Irrigation and taxation in Iraq 6th to 10th Century

Working Paper

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An initial sketch

This paper represents an initial attempt to compare taxation and water management in Iraq before and after the Arab conquest. I have already analysed land tax in Iraq in the early Islamic period, but for several reasons I feel it is necessary to go back to the period when Babylonia was subject to the authority of the Persian kings. There are two reasons for this. Firstly, some eminent scholars, such as Michael Morony, have argued that a period of economic growth started in Iraq (and more generally, in the Sasanian Empire) from the VI century, continuing deep into the early Islamic period[1]. As we aim to offer an explanation of the process of economic growth and decline in the long run, it is necessary to remove the somewhat artificial threshold of the Arab conquest. Secondly, the continuity in the institutional framework of the two 'worlds' (pre-Islamic and Islamic) is sometimes striking. For example, an historian of Sasanian law, Maria Macuch, has illustrated the elements of continuity in a 'typical' Islamic institution, the famous *waḳf*-, and the foundation *ruwān rāy* (Middle Persian: "for the soul")[2]. It is necessary to understand thhe patterns of institutional changes if we want to understand the peculiarities of Arab-Islamic institutions in post-conquest Iraq: to analyse the economy of Islamic Iraq without knowing upon what basis it was built would prevent us from identifying these peculiarities.

Water management was crucial for agriculture in Iraq. The delicate ecological balance that

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[1] M. Morony, *Economic Boundaries? Late Antiquity and Early Islam*, in "Journal of the Economic and Social History of the Orient", 47/2 (2004), pp. 166-94, pp. 183-184.

[2] M. Macuch, *Sasanidische Institutionen in Früh-islamischer Zeit*, in *Transition Periods in Iranian History*. Actes du symposium de Fribourg-en-Brisgau (22-24 Mai 1985), Leuven 1987, pp. 177-9; M. Macuch, *Eine sasanidische Stiftung «für die Seele»-Vorbild für den Islamischen* waqf?, in *Iranian and Indo-European Studies. Memorial Volume of Otakar Klíma,* Praha 1994, pp. 163-180

allowed high soil productivity could be seriously threatened by irresponsible land administration. Summer heat could dry out the land: the increment of tilled superficies depended upon extensive irrigation works. Floods or changes in the course of the Tigris and the Euphrates could also be a serious menace to the environment, turning the tillable superficies into swamps. Insufficient drainage could increase the level of salinisation, causing serious harm to agriculture[3].

As I will show later, irrigated agriculture in Iraq saw a substantial expansion in the VI century. Many works were carried out by the State, whose financial footing was strengthened by the tax reform started by Kawād (488-531) and implemented by Xusraw Anōšarvān (531-579). According to my previous research, the importance of this reform has to be found, as I shall try to demonstrate in this paper, not just in the possibility it provided to increase fiscal revenue and therefore investment in irrigational works, but also in the opportunity it created for the authorities to understand the conditions of the soil in the different areas of the country and to therefore allocate resources in a more productive way. Another important issue is that this reform was implemented and maintained as the result of a new equilibrium of power between the social classes social classes. The power of the upper aristocracy was seriously challenged by a large uprising, the Mazdakite revolt, and was limited by the increasingly centralised administration and bureaucracy, the rise of a class of medium-sized landholders and, as I argue, by the involvement of different social layers in the process of tax collection.

Many irrigational works were also carried out by the State after the Arab conquest, but we can see a shift in the patterns of water management. The revival of dead land, involving extensive

[3] C. E. Larsen, *The Mesopotamian Delta Region: a Reconsideration of Lees and Falcon*, in «Journal of the American Oriental Society», 95/1, (1975) pp. 43-57; E. Wirth, *Agrargeographie des Irak*, Hamburg 1962, pp. 97-8; P. Buringh, *Soils and Soil Conditions in Iraq*, Baghdad 1960, pp. 255-63; J. H. G. Lebon, *The New Irrigation Era in Iraq*, «Economic Geography», 31/1 (1955), pp. 47-59, pp. 47-50

irrigational works or the clearance of swamp lands, was often carried out by apportioning large extensions of land as grants to rich and powerful members of the elite, who acquired ownership of the land by reviving it. They were usually allowed to pay lower tax rates than other landlords, and obviously these tax reductions had important consequences for investment allocation. This led to extensive investment in agriculture in some areas of Iraq, but it had also some other relevant consequences, such as the expropriation of land that was not always as 'dead' as might be supposed, the creation of large *latifundia* held by an aristocracy whose destiny was strictly bound to the dynasty in power, the decline of tax revenue, and the probable over-irrigation of land.

To sum up, this paper will investigate: 1) the effects of the tax reform undertaken by Xusraw Anōšarvān on water management, connected to the fundamental role of government investments; and 2) changes in water management patterns after the Arab conquest, focusing on the effects of the revival of dead lands through the use of land grants.

The tax reform

Our understanding of taxation in the Sasanian Empire before and after Xusraw's reform is seriously undermined by the general lack of sources and our dependence on later sources, viz. Arabic sources[4]. However, a reconstruction of the general lines of the Sasanian taxation system can be attempted. This reconstruction, in which I draw, to some extent, on the primary sources available in their original languages, is not based purely on annals and chronicles, but also draws on numismatic evidence, on sigillography and on the *Hazār Dādestān,* or *A Thousand Judgements*, commonly referred to as *Mādayān ī Hazār Dādestān*, or as *Book of a Thousand Judgments*, a collection of Sasanian legal cases from the first half of the VII century.

Before Kawād and Xusraw, the land tax was mainly collected from each district on the basis of a

[4] See, for example: Z. Rubin, *The Reforms of Khusro Anûshirwân*, in *The Byzantine and Early Islamic Near East. III: States, Resources and Armies*, ed. by A. Cameron, Princeton 1995, pp. 227-97.

portion of the harvest[5]. The high aristocracy had a very important role in the process of tax collection. The lords were supposed to submit to the central government the due share collected from the different districts[6]. The king had direct control over the crown lands, usually put under the control of a city, often founded by the king himself[7]. This system, of which we have given a very brief outline, did not allow for direct control over tax collection and land administration by the central government. The nobles often refused to pay taxes, or asked for relief in exchange for their participation in wars[8]. The situation under Xusraw changed radically: tax was collected on the basis of a fixed amount of money per unit of superficies[9]. The role of State officers in tax collection

[5] V. G. Lukonin, *Political, Social and Administrative Institutions*: *Taxes and Trade*, in *The Cambridge History of Iran*, vol. III, *The Seleucid, Parthian and Sasanian Periods*, ed. by Ehsan Yarshater, Cambridge 1983, part 2, pp. 681-746, pp. 745-46; M. G. Morony, *Landholding in Seventh-Century Iraq: Late Sasanian and Early Islamic Patterns*, in *The Islamic Middle East, 700-1900. Studies in Economic and Social History*, edited by A. L. Udovitch, Princeton 1981, pp. 135-175, p. 158; Z. Rubin, *The Reforms*, p. 232.

[6] F. Altheim-R. Stiehl, *Ein asiatischer Staat. Feudalismus unter den Sasaniden und ihren Nachbarn*, vol. I, Wiesbaden 1954, p. 11; Z. Rubin, *Nobility, Monarchy and Legitimation under the later Sasanians*, in *The Byzantine and Early Islamic Near East*, VI. *Elites Old and New in the Byzantine and Early Islamic Near East*, edited by J. Haldon and L. I. Conrad, Princeton 2004, pp. 235-73, p. 245.

[7] Altheim-Stiehl, *Ein asiatischer Staat*, p. 18-9; N. Pigulevskaja, *Les villes de l'état iranien aux époques parthe et sassanide. Contribution à l'histoire de la Basse Antiquité*, Paris-La Haye 1963, pp. 186-7 (*Goroda Irana v rannem sredievekov'e*, Moskva-Leningrad, 1956); V. G. Lukonin, *Political, Social and Administrative Istitutions*, p. 723 and pp. 726-7.

[8] Altheim-Stiehl, *Ein asiatischer Staat*, p. 19; Rubin, *Nobility*, p. 245.

[9] M. Khan Fateh, *Taxation in Persia. A Synopsis from the Early Times to the Conquest of Mongols*, "Bulletin of the School of Oriental Studies", 4/4 (1928), pp. 723-43; M. Grignaschi, *La riforma tributaria di Hosro I e il feudalesimo sassanide*, in *Accademia Nazionale dei Lincei. Problemi attuali di scienza e cultura. Atti del convegno internazionale sule tema La Persia nel medioevo (Roma, 31 marzo-5 aprile 1970)*, Rome 1971, pp. 87-138; R. N. Frye, *The History of Ancient Iran*, München 1984, pp. 324-5; Rubin, *The Reforms*, pp. 227-97; U. Mårtensson, "Discourse

became more important at every level. The new tax assessment system was implemented on the principle of land measurements and, in general, a very deep knowledge of the conditions of land tenure throughout the empire[10]. The tax rate varied according to the nature of the crops: namely tax rates for fields cultivated with wheat were different from rates for fields cultivated as vineyards.

This situation also changed the balance of power within the empire and probably also influenced patterns of landholding and land administration in Sasanian society. Status was increasingly based on the position granted by the central government in connection with public function and less on status at birth. Another consequence was that landholding was increasingly seen as a simple grant from the sovereign, supporting his absolutist claims. The class of the *dahāqīn* (as they are called in Arabic sources) became the backbone of the Persian military and played an important role in tax collection. They represented the 'petty nobility' of the empire and owed their position to royal land grants[11]. Land grants could be also given for military outfitting, but the land then returned to the State upon the death of the grantee[12].

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and Historical Analysis: the case of al-Tabarî's *History of the Messengers and the Kings*", in "Journal of Islamic Studies", 16/3 (2005), pp. 287-331; for a general discussion of sources and descriptor of administration: A. Gariboldi, *Il regno di Xusraw dall'anima immortale. Riforme economiche e rivolte sociali nell'Iran Sasanide del VI secolo*, Milano 2007, pp. 178-97

[10] Altheim-Stiehl, *Ein asiatischer Staat*, p. 31 and pp. 34-5; Lukonin, *Political, Social and Administrative Institutions*, pp. 732-4.

[11] Altheim-Stiehl, *Ein asiatischer Staat*, p. 141; Lukonin, *Political, Social and Administrative Institutions*, p. 734; Gariboldi, *Il regno di Xusraw* , pp. 31-2; T. Daryaee**,** *Sasanian Persia: The Rise and Fall of an Empire*, London 2009, p. 29, pp. 147-8.

[12] The *Mādayān ī Hazār Dādestān*, a Sasanian law book from the first half of the VII century, tells us that if a horseman (*aswār*) who holds a land grant for his outfitting dies, his heir has to pay back the value of the outfitting each year up to the time when the land is given back to the treasury (*šahigan*, 'palace'). The text of *Mādayān ī Hazār Dādestān* seems to suggest that the State was able to take its properties back and that the eventual heir had to bear high

The role of the royal scribes became more important, and they represented another important class in the administration of power, as one of the four pillars of Sasanian society mentioned in the literary sources, along with the priests, the nobles and the commoners (peasants and artisans)[13]. The empire became more centralised: the State was divided into four regions, with a general (*spāhbed*) and a spiritual master (*rad*) leading each of the four quarters[14]. It is also difficult give a complete description of Sasanian administrative geography and Sasanian administration, because important research is still underway. Some scholars have tried to provide a general picture of the administrative structure. The empire was divided into *šahr*, 'districts', led by a *šahrab*, appointed by the king to administer the district surrounding a city, and a *mowbed* (a clergyman)[15]. These *šahr* were then divided into *rōstāg*, which were then probably dividend again into *tasug*. A *dādwar*, or judge, had authority over the *tasug*[16]. The last administrative subdivision was the *deh*, or village[17]. The *Mādayān ī Hazār Dādestān*, or *Book of a Thousand Judgments*, portrays a complex tax administration system[18]. The levying of taxes involved both what we could call a 'State' and a 'Church' administration. The 'judge' (*dādwar*) was competent in what we would call 'property rights': this meant he knew what (*če*), how much (*čand*), how (*čiyōn*) and in what form (*če-ēwēnag*)

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costs if he delayed the transfer of the estate to the public authorities; Farraxvmart ī Vahrāman, *The Book of a Thousand Judgments (a Sasanian Law-Book)*, ed. by Perikhanian, Costa Mesa, Mazda Publishers, 1997, pp. 188-9; Gariboldi, *Il regno di Xusraw*, pp. 37-8.

[13] Rubin, *Nobility*, p. 241.

[14] Daryaee**,** *Sasanian Persia*, p. 124.

[15] Lukonin, *Political, Social and Administrative Institutions*, p. 725; Daryaee**,** *Sasanian Persia*, p. 125.

[16] Lukonin, *Political, Social and Administrative Institutions*, p. 727; Daryaee**,** *Sasanian Persia*, pp. 125-6; on *rōstāg* and *tasug* see also R. N. Frye, *The Golden Age of Persia. The Arabs in the East*, London 1973, p. 10.

[17] Lukonin, *Political, Social and Administrative Institutions*, p. 727; Daryaee**,** *Sasanian Persia*, pp. 125-6.

[18] See also Lukonin, *Political, Social and Administrative Institutions*, pp. 732-4 and pp. 735-8.

the land owners held the land[19]. This, of course, covers similar competences to those of a modern day cadastre bureau. A *mowbed*, or 'chief priest', was in charge of tax assessment (*sāk abar nihād*) on property (*xwāstag*) returned to the 'Fire' (Zoroastrian Fire-Temple) and had authority over the judge[20]. A spiritual master (*rad*) also had authority over tax assessment (*sāk abar nihād*) and the financial administration of temple properties ("the purchase, indemnity, value and price of the items that should go to the temple treasure". In Middle Persian: "*xrīd ud gōhrīg ud arz ud wahāg ī pad hēr ī ātaxšan abāyēd kard*"[21]). It seems therefore that the priestly class was competent both in the administration of temple possessions and in more general matters of taxation. The *ōstāndar* was also responsible for tax assessment (*sāk abar nihād*), but his competences were probably exercised only on crown lands[22]: in the Islamic sources, crown land is called *sawāfī al-ustān*, the etymology of the word *ustān* clearly reminding us of its Middle Persian origins[23]. Interestingly, it seems that tax assessment on crown land followed a system of crop-sharing even after the reform and the Arab conquest, and this was probably permitted because they were under the more direct control of the

[19] Farraxvmart ī Vahrāman, *The Book of a Thousand Judgments*, pp. 292-3; M. Macuch, *Das sasanidische Rechtsbuch* Mātakdān i hazār Dātistān *(Teil II)*, Wiesbaden 1981, pp. 49-50 (Middle Persian) and p. 188 (German translation) (Abhandlungen für die Kunde des Morgenlandes, Bd. XLV, 1); Daryaee**,** *Sasanian Persia*, p. 133.

[20] Farraxvmart ī Vahrāman, *The Book*, pp. 294-5; Macuch, *Das sasanidische Rechtsbuch*, p. 51 (Middle Persian) and p. 189 (German translation); Daryaee**,** *Sasanian Persia*, pp. 128-9.

[21] Farraxvmart ī Vahrāman, *The Book*, pp. 294-5; Macuch, *Das sasanidische Rechtsbuch*, p. 51 (Middle Persian) and p. 189 (German translation).

[22] Daryaee**,** *Sasanian Persia*, p. 126.

[23] For example: Ḳudāma ibn Dja'far, *Kitāb al-kharādj. Part seven and excerpts from Abū Yūsuf's Kitāb al-Kharāj*, translated and with introduction and notes by Aharon Ben Shemesh, Leiden-London 1965, p. 38 (English translation), p. 121 (Arabic text); see also M. Morony, *Iraq after the Muslim Conquest*, Princeton 1984, pp. 104-5.

crown representatives[24]. The office of *ōstāndar* was still important in the first decennia after the Arab conquest, as has been shown by the Berkeley collection of parchments being investigated by Philippe Gignoux[25]. The *āmārgar* (accountant) also had important financial and legal functions in one or more provinces or across a district[26]. The *āmārgar*, for example, was responsible for the reckoning and collection of taxes and for entries to- and disbursements from- the Royal Treasury. The Middle Persian text also includes what is 'coming to and from the Palace', *ō šahigan madan ud az šahigan*, as part of the *āmārgar's* responsibilities; i.e. general financial responsibilities at the Treasury. The *āmārgar* and the *rad* (the latter, as we know, belonging to the priestly ranks) were also responsible for ascertaining and finding compensation for- deficits from the Royal Treasure[27]. This tas is particularly significant for us because the tax reform was clearly implemented to achieve greater financial stability, since a tax based on a fixed amount of cash or crops per unit of supervisies would assure a steadier income than a land-tax based on crop-sharing.

How was Xusraw able to implement the tax-reform? The answer is to be found in the aftermath of Mazdak's revolt, which was suppressed by Xusraw himself (528-529 and 531). The peasantry rose up in arms during the reign of Kawad under the leadership of an 'heretic' Zoroastrian priest, Mazdak. The rebellion seriously undermined the position of the higher aristocracy, and it seems that it was even used by King Kawād himself to crush the power of the aristocrats[28]. What was the

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[24] Morony, *Landholding*, pp. 158-9.

[25] Ph. Gignoux, *Aspects de la vie administrative et sociale en Iran du 7ème siècle*, in *Contributions á l'histoire et la géographie historique de l'empire Sassanide*, Bures-sur-Yvette : Groupe pour l'Eitude de la Civilisation du Moyen-Orient, 2004, pp. 37-48; Gignoux describes the *ôstândar* simply as a provincial governor.

[26] Lukonin, *Political, Social and Administrative Institutions*, p. 726; Daryaee**,** *Sasanian Persia*, pp. 132-3.

[27] Farraxvmart ī Vahrāman, *The Book*, pp. 296-7; Macuch, *Das sasanidische Rechtsbuch*, p. 52 (Middle Persian) pp. 190-1 (German translation).

[28] Rubin, *The reforms*, pp. 229-30; Idem, *Nobility,* pp. 248-9; Daryaee**,** *Sasanian Persia*, pp. 26-7 ; for a different

nature of the revolt, the doctrine of its leaders (the Mazdakite movement was a religious movement), and how many supporters did it have? It is hard to find answers to these questions. The topic is highly controversial: to a large extent this is due to the nature of the sources. We can focus on the social aspects of the revolt: it is difficult to deny that the revolt was mainly directed against the nobility, and that radical social and economic ideas, such as the communal control of women and property and the equality of all human beings, were advocated by Mazdak[29]. The social aftermath of the rebellion, which crushed the power of a large part of the nobility, made it possible to implement the tax reform and to increase, to a certain extent, State centralisation. As Zeev Rubin has written: "no better explanation than the Mazdakite revolt has so far been offered for Xusraw's success in implementing a reform which would have provoked a fierce opposition on the part of the nobility"[30].

As –I said before, the tax reform aimed to assure a stable income for the government, and to strengthen central control over land administrator. However, a tax assessed on the basis of a fixed amount of coins per acre was less flexible: it would have been hard to pay the due amount of cash after a bad harvest, resulting in further oppression for the same peasantry that had already risen up under Kawād. Some important sources imply that this tax reform also included countermeasures to make it easier for the peasantry to bear the tax burden and that it involved different layers of the society in the process of tax collection. An important account of the tax reform is found in aṭ-Ṭabarī's *Ta'rīkh ar-Rusul wa 'l-mulūk*. He states that the judges of each administrative district received a copy of the tax register in order to prevent extortion. They als had to inform the king

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view, see P. Crone, *Kavād's Heresy and Mazdak's Revolt*, in "Iran", 29 (1991), pp. 21-42.

[29] Crone, *Kavād's Heresy*, p. 29.

[30] Z. Rubin, "The Reforms of Khusro Anûshirwân", *The Byzantine and Early Islamic Near East. III: States, Resources and Armies*, ed. by A. Cameron, Princeton 1995, pp. 227-97, p. 230.

about the condition of the land, in order to remit taxes in the case of a crop failure[31]. According to the *Nihāyat al-ʻarab fī akhbār al-Fars wa l-ʻarab*, al-Muḳaffaʻ stated that Xusraw appointed officers to supervise crop failures and remit taxes in the case of shortages[32]. Al-Muḳaffaʻ(† ca. 760) is an important source because he was the most important Arab translator from Middle Persian[33]. The *Sīrat Anūširwān* presents the most interesting account of the reform. The *Sīrat Anūširwān* is a first-person narrative of the main deeds of Xusraw and has been transcribed in ibn Miskawayh's *Tadjārib al-umam*. This narrative is probably based on ancient Middle Persian texts[34]. It does not just confirm the remission of imposts to help the subjects (*riʻiyya*) to farm the land[35], but also illustrates some interesting elements which help us to understand how the process of tax collection worked and how relevant data were collected and processed by the administration. The fiscal prefect (ʻ*āmil*, what would be called an *āmārgar* in Middle Persian, as described above), who was controlled by other functionaries chosen from the people to whom the king could grant his trust (and who are, later in the same text, called *amīn ahl al-balad*: the faithful of the people of the country), and the taxpayers (*ahl al- kharādj*) had the right to present complaints to the judge (*qāḍī*, probably the *dādwar* described above). The fiscal prefect, the judge, the *amīn ahl al-balad* and the

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[31] *Annales quos scripsit Abû Djafar Mohammed Ibn Djarîr At-Tabarî*, ed. M.J. De Goeje, 15 vol., Leiden 1879-1901, vol. I, pp. 960-3.

[32] We can read the Arabic text in: M. Grignaschi, *La riforma tributaria di Hosrō I e il feudalesimo Sassanide*, in *La Persia nel Medioevo*. Atti del convegno di studi (Roma, 31 marzo-5 aprile 1970), Roma, Accademia Nazionale dei Lincei, 1971, pp. 87-147, p. 135.

[33] Cereti, *La letteratura pahlavi*, p. 189.

[34] This narrative is related to the epic narratives of the *Xwadāy Nāmag* tradition: for a short but good overview and bibliography see: C. G. Cereti, *La letteratura pahlavi*, Milano, Mimesis, 2001, pp. 191-2.

[35] Grignaschi, *La littérature Sassanide*, p. 18; Arabic text (manuscript facsimile): *The Tajârib al-umam or History of Ibn Miskawayh*, preface and summary by L. Caetani, Principe di Teano, vol. I, Leyden-London 1909, pp. 189-90.

region's scribe (*kātib al-kūra,* or *šahr-dibīr,* a royal tax collector sent to the province[36]) reported to the royal department[37]. The taxpayers of each district gathered in the chief town with their leader (*qā'id*, possibly the fiscal prefect), the judge and the *amīn* to discuss their problems with the king's representatives[38]. The judges also had to gather the inhabitants of the district without revealing their actions to the lords and the fiscal prefects. They had to report to the king, and dishonesty had a high price: death[39]. Delegates from the district, even from the peasantry, were able to report to the government[40]. This system can be linked to another ancient Sasanian institution, the appellate court for the redress of grievances, which originally served as a check against the excesses of government bureaucrats and later became the Islamic *mazālim* court[41].

Although the description of the tax-reform in the *Sīrat Anūširwān* is to some extent ideological, it is coherent with the structure of Sasanian administration that I have already described. This is clear if we analyse the administrative geography. The Arabic text reports the following administrative hierarchy: 1) *balad*; 2) *kūra*; 3) *rustāq*; 4) *qarya*, and these reproduce the administrative divisions that we have already discussed as *šahr*, 'districts', *rōstāg* and *deh* (villages), with *balad* referring to the four quarters of the empire or, more probably, to bigger *šahr*s combining more districts[42]. However, it is more difficult to establish whether the system of checks

[36] Daryaee, *Sasanian Persia*, p. 54.

[37] Grignaschi, *La littérature Sassanide*, p. 18; Arabic text *The Tajârib al-umam,* p. 190.

[38] Grignaschi, *La littérature Sassanide*, pp. 20-1; *The Tajârib al-umam,* p. 194.

[39] Grignaschi, *La littérature Sassanide*, p. 22; *The Tajârib al-umam,* pp. 195-6.

[40] Grignaschi, *La littérature Sassanide*, p. 22; *The Tajârib al-umam,* p. 196. cfr. Rubin, *The Reforms*, p. 273.

[41] Morony, *Iraq*, p. 85; for the Islamic *mazālim*.

[42] Grignaschi, *La littérature Sassanide*, p. 32; *Madina/Shahr, Qarya/Deh, Nahiya/Rustaq. The City as Political-Administrative Institution: the Continuity of a Sasanian Model*, in "Jerusalem Studies in Arabic and Islam", 17 (1994), pp. 85-107; Daryaee, *Sasanian Persia*, pp. 125-6.

and balances~~,~~ described in the source actually worked~~,~~ and to what extent[43]. In particular, it is difficult to understand the role of the peasantry in the whole process.

We do not know as much about the living conditions of the peasantry. It is certain that some of the peasants lived in slavery. According to the *Mādayān ī Hazār Dādestān*, or *Book of a Thousand Judgments,* slaves (*anšahrīg* in Middle Persian) and cattle (*stōr*) working on an estate were transferred with it[44]. Other peasants were probably free sharecroppers. Altheim and Stiehl, in their work on Sasanian 'feudalism', have argued that the tax reform produced a change in the status of the peasantry. Put under the direct control of State officers, existing slaves and free tenants became to a large extent bound to the soil, but this direct contact with public authority, due to the more centralised and 'bureaucratic' process of tax collection, somehow improved their status vis-à-vis the lords[45].

It has been argued by Zeev Rubin that Xusraw's reforms failed in the long run and that the high nobility regained most of its power[46]. There is much truth in this affirmation, but it is perhaps necessary to give a more nuanced and a more 'dynamic' picture. Central control was not present in

[43] See Michael Morony: "The use of internal administrative checks, overlapping responsibilities, parallel officials, and informers was fairly developed in the Sasanian system. Even so, such a system depended ultimately on the personal loyalty, integrity, and reliability of persons on whom the monarch could count to carry out his orders", *Iraq*, p. 87. I agree with this statement. I would just like to add that the balance of social forces also played a role in determining the possibility of preserving the fidelity of the officials and ~~to~~ put under check the authority of the nobility.

[44] Farraxvmart ī Vahrāman, *The Book*, pp. 62-63. See also D. N. MacKenzie, *A Concise Pahlavi Dictionary*, London, Oxford University Press, 1971, *ad vocem* and M. Macuch, *Rechtskasuistik und Gerichtspraxis zu Beginn des siebenten Jahrhunderts in Iran. Die Rechtssammlung des Farrohmard i Wahraman*, Wiesbaden 1993, pp. 24-39.

[45] Altheim-Stiehl, *Ein asiatischer Staat*, p. 15

[46] Rubin, *Nobility*, p. 251 and pp. 272-3.

every part of the empire equally[47]; the balance of power among the different social classes was not immutable. Bitter conflicts between the nobles and the crown and the nobles and the peasantry still occurred. According to Agathias, a Greek historian from the VI century, the Greek philosophers who established themselves the Sasanian Empire during Xusraw's reign were very unsatisfied with the conditions of the empire, thinking that the powerful (δυνατοὶ) abused the weak, and that they used all sorts of inhumanity against each other. He also wrote that they found a lot of thieves and bandits[48]. Agathias seems to describe the conditions of bitter social conflicts and the probable presence of social banditism, a typical expression of social rebellion and opposition in rural societies[49]. Middle Persian texts also mention the *mard i juwān*, the 'young men', as group of discounted youths who, according to the sources, stole from the rich to give to the poor[50]. The conflict between the crown and the nobility became even more violent during the reign of Xusraw's heirs. For example, Hormizd, Xusraw's son (ruled 579-590), tried to draw on the support of the masses, and it has been reported that he killed 3,000 (or 13,000) members of the high aristocracy[51].

I can summarise my position on tax-reform by saying that it was made possible by the bitter social conflicts that had weakened the high aristocracy (in particular, the Mazdakite revolt). Tax-reform was largely effective, and indeed the empire became more centralised. The system of tax collection integrated different kinds of organisations and public offices and was implemented through a bottom-up flow of information. The new system had to be based on cadastral surveys,

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[47] See, for exemple: Daryaee, *Sasanian Persia*, p. 148.

[48] Greek text and commentary in: A. Cameron, *Agathias on the Sasanians* in "Dumbarton Oaks Papers", 23 (1969) pp. 67-183, p. 168.

[49] E. J. Hobsbawm, *Bandits*, New York 2000, pp. 20-1

[50] Daryaee, *Sasanian Persia*, p. 57.

[51] Rubin, *Nobility*, pp. 257-9.

since a fixed amount of money was levied per unit of superficies, with tax rates varying according to the crops being grown. This meant that a huge amount of data had to be available to the central administration. I believe that this is very relevant in explaining the development of irrigated agriculture in Sasanian Iraq, since central control over land administration and knowledge of soil conditions were useful for improving the organisation of water management and the allocation of government investment in irrigation and land reclamation.

The most important sources for this process of expansion are the archaeological surveys of Robert McC. Adams[52]. Although these data can be quite problematic, they still provide the best data on the development of irrigated agriculture in Sasanian Iraq. The areas covered by archaeological surveys reveal the extension of the cultivated area and the creation of new settlements in the late Sasanian period. We also possess evidence from written sources which we can compare with the archaeological surveys. Aṭ-Ṭabarī left us an important account of the deeds of the Persian kings, including reports that Xusraw invested large amounts of money in building forts, bridges, canals, *qanāt* (the famous underground canals) and other irrigation works and even rebuilt villages[53].

Two examples drawn from Adams' study illustrate the nature of State intervention in Sasanian Iraq. Adams first analysed data concerning the Diyala basin. New canals were built in this region in

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[52] R. McC. Adams, *Land behind Baghdad. A History of settlement on the Diyala plain*, Chicago and London 1965; Idem, *Heartland of Cities. Surveys of Ancient Settlement and Land Use on the Central Floodplain of the Euphrates*, Chicago and London 1981; R. McC. Adams and H. Nissen, *The Uruk Countryside. The Natural Setting of Urban Societies*, Chicago and London 1972; R. McC. Adams, *Intensified Large-Scale Irrigation as an Aspect of Imperial Policy: Strategies of Statecraft on the Late Sasanian Mesopotamian Plain*, in *Agricultural Strategies*, ed. by J. Marcus and C. Stanis, Los Angeles 2006, pp. 17-37.

[53] Adams, *Land*, p. 71; F. Rahimi-Laridjani, *Die Entwicklung der Bewässerungslandwirtschaft im Iran bis in sasanidisch-frühislamische Zeit*, Wiesbaden, Ludwig Reichert Verlag, 1988, p. 457.

the late Sasanian period and a more efficient water management system was implemented, leading to an expansion of settlements in the area[54]. The most interesting case was that of the Kātūl al-Kisrawī, a huge canal drawn from the Tigris that solved the chronic problem of water shortage in some parts of the region. This canal was about 100 km long. Islamic sources, such as Yāḳūt ar-Rumi and Ḳazwini attribute the building of the canal to Xusrō. The king established the three administrative districts of the Upper, Middle and Lower Nahrawān, where the Kātūl al-Kisrawī played a central role in the canal system[55]. Such engineering works, as Adams argues, needs extensive planning and large investments, both of which it was possible to supply after the tax reform[56]. Captives from Xusraw's military campaigns were crucial in completing these works[57]. The establishment of the new districts, provided with water by the new canal, was associated, as aṭ-Ṭabarī points out, with the foundation of a new city, Weh Antiok ī Xusraw, where the Persian king resettled the population of Antioch, which he had conquered in 540[58].

Another example is the district of Kaskar. This region saw a large-scale expansion of the marsh, beginning in the reign of Bahrām V (420-438), which resulted in an overall decline in the importance of the region, and apparently led to a reduction in the number of administrative districts (*rōstāg*) in Iraq from 60 to 48. However, this area was involved in large reclamation projects that started under Xusraw. Uniform water distribution was implemented through a fairly regular, almost rectangular, grid of short canals. The new system integrated two hydrographic systems: a great

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[54] Adams, *Land*, p. 70.

[55] Adams, *Land*, p. 76.

[56] Adams, *Land*, p. 82.

[57] Adams, *Intensified Large-Scale Irrigation* p. 23; Gariboldi, *Il regno di Xusraw*, p. 9.

[58] B. Dignas-E. Winter, *Rome and Persia in Late Antiquity. Neighbours and Rivals*, Cambridge, Cambridge University Press, pp. 108-109.

trunk canal drawn from the Euphrates and the lower course of the re-routed Tigris[59]

. Adams hypothesises that under the Sasanian Empire water management was more efficient and highly centralised, although, he also believes that "evidence is lacking for the centralised bureaucratic management of water consumption that would have been necessary to allocate supplies between different major canals and regions" and that "references to royally appointed irrigation officials do not occur in surviving sources on the Sassanian period"[60]. We do have evidence of the direct involvement of bureaucrats in water management. Ibn Qutayba ad-Dīnawarī, a IX century Iraqi scholar, wrote that the Persians used to say that the secretary who does not know about water mains, digging, closing canals locks and other water management issues, is a useless secretary[61]. In the Persian court, under Bahrām V Gōr (420-438), we find the office of *wāstaryōšān sālār*, Master of the cultivators, and later, of *wāstaryōšān bay*, Lord of the cultivators, which seem to have been appointed not only to undertake land-tax collection but also probably to deal with more general issues of land administration; it is perhaps necessary to further investigate the role of these functionaries, as they may have been involved in water management[62]. The 'judge' (*dādwar*) was also able to solve private disputes concerning water management. The *Mādayān ī Hazār Dādestān* shows how some canals were owned (jointly or individually) by private investors. Elman has pointed out that this source does not refer to *qanāt*, but to over-ground canals dug for irrigation,

[59] Adams, *Intensified Large-Scale Irrigation*, pp. 25-6; see also Morony, *Iraq*, pp. 155-7.

[60] Adams, *Land*, p. 80.

[61] Ibn Qutayba ad-Dīnawarī, *'Uyūn al-akhbar*, 2 voll., El Cairo 1343 (1925), Vol. I, pp. 44-5; Cfr. F. Rahimi-Laridjani, *Die Entwicklung der Bewässerungslandwirtschaft im Iran bis in sasanidisch-frühislamische Zeit*, Wiesbaden, Ludwig Reichert Verlag, 1988, pp. 231-232 .

[62] Altheim-Stiehl, *Ein Asiatischer Staat*, p. 19; Lukonin, *Political, Social and Administrative Institutions*, p. 738. MacKenzie, in his Pahlavi dictionary, translates *wāstaryōš* as husbandman. In general, a more accurate analysis of this office would be required.

which were derived from *qanāt*, from big rivers, such as the Tigris and the Euphrates, and from larger canals[63]. According to the *Mādayān ī Hazār Dādestān*, the man who individually made expenditures which were indispensable for the maintenance of canals owned jointly with other people could be supported in his claims to receive adequate compensation for his expenditure by the judge if his partners and co-owners refuse to collaborate[64]. This disposition would have encouraged individual initiative and probably allowed greater flexibility to cope with unforeseen problems.

In brief, I think we must agree with Adams that intensified large-scale irrigation in late Sasanian Iraq was the effect of an intentional, 'top-down' policy choice. Adams tries to distinguish his position from Karl August Wittfogel's thesis, expressed in his influential work on *Oriental Despotism.* The German historian mentions the Sasanian Empire in the 'Asiatic' hydraulic societies analysed in his work, seeing co-operation as the 'organisational key device' of these social complexes[65]. Adams clearly distinguishes his position from Wittfogel's: "such systems were introduced apparently not in a process of organic, incremental growth but as conscious, 'top-down' policy choice arising from considerations of politico-military strategy. They were, in short, neither a consequence of autonomously growing technological scale and complexity that resulted in self-sustaining, spreading Oriental despotism, as Karl Wittfogel (1957) once forcefully argued, nor embodiments of some demographically or environmentally imposed course of action"[66]. I would like to stress, in any case, the importance of the tax-reform and the shift in social balance (of which,

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[63] Y. Elman, *"Up to the Ears" in Horses' Necks (B.M. 108a): on Sasanian Agricultural Policy and Private "Eminent Domain"*, in "Jewish Studies, an Internet Journal", 3 (2004), pp. 95-149, pp. 125-7.

[64] Farraxvmart ī Vahrāman, *The Book*, pp. 201-2; Macuch, *Rechtskasuistik*, pp. 550-1, 553-4 and 557-8.

[65] *Oriental Despotism. A Comparative Study of Total Power*, New Haven and London, Yale University Press, 1976 (9), p. 25.

[66] *Intensified Large-Scale Irrigation*, p. 19.

to a certain extent, the tax reform was a consequence) as key-elements in understanding the expansion of large-scale irrigated agriculture in the VI century. The new taxation system created a steadier financial basis for the State. Based on a deeper knowledge of soil conditions, it provided the authorities with more data to allow a better allocation of resources. A control system, in which the bureaucracy and locals interacted, seems to have existed, helping the authorities to understand local conditions.

Water management was dependent on public initiatives and, therefore, on political continuity[67]. The fall of the central administration would have had a tremendous effect on water management, as we can see in the period between Heraclius' invasion of the Sasanian Empire and the Arab conquest (627-651 a). For example, the Great Swamp in Southern Iraq was created in 628, when the Tigris River expanded out of its bed, and attempts made by the Umayyad governor, Khālid al-Kasrī, to restore it were unsuccessful[68]. Archaeological surveys show the abandonment of a large area of the lower central floodplain of the Euphrates and discontinuity between Sasanian irrigation and settlement patterns and Islamic ones (from the second half of the VII century)[69]. Ḳudāma speaks diffusely of floods and the breaking of dykes during the late Sasanian period and the Arab conquest of Iraq[70]. Islamic authors, such as al-Māwardī and Abū Yūsuf, make allusions to a decline in the number of tilled superficies after the conquest[71]. Uruk was inhabited until the

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[67] Adams, *Heartland*, p. 213.

[68] E. Ashtor, *A Social and Economic History of the Near East in the Middle Ages*, London 1976, p. 61.

[69] Adams, *Heartland*, pp. 205-11.

[70] Ḳudāma ibn Dja'far, *Kitāb al-kharādj* (*Liber viarum et regnorum auctore Abu'l-Kasim Obaidallah Ibn Abdallah Ibn Khordadhbeh et Excerpta e Kitab al-Kharadj auctore Kodama ibn Dja'far*), ed. by Michael J. de Goeje, Leiden 1889, pp. 240-1.

[71] Abū Yūsuf, *Kitāb al-kharādj*, translated and with introduction and notes by Aharon Ben Shemesh, Leiden-London 1969, p. 106; Abū Yūsuf, *Kitāb al-kharādj*, El Cairo 1886, pp. 62-3 (Arabic text), Al-Māwardī, *al-Aḥkām al-*

beginning of the Islamic period, and then abandoned[72].

sulṭānīyya wa- al-wilāyya ̄al-dīnīyya, Beirut 1980, pp. 218-9.

[72] Rahimi-Laridjani, *Die Entwicklung*, p. 227.

Water management and taxation after the Arab conquest

The role of central authority remained crucial to water management after the Arab conquest. Islamic jurists focus on this duty of the government. Abū Yusūf (†798), who was appointed qāḍī of Baghdad at the demand of the caliph Hārūn ar-Rashīd (786-809), put a lot of emphasis on the revival of the dead lands and the importance of irrigation for this purpose in his *Kitāb al-kharādj*, *Book of Land -Tax*. He argued that "if the main canals and watercourses, from the Tigris and Euphrates, need clearing and cleaning the expenses should be borne by the Treasury and by those directly benefiting from such watercourses"[73]. He also stated that "the expense of the upkeep of the walls on the river banks, to prevent flooding, of the dams and the water locks on the Tigris and Euphrates and similar great rivers, must be borne by the Treasury alone, because it is in the public interest that they should be kept in order as any malfunction will cause damage to agriculture and decrease the income from taxation"[74]. Ḳudāma affirmed that the most relevant Muslim jurists, such as Abū Ḥanīfa (ca. 699-767) and Malik (708/716?-796), also asserted that the supervision of irrigation and the damming of the overflows of the great rivers had to be sustained by the government at the expense of the Treasury[75].

This aspect of early Islamic water management can clearly be seen as an element of continuity with Sasanian patterns of water management and land administration. As I have shown before, water management structures had been seriously damaged in the period of disorder following Heraclius' invasion of the Sasanian Empire and the Arab conquest. Land fell out of cultivation and

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[73] For example, Abū Yūsuf, *Kitāb al-kharādj* (transl. Ben Shemesh), p. 106; Abū Yūsuf, *Kitāb al-kharādj*, pp. 62-3 (Arabic text).

[74] Abū Yūsuf, *Kitāb al-kharādj*, p. 106; Abū Yūsuf, *Kitāb al-kharādj*, p. 63 (Arabic text).

[75] Ḳudāma ibn Dja'far, *Kitāb al-kharādj*, p. 62, M. 'Abdul Jabbar, *Agricultural and irrigation labourers in social and economic life of 'Irāq during the Umayyad and 'Abbāsid Caliphates*, in "Islamic Culture", 47 (1973), pp. 15-31.

large areas were covered by swamps. A big effort had to be made to restore Iraqi agriculture.

The caliphs, both Umayyad and Abbasid, were involved in huge reclamation initiatives, which contributed to increasing their financial base. The caliphs tried to extend the estates under their direct control by reclaiming Sasanian crown land and swamp land, especially in the area of al-Batā'ih, the large swamps in lower central Iraq[76]. The Umayyad caliph Mu'āwiya (661-680) seems to have paid close attention to this process. Under his reign, crown lands from Iraq and contiguous regions are reported to have yielded a 100,000,000 dirham revenue, which sounded like a very high figure to the historian who narrated his deeds, Ahmad ibn Abī al-Ya'qūbi. We should remember that land tax from the whole of Iraq yielded, under Mu'āwiya, around 150,000,000 dirhams[77]. Important initiatives were also implemented under the first Abbasids: considerable irrigation works were accomplished by the first members of the 'Blessed Dynasty', initially in the areas of Basra and Wāsit, with attention then shifting to the areas of Baghdad, Samarra and the central reaches of the Tigris River[78].

However, water management and, in particular, land reclamation, were also, to a large extent, committed to private initiatives. These activities were encouraged through land grants and tax cuts. Islamic law granted possession of the soil to the people who revived the 'dead land', which was land out of tillage, usually because of a lack of irrigation. There were disputes among the jurists concerning the necessity of a land grant as a condition for taking possession of the land, but this

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[76] I. M. Lapidus, *Arab Settlement and economic Development of Iraq and Iran in the Age of Umayyad and Early Abbasid Caliphs*, in *The Islamic Middle East 700-1900: Studies in Economic and Social History*, ed. by A. L. Udovitch, Princeton 1981, pp. 177-208, pp. 183-7; cfr. Ahmad ibn Abī al-Ya'qūbi, *Ta'rīkh,* ed. by M. Th. Houtsma, 2 vol., Leiden 1883, vol. II, p. 278.

[77] Adams, *Land,* pp. 84-85; Ahmad ibn Abī al-Ya'qūbi, *Ta'rīkh*, vol. II, p. 277.

[78] Lapidus, *Arab Settlement,* pp. 187-9.

was to a large extent a theoretical discussion: land grants and reclamation went together. In most of the cases, only rich people were able to undertake this work and this led to an extension of the big estates[79]. Owners of privately reclaimed land usually only paid the tithe (but there were debates among the jurists concerning this point) or even only half of it due to the extensive artificial works of irrigation or drainage that had been carried out[80]. Many of the land grants given by caliphs and governors consisted of dead lands from the area of Basra, which was considered by the sources to be a tithe-paying area. Basra was an important area for sugar cane plantations[81]. The largest estates were often used for market-oriented monocultures, often, from the end of the VII century, due to the introduction of Zandj, African slaves[82]. These ḳaṭī'a, the Arabic word for these land grants, could yield very high revenues. 'Abd Allāh ibn Darrādj, for example, was able to reclaim land from swamp land which yielded five or maybe 15,000,000 dirhams (silver coins)[83]. These grants could be enormous; their size could be as big as 8000 djarīb (1 djarīb = 1592 m^2)[84].

Arabic sources offer some concrete evidence of how members of the elite were awarded these grants. An interesting example is provided by Al-Balādhurī, the famous historian of the Arab conquest, who describes the reclamation project of Maslama, the son of the Umayyad Caliph 'Abd

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[79] Ashtor, *A Social and Economic History*, p. 46.

[80] Ḳudāma ibn Dja'far, *Kitāb al-kharādj*, p. 123 (Arabic text).

[81] H. es-Samarraie, *Agriculture in Iraq During the 3rd Century AH*, Beirut 1972, p. 94.

[82] A. Duri, *Arabische Wirtschaftgeschichte*, aus dem Arabischen übersetz von J. Jacobi, Zürich-München 1979 (first edition Beirut 1969), pp. 90-92. Slaves were also common on crown land; Morony, *Landholding and Social Change*, p. 210 and pp. 218-9.

[83] Ashtor, *A Social and Economic History*, p. 61.

[84] Morony, *Landholding*, p. 150, pp. 157-9; Idem, *Landholding and Social Change: Lower al-'Iraq in the Early Islamic Period*, in *Land tenure and social transformation in the Middle East*, ed. by T. Khalidi, Beirut 1984, pp. 209-22.

al-Malik, in southern Iraq during the reign of al-Walīd (705-715)[85]. Maslama proposed the investment of money in a reclamation project, the cost of which had been estimated to be about 3,000,000 dirhams. Maslama asked that the land that remained under water was given to him as ḳatī'a. The reclamation project was successful, farmers were brought in to work this land, and many other people entrusted their farms (*diyyā'*) to Maslama for 'protection'.

As we have seen, these grants usually enabled the landlords to recover large areas, which had fallen out of use because they had become swamps, lacked irrigation or had been surrounded by swamps. The extent of the 'abandonment' of these lands can sometimes be questioned. For example, the evidence records an uprising of discontented people when Yazīd ibn 'Abd al-Malik tried to grant some 'abandoned' land near al-Basra. The grantees were often closely bound to the caliph or were members of his family. Uthmān (644-656) had already granted many such estates to his favourites, but this pattern later expanded, especially under the governor 'Abd Allāh ibn Amīr ibn Ḳurayẓ (650-56), who granted lands to many of his relatives and mawālī[86]. Umayyad caliphs pursued the same policy, creating a large aristocracy tied to the destiny of the dynasty, which largely profited from the ruin of smaller landlords through the creation of bigger estates. The destiny of these landlords was connected to their political fortunes and misfortunes: dynastical wars and expropriations could menace their position. With the rise of the Abbasids in the middle of the VIII century, members of this clan often took possession of the estates around Basra that had

[85] Aḥmad ibn Yaḥyā ibn Djâbir al-Balâdhurī *Kitāb futūh al-buldān* (*Liber expugnationis regionum, auctore imaìmo Ahmed ibn Jahja ibn Djabir al-Belaìdsorii*), ed. by Michael J. de Goeje, Leiden 1866, p. 294. This event has been broadly discussed by Hugh Kennedy: *Elite Incomes in the Early Islamic State*, in *The Byzantine and Early Islamic Near East*, VI. *Elites Old and New in the Byzantine and Early Islamic Near East*, edited by J. Haldon and L. I. Conrad, Princeton 2004, pp. 13-28, pp. 21-2.

[86] Morony, *Landholding and Social Change*, pp. 211-3.

previously been in the hands of clients or members of the preceding ruling family[87].

The diffusion of large land grants in the VII century led to much disappointment among the small aristocracy of the dahāqīn, survivors from the Persian mid-level landlord strata, and even among other Arab landlords who were not as close to the governors or the caliphs. The contrast between the crown and its favourites who were granted big estates on the one hand, and the local aristocracy and Arab tribesmen on the other, led to the revolt against al-Hadjdjādj in 701. This uprising resulted in the battle of Dayr al-Djamādjim, culminating in victory for al-Hadjdjādj. The governor also contributed to the ruin of many dahāqīn by refusing to repair their dykes.

I should also remind the reader of other consequences of the diffusion of land grants and the movement of land reclamation. As I have said, the owners of revived dead land usually only paid the tithe (although this was not always the case). The diffusion of land reclamation would have therefore contributed on a very small scale to the increase of tax revenue. I think this development links to another interesting change found in post-conquest Iraq: the increase of *kharādj* tax rates. Tax assessment mainly followed a system called '*alā l-misāḥa*: from a fixed portion of land (usually one *djarīb*, i.e. 1592 m^{2-}) a fixed amount of money (and eventually also of crops) was collected. The tax was usually levied in cash and the rate depended on the crop. Usual rates reported in the sources are, for post-conquest Iraq, 12 dirhams (silver coin) for a djarīb of olives, 10 dirhams for vines, 8 to 10 dirhams for date palms, 3 or 8 dirhams for clover, 6 dirhams for sugar cane, 5 dirhams for sesame and cotton, 4 dirhams for wheat and 2 dirhams for barley[88]. We are told that

[87] Morony, *Landholding and Social Change*, pp. 215-7.

[88] Occasionally different rates are found: al-Muḳaddasī wrote that in Iraq a djarīb of palms was taxed at 8 dirhams; Ibn Khurdadbeh recorded 8 dirhams for palms, 6 for vines and 6 for the medic. It should be remembered that our sources are not official documents, but geographical and juridical treatises; F. Løkkegaard, *Islamic taxation in the classic period with special reference to circumstances in Iraq*, Philadelphia 1978 (2), pp. 102-103; al-Muḳaddasī, *Kitāb*

‘Umar ibn Khaṭṭab levied on wheat and barley either 4 and 2 dirhams respectively, or one dirham and one ḳafīz. Some sources, such as al-Balādhuri’s *Kitab futūh al-Buldān* and al-Māwardī’s *Al-aḥkām as-suḷtāniyya* affirm that the two different assessments depended on the different levels of soil fertility and the nearness to markets and water courses[89]. Tax rates seem to have been lower under the Persians, and some crops were not taxed. Recorded taxation rates under the Sasasians include one dirham per djarīb for wheat and barley, 5 or 6 for rice, 8 for vines, 7 for clover, one dirham for 6 fruit trees, and one dirham per 4 or 6 date palms (depending on the kind of palm)[90]. It should also be noted that the weight of the dirham changed at the end of the VII century, shifting from about 3.98 g to 2.97 g. This would have reduced the taxes paid in silver, but without returning them, in most cases, to Sasanian levels[91]. Initially, the tax was also assessed on a smaller djarīb compared with the size in Sassanian times: 1050 m^2 compared with 1592 m^2, which implicitly increased the tax rate by about 33%. However, use of the larger djarīb was restored, probably under the governor Ziyād ibn Abī Sufyān (665-673)[92]. Poll tax also increased: Sasanian rates were 4, 6, 8

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aḥsan at-taḳasīm fī ma‘rifa al-aḳâlīm (*Descriptio imperii moslemici, auctore Shams ad-dīn Abū Abdallah Mohammed ibn Ahmed ibn abī Bekr al-Bannā al-Basshārī al-Moqaddasi*), ed. by Michael J. de Goeje, Leiden 1906, p. 133; Ibn Khurdādbih, *Kitāb al-masālik wa ’l-mamālik* (*Liber viarum et regnorum auctore Abu'l-Kasim Obaidallah Ibn Abdallah Ibn Khordadhbeh et Excerpta e Kitab al-Kharadj auctore Kodama ibn Dja’far*), ed. M. J. De Goeje, Leiden 1889, p. 14 (Arabic text).

[89] al-Balādhurī, *Kitāb futūh al-buldān*, p. 271; al-Māwardī, *al-Ahòkâm al-sultòâniyya wa al-wilâyat al-diniyya*, Beyrut 1980, pp. 220-1; on this problem, see also Ḳudāma ibn Dja‘far, *Kitāb al-kharādj*, p. 121 (Arabic manuscript).

[90] Morony, *Iraq*, p. 100.

[91] Also because the tax collectors tried to collect the tax for as long as they could, in old Persian coinage. Ashtor, *A Social and Economic History*, p. 83.

[92] Morony, *Iraq*, p. 103, Hinz, *Islamiche Masse*, p. 55 and pp. 65-66.

or 12 dirhams per year, Arab rates 12, 24 or 48 dirhams per year according to personal wealth[93]. Tax rates had to be increased because many landlords, mainly among the Muslim elite, now paid only the tithe. It was therefore necessary to increase the tax rate on *kharādj*–paying land in order to ensure financial stability. The tithe (*'ushr*), in theory, had to be assessed on the land of believers. This impost amount, at 10% of production in the case of naturally irrigated land, could be reduced by half in the case of artificially irrigated land[94].

But a process of a concentration of land into the hands of Arab elites (or through the conversion of local elites to Islam) –was happening everywhere in Iraq[95]. For financial reasons, it was not possible to remove the *kharādj* on land which came into the hands of Muslim landlords, allowing them to pay just the tithe, although many landlords were asking for this change. As we have already noted, tax collection based on *'alā 'l-misāḥa* required the drawing up of cadastres. This allowed the government greater control over taxpayers and therefore it caused much discontent. One particular example of this, the land survey of the Sawād conducted in 105 AH (723-4 AD) by the governor 'Umar ibn Hubayra at the request of Yazīd II, which was reported to have caused hardship and discontent among taxpayers[96]. At the end of the reign of al-Manṣūr (754-775), Muslim landlords in

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[93] Morony, *Iraq*, pp. 107-8.

[94] Samarraie, *Agriculture*, p. 94; M. M. Ahsan, *Social life under the Abbasids, 170-289 AH, 786-902 AD*, London 1979, p. 102; Morony, *Landholding and Social Change*, pp. 215-7. See also: *The Book of Curious and Entertaining Information. The Latā'if al-Ma'ārif of Tha'âlabî*, translated by C.E. Bosworth, Edinburgh 1968, p. 126; 30,000 raṭl are reported in 'Abd al-Malik ib Muḥammad ath-Tha'ālabī, *Thimār al-ḳulūb fī al-mudòaf wa al-manṣūb*, El Cairo 1965, pp. 536-7.

[95] On this topic refer to M. Campopiano, *Muqasama Land Tax: Legal Theory and the Balance of Social Forces in Abbasid Iraq (VIII-X)*–paper presented at the 42nd Annual Meeting of the Middle East Studies Association of North America, Washington DC, November 22-25, 2008- and its bibliography, especially Morony, *Landholding*.

[96] Wadād al-Qāḍī, *Population Census and Land Surveys under the Umayyads (41-132/661-750)*, "Der Islam",

the Sawād, who were still subject to the heavy *kharādj,* asked for a tax reform. The new system, which was enforced under al-Mahdī, was known as *muḳasama*: taxpayers had to deliver a share of their crops to the State. This new system made tax payment more affordable for the taxpayers, offering the possibility of risk sharing. This system, however, perfectly fitted the situation in which investment in land administration was declining, and the landlords were living off their land as parasitic *rentiers*. If a share of the crops had to be handed in instead of a fixed amount of money or cash, the payment of the tax became more affordable, but it also stimulated less investment in agriculture, whereas the *'alā 'l-misāḥa* tax system resulted in a more intensive use of the land. The new system also reduced the importance of cadastres and therefore the necessity of drawing them up. These cadastres had played, as I have argued in the previous chapter, a key role in developing centralised water management in the late Sasanian period. The new tax assessment also had consequences for the financial stability of the central government. *'Alā 'l-misāḥa* would have provided a steadier source of income and would have made it easier for the State to estimate tax revenue: this was more difficult in a system fundamentally based on *ushr and muḳasama*[97].

This is one of the reasons why the Abbasid State increasingly had recourse to tax-farming during the IX century. Tax-farming made it easier to calculate the budget and was possible at different levels, within the central or local government, or within smaller districts. Before the contract was signed, the sum to be handed over to the State, the total amount of revenue and all the extra charges were fixed on the basis of the previous income from that area, usually according to the last three budgets or based on the last one slightly increased. The tax-farmer, however, was forced to hand over a fixed sum to the State even if the total revenue was smaller than the sum fixed in the

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83/2 (2006), pp. 341-416, p. 365.

[97] These problems are discussed in *Muqasama Land Tax.* The footnotes include a large bibliography.

contract[98]. The tax-farmers were expected to take upon themselves tasks such as ground amelioration and hydraulic works, and their activity was monitored by inspectors[99]. The tax-farmer could eventually ask the government to allocate resources for ground amelioration and, in particular, for water management. But such tasks were now mainly the responsibility of the tax-farmers, and his interest was therefore in minimising the costs in order to maximise profits, as the tax-farming contract ran for a limited period. Therefore he had more interests in 'squeezing' money from the tax-payers than in investing in water management.

To sum up, our data point to a diminution of the role of the central authorities in the organisation of water management. Private investments became increasingly important, but depended upon the elite, whose wealth and social position was bound to their political role and their link to the ruling dynasty. Tax-farming committed important aspects of land administration to wealthy members of the elite (often rich 'burghers', such as merchants etc.) who could invest in the land but whose first interest was in maximisng profits in the short term. What were the consequences for water management? It is difficult to answer this question because of the gaps we have in the sources, but a few pieces of evidences can be brought to the attention of the reader. I have already mentioned that some areas that were populated and cultivated in the late Sasanian period seem to have been abandoned in the Islamic period. Between the VII and X centuries, there was a growing phenomenon of land abandonment by peasants: under al-Hadjdjādj force was used in order to bring them back to the land[100]. It seems that many villages and fields were abandoned; leading to a decline in the size of the cultivated area, but the abandonment was also deeply interellated to problems of

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98 M. Shimizu, *Les finances publiques de l'Etat Abbaside*, in „Der Islam„, 42 (1965), pp. 12-14.

99 Løkkegaard, *Islamic Taxation*, p. 96.

100 P. G. Forand, *The Status of the Land and Inhabitants of the Sawâd during the first two centuries of Islâm,* in "Journal of Economic and Social History of the Orient", 14 (1971), pp. 25-37, pp. 29-30, p. 28.

water management. Archaeological surveys conducted in the Central Euphrates floodplain show, according to Adams, a decline in land use from the VII century, which almost became abandonment in the IX and X centuries[101]. Of course there are different methodological risks in using, as Adams does, the absence of diagnostic sherds to prove the absence of occupation at a site, and one of these problems can be the need to use pottery to establish a relative chronology of the settlements[102]. However, we should not forget that this process of abandonment seems to have happened over several centuries, therefore making the possibility of an error in chronology or in settlement occupation smaller. Abū Yusūf, one of the acutest observers of the situation in Iraq at the end of the VIII century, wrote that in the time of ‘Umar ibn Khaṭṭab a greater part of the land was cultivated (which suggests that in his time the situation was rather different) and he added: “there are lands which were not cultivated for a period of 100 years, more or less, and could not be developed and irrigated without expense beyond the means of the peasants”[103]. As I have explained previously, Abū Yusūf wrote that the cost of many of these works had to be borne by the State, but in the written sources there is less and less evidence of large-scale irrigational work taking place from the IX century onwards[104]. If we look at the figures of land tax revenue, we can see that they rapidly decline between the IX century and the beginning of the X century. It is particularly interesting to look at the figures provided for 819 by the jurist Ḳudāma ibn Djaʿfar and for the end

[101] Adams, *Heartland*, pp. 218-23; for land abandonment, see also Adams and Nissen, *The Uruk Countryside*, pp. 63-65.

[102] M. G. Morony, *Land Use and Settlement Patterns in Late Sassanian and Early Islamic Iraq*, in *The Byzantine and early Islamic Near East* II *Land Use and Settlement Patterns*, ed. by G.R.D. King and Averil Cameron, Princeton 1994, pp. 221-29, pp. 222-6.

[103] Abū Yūsuf, *Kitāb al-kharādj* (Transl. Ben Shemesh), p. 100; Abū Yūsuf, *Kitāb al-kharādj*, p. 28 (Arabic Text); e.g. Abū Yūsuf, *Kitāb al-kharādj* (transl. Ben Shemesh), p. 106; Abū Yūsuf, *Kitāb al-kharādj*, pp. 62-3 (Arabic text).

[104] Lapidus, “Arab Settlement”, p. 189.

of the IX century by the geographer ibn Khurdādbih. In 819 (204 of hegira), according to Ḳudāma ibn Dja'far, the revenue of Iraq was 177,200 kurr of wheat, 99,721 kurr of barley and 8,095,800 dirhams (one kurr=2,925 kg) [105]. The amount of wheat recorded is possibly an error in the manuscript transmission. Von Kremer, who investigated the Abbasid budget, and De Goeje, the editor of the text, have proposed that it should read 117,200 *kurr* of wheat[106]. In the time of ibn Khurdādbih, the revenue of as-Sawād amounted to 70,650 kurr of wheat, 112,050 kurr of barley or rice, and 11,848,840 dirhams[107]. The first interesting thing to note is the abrupt fall in wheat production. Rice and barley were more robust grains and more capable of growing in highly saline soils. This change in crops points to a deterioration of soil conditions in Iraq. Between the end of the VIII century and the beginning of the X century, grain prices increased and real wages declined. Between the second half of the VIII century and the beginning of the X century, nominal prices of wheat increased around ten times (from 0.112 dinars for 100 kg to 1.36 dinars). In the same period, the wages of mounted soldiers (who had considerable bargaining power) increased between two and six times: if we want to calculate the real price of wheat in terms of wages, we can see how the price of 100 kg of wheat at the end of the VIII century represented only 1.723% of the monthly wage of a horseman, while at the beginning of the X century it was as much as 10.9% of the monthly wage of a cavalier. These data suggest a rapid decline in Iraqi agriculture, especially in the IX century; decline due to the diminution of the tilled superficies, but probably also due to the

[105] Ḳudāma ibn Dja'far, *Kitāb al-kharādj*, ed. M. J. De Goeje, Leiden 1889, pp. 239-40.

[106] Von Kremer, *Über das Einnahmebudget*, p. 43, Ḳudāma ibn Dja'far, *Kitāb al-kharādj* (ed. M. J. De Goeje), p. 180, no. 2.

[107] A. von Kremer, *Culturgeschichte des Orients unter den Chalifen*, Wien 1875-1877, vol. I, p. 291; Ibn Khurdādbih, *Kitāb al-Masālik wa 'l-Mamālik*, pp. 8-14 (Arabic text).

decline of land productivity in some areas[108].

Conclusion

The middle of the VII century represented a period of wars and devastation in the history of Babylonia. This had tremendous consequences for the water management system and, more generally, for agriculture. The Arab conquest led to a revival which probably continued until the end of the VIII century. However, this revival followed a slightly different path. The State was still carrying out important works of water management, but its control over land administration became weaker. Land reclamation in the VII and VIII centuries was largely left in the hands of big landlords, who were bound to the royal families or to the governors, but this also led to inequalities in the fiscal positions of different landlords and different regions, to the creation of politically and socially powerful elites, and to the State having less control over water management.

Different elites (*kharādj*-paying landlords, members or clients of the ruling dynasty, wealthy burghers who could invest in tax-farming etc.) competed to have access to land surplus. These groups struggled to receive land grants, to acquire fiscal privileges and to have a more favourable tax assessment system. For tax-farmers, land (in the form of tax-farming contracts) was just another opportunity for speculation. For large landlords, the chance to acquire and retain possession of land surplus relied to a large extent on their political position. For all of them, the need to make land prosper and fructify was secondary. Surplus land was for them a reward for their political affiliation or for their military services and was another source of revenue to integrate into their political, bureaucratic or commercial activities. In all probability the stronger social influence of

[108] These problems have been already discussed in: M. Campopiano, *Land-Tax Revenue in Iraq during the VII to X centuries: Taxation, Land Tenure and the Decline in Agricultural Production,* submitted paper.

those social groups whose life and prosperity entirely depended on land and on its returns would have stopped the process of decline in Iraqi agriculture.

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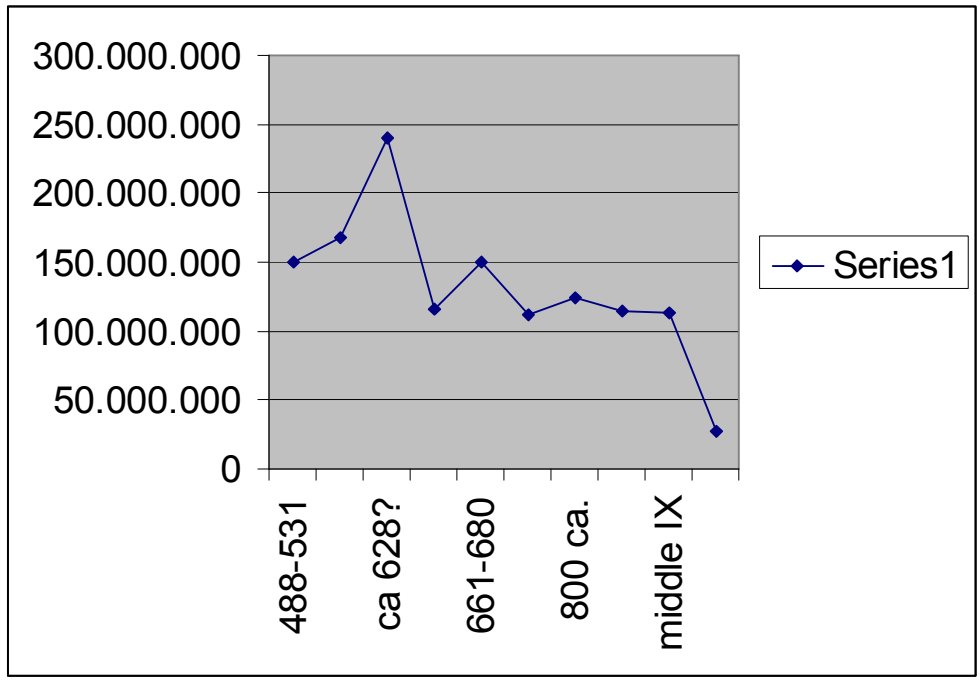
Recorded tax revenue from Iraq (in dirham, ca. 488 to ca. 918-919)



Recorded grains prices

Year	Wheat Prices	Barley Prices
743-4	1 dinar for 22.715/25.96 kg	
750-1	1 dinar for 34.25 kg	
766-7	0.112 dinars for 100 kg	
766-7	0.29 dinars for 100 kg	
768-9	0.088 dinars for 100 kg	
ca 772	0.027 dinars for 100 kg	
791	0.51 dinars for 100 kg	0.34 dinars for 100 kg
815	0.34 dinars for 100 kg	
822	4 dinars for 100 kg	
874	5 dinars for 100 kg	4 dinars for 100 kg
892-902	2 dinars for 100 kg	1 dinar for 100 kg
Beginning X century	1,367 dinars for 100 kg	0.68 dinars for 100 kg
919	9 dinars for 100 kg	
935	4 dinars for 100 kg	
941 (summer)	4.4 dinar for 100 kg	
941 (December)	7.17 dinars for 100 kg	4 dinars for 100 kg
942	10.8 dinars for 100 kg	4 dinars for 100 kg
946	1.78 dinars for 5.625 kg	