the course of discussion, I took account of the cultivation of the best-known plants and fruits and vegetables.