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The confluence of water and power: water management in the Brantas river basin from the tenth to the sixteenth century CE

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Chapter 4

Textual Records of Ancient East Javanese Water Management

This chapter discusses the reconstruction of water management in East Java on the basis of inscription records. The first part contains an explanation of East Javanese inscriptions, in which I discuss the nature of Javanese inscriptions in general before making some more specific comments about the inscriptions I have used in the thesis. The second part analyses those inscription records that deal with water management in East Java, and in which I explain the water management approaches employed by the East Javanese. In the final part of this chapter, I note the important role of the Brantas river as a commercial space, after which there is the conclusion.

4.1. THE NATURE OF THE EAST JAVANESE INSCRIPTIONS

Hundreds of inscriptions have been found in Indonesia, especially from the Hindu-Buddhist period. They have been found in Sumatra, Kalimantan, Java, and Bali, and date from the end of the fourth century (the oldest inscriptions, namely the Kutai Inscriptions) to the latest dated inscriptions, Trailokyapuri I and II inscriptions, from 1408 Śaka (1486 CE). Most of them have been published and some have also been translated (into Indonesian, Dutch or English), with notes and commentaries. Some essential corpuses of Old Javanese inscriptions have been published. In 1913, J.L.A. Brandes published transcriptions of 125 inscriptions, both dated and undated.[1]

1 J.L.A. Brandes, "Oud-Javaansche Oorkonden", *Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen, Deel LX* (Batavia-'s Hage: Albrecht & Co.-M.

Others were published by J.G. De Casparis, H.B. Sarkar, and Boechari.[2] In 1952, L.Ch. Damais published a list of 290 dated inscriptions, while 251 dated long inscriptions and 352 dated short inscriptions were listed by Kōzō Nakada in 1982.[3] There are also small collections that cover less than 30 inscriptions, for instance those published by A.B. Cohen Stuart, Machi Suhadi and Richardiana K., Soekarto Karto Atmojo *et al*., and Machi Suhadi and M.M. Soekarto, and also A. Griffiths.[4]

These inscriptions were carved into stone or metal. Some of the stone inscriptions are very large and were even inscribed onto huge monolithic stones, such as the Ciaruteun inscription near Bogor, West Java. At the same time, there are also large inscriptions chiseled into a block shape, such as the Sangguran inscription, which is around two metres high and 35 cm thick. Smaller stone inscriptions have been shaped from blocks of stone less than one metre in size. Metal inscriptions were produced on copper, silver or gold. The copper plate inscriptions are of various sizes, from around 20 to 50 cm in length and 10 to 25 cm wide, but an inscription on silver or gold is usually very thin — less than 0.2 cm thick — and with small dimensions.[5] More perishable materials such as *lontar* or palm leaf are assumed to have also been used at that time.[6]

Most of the inscriptions are legal documents concerning the establishment of *sīmas*. It is not currently possible to give an exact number, but some scholars assume

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Nijhoff, 1913).

2 J.G. de Casparis, *Prasasti Indonesia 1: Inscripties uit de Çailendra-tijd* (Bandung: Nix, 1950); J.G. de Casparis, *Prasasti Indonesia 2: Selected Inscriptions from the Seventh to the Ninth Century A.D.* (Bandung: Nix, 1956); H.B. Sarkar, *Corpus of the Inscriptions of Java Vol. I* (Calcutta: Firma K.L. Mukhopadhyay, 1972); H.B. Sarkar, *Corpus of the Inscriptions of Java Vol. II* (Calcutta: Firma K.L. Mukhopadhyay, 1972); Boechari, *Prasasti Koleksi Museum Nasional Jilid I* (Jakarta: Proyek Pengembangan Museum Nasional, 1985-1986).

3 L.Ch. Damais, "Etudes d'Epigraphie Indonésienne: Liste des Principales Inscriptions Datées de l'Indonésie, *BEFEO* 46 (1952): 1-105. K. Nakada, *An Inventory of the Dated Inscriptions in Java* (Tokyo: Toyo Bunko, 1982).

4 A.B. Cohen Stuart, *Kawi Oorkonden in Facsimile: met inleiding en transcriptie* (Leiden: E.J. Brill, 1875); M. Suhadi and K. Richardiana, *Berita Penelitian Arkeologi No. 47: Laporan Penelitian Epigrafi di Wilayah Provinsi Jawa Timur* (Jakarta: Proyek Penelitian Arkeologi Jakarta, Pusat Penelitian Arkeologi Nasional, Departemen Pendidikan dan Kebudayaan, 1996); M. Suhadi and M.M. Soekarto, *Berita Penelitian Arkeologi No. 37. Laporan Penelitian Epigrafi Jawa Tengah* (Jakarta: Proyek Penelitian Purbakala, Departemen Pendidikan dan Kebudayaan, 1986); A. Griffiths, "The Epigraphical Collection of Museum Ranggawarsita in Semarang (Central Java, Indonesia)", *BKI* 168, 4 (2012): 472-496.

5 See for the example of the inscriptions in: A. Griffiths, "Written traces of the Buddhist past: Mantras and Dhāraṇīs in Indonesian Inscriptions", *Bulletin of SOAS*, 77, 1 (2014): 137–194.

6 See: J.G. de Casparis, *Indonesian Palaeography: A History of Writing in Indonesia from the Beginnings to c. A.D. 1500* (Leiden: Brill, 1975).

that more than 90 per cent of the total are such *sīma* inscriptions.[7] A *sīma* grant inscription attests that a village or part of a village has had its taxes reduced or that the beneficiary has a tax exemption; in most cases, this was a religious foundation. The *sīma* land seemingly benefitted from this financial reward, but after receiving it seems that the *sīma* land had to finance the operating costs of the religious foundation located on that land. It seems likely that the *sīma* owner had to change how tax was paid; instead of paying it to the state, the owner had to give it to a new beneficiary, usually a religious foundation or something to which the *sīma* was dedicated.[8]

The text of an inscription is usually divided into a number of sections, and each section contains different information. Scholars have attempted to identify a general structure to these texts, but as the various sections are not the same in each inscription they have only been able to describe the structure of such texts in very broad terms.[9] For *sīma* inscriptions this consists of (1) the *maṅgala*, (2) the date, (3) the promulgation of the decree by the king or royal functionaries who established the *sīma*, (4) the motivation or reason for the establishment of the *sīma*, (5) information regarding the status of the *sīma*, (6) the list of functionaries and names of guests to whom gifts were given, (7) the description of the *sīma* ritual ceremony, (8) the description of the feast that was given as part of the process, and (9) the name of the person who produced the inscription.

The first section of the *sīma* inscription is the *maṅgala,* which is an invocation of a deity or a salutation, for instance *nama śiwāya* (a salutation to Śiwa), *om* (or *oṅ*, the sacred syllable), *awighnam astu* ("may there be no hindrance"), or just *swasti* ("hail"). Some inscriptions lack a *maṅgala* element. Most of the dates are in the Śaka era and they are commonly given with various expressions, such as

7 One of the scholars who stated this was Jan Wisseman Christie, in: J.W. Christie, *Patterns of Trade in Western Indonesia: Ninth through Thirteenth Centuries A.D.* (Ph.D. Thesis, School of Oriental and African Studies, University of London, 1982).

8 Comparing them with Indian inscriptions from around the same period, Timothy Lubin argues that although the Javanese borrowed the word from India, the concept of *sīma* had a different meaning in Java: "*sīma* (sometimes *dharma sīma)* denotes a distinctive Javanese variant of the South Asian land grant", see: T. Lubin, "Writing and the Recognition of Customary Law in Premodern India and Java", *Journal of the American Oriental Society* 135/2 (2015): 252. For the definition of *sīma,* compare to A.M.B. Jones, *Early Tenth Century Java from the Inscriptions. A Study of Economic, Social and Administrative Conditions in the First Quarter of the century* (Dordrecht: Foris Publications, 1984): 59-61 and also Christie, *Patterns of Trade in Western Indonesia:* 84.

9 Among them are: Buchari, "Epigraphy and Indonesian Historiography", in: *An Introduction to Indonesian Historiography*, ed. Soedjatmoko *et al*. (Ithaca, New York: Cornell University Press, 1965): 47-73; Jones, *Early Tenth Century Java from the Inscriptions:* 11-12; J. van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band I* (Ph.D Dissertation, Leiden University, 1996).

"Śrī Śakawarṣātīta", "Śakawarṣātīta", or just "*iṅ Śaka*". This is then followed by the digits of the year. Another era used in Old Javanese inscriptions is the *Sañjayawarṣa*, but this is found in only four inscriptions, namely those of Taji Gunuṅ, Timbaṅan Wuṅkal, Tihaṅ, and Tulaṅ Er. After the year, other dating elements follow, such as the month, the day, and various astronomical dating elements.[10] The inscription then mentions the *ājñā* (command) handed down by the ruler to the lower functionaries that would establish the *sīma*. This part of the inscription contains very useful data that help us identify the bureaucratic system of the state. Then the reason for the *sīma*'s establishment is described, usually preceded by the word *sambandhanya* (the reason was the following). The *sambandhanya* passages provide important historical data, such as that the tax of the cultivated land was transferred to a religious institution. The next part of the inscription mentions the rights and privileges of the grants that the beneficiary received, such as tax exemptions. It then records the various gifts or donations (*pasĕkpasĕk*) that were given to the officials and the witnesses who came from neighbouring villages (the status and positions of the officials determined the total gifts they would receive). Then comes a description of the ritual ceremony, which was led by a religious functionary called the *saṅ makudur*, and which sometimes began with a list of offerings provided for the ceremony followed by the ceremony itself and the curses that were uttered by the *saṅ makudur*. In many inscriptions, it is recorded that a feast was held after the ceremony, the description of which contains information on the food, drinks, and entertainment (e.g. dancing, singing, comedy, and even gambling) involved. The final part of the inscription records the name of the scribe (*citralekha*) who produced it.

The other type of inscription is the non-*sīma* inscription, and includes inscriptions dealing with judicial decisions, religious mantras, disputes over land, disputes over debt payments, donations to religious foundations, names, and those inscriptions which contain only a date. These non-*sīma* inscriptions may be either short or long; the name and date inscriptions are always short; names — whether official or personal — consist of less than five words while dates have only three or four digits. Mantra inscriptions often have longer texts, sometimes consisting of more than one row and being inscribed on a stone or a precious metal, such as gold or silver plate. The longest non-*sīma* inscriptions contain judicial opinions that resolve legal disputes and political decisions. One such example is the Wurudu Kidul

10 For further details on dating elements, see: J.G. de Casparis, *Indonesian Chronology* (Leiden: Brill, 1978); van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band I:* 59-69; and A. Gomperts, "Sanskrit *jyostiṣa* Terms and Indian Astronomy in Old Javanese Inscriptions", in: *Fruits of Inspiration. Studies in Honour of Prof. J.G. de Casparis*, ed. Marijke J. Klokke and Karel R. van Kooij (Groningen: Egbert Forsten, 2001): 93-134; and J.C. Eade and Lars Gislén, *Early Javanese Inscriptions. A New Dating Method* (Leiden: Brill, 2000).

inscription (dated 922 CE), which concerns a dispute about citizenship status.[11] The inscription records how the dispute arose, the subsequent judicial process, and the judgement that was promulgated by the law court.

It is important to highlight F.H. van Naerssen's explanation of the nature of Old Javanese inscriptions. He states that, because the inscriptions were related to "deeds of land grants or records of economic transactions," they were "not state documents dealing with general administration but dealt rather with specific local affairs".[12] Moreover, he concludes that Old Javanese inscriptions can be considered "the most authentic documents for historians". His conclusion was drawn on the basis of his observation that the content of the inscriptions really did record events of the past and that these were faithfully detailed in the inscriptions with authentic dates given;[13] as such, historians generally agree that the inscriptions do contain historically useable records. They can, however, be used as historical sources only if they are treated carefully and attempts are made to discover precisely what information contained within each may be used to reconstruct ancient Javanese history.

The main point to note is that it is necessary to understand both the contexts in which the inscriptions were produced and their limitations as records of past events. The context of an inscription refers to the target audience and the aim or mission of the inscription (or of the author or individual who tasked the author with producing the text). As such, the context of a *sīma* inscription is not the same as, for instance, the context of a mantra inscription; an inscription with a mantra or spell had to produce the spell precisely in order to fulfill its extra-textual function, to produce a magic effect, usually to a single owner. A *sīma* inscription was meant to be read aloud publicly because its content was legal documentation related to the status of a piece of land.

Even though Van Naerssen called them the most authentic documents for historians, it should be noted that Old Javanese inscriptions were in general not intended to record historical events and as such have limited value as historical sources. In the first place, because most inscriptions deal only with *sīma* grants, the overall information available is limited because we lack other kinds of data that could help us reconstruct a more comprehensive image of the ancient Javanese past. As such, it would be useful to compare the inscriptions with other sources, such as archaeological and literary ones. Secondly, by their very nature all Old Javanese inscriptions come from the past and use a very different language from Javanese

11 W.F. Stutterheim, "Transcriptie van Twee Jayapattra's", *OV 1925* (1925): 59; W.F. Stutterheim, "Een Javaansche Acte van Uitspraak uit het Jaar 922 A.D.", *TBG* 75 (1935): 444-456.

12 F.H. van Naerssen, "Ancient Javanese Recording of the Past", *Arts. The Journal of the Sydney University Arts Association* 5 (1968): 32.

13 Van Naerssen, "Ancient Javanese Recording of the Past": 33.

today. Old Javanese, with its many Sanskrit loan words, is not yet fully understood and still presents us with various problems of interpretation. Without a doubt, Zoetmulder's Old Javanese-English dictionary — which was based on literary texts — has contributed greatly to understanding the meaning of Old Javanese words, but comprehensive linguistic research on the Old Javanese used in the inscriptions remains a desideratum.[14] Thirdly, those editions of Old Javanese inscriptions that have been published contain many misreadings, incorrect transcriptions, mistranslations, and debatable interpretations.[15] Hence, each edition that will be used must be checked carefully. Fourthly, there is the possibility that some inscriptions may have been copied at a later time. In ancient Java, there were many inscriptions that were duplicated from older, original ones, while other inscriptions contain orthographic errors that cast doubt on their originality. In a dubious inscription errors can be found in the palaeography, linguistics, and dating, as well as historical anachronisms. For instance, the Gulunggulung inscription from 851 Śaka (929 CE) has many incorrect aspects; for example, Old Javanese words such as *pamṛṣi*, *tan pa wuah*, *duhilaten*, and *parahu* are written as *pamṛsi*, *tan mawuah*, *duhilatan*, and *barahu* respectively.[16] In this case, it is necessary to question the cause of these errors: were they caused by a sloppy carver or by someone who did not have good ability in Old Javanese?[17] The best way to detect this sort of errors is to compare the inscription in question to validated inscriptions from the period in question, comparing their paleographic style and linguistic characteristics.

4.2. THE EAST JAVANESE INSCRIPTIONS ON WATER MANAGEMENT

According to Nakada's list, 128 dated long inscriptions and 352 dated short inscriptions have been found in East Java, in 18 regencies (*kabupatens*).[18] Nakada

14 J.A.L.B. van den Veerdonk has argued that linguistic research has been undertaken only partially, and has called for more wide-ranging research involving the overall corpus of extant inscriptions; see: J.A.L.B. van den Veerdonk, "Old Javanese Inscriptions and Linguistic Research", in: *Studies in South and Southeast Asian Archaeology.* ed. H.I.R. Hinzler (Leiden, Brill: 1986): 5-12.

15 J.G. de Casparis puts forward these issues: J.G. de Casparis, "Reading Old Javanese Inscriptions", *BKI* 143/4 (1987): 545-547.

16 Trigangga, *Tiga Prasasti Batu Jaman Raja Sindok* (Jakarta: Museum Nasional, 2003): 10-16.

17 This is also seen in Indian epigraphy; for example, Richard Salomon wrote that in South Indian epigraphy are occasionally found spurious copperplate inscriptions. See: R. Salomon, *Indian Epigraphy. A Guide to the Study of Inscriptions in Sanskrit, Prakrit, and the other Indo-Aryan Languages* (New York-Oxford: Oxford University Press, 1998): 165-168.

18 Nakada, *An Inventory of the Dated Inscriptions in Java*: 100-171.

did not include undated inscriptions. His list was published in 1982, and the total number of inscriptions will be higher now because both more inscriptions have since been found and the many undated inscriptions must be included. On the basis of Nakada's list, the regency with the highest number of inscriptions is the Mojokerto regency, which has 148 inscriptions in total, followed by the Blitar regency with 61, the Kediri regency with 54, the Malang regency with 38, and the Tulungagung regency with 34.[19] It seems that the quantitative distribution of the inscriptions within East Java directly correlates with the regencies in which the centres of the East Javanese kingdoms were located.[20]

It is also interesting to note that around 38 inscriptions found in East Java are from the Central Javanese period, when the centre of power was Central Java (before 929 CE). The below table gives the names of these inscriptions, where they were discovered, and their dates.

Table 4.1. Inscriptions from East Java pre-929 CE.

No.	Name of Inscription	Place of discovery	Date	
			Śaka	CE
1	Kañjuruhan (Dinoyo)	Dinoyo and Merjosari, Malang	682	760
2	Pu Taṅgal	Not known[1)]	717	795
3	Hariñjiṅ A[2)]	Siman, Pare, Kediri	726	804
4	Pu Bali,	Gundik, Ponorogo		mid-9th c.
5	Pu Kayutarā	Gundik, Ponorogo		mid-9th c.
6	Pu Balārāma	Gundik, Ponorogo		mid-9th c.
7	Abhaya	East Java (?)		mid-9th c.
8	Abhayamukha	East Java (?)		mid-9th c.
9	Kuṭi (Joho)[3)]	Joho, Sidoarjo	762	840
10	Dang Hyaṅ Guru Candik	Dinoyo, Malang	772	850
11	Kañcana (Buṅur A/Gedaṅan I)[4)]	Gedangan, Sidoarjo	782	860
12	Waharu I (Keboan Pasar)	Keboan Pasar, Sidoarjo	795	873
13	Baliṅawan (Singosari I)	Singosari, Malang	813	891
14	Pĕnampihan I[5)]	Tulungagung	820	898/9
15	Taji (Ponorogo II)	Ponorogo	823	901
16	Baṇigrama (Watukura I A)	East Java (?)	824	902
17	Ketanen I	Ketanen, Mojokerto	826	904
18	Kubukubu (Malang I)	Singosari (?), Malang	827	905

19 Nakada, *An Inventory of the Dated Inscriptions in Java*: 184-190.

20 A more detailed explanation of the centers of the Javanese kingdoms can be found in the next sub-chapter.

19	Kinĕwu (Blitar I)	Blitar	829	907
20	Barsahan	East Java (?)		ca. 908
21	Parĕ Gaṇeśa	Pare, Kediri	83[?]	908-17
22	Kaladi (Penangungan)	Gunung Penangungan	831	909
23	Tulaṅan (Jedong I)	Jedung, Mojosari Lor, Mojokerto	832	910
24	Sugiḥ Manek	Singosari, Malang	837	915
25	Piliṅpiliṅ	Dinoyo, Malang	840	918
26	Hariñjiṅ B (Sukabuni B)	Siman, Pare, Kediri	843	921
27	Wurudu Kidul A (Singasari III)	Malang	844	922
28	Wurudu Kidul B (singasari IV	Malang	844	922
29	Kambang Śrī A (Jedong II)	Jedung, Mojosari Lor, Mojokerto	848	927
30	Hariñjiṅ C (Sukabumi C)	Siman, Pare, Kediri	849	927
31	Palĕbuhan (Gorang gareng)	Gorang gareng, Madiun	849	927
32	Kambaṅ Śrī B (Jedong III)	Jedung, Mojosari Lor, Mojokerto		927-928 (?)
33	Kinawĕ (Tanjung Kalang)	Kediri	849	928
34	Saṅguran (Minto Stone)	Malang/Surabaya	850	928
35	Paṅgumulan III (Blota)	Blota, Mojokerto	850	928
36	Kampak (Pangurumbigyan)	Surabaya		pre-929[6]
37	Karaṅ Tengah	Blitar		10th c.[7]
38	Wijaksara	Banyuwangi		10th c.[8]

Note:

1) Now kept in the Laboratory of Universitas Negeri Surabaya, Ketintang, Surabaya.
2) This inscription was reissued in the early tenth century.
3) A copied inscription from Majapahit period
4) A copied inscription from Majapahit period
5) A majapahit copy of a Balitung inscription (?)
6) Undated; according to Brandes, the inscriptions dates to before 850 Śaka. See: Brandes, "Oud-Javaansche Oorkonden": 110-111.
7) Undated, but probably at least from the early tenth century based on the character style; see: Machi Suhadi and K. Richardiana, Berita Penelitian Arkeologi No. 47: Laporan Penelitian Epigrafi di Wilayah Provinsi Jawa Timur (Jakarta: Proyek Penelitian Arkeologi Jakarta, *Pusat Penelitian Arkeologi Nasional, Departemen Pendidikan dan Kebudayaan, 1996): 1-2, 25-16.*
8) Undated; it has the same case as the Karang Tengah inscription above; see: Suhadi and Richardiana, Berita Pene*litian Arkeologi No. 47: 1-2, 7-8.*

The presence of so many inscriptions from the Central Javanese period within East Java demonstrates that polities did exist in these regions despite the fact that power was focused in Central Java. J.G. de Casparis has even claimed that, from

the time of Balituṅ, the Central Javanese polity had a second capital, in East Java.[21] However, I think there is little evidence for this because there is no single extant textual source that proves this. I suggest that some smaller polities flourished in East Java from the middle of the eighth century CE, some of which were under the power of the Central Javanese polity. At the very least, the inscriptions in the list above—with the exception of the Kañjuruhan inscription, the oldest inscription, which suggests an autonomous polity in the earliest period—contain the names of rulers who were probably petty local sovereigns related to the Central Javanese kings. The Waharu I inscription, for instance, mentions that a local ruler who established a *sīma* was the nephew of Rakryan Tuloḍoṅ.[22] Hariñjiṅ B, found in Pare and dating from 921 CE, has the title "*saṅ dewata lumaḥ i Kwak*", which seems to be referring to a local ruler. [23] Moreover, from a broader perspective, the presence of these inscriptions issued in East Java by the Central Javanese kings demonstrates how the Central Javanese polity consolidated its authority over East Java.

Some of the Central Javanese inscriptions found in East Java also refer to matters related to water management in the latter region when political power was still centreed in Central Java.[24] Thus, at least from the early ninth century CE water management was a significant issue for the villages and inhabitants of East Java. In this thesis, I will make use of the inscriptions relevant to my topic, while these and other inscriptions from the East Javanese period used as sources within this thesis are listed in Table 4.2, below.

Table 4.2. Inscriptions from East Java from 929 to ca. 16th century CE

No.	Inscription	Dates		Place of Discovery
		Śaka	CE	
1	Poh Rintiṅ	851	929	Glagahan, Jombang.
2	Saraṅan	851	929	Mojokerto
3	Guluṅ guluṅ	851	929	Singosari, Malang.

21 J.G. de Casparis, "Some Notes on Transfer of Capitals in Ancient Sri Lanka and Southeast Asia", *Pertemuan Ilmiah Arkeologi VI* (Jakarta: Pusat Penelitian Arkeologi Nasional, 1993/1994): 378.

22 Boechari, *Prasasti Koleksi Museum Nasional I*: 22-27.

23 P.V. van Stein Callenfels, "De inscriptie van Soekaboemi", *MKAWL 78* (1934): 115-130. In this article, van Stein Callenfels reads "*sang dewata lumah i Twak*", while Sukarto K. Atmodjo reads "*sang dewata lumah i Kwak*". The term *Kwak* is the name of a village in Kediri, called Kuwak, which has the spring Umbul Kuwak nearby. See: S.K. Atmodjo, "Bhagawanta Bārī, Bapak Pembangunan Daerah Kediri Tahun 804 Masehi", in *Jawa: Majalah Berkala Kebudayaan Vol. 1* (1997): 61.

24 See also Table 5.2; water officials mentioned in Old Javanese inscriptions from the eighth to the fifteenth century in this chapter.

4	Liṅgasuntan	851	929	Lawajati, Malang.
5	Waharu II	851	929	Jenggala, Surabaya
6	Turyan	851	929	Watugodeg, Turen, Malang.
7	Cuṅgraṅ I	851	929	Suci, Bangil, Pasuruhan.
8	Cuṅgraṅ II	851	929	Mount Kawi, East Java.
9	Jru jru	852	930	Banyubiru, Singosari, Malang.
10	Wulig	856	934	Bakalan, Gondang, Mojokerto.
11	Añjukladaṅ	857	935	Candi Lor, Berbek, Nganjuk.
12	Hriṅ	859	937	Kujon Manis, Berbek, Nganjuk.
13	Paraḍaḥ	865	943	Siman, Kediri.
14	Kanuruhan	865	943	Bunul, Blimbing, Malang
15	Muñcaṅ	866	944	Malang
16	Kamban	893	971	Pělěm, Trowulan, Mojokerto.
17	Cane	943	1021	Surabaya (Cane, Sambeng, Lamongan?)
18	Terep I dan II	954	1032	Penanggungan, East Java.
19	Baru	956	1034	Simpang, Surabaya
20	Kamalagyan	959	1037	Kelagen, Sidoarjo
21	Gandhakuti	964	1042	Keboan Pasar, Sidoarjo
22	Sumĕṅka	981	1059	Surabaya
23	Padlĕgan	1038	1116	Pikatan, Blitar
24	Patakan	n.d.	11th century	Surabaya (Patakan, Lamongan?)
25	Manañjuṅ	n.d.	11th century	Malang
26	Hantaṅ	1057	1135	Ngantang, Malang
27	Panumbaṅan	1062	1140	Plumbangan, Blitar
28	Talan	1058/ 1068	1136/1146	Gurit, Babadan, Wlingi, Blitar
29	Jaring	1103	1181	Jaring, Kembang Arum, Blitar.
30	Pĕnampihan/ Sarwadharma	1191	1269	Pĕnampihan, Tulungagung
31	Kudadu	1216	1294	Gunung Butak, Blitar/Malang.
32	Dhimaṇāśrama	n.d.	13th /14th century	Brantas Delta, near Sidoarjo
33	Sukamĕrta	1218	1296	Penanggungan slope, between Gajah Mungkur and Bekel.
34	Balawi	1227	1305	Trowulan, Mojokerto
35	Balambangan/ Jayanagara/ Lamongan	n.d.	early 14th century	Lamongan

36	Kambaṅ Putih	n.d.	early 14th century	Tuban
37	Tuhañaru/ Sidatĕka	1245	1323	Sidateka (?), Mojokerto
38	Kuśmala	1272	1350	Kandangan, Kediri
39	Pĕlĕm	n.d.	1350-1389	Pĕlĕm, Mojokerto.
40	Jenggring	1276	1354	Jenggring (Jabung), Mojokerto
41	Keputran	1277	1355	Keputran, Kutorejo, Mojokerto
42	Caṅgu/Trowulan I	1280	1358	Temon, Trowulan, Mojokerto
43	Seloliman	1280	1358	Seloliman, Trawas, Mojokerto
44	Biluluk I	1288	1366	Bluluk, Lamongan
45	Buṅur B	12(89)	1(367)	River Gedangan, Sidoarjo
46	Karaṅ Bogĕm/ Tirah/ Trowulan V	1308	1386	Trowulan, Mojokerto
47	Biluluk V (Karaṅ Bogĕm)	n.d.	1387	Bluluk, Lamongan.
48	Biluluk II	1313	1391	Bluluk, Lamongan
49	Śelamaṇḍi I	1316	1394	Surabaya ?
50	Lumpang/ Katiden II	1317	1395	Malang
51	Biluluk III	1317	1395	Bluluk, Lamongan
52	Śelamaṇḍi II	1317	1395	Surabaya (?)
53	Wariṅin Pitu/ Surodakan	1369	1447	Soradakan, Trenggalek
54	Pamintihan	1395	1473	Sendang Sedati, Bojonegoro
55	Trailokyapuri I	1408	1486	Jiyu, Mojokerto
56	Trailokyapuri IV	n.d.	late 15th century	Jiyu, Mojokerto
57	Saṇḍuṅan	n.d.		Berbek, Nganjuk.
58	Kalimusan	n.d.		Malang, East Java

The inscription record supplies much information related to aspects of East Javanese water management, as the information provided shows the relationship(s) between water, infrastructure, various political and economic aspects of the kingdoms, and the local community.

4.3. WATER BUREAUCRACIES IN ANCIENT JAVA FROM INSCRIPTIONS

Based on inscription data, we can conclude that the administrative structure of the ancient Javanese polity had a lengthy developmental history. Two distinctive

administrative structures can be identified: one that existed before the tenth century and one that existed after that time. The most significant development that occurred after the centre of the Javanese polity had moved to East Java was the alignment of the growth of settlement patterns, population structure, and trading activities.[25] The latter was the most significant aspect for transforming the administrative and bureaucratic structure of the East Javanese polity. Moreover, as Christie argues, the centre of the East Javanese polity began to place more importance on commerce—especially in the Brantas river basin—as the inscriptions mention more traders than administrative officials, while agricultural and commercial taxes began to be recorded more quantitatively than they had been before.[26]

Furthermore, the East Javanese administrative and bureaucratic power structure continued to be based on the three-level hierarchical order of court-village-hamlet. The terms employed to refer to a village or hamlet community and administration were probably altered, but the administrative structure did not change significantly.[27] These hierarchical institutions reflected in the three groups of officials: royal officials, village officials, and hamlet "officials". Royal officials were a group of officers under the direct command of the king. The officials within this group are referred to as, among other things, *rakryan*s or *rakarayān*s; for example, *rakryan mahāmantrī i hino*, *rakryan mahāmantrī i halu*, and *rakryan mahāmantrī i sirikan*. During the Majapahit period, the highest officer was called *rakryan mahāmapatih*, and he had a role similar to that of a prime minister or grand vizier. At the next level down, village officials were tasked with dealing with the administrative affairs of the village. Officers within this group occasionally had a title such as *tuha* (head or superintendent of a group), *hulu* (head of), or *rāma* (village elder).[28] At the hamlet level, it seems that there were more direct

25 J.W. Christie, "States without Cities: Demographic Trends in Early Java", *Indonesia* 52 (1991): 27.

26 J.W. Christie, "Wanua, Thani, and Paraduwan: The 'Disintegrating' of Village in Early Java?", in: *Texts from the Islands: Oral and Written Traditions of Indonesia and the Malay World*, ed. Wolfgang Marschall (Bern: Institute of Ethnology, University of Bern, 1994): 36.

27 Jan Wisseman Christie discusses the changing meanings of these terms in detail. For instance, the term *wanua*—the name of an intermediary institution between a village community and the royal court, which had been used since the early Central Javanese period—was changed to *thāni* in the late tenth century, and the term *wanua* began to disappear. In some inscriptions the *dūwān*—a sub-unit of *thāni*—set up a group of *dūwān* called *paradūwān*. Later, in the fifteen century, another term, *deśa*, appears in the inscriptions. See: Christie, "Wanua, Thani, and Paraduwan": 37-38.

28 According to De Casparis, these officials were royal officers who resided in the villages, but there is not sufficient evidence to support this assertion. For De Casparis' opinion see: J.G. de Casparis, "Some Notes on Relations between Central and Local Government in Ancient Java", in: *Southeast Asia in the 9th to 14th Centuries*, ed. David G. Marr and A.C. Milner (Singapore-Canberra: Institute of Southeast Asian Studies ISEAS-Research School of Pacific Studies, Australian National University, 1986): 49-63.

functionaries, and hamlet affairs may have been handled directly by the elders, who did not have specific titles.

The lists of officials recorded in the inscriptions also refer to irrigation officials who had to deal with the water management of the village. There are at least nine officials who are frequently mentioned in the inscriptions:

1) *Hulair/Hulu air/Huler*
   W.F. Stutterheim identified the *hulair* as an official who maintained the irrigation system and who is nowadays known as the *ulu-ulu.*[29] Using the same definition, De Casparis explained that this person was "in charge of the maintenance of the irrigation system including the distribution of the irrigation water supply to the *sawahs*".[30] In some inscriptions, *hulair karamān* is also mentioned, a term that may refer to a group or board of *hulairs* from a number of villages.[31] The *hulu air* is often mentioned in the lists of officials in inscriptions from the ninth and tenth centuries, although it occurs less frequently in later ones before disappearing completely. It may be that the term *hulu air* was changed into something different during that period. The *hulu air* was a local official at the village level who had a similar role to that of other village officials whose names included the term "*hulu*": *hulu wras* (the official in charge of rice), *hulu buru* (the official in charge of hunting), and *hulu alas* (the official in charge of the forest). Moreover, since the *hulu air* was a local official, he was most likely chosen from among the villagers themselves.[32]
2) *Matamwak/patih tambak/mpu tambak/matamwak mula*
   This official is defined by De Casparis as a "surveyor of the dams", which aligns with Zoetmulder's description.[33] Christie and Van Setten van der Meer give a more elaborate meaning; they suggest that the *matamwak* was a village official in charge of the installation and construction of water works.[34] Whichever is the case, this official was definitely in charge of dykes and dams.
3) *Air Haji*
   The term *air haji* appears in a number of Old Javanese inscriptions, including

29 W.F. Stutterheim, "Inscriptie op een zuiltje van Papringan" *TBG 73* (1933): 100.

30 De Casparis, *Prasasti Indonesia 2*: 230.

31 Cf. N.C. van Setten van der Meer, *Sawah Cultivation in Ancient Java. Aspects of Development during the Indo-Javanese Period, 5th to 15th century* (Canberra: Australian National University Press, 1979): 63.

32 For a description of *hulu air* see also: J.W. Christie, "Water from the Ancestors: Irrigation in Early Java and Bali", in: *The Gift of Water: Water Management, Cosmology and The State in South East Asia*, ed. Jonathan Rigg (London: School of Oriental and African Studies, University of London, 1992): 14.

33 De Casparis, *Prasasti Indonesia II:* 241; P.J. Zoetmulder, *Old Javanese-English Dictionary* (Leiden: KITLV, 1982): 1916.

34 Van Setten van der Meer, *Sawah Cultivation in Ancient Java:* 61; Christie, "Water from the Ancestors": 14.

Er Hangat (885 CE), Waharu I (873 CE), Watukura (902 CE), and Panggumulan A (902 CE). In these inscriptions, the *air haji* is mentioned as one of the *saṅ maṅilala dṛwya haji* officials (royal tax collectors). The precise role of the *air haji* is unclear; perhaps they were the head of the royal holy water officials so, in contrast to those officials who were in charge of water for irrigation purposes, they were in charge of the holy water and the royal *pathirtan* temple, and they collected the (holy) water revenues from the villagers.[35]

4) *Lĕblĕb*
This concept has various forms in Old Javanese inscriptions, including *lĕbĕlĕb, lablab, labalab, ḷbḷb,* and *löbĕlöb*. In modern Javanese, the word has become "*ngĕlĕb*", which refers to the activity of watering a rice field or plants so that the lower part of the plants is submerged for a specific time. Edhie Wurjantoro interprets it as an officer who arranged *sawah* irrigation.[36] Basing himself on a number of inscriptions, Zoetmulder described the *lĕblĕb* as a member of the *maṅilala dṛwya haji*, one of the groups of royal tax collectors.[37] I therefore propose that this functionary was responsible for collecting royal taxes from irrigation.
5) *Hulu wuatan*
The *hulu wuatan*—sometimes spelt *hulu wwatan*—was an officer in charge of supervising bridges and causeways.[38] This official's role was not directly connected to water management but because his work included the building of bridges over rivers it did, therefore, contribute significantly to riverine affairs.
6) *Manambaṅi/Anambaṅi*
This term refers to a person who managed a village's harbor and all the activities related to crossing rivers by boat. Boechari has questioned whether the person was an official who managed and took care of all the crossing places or someone who helped people to cross the river by boat.[39] However, from the Caṅgu

35 This official was also assigned caretaker of Ṛṣis communities, at least in Majapahit period as is stated in canto 75: 2 line 4: "*mantrī her haji taṅ karṣyan iniwönyān/rakṣeka saṅ tapaswi*" ("the mantri Her Haji cares for the communities of Ṛṣis, being the protector of the ascetics"); see the Old Javanese excerpt in: Th. Pigeaud, *Java in the 14th Century: A Study in Cultural History. The Nāgara-Kĕrtāgama by Rakawi, Prapañca of Majapahit, 1365 A.D.* I: *Javanese Text in Transcription* (The Hague: Nijhoff, 1960): 58, and the English translation in: S. Robson, *Deśawarṇana (Nāgarakṛtāgama)* (Leiden: KITLV Press, 1995): 79.

36 E. Wurjantoro, *Anugerah Sri Maharaja. Kumpulan Alihaksara dan Alihbahasa Prasasti-prasasti Jawa Kuna Abad VIII-XI* (Depok: Departemen Arkeologi Fakultas Ilmu Pengetahuan Budaya Universitas Indonesia, 2018): 698).

37 P.J. Zoetmulder, *Old Javanese-English Dictionary I* ('s Gravenhage: Nijhoff, 1982): 949.

38 Van Setten van der Meer, *Sawah Cultivation in Ancient Java:* 62; Stutterheim, "Inscriptie op een zuiltje van Papringan": 96-101.

39 Boechari, "Manfaat Studi Bahasa dan Sastra Jawa Kuna": 38-39.

inscription it is clear that the official was responsible for managing the harbor and serving people crossing the river(s) in boats.[40] This method of crossing rivers is still used today in parts of East Java. The term is found in at least six inscriptions: Wahuta Kuti 762 Śaka (840 CE), Cane 943 Śaka (1021 CE), Caṅgu 1280 Śaka (1358 CE), Garamān 975 Śaka (1053 CE), Sukun 1083 Śaka (1161 CE), and Balambaṅan (undated).[41] Even though the Wahuta Kuti inscription was originally from the Central Javanese period before being rewritten in the Majapahit era, while the other inscriptions are from the East Javanese period, each of these inscriptions was found in East Java, and especially in the delta region of the Brantas river and its surroundings where there are many rivers, both large and small. Something particularly noteworthy is that none of the inscriptions found in Central Java mention this term.[42] Consequently, it can be assumed that the *Manambaṅi* officials and their *tambaṅ* activities were more developed in East Java than they were in Central Java. Geographically, East Java has two large rivers—the Bengawan Solo and the Brantas—and many small rivers within the Brantas delta that required a means of transportation to cross them. Moreover, it seems that the Brantas delta region was an area where there was more intense movement in everyday life and this was probably caused by trade, among various other factors.

7) *Hulu Bañu*

As well as the aforementioned officials, Van Naerssen, De Casparis, and Van Setten van der Meer state that there was another officer who dealt with irrigation system affairs. This officer was known as the *paṅulu bañu*, and has been identified as an irrigation official who had the same task as the *hulair*. Those modern scholars have suggested that this is probably just another, later

40 The Canggu inscription is also called as the Ferry Charter by Pigeaud; see: Th. Pigeaud, *Java in the 14th Century. A Study in Cultural History: The Nāgara-Kĕrtāgama by Rakawi, Prapañca of Majapahit, 1365 A.D. I: Javanese Texts in Transcription* (The Hague: Nijhoff, 1960).

41 The Balambangan inscription has no date, but according to Poerbatjaraka it comes from the period of Jayanagara, while H.M. Yamin assumes that it is from after 1316. See: Poerbatjaraka, "Vier Oorkonden in Koper", *TBG 76* (1936): 388-391 and H.M. Yamin, *Tatanegara Madjapahit Sapta-Parwa II* (Djakarta: Jajasan Prapantja, 1962): 37-40. For a transcription of the inscription, see: van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari–Majapahit, 1255-1486, Band II:* 494-497. For the Wahuta Kuti transcription, see: Boechari, *Prasasti Koleksi Museum Nasional I*: 16-21; and for the Cane inscriptions see: Boechari, *Prasasti Koleksi Museum Nasional I*: 16-21. A transcription of the Canggu inscription is in Th. Pigeaud, *Java in the 14th century, I: 108-112.* Some parts of the transcription were also published in: Boechari, *Prasasti Koleksi Museum Nasional I*: 116-117 and Brandes, *Oud Javaansche Oorkonden*: 255.

42 See the appendix of the table of Water Officials.

term for the *hulair.*[43] However, Pigeaud has a different opinion. He has suggested that the *pańulu bañu* was connected with a type of irrigation-water fee, being the compensation paid by a farmer when he used an irrigation facility owned by someone else.[44] Moreover, Zoetmulder defines *pańhulu bañu* as "a tax for the use of water for irrigation".[45] I tend to agree that it was related to a contribution to or fee paid for using irrigation water, and I will elaborate further on the meaning of *pańhulu bañu* below, in the sub-chapter on water taxes. But my opinion is that the *pańhulu bañu* was a payment given by irrigation water users (farmers) to an official, who was called *hulu bañu*, as compensation for his work. This official had to take charge of irrigation water in the same way as the *hulu air*, and it is most likely that the term *hulu air* morphed into *hulu bañu* during the late East Java period.

8) *Jukuń*

This official's name appears in at least six inscriptions: Kancaña 782 Śaka (860 CE), Talan 1058 or 1068 Śaka (1136 or 1146 CE), Panumbaňan 1062 Śaka (1140 CE), Buńur B 1289 Śaka (1367 CE), Kudadu 1216 Śaka (1294 CE), and Tuhañaru 1245 Śaka (1323 CE). In the Kancaña inscription it is written as "*pajukuń*" while in the others it is recorded as "*jukuń*".[46] The terms *pajukuń* and *jukuń* come from the Old Javanese *jukuń*, which means "a small boat". According to Zoetmulder, it also denotes an official related to a group of *watěk i jro* (*mańilala dṛwya haji*).[47] Therefore, the function of the *jukuń* as a member of the *mańilala dṛwya haji* is related to the meaning of *jukuń* as a small boat; my interpretation of *jukuń* is, therefore, that he was either an official who headed a group of *jukuń* owners or that he was responsible for collecting levies or fees from *jukuń* owners. All six of the inscriptions were found in East Java, and it seems that the *jukuń* official was only known in East Java, from the eighth century. Geographically, as mentioned above, East Java has two large rivers, the Bengawan Solo and the Brantas, along with their tributaries, and consequently the region required much more by means of river transportation than did Central Java. Therefore, the *jukuń* and other kinds of boats were widely used by people in East Java.

43 F.H. van Naerssen, *Oudjavaansche Oorkonden in Duitsche en Deensche Verzamelingen.* Proefschrift Leiden (1941): 50; De Casparis, *Prasasti Indonesia II:* 241; Van Setten van der Meer, *Sawah Cultivation in Ancient Java*: 64.

44 Th. Pigeaud, *Java in the 14th Century. A Study in Cultural History: The Nāgara-Kěrtāgama by Rakawi, Prapañca of Majapahit, 1365 A.D. IV: Commentaries and Recapitulation* (The Hague: Nijhoff, 1962): 383 and 387.

45 Zoetmulder, *Old Javanese-English Dictionary*: 648.

46 See the transcription of this inscription in: H. Kern, "Over eene Oudjavaansche Oorkonde (gevonden te Gĕḍangan, Surabaya)", *Verspreide Geschriften 7* ('s Gravenhage: Martinus Nijhoff, 1917): 32-41.

47 Zoetmulder, *Old Javanese-English Dictionary*: 274. Kern translated *jukuń* as *een schuitenvoerder* (a barge carrier); see: Kern, "Over eene Oudjavaansche Oorkonde": 48.

9) *Mawuai*
This term is found in only two inscriptions, Mantyāsiḥ I (829 Śaka) and Lintakan (841 Śaka). The word *mawuai* comes from the Old Javanese words "*wwe, wwai, wway,* or *way*", which mean "water". In line B.1. of the Mantyāsiḥ I inscription it is written "*mawuai si busū rama ni garagasī muaṅ si rubiḥ kapua winaiḥ pirak mā 2 sowaṅ*", which can be translated as "*Mawuai* si Busū the father of Garagasī and si Rubiḥ were each given 2 *māsa* of silver".[48] From this citation it is very clear that the term "*mawuai*" refers to an official's title and I infer that it was an official who managed and provided water for the people. It is likely that he was only in charge of providing non-irrigation water, because in the Lintakan inscription a *hulair*—an official in charge of irrigation water—is mentioned alongside the *mawuai*.

The table below (Table 4.3) shows how the terms related to water officials that are found in the Central and East Javanese inscriptions are distributed in those areas and demonstrates the development of water officials from Central Java to East Java. Some conclusions may be drawn related to how the officials changed their role in water management; these relate the changing ways in which local rulers and communities dealt with their needs and the environment, especially those aspects related to water management. The East Javanese landscape, with its large rivers and their tributaries, required different strategies compared to Central Java. The emergence of *jukuṅ* and *manambaṅi* officials as part of the East Java bureaucracy shows that the East Javanese communities required transportation services to overcome the physical barriers and to benefit from the existence of the large number of rivers in the region.

However, with the *hulair* officials there is a difference because they were very popular in Central Java, as demonstrated by them being mentioned in many Central Javanese inscriptions. However, after around the middle of tenth century CE they are no longer mentioned in the inscriptions. The last inscription in which the term is recorded is the Paraḍaḥ inscription from 865 Śaka (943 CE). On the other hand, *Lěblěb* officials were mentioned more often in the inscriptions from the first quarter of tenth century CE, which almost exactly corresponds to the time when the Central Javanese powers moved into East Java. It seems that the East Javanese polities saw a general increase in the state income generated from the irrigation taxes collected by the *lěblěb* while, in contrast, the *hulairs* lost their function and then their existence, being replaced by direct self-management by the villagers.

48 See the transcription of this inscription in: W.F. Stutterheim, "Een Belangrijke Oorkonde uit de Kedoe", *TBG* 67 (1927): 205-212 and also in: Sarkar, *Corpus of the Inscriptions of Java II:* 64-81. *M*ā is an "abbreviation of *māsa*, *a* weight (measure) in gold or silver; unit of money", see: Zoetmulder, *Old Javanese-English Dictionary*: 1073.

Table 4.3. Water Officials mentioned in Old Javanese inscriptions from the eighth to the fifteenth centuries CE.

No.	Inscriptions	Dates (Śaka)	Place	Water Official									
				Central Java	East Java	*Air Haji*	*Lĕblĕb*	*Hulair*	*Hulu Wuattan*	Mawuai	Manambaṅi	Jukuṅ	Matamwak
1	Hariñjiṅ A	709	Sukabumi, Pare.		√			+					
2	Waṅwaṅ Baṅen	746	Bagelen.	√		+							
3	Waharu Kuti	762	Joho, Sidoarjo.		√	+	+				+		
4	Tulaṅ Air I	772	Temanggung	√				+					+
5	Kaṅcana	782	Gedangan, Sidoarjo		√		+	+				+	
6	Tunahan/ Polengan I	794	Polengan, Kalasan, Yogyakarta.	√				+					
7	Waharu I	795	Keboan Pasar, Sidoarjo.		√	+	+	+					
8	Humaṇḍiṅ	797	Polengan, Kalasan, Yogyakarta.	√				+					
9	Haliwaṅbaṅ	799	Polengan, Krapyak, Kalasan, Yogyakarta.	√				+					
10	Kwak I	801	Ngabean, Magelang	√				+					
11	Taragal	802	Polengan, Krapyak, Kalasan Yogyakarta.	√				+					
12	Ratawun I	803	Magelang,	√				+					
13	Ratawun II	803	Ngabean, Magelang.	√				+					
14	Salimar I	804	Prambanan, Yogyakarta.	√				+					
15	Salimar II	804	Nanggulan, Yogyakarta	√				+					
16	Salimar III	804	Papringan, Yogyakarta	√					+				
17	Kuruṅan	807	Randusari, Gondang Winagun, Klaten	√				+					
18	Muṅgu Antan	808	Bulus, Balak, Kedu, Magelang	√				+					
19	Baliṅawan	813	Singasari, Malang		√				+				
20	Kembaṅ Arum	824	Yogyakarta	√		+							
21	Watukura I	824	East Java (?)			+	+						
22	Rumwiga I	826	Payak , Piyungan, Yogyakarta	√				+					
23	Poh	827	Central Java	√		+							
24	Kubu	827	Malang (?)		√	+			+				
25	Mantyāsiḥ I	829	Central Java (?)	√		+				+			

Table 4.3. Water Officials mentioned in Old Javanese inscriptions from the eighth to the fifteenth centuries CE.

No.	Inscriptions	Dates (Śaka)	Place	Water Official								
				Central Java	East Java	*Air Haji*	*Lĕblĕb*	*Hulair*	*Hulu Wuatton*	Mawuai	Manambaṅi	Jukuṅ	Matamwak
26	Palepaṅan	829	Borobudur, Magelang.	√				+					
27	Mantyāsiḥ II	829	Matesih, Central Java	√		+							
28	Palepaṅan	829	Borobudur, Magelang	√				+					
29	Wanua Tṅah III	830	Kedunglo, Kaloran, Temanggung	√				+					
30	Kaladi	831	Mount Penanggungan, East Java		√	+	+						
31	Timbaṅan Wuṅkal	835	Gata, Prambanan	√		+							
32	Tihaṅ	836	Prambanan or Magelang (?)	√		+	+						
33	Sugih Manek	837	Singosari, Malang		√	+	+						
34	Lintakan	841	Yogyakarta	√				+		+			
35	Hanriñjiṅ B	843	Siman, Kepung, Kediri		√	+							
36	Saṅguran	850	Ngendat, Malang,		√	+	+						
37	Poh Rintiṅ	851	Glagahan, Jombang.		√	+							
38	Saraṅan	851	Mojokerto		√		+						
39	Guluṅ	851	Singosari, Malang.		√	+	+						
40	Liṅgasuntan	851	Lawajati, Malang.		√	+	+						
41	Waharu II	851	Jenggala, Surabaya		√	+							
42	Turyan	851	Watugedeg, Turen, Malang.		√	+			+				
43	Cuṅgrang I	851	Suci, Bangil, Pasuruhan.		√	+							
44	Cuṅgrang II	851	Mount Kawi, East Java.		√	+							
45	Jru jru	852	Banyubiru, Singosari, Malang.		√	+	+						
46	Añjukladaṅ	857	Candi Lor, Berbek, Nganjuk.		√	+							
47	Hriṅ	859	Kujon Manis, Berbek, Nganjuk.		√		+						
48	Paraḍaḥ	865	Siman, Kediri.		√		+	+					
49	Kanuruhan	865	n.p.										

Table 4.3. Water Officials mentioned in Old Javanese inscriptions from the eighth to the fifteenth centuries CE.

No.	Inscriptions	Dates (Śaka)	Place	Water Official								
				Central Java	East Java	*Air Haji*	*Lĕblĕb*	*Hulair*	*Hulu Wuattan*	Mawuai	Manambaṅi	Jukuṅ	Matamwak
50	Muñcaṅ	866	Malang		√	+	+						
51	Kamban	893	Pĕlĕm, Trowulan, Mojokerto.		√	+	+						
52	Cane	943	Surabaya		√	+	+				+		
53	Baru	956	Surabaya		√	+	+						
54	Bañjaran	975	?			+	+						
55	Sukun	1083	Malang		√	+	+				+		
56	Talan	1058/ 1068	Wlingi, Blitar		√	+	+					+	
57	Pupus	1022	Pojok, Dragung, Semarang.	√		+	+						
58	Padlĕgan	1038	Pikatan, Blitar		√	+	+						
59	Hantaṅ	1057	Ngantang, Malang		√	+	+						
60	Panumbaṅan	1062	Plumbangan, Blitar		√	+	+					+	
61	Jaring	1103	Jaring, Blitar.		√	+							
62	Buṅur B	12(89)	Gedangan, Sidoarjo		√	+	+					+	
63	Kudadu	1216	Gunung Butak, Mojokerto		√							+	
64	Sukamĕrta	1218	Penanggungan Slope.		√	+	+						
65	Balawi	1227	Trowulan (?)		√	+	+						
66	Tuhañaru/ Sidatĕka	1245	Sidateka, Mojokerto		√	+	+					+	
67	Caṅgu	1280	Temon, Trowulan.		√						+		
68	Wariṅin Pitu	1369	Soradakan, Trenggalek		√	+	+						
69	Pamintihan	1395	Sendang Sedati, Bojonegoro		√	+	+						
70	Pĕlĕm	n.d.	Pĕlĕm, Mojokerto.		√						+		
71	Balambaṅan	n.d.	Lamongan, East Java.		√	+	+				+		
72	Erhaṅat	n.d.	Central Java	√		+							
73	Kalimusan	n.d.	Malang, East Java		√		+						

The limited number of royal water officials mentioned in the East Javanese inscriptions highlights the absence of central royal court officials in the management of water. The exception to this was the *lěblěb* and *air haji*, who managed irrigation taxes only. In other words, water management—or at least irrigation management—appears to have been an internal village matter. Exceptions to this may have occurred when issues related to water threatened the safety of a village and its inhabitants; in such circumstances, the central government would intervene and take part in running the village. A Kamalagyan inscription from 1037 CE records the construction of a dam upon the order of King Airlaṅga after the villagers had failed to prevent flooding caused by an overflowing river.[49]

4.4. WATER REDISTRIBUTION AND TAXES

The Old Javanese taxation system is one of the most difficult subjects to investigate because information related to the subject is either opaque or wholly absent. Most of the data are obtained simply from inscriptions, especially those dealing with the establishment of a *sīma*. The element part of the inscription, which gives data on taxes, is within the section that provides the *maṅilala dṛwya haji* list. Etymologically, the term *maṅilala dṛwya haji* has the meaning "collector of the king's due" and can be interpreted as "tax collectors".[50] The *maṅilala dṛwya haji* worked under the supervision of the king and was authorized by him to collect taxes. Therefore, the authority for establishing and changing the taxes was the king, and whenever the stipulation was changed it would be issued in an official decree.

Regarding to the taxes, it is interesting to see a *sīma* as a freehold institution. An inscription regarding a *sīma* is basically a declaration of a freehold grant from the ruler to the land foundation thereby after a land was granted a *sīma* status, the foundation had no obligation to pay taxes. As the land had a status of a tax-free zone, the upkeep of a religious institution such as a temple or a monastery had to finance independently its own operational expenses.[51] Such ancient Javanese religious institutions were essentially non-state funded; money was provided by devotees.

From the lists of the taxes that were collected, it appears that there were many different types of taxes in ancient Java. The taxpayers or individuals who

49 A transcription of this inscription can be found in: Brandes, "Oud-Javaansche Oorkonden": 134-136. See also the Indonesian translation in: Sutjipto Wiryosuparto, "Apa Sebabnja Kediri dan Daerah Sekitarnja Tampil Kemuka dalam Sedjarah", *Kongres Ilmu Pengetahuan Nasional I* (Djakarta: Madjelis Ilmu Pengetahuan Indonesia, 1958): 15-21.

50 For more detailed discussions of this term, see: W.F. Stutterheim, "Een Oorkonde op Koper uit het Singhasarische", *TBG* 65 (1925): 245-267; F.H. van Naerssen, *Oud-Javaansche Oorkonden in Duitsche en Deensche Verzamelingen*: 12-13; Jones, *Early Tenth Century Java from the Inscriptions*: 137-141.

51 Jones, *Early Tenth Century Java from the Inscriptions*: 66-67.

were subject to tax included farmers, artists, fishermen, craftsmen, and traders. Although the inscriptions provide data about the different types of taxes applied in ancient Java, unfortunately these inscriptions only give their names, with no explanation regarding their meanings. Therefore, many modern translations and interpretations of these taxes are still sketchy. Some of them are mentioned only by naming the professions of the taxpayers, like *tuha dagaṅ* (the chief of the traders), *tuha gusali* (the chief of the smiths), *juru judi* (the overseer of gambling), and *uṇḍahagi* (the carpenter), while others are mentioned by name, such as *pabata* (a tax on buildings made with bricks), *pagarĕm* (a tax on salt), *paharĕṅ-harĕṅ* (a tax on making charcoal), *pobaran* (a tax on the dying or the wearing of dyed clothes), *pamĕḍihan* (a tax or contribution in the form of clothes), and *pabaraṅka* (a tax on the making of sheaths).

Taxes and other charges related to water are also recorded in the inscriptions; these include, among others, Sarwadharma 1191 Śaka (1269 CE) and Trailokyapuri IV (undated).[52] The Sarwadharma inscription of 1269 CE depicts the taxes and charges:

IV.b.

4. *…., maryyaweha papiṇḍa pa[ṅ]ti, patiklaṅgas, paṅhulubaña, mareṅ thāni balanya, sowaṅ so*
5. *waṅ, kuněṅ yan panuku baña ikaṅ thāni bala pangaśrayanya, tumatātukwa sapanut sa*
6. *ni sawaḥnya*[53]

Translation:

IV.b.

4. …., should cease to give *papiṇḍah panti* (a contribution for house-moving), *patikĕl aṅgas* (a contribution or fee for *tikĕl aṅgas*[54]), *panghulu bañu* (irrigation water controlling fees) to each village.
5. But in the case of villagers asking to buy [irrigation] water, their purchase of it should be arranged according to
6. [the width of] their irrigated rice-fields.

52 The Trailokyapuri IV inscription is undated, but Hasan Djafar dates it to 1408 Śaka (1486 CE), probably based on the assumption that the date is similar to Trailokyapuri I and II because they are from the same bundle; H. Djafar, *Masa Akhir Majapahit. Girindrawarddhana dan Masalahnya* (Jakarta: Komunitas Bambu, 2009): 9-17.

53 See the transcription and its Dutch translation in: J. van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari – Majapahit, 1255-1486, Band II*: 256. The word *"pa[ng]ti"* should be *"pa[n]ti"*, which means pavilion or house. This translation can also be compared with that of Pigeaud in: Th.G.Th. Pigeaud, *Java in the 14th Century. A Study in Cultural History*, Vol 3 (The Hague: Martinus Nijhoff, 1960): 143-150.

54 Perhaps it is related to the words tikĕl (to break into two) and aṅgas (stick or stake), so it is probably a fee for cutting wooden stakes.

Moreover, another inscription, Trailokyapuri IV (undated) also recorded:

A.

14. *….. deniṅ parimāṇa niṅ deśāmpiha=niṅ trailokyapuri. riṅ talasan=puṅ batu. wuṅgw=iṅ tamraripta. makādi kawĕwnaṅan*
15. *ḍalawan=saṅ hyaṅ dharma. deniṅ paṅulubañu. sakiṅ trailokyapuri, mariṅ jiwu, pisis, 2300, ḍawuhan=wetan=iṅ umaḥ=iṅ jiwu*
16. *miliṅ kali panambaṅan. muwaḥ sawaḥ kumalaśa kahilen=bañu sakiṅ jiwu. margga galĕṅ, kaliṅ siwalan=ḍawuhan=bhumiṅ jiwu, paṅulubañu*
17. *2200, paḍa haśraḥ kaṅkĕn=purṇnamaniṅ kasaṅa. lawan=pari ciṅ. 8. kaṅkĕn=taṅ. 15. ka. 3. makadośa tan=aṅilenana tañu riṅ*
18. *jiwu katĕmpuhana saloṅloṅ=iṅ sawaḥ kaṅ tan=kahilen=bañu, tur katagiha panikĕl= saguṅ=iṅ paṅulubañu.*[55]

Translation:

14. As a number of hamlets in the villages of Trailokyapuri, Talasan, and Puṅ Batu have copper plates (inscriptions), giving the first rights to
15. Saṅ Hyaṅ Dharma to receive the *paṅhulu bañu* (irrigation water controlling fee) of Trailokyapuri to Jiwu [areas], to the amount of 2300 *pisis*,[56] [and of] the dam located south of the house at Jiwu which flows
16. through the Panambaṅan river, and of the rice fields of Kumalaśa which were flowed by water from Jiwu through diking a river at dam Siwalan at Jiwu region. [So, the total amount of] the *paṅhulu bañu* [for the last two areas] is
17. 2200. [Therefore] everyone should hand it over on every full moon in the ninth month and rice worth 8 *ciṅ*[57] every fifteenth (day) of the third month. Guilty are those who do not let the water flow to
18. Jiwu. Someone will be fined [if he makes] the *sawah*s less because [the lands have] have not seen a flow of water; if they do so, people will even be charged double that of the *paṅulu bañu*.

Another passage from the same inscription gives the following information:

55 See the transcription in: Brandes, *Oud-Javaansche Oorkonden*: 94-95. The translation can be compared with: Van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band II*: 484 and 488.

56 *Pisis* is a Javanese currency that emerged after c. 1350. According to Robert S. Wicks, it was based on the Chinese cash coin, and the system was as follows: 1 *kupang* (*sakupang*) = 100 units (*pisis*), 1 *atak* (*sātak*) = 200 units, 1 *māṣa* (*samas*) = 400 units, 2 *māṣa* (*ḍomas*) = 800 units. See: R.S. Wicks, *Money, Markets, and Trade in Early Southeast Asia: The Development of Indigenous Monetary Systems to AD 1400*, (Ithaca, N.Y.: Southeast Asia Program, Cornell University, 1992): 291-292.

57 *Cing* is a unit of measurement, especially for rice.

B.

6. *…… deniṅ deśa sosoran=kaṅ kahilen=bañu sakiṅ trailokya*
7. *puri paḍa haweḥ paṅulu bañu mariṅ trailokyapuri, deśeṅ subaki hasraḥ paṅulu bañu, pisis. 8400. pari. sā. 4. woṅ ka*
8. *tiḍur=asraḥ paṅulu bañu pisis. 8400. pari. sāṅ. 4. haḍawuhan=iṅ ḍoḍogan. riṅ kĕpuḥ. bhumiṅ trailokyapuri sigarada. riṅ aliwu*
9. *wuṅ=hasraḥ paṅulu bañu. 6000. pari ciṅ. 8. riṅ jākuṅ=apaṅulu bañu pisis. 6000. pari. ciṅ. 8. riṅ kaměñjiṅ bañu tutuko*
10. *n. 6000. pari ciṅ. 8. riṅ glĕṅ=atuku bañu. 4000. riṅ garmma. 400. pari ciṅ. 3. riṅ=ĕluk= atuku. 800. kudur paṅulu bañu 100*
11. *0. liṅgirin. 400. pari ciṅ 3. paḍa haśraḥ kaṅkĕn taṅ. 7. ka. 9. yekanaṅ deśa sosoran= hamet paragaḍa tan=aweha paṅulu bañu*
12. *hagagamana handika. rājamudra cĕlĕk=pañĕlĕk=tān=mandiha//* [58]

Translation:

6. ..to the villages located in the lower regions and which are fed by water from Trailokya
7. Puri, [they] pay altogether to Trailokyapuri. The Subaki village should hand over *paṅulu bañu* (irrigation water controlling fees) [to the amount of] 8400 *pisis* and rice 4 sheaves.[59] The residents of
8. Katiḍur should hand over *paṅulu bañu* [to the amount of] 8400 *pisis* and rice 4 sheaves. Whoever uses the dam at Ḍoḍokan and Kĕpuh in the Trailokyapuri region, on the border of
9. Aliwuwuṅ, should hand over *paṅulu bañu* [to the amount of] 6000 [*pisis*] and rice 8 *ciṅ*. In Jākuṅ [they] should pay *paṅulu bañu* 6000 and rice 8 *ciṅ*. In Kaměñjiṅ the payment for buying the water is
10. 6000 and rice 8 *ciṅ*. In Glĕṅ the price of buying the water is 4000 [*pisis*]. In Garmma [the price] is 400 [*pisis*] and rice 3 ciṅ. In Ĕluk [the price is] 800 [*pisis*]. In Kudur the *paṅulu bañu* is 1000 [*pisis*].
11. In Liṅgirin [the price is] 400 [*pisis*] and rice 3 *ciṅ*. They all hand over every seventh day of the ninth month. The villages located in the lower regions which want to try to get *paragaḍa*[60] for not paying the *paṅulu bañu*
12. through use of a royal decree order, it would not be effective.

The above passages demonstrate that there were two different kind of payments

58 *Ibid.*

59 *Sā* or *sāng* is a unit of rice measurement/weight. Van den Veerdonk, based on the Gericke and Roorda's dictionary of *Javaansch-Nederlandsch Handwoordenboek* considers that *sā* = sheaf.

60 The meaning of *paragaḍa* is unclear. From the context of the sentences, it seems that that it is a mechanism to avoid paying taxes.

that were taken from the villagers, *paṅulu bañu* and *atuku bañu.* The first refers to an irrigation water controlling fee while the latter is a payment for buying (*atuku*) water for irrigation. The above inscriptions record that some villages were charged *paṅulu bañu* and that others were required to pay *atuku bañu*, but the passages do not provide sufficient information to explain why a village should give *paṅulu bañu* or *atuku bañu*. I presume that the location of the village determined its water payment. Each irrigated region—composed of a number of villages—had its own irrigation network, and the villages of any one network would only pay the fees (*paṅulu bañu*) while those villages that were located outside the network and which wanted to use water from it had to purchase water by paying *atuku bañu*.

The amount of *paṅulu bañu* and *atuku bañu* that was charged differed, though it is likely that the size of the payment correlated with that of the rice field or the water usage of each village. The water charges were stipulated on the basis of the village, not individual users. Moreover, the payment of both levies was carried out at least once a year on a specific date. It is clear from the inscriptions that the amount of the charge was determined by the royal court and in the case of a *sīma* establishment the stipulation was written down on an official inscription. The rules were supposed to be obeyed and documented in the inscription to make sure that no-one took advantage of the situation.

Since the *sīma*s in Sarwadharma and Trailokyapuri were established to help with the upkeep of the religious foundations located in those villages, the levies and the payments went to these religious foundations directly rather than to the *maṅilala dṛwya haji* or the royal court. In other words, the inhabitants were not freed from paying the levies after their villages had been granted *sīma* status; they still had to pay, but the money was now used for their religious foundations. This is the essence of the *sīma*: it was a contribution to the community finances. The beneficiary of this payment diversion was the religious foundation, perhaps at the hand of the upkeeper of the foundation for operating costs of the foundation.

Other taxes and fees related to water management are mentioned in the Palĕbuhan 849 Śaka (927 CE), Cane 943 Śaka (1021 CE), and Dhimaṇāśrama (undated) inscriptions. These taxes were taken from *parahu/prau* (boat) operators, and the amount of tax depended on the size and equipment of the boats.[61] Similarly, a type of fee might also be applied to small boats or *jukuṅ*.[62] It seems that these taxes were applied to boats used for commercial transport or fishing. The Dhimaṇāśrama inscription provides the interesting piece of information that the taxes could be

61 For a transcription of the Palĕbuhan inscription, see: Stutterheim, W.F., "Epigraphica: I. Een Oorkonde van Koning Wagiçwara Uit 927 A.D.", *TBG* 75 (1935): 420-482. For a transcription of the Cane inscription, see: Brandes, *Oud Javaansche Oorkonden*: 120-125. For a transcription of the Dhimaṇāśrama inscription, see: Christie, *Patterns of Trade in Western Indonesia: Ninth through Thirteenth Centuries A.D.*: 515-516.

62 See the sub-chapter on Water Officials in this chapter.

collected by the *mpuṅku* Muntun, who had purchased land on which to build and endow a religious foundation.[63] As such, the taxes from trade and fishing along the river were given to the religious foundation probably in order to maintain it.

4.5. HYDRAULIC INFRASTRUCTURE

Information on water infrastructure is found in only a few inscriptions, and most of these are from East Java.[64] They are: Hariñjiṅ A 726 Śaka (804 CE), Hariñjiṅ B 843 Śaka (921 CE), Sarañan 851 Śaka (929 CE), Turyan 851 Śaka (929 CE), Wulig 857 Śaka (935 CE), Gaṇeśa Pare (unclear date, probably between 908-1017 CE), Kamalagyan 959 Śaka (1037 CE), Kuśmala 1272 Śaka (1350 CE), Jeṅgring 1276 Śaka (1354 CE), Keputran 1277 Śaka (1355 CE), Seloliman 1280 Śaka (1358 CE), and Trailokyapuri IV (undated, probably the same with Trailokyapuri I and II from 1468 CE), Seloliman . As regards the water infrastructure, these twelve inscriptions refer to dams, dykes, canals, and water pipes.

The inscriptions that refer to dams are Hariñjiṅ, Ganesa Pare, Turyan, Kamalagyan, and Wulig. In the Hariñjiṅ and Ganesa Pare inscriptions, there mention is made of a type of dam, a *mula ḍawuhan*, which has been interpreted by Christie as referring to a dam that had a link with a religious establishment, and she added that it was likely connected to a *patirthan* (a sacred bathing place).[65] In the Hariñjiṅ inscription, *mula ḍawuhan* is mentioned in a passage that refers to "*sīmanira mula ḍawuhan"* (his *sīma* Mula Ḍawuhan), while in the Ganesa Pare inscription the text is unclear so it is not possible to read and therefore understand it, although in some parts of it offerings for *mula ḍawuhan* are recorded.[66] From both these records, we can confirm Christie's interpretation of *mula ḍawuhan*: that it was a type of sacred bathing place that might have had or been near a larger water reservoir, so it could be a *ḍawuhan* (dam).

63 Christie, *Patterns of Trade in Western Indonesia: Ninth through Thirteenth Centuries A.D.*: 514.

64 There are also inscriptions which mention water infrastructure found in West Java and Central Java, namely Tugu inscription (West Java) and Śiwagṛha 866 CE, Rumwiga I 904 CE, Tluron 900 CE (Central Java). See: Poerbatjaraka, *Riwajat Indonesia I* (Djakarta: Jajasan Pembangunan, (1952): 13-14; M. Suhadi, "Prasasti Rumwiga", *Berkala Arkeologi* 4(1) (1983): 37–47; Casparis, *Prasasti Indonesia 1*: 280-330; T. Prasodjo and J.S.E. Yuwono, "Ḍawuhan, Wluran, dan Pañcuran: Penelusuran Aspek Hidrologi terhadap Isi Prasasti Tlu Ron", in: *Menggores Aksara, Mengurai Kata, Menafsir Makna*, ed. Tjahjono Prasodjo and D.S. Nugrahani, (Yogyakarta: Departemen Arkeologi, FIB-UGM, 2019): 8-31.

65 Christie, "Water from the Ancestors": 17.

66 For a transcription of the Hariñjing inscriptions, see: Callenfels, "De inscriptie van Soekaboemi": 115-130; for the Ganesa Pare inscription, see: E. Sedyawati, *Ganesa Statuary of the Kaḍiri and Singhasari Periods: A Study of Art History* (Leiden: KITLV Press, 1994): 323-324.

Other inscriptions provide information on dam construction for the benefit of the villagers. Thus, the Turryan inscription records: "*nikanaṅ Imah kulwan=iṅ lwaḥ ya paṅadaggana saṅ hyaṅ kabhaktyan. mwaṅ makabwatthajya ikeṅ saṅ hyaṅ ḍawuhan tus=niṅ lwaḥ saṅkā ri air=lubaṅ"* ("the land to the west of the river is designated as a location on which to build the Saṅ Hyaṅ Kabhaktyan, and to conduct corvée to build a dam where the spring flows from Airlubaṅ…").[67] The initiative for this dam construction came from Ḍaṅ Atu pu Sāhitya, who appealed to the king to build a religious foundation. The king agreed to do so by giving a decree in favor of the foundation, yet imposed corvée on the villagers to build the dam. The decree also commanded that some lands be converted into part of a *sīma*, to be used in constructing and creating *sawah* that would benefit the religious foundation.

The Wulig inscription records that Rakryan Binihaji Rakryan Maṅibil decreed that three dams be constructed in three villages. The decree also contains regulations regarding taking care of the dams:

Front side:

1. *|| ujar rakryan biniha*
2. *ji rakryan maṅibil umiṅsö*
3. *r) i samgat susuhan umajar(a) ikanaṅ*
4. *rama i wulig mūaṅ i paṅiktan i paḍi*
5. *paḍi i pikattan i paṅhawaran i busuran pa*
6. *rṇnaḥ nikanaṅ ḍawuhan kinonkĕn (?) rakryan binihaji*
7. *gaweyakna samgat susuhan tlas ta ya hinaṛĕp*
8. *de samgat taplan kunaŋ de yanikanaṅ rāma sahananya*
9. *kabaiḥ ṛĕmiṅa ikana an kapratapā rakryan bini*
10. *haji warahĕnnyu aṇaknyu antan ba(r)yyaba(r)yya*
11. *irikana ḍawuhan mūaṅ umajara kamu tepaṅu*
12. *pullakna ḍawuhan telyenu ikana wĕluran*
13. *ri wĕṅi ṅuniwaiḥ umalappa iwaknya i rahina kunaṅ*
14. *yan hana wwaṅ gumawayakĕn ikana senuhuttake*
15. *n kinonnaken anigrahān iṅima katiga*
16. *wĕllas taṅaḥ kunaṅ deyanikanaṅ rama kabaiḥ ka*
17. *yatnaknanyu raṣānike tulis yathanya paḍa la*
18. *pamrinyu iyanakwanūa kabeḥ nahan samgat*

Back side:

1. *taplan kinon rakrya*
2. *n binihaji dumiyyana i*
3. *kana punta pakatuppan deni*

67 For a transciption of this inscription, see: J.G. de Casparis, "Where Was Pu Siṇḍok's Capital Situated?" in: *Studies in Southeast Asian Archaeology No.2. Essays offered to Dr. R. Soekmono*, ed. H.I.R. Hinzler (Leiden: Koentji Press, 1988): 43-44.

4. *kana ḍawuhan kumayatnakna ika*
5. *na saṅ hyaṅ ambrita i rahina i wĕṅi*
6. *|| swasti sakawarṣatīta 856 maghamasa tithi*
7. *pratipāda śuklapakṣa tu ka wṛhaspati wukir wā*
8. *ra irika ḍiwasa rakryan binihaji rakryan maṅibil*
9. *pagĕḥhakĕn ikaṅ ḍawuhan katrini i kahulunan*
10. *i wuatan wulas i wuatan tamya samakaṅkā ku*
11. *eḥ nikaṅ kali tlas mapagĕh……..*[68]

Translation:

Front side:

1. || The command of Rakryan Biniha
2. ji Rakryan Maṅibil [which is] passed down
3. to Samgat Susuhan [as an] order to
4. the head of the village at Wulig and at Paṅiktan, at Padi
5. padi,[69] at Pikattan,[70] at Paṅhawaran, at Busuran
6. [which are decreed] as the location of a dam. [It was] ordered by Rakryan Binihaji [that the dams]
7. to be made by Samgat Susuhan which it is expected
8. to Samgat Taplan [as well]. Now, all the heads of the villages
9. were happy with the authority of Rakryan Bini
10. Haji. Tell your children, your wives
11. about the dam and tell them that there were restrictions
12. regarding destroying the dam, do not flow the water channel in
13. at night and certainly take the fish. But in daytime if
14. there are people who do it there tell them
15. to give to the *sīma* the amount of thirteen
16. and a half. Further, to the entire heads of villages, they should pay attention
17. to the aims of this inscription so that everyone makes a serious effort
18. for all villagers. Then Samgat

Back Side:

1. Taplan was ordered by Rakrya
2. n Binihaji to share part [of the task] with
3. Punta Pakatuppan
4. over the dam, to take serious care of

68 Brandes, *Oud-Javaasche Oorkonden*: 81-82.

69 *Padi-padi* is still the name of a village of Padi, in Kecamatan Gondang, Kabupaten Mojokerto, East Java, near Bakalan village where the inscription was found.

70 *Pikkatan* is now the name of river in the same area where the inscription was found.

5. Saṅ Hyaṅ Ambrita, both night and day.
6. || Hail! The Śaka, has been passed, 856, in the month of Magha
7. on the first of the bright half month of Tuṅlai Kliwon Thursday, Wukir *wuku*
8. when Rakryan Binihaji Rakryan Mañibil
9. inaugurated 3 dams in Kahulunan,
10. in Wuatan Wulas, and in Wuatan Tamya[71]. Thus
11. there many rivers were inaugurated……

The Wulig inscription was found at Bakalan, in Mojokerto, south of the Brantas river and southeast of the Porong river, where there are tributaries of the Brantas. Even today, this area is one of the main irrigated agricultural areas of East Java. There is little doubt that agricultural life there has deep roots in the past, many centuries ago, as the Wulig inscription suggests. The three Wulig dams provided the inhabitants who were living in the areas around the dams with many benefits, allowing them to irrigate *sawah*s and cultivate fish, but in fact the main goal of their construction was to perform an act of devotion through the religious foundation of the Sang Hyang Ambrita.

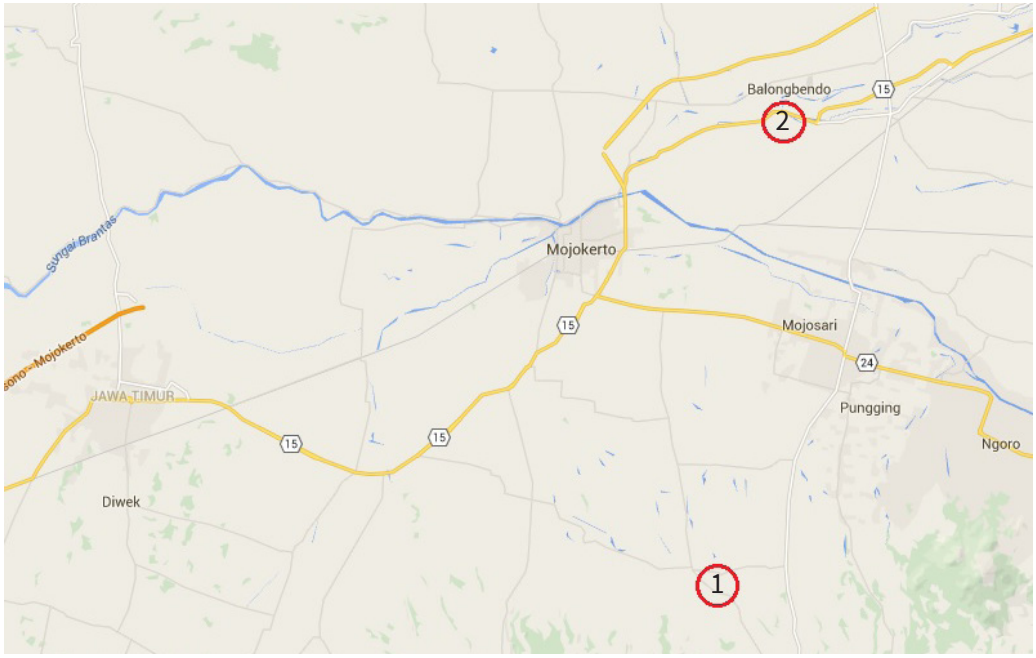

Fig 4.1. The locations of the Wulig inscription and of the Kamalagyan inscription. The region where the Wulig inscription was found (1) and the Kamalagyan inscription (2). (Source: Google Maps, with a modification)

71 Tamya is probably the same place as today's Tameng, a small village (*dusun*) in Padi village, Gondang, Mojokerto.

The people of ancient East Java also constructed dykes, either to support dam construction or as a single construction to control the water. The Kamalagyan inscription of Śaka 959 (1037 CE) provides fairly detailed information on dyke construction in ancient East Java, as the following shows:[72]

1. *||o|| swasti śakawarṣātīta 959 mārggaśīramāsa. tithi pratipada śuklapakṣa, pa, po, śu, wāra duṅulan (graha)cara bāyabyastha, jyeṣṭanakṣatra śakragni dewatā, dhṛtiyoga, wawakaraṇa, irikā diwaśamyājñā śrī*
2. *mahārāja rake halu śrī lokeśwara dharmmawaṅśa airlaṅgānanta wikramottuṅgadewa, tinaḍah rakyān mahāmantri i hino śrī saṅgrāmawijaya prasādottuṅgadewī, umiṅsor i rakryān kanuruhan pu dharmmamūrtti narottamajāna*
3. *naśura, i piṅsornyājñā śrī mahārāja kumonakanikāṅ rāma jātaka i kamalagyan sapasukthāni kabeḥ, thani watĕk paṅkaja, atagan kĕlpurambai, gawe mā 1 masawaḥ tampaḥ 6 hinajyan mā su 6 mā 7 ku 4, len (?)*
4. *drabyahajiniṅ gagā, kbwan pasĕrĕhan, tkariṅ lwaḥ, rĕnĕk, tpitpi, wuluwulu prakāra kabeḥ, piṇḍa samudāya mā su 17 mā 14 ku 4 sā 4 yatikā inaṇḍöan patahila drabya haji mā su 10 aṅkanasuji*
5. *māsa i śrī mahārāja magiliṅgiliṅan tanpārik tanpapādapaṅlĕyö, tanpapagaḍuḥ, tan papilihmas len drabya haji niṅ kalagyan saṇḍaṅan mā su 2 ma 10 milu inaṇḍĕḥ matahila mā su 2 kakala*
6. *ṅan madrabya haji mā 1 ku 2 inaṇḍĕḥ matahila drabya haji mā 1 atĕhĕr tan knā riṅ pintapalaku, buñcaṅ haji turunturun sakupaṅ sātak sukha duḥkha magöṅ maḍmit denikāṅ warggahatur, wargga patiḥ, mwaṅ juruniṅ ka*
7. *lagyan raṇu riṅ dharmma, kewalāněmwa drabyahaji iṅ sīma ḍawuhan i kamalagyan riṅ tambak riṅ wariṅin sapta juga parṇnahanya kāliḥ, sambandha, śrī mahārāja madaměl ḍawuhan riṅ wariṅin sapta lmaḥ nikāṅanak thāni ri kamala*
8. *gyan, puṇyahetu tan swartha, kahaywaknaniṅ thāni sapasuk hilir lasun paliñjwan, sijanatyĕsan pañjigantiṅ, tālan, daśapaṅkaḥ, paṅkaja, tkariṅ sīmaparasīma, kala, kalagyan, thāni jumput, wihāra śā*
9. *la, kamulan, parhyaṅan, parapatapān, makamukhyabhuktyan, saṅ hyaṅ dharmma riṅīśānabhawana maṅaran i surapura, samaṅkana kweḥnikāṅ thāni katahan kaḍĕḍĕtan cariknya denikāṅ kāntĕn tmahan baṅawan amgat ri wa*
10. *riṅin sapta, dumadyakan unānikāṅ drabyahaji mwaṅ hilaṅ nikāṅ carik kabeḥ, āpan durlabha kawnaṅanikatambakanikāṅ baṅawan amgat de parasāmya makabehan, tan pisan piṇḍwa tinamhak parasamya,*
11. *ndātan kawnaṅ juga parṇnahnya, samaṅkana ta śrī mahārāja lumkas*

72 This inscription was found at the village of Klagen, Sidoarjo, East Java. This transcription of the inscription is taken from: Brandes, *Oud-Javaansche Oorkonden*: 134-136.

umatagaknikāṅ tanayan thāni sakalrā re nikĕrkĕ mritāpa śrī mahārāja, inatag kapwa paṅrabḍa mabuñcaṅhajya maḍawuhan saṅpun ta siddha kadamla

12. *nikāṅ ḍawuhan de śrī mahārāja, subaddhāpagĕḥ huwus pĕpĕt hilīnikāṅ bañu, ikaṅ baṅawan amatlū*[73] *hilīnyaṅalor, kapwa ta sukhamanaḥ nikāṅ maparahu samaṅhulu maṅalap bhāṇḍa ri hujuṅ galuḥ tka*
13. *rikāṅ parapuhawaṅ prabaṇyaga saṅkāriṅ dwīpāntara, samañuntĕn ri hujuṅ galuḥ ikaṅ anak thāni sakawāhan kaḍĕḍĕtan sawaḥnya, atyanta sarwwasukha ni manaḥnya makāntaṅka sawaha muwaḥ sawaḥnya kabeḥ an pinunya*
14. *n tinambak hilīnikāṅ baṅawān amgat riṅ wariṅin sapta de śrī mahārāja, mataṅyan ḍawuhan śrī mahārāja parṇnaḥnikāṅ tambak riṅ wariṅin sapta, samaṅkana ta śrī mahārāja haṅanaṅan ri tantguhanikāṅ ḍawuhan*
15. *deni kweḥ nikāṅ wwaṅ mahyūn, maṅlburaṅ yaśa, ri sḍaṅanyan tan tiṅgīn rakṣān parṇnaḥya umahana, mataṅyan ….. ni ikamalagyan tkari kalagyanya katuduḥ momaha i samīpanikāṅ ḍawuhan riṅ wariṅin sapta.*

Translation[74]:

1. ||0|| Hail! The Saka year, has been passed, 959 (1037 CE), the month of Mārggaśira, the first day of the bright half of the month,[75] the day of *Paniruan*, *Pon*, and *Śukra*,[76] the *wuku* of Duṅulan,[77] the *grahacara* of *Bāyabyastha*, the *nakṣatra* of *Jyeṣṭa*, the *dewata* of Śakrāgni, the *yoga* of *Dhṛti*, the *karaṇa* of *Wawa*,[78] when the order of Śrī

73 According to Christie, the word "*amatl*ū" is a misreading of "*amatluk*". See: Christie, *Patterns of Trade in Western Indonesia:* 503*.* However, I have checked the original stone inscription, which is now in Klagen, Sidoarjo, East Java and it should, in fact, be read as "*amatl*ū". Many thanks to Goenawan A. Sambodo who helped me by providing a close-up photo of the Kamalagyan inscription in 2016.

74 Translations of this inscription were also published by Jan Wisseman Christie in: Christie, *Patterns of Trade in Western Indonesia*: 496-503, and by Wirjosuparto in "Apa Sebabnja Kediri dan Daerah Sekitarnja Tampil Kemuka dalam Sedjarah": 17-21.

75 Each Old Javanese month containing 30 *tithis* is divided into two *pakṣas*: śuklapakṣa and *kṛṣṇapakṣa.* Śuklapakṣa is the bright half of the month—or the waxing moon—and śuklapakṣa is the dark half of the month—the waning moon. I think Christie's translation of śuklapakṣa in this inscription as "the dark half of the month" is just an accidental mistake. See: Christie, *Patterns of Trade in Western Indonesia:* 496.

76 Paniruan, Pon, and Śukra are abbreviated as "pa", "po", and "śu" in the inscription. They are the names of the weekdays in three different weeks: the six-day week, the five-day week, and the seven-day week, and they were put on the inscription in that order. See: De Casparis, *Indonesian Chronology*: 49.

77 *Wuku* refers to the names of weeks. There are 30 week-names in the Old Javanese dating system.

78 *Grahacāra* shows the place of a planet, and *B*āyabyastha is one of its positions, in the

2. Mahārāja Rake Halu Śrī Lokeśwara Dharmmawaṅśa Airlaṅgānanta Wikramottuṅgadewa was received by the Rakryān Mahāmantri of Hino Śrī Saṅgrāmawijaya Prasādottuṅgadewī and then passed down to the Rakryān of Kanuruhan Pu Dharmmamūrtti Narottamajānanaśura.
3. Then the passed down order of Śrī Mahārāja was to be carried out by Rāma Jātaka officials at Kamalagyan, all the *thani*, under the *watĕk* of Paṅkaja, who are commanded to convert the *kĕlpurambai* tree field, which has a value 1 *māsa*, into 6 *tampah* of *sawah* fields, at the price of 6 *suwarṇa*, 7 *māsa* and 4 *kupaṅ* in gold.[79] The other things [ordered] are
4. that the royal taxes on the dry rice fields, *sirih* gardens, including river, marsh, and border areas, and grasslands,[80] which have an overall total [of the taxes] of 17 *suwarṇa*, 14 *māsa*, 4 *kupaṅ* and 4 *sāga*,[81] should be reduced to a continuous tax payment of 10 *suwarṇa* in gold each month of Asuji
5. to Śrī Mahārāja.[82] Moreover, there is no *arik* tax, no *pādapaṅlĕyö* tax, no *pagaduḥ* tax, and no *piliḥmas* tax.[83] Another thing is that the *kalagyan saṇḍaṅan*[84] levy of 2 *suwarṇa* and 10 *māsa* in gold is also to be reduced, to pay [only] 2 *suwarṇa* in gold. The *kakalaṅan*[85]
6. tax of 1 *māsa* and 2 *kupaṅ* is to be reduced, to pay [only] 1 *māsa*. Also, they

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north-west. *Nakṣatra* is a lunar mansion and the *yoga* "combines [the] longitudes of the sun and the moon" See: Eade and Gislén, *Early Javanese Inscriptions*: 4-5. *Karaṇa* is half a *tithi*.

79 *Suwarṇa*, *māsa*, and *kupang* are units of gold weight. See: J. W. Christie, "Money and Its Uses in the Javanese States of the Ninth to Fifteenth Centuries", *Journal of the Economic and Social History of the Orient* 39 *(1996):* 258-261.

80 *Wuluwulu* is usually translated as an official, but here Christie translates it as grasslands; Christie, *Patterns of Trade in Western Indonesia:* 496*.*

81 *S*āga is a unit of gold weight. See: Christie, "Money and Its Uses in the Javanese States of the Ninth to Fifteenth Centuries": 261.

82 *Magilinggilingan* is actually unclear in this context; it may mean "continuously".

83 *Pārik*, *papādapanglĕyö, papagaduḥ,* and *papiliḥmas* are types of taxes. The *arik* tax is sometimes referred to as *arik-purih*, which, according to Christie, is a tax on producing something. See: Christie, *Patterns of Trade in Western Indonesia:* 501. The *pādapanglĕyö, pagaduḥ* and *piliḥmas* taxes are still unclear.

84 A tax or levy for clothing or decorating a *kalagyan* (a religious dwelling). A *kalagyan* is a distinctive settlement, but it is still unclear what kind of distinction it had. In the Deśawarṇana (Nagarakṛtāgama) it is mentioned as one of the special settlements, similar to *dharmma, sīma, wangśa, hila-hila, hulun hyang, and kuṭi*. See: Stuart Robson, *De*śawarṇana (Nagarakṛtāgama) by Mpu Prapañca (Leiden: KITLV, 1995): 79.

85 *Kakalangan* is "a particular kind of religious establishment"; see: Zoetmulder, *Old Javanese-English Dictionary*: 772.

are not to be subjected to *pintapalaku*[86], royal corvée, *turunturun*[87] of 1 *kupaṅ* 1 *atak*[88], *sukhaduḥka*, much or little, from *warggahatur, wargga patiḥ*, and the head of the

7. religious establishment of Ṛanu (lake) at Dharma. Both receive nothing except [receive] the taxes from the *sīma* of dam at Wariṅin Sapta and the dyke at Kamalagyan. The reason is that Śrī Mahārāja built the dam at Wariṅin Sapta on land belonging to the inhabitants of the *thāni* of Kamalagyan,
8. because it is a [manifestation of his] meritorious act and not for his own advantage. This is agreed by the downstream [inhabitants of the] *thāni* of Lasun, Paliñjwan, Sijanatyĕsan, Pañjigantiṅ, Tālan, Daśapankaḥ, and Paṅkaja, including all the *sīma, kalaṅ, kalagyan, thāni jumput, wihāra*, śāla,
9. *kamulān*, *parhyaṅan* and *parapatapān*, especially Saṅ Hyaṅ Dharmma at Iśānabhawana, [which is] called Surapura. Thus, many *thāni* were hopeless [because] their rice fields overflowed as a result of the change of the [flow of the] river after the *baṅawan* (big river) had been intercepted (dammed?) at Wariṅin
10. Sapta. This caused a decrease in the tax revenues and all the rice fields vanished because it was difficult for the people to be able to dam the big river to intercept [the overflow]. Not only once or twice they had tried to dike the great river [but many times],
11. but were still unsuccessful. Then Śrī Mahārāja started to summon all the villagers of the *thāni* .....[89] Śri Mahārāja. They were all ordered to do the royal corvée to build the [dike of the] dam. The construction of the [dike of the] dam was completed successfully
12. by Śrī Mahārāja, stands stable and sturdy and completely blocks the flow of the water. The [course of the] great river was divided into three flowing north.[90] All are happy, [including] those who sail upstream and take goods

86 According to Christie, this means an "official commandeering"; see: Christie, *Patterns of Trade in Western Indonesia:* 502.

87 The meaning is unclear. Is it a kind of tax? Or perhaps it is a kind of obligation for people to participate in social activities, since the word "*turunturun*" is often put after the word *bu*ñcaṅ haji (royal corvée).

88 *Sakupaṅ sātak* is one hundred and two hundred. According to Robert S. Wicks, it is probably a payment that refers to Chinese copper coins; see: R.S. Wicks, *Money, Markets, and Trade in Early Southeast Asia:* 282. Christie explains that this phrase "became the standard formula for expressing the general idea of tax payments in small units"; see: Christie, "Money and Its Uses in the Javanese States of the Ninth to Fifteenth Centuries": 268.

89 The phrase "*sakalr*ā re nikĕrkĕ mritāpa" cannot be understood.

90 Christie translated this as "has been deflected" because she argues that it is from Old Javanese word "*amatluk*" as a misreading of "*amatl*ū". See: Christie, *Patterns of Trade*

at Hujuṅ Galuh, including

13. ship captains and traders from other islands who meet each other at Hujuṅ Galuh. The villagers who have the *sawah*s which were flooded and inundated are all very happy [because] the floods have ended. Also, all their *sawah* fields are [basically] a gift
14. from Śrī Mahārāja [which are manifestated by] diking [and] cutting off the flow of the *baṅawān* (great river) at Wariṅin Sapta. Therefore, the dam of Śrī Mahārāja is placed [as a single entity with] the dyke at Wariṅin Sapta. Because Śrī Mahārāja thinks that the dam [with its dyke] might be weakened
15. by many people who want to destroy the meritorious deed. While it is not protected, it would be the right time [for the surrounding area of the dam] to be inhabited. Thus, the villagers[91] of Kamalagyan, including its religious establishment, have been ordered to dwell near the dam at Wariṅin Sapta.

Thus, the inscription records the order given by King Airlaṅga to the elders of Kamalagyan village concerning the construction of a dyke (*tambak*) in Kamalagyan in order to secure a dam (*ḍawuhan*) in Wariṅin Sapta. This was needed in order to lessen the effects of the water that was overflowing from the river to the *sawah*s in Kamalagyan, causing the *sawah* fields to vanish and a consequent decrease in tax revenues. The villagers had tried to overcome this disaster themselves, but they failed. Therefore, the king ordered that land (a *kĕlpurambai* tree field) be converted into ricefields so yields from the ricefields could be used for the upkeep of the dam and its religious establishment. Tax exemptions and tax reductions were also made in order to compensate for the construction and upkeep of the dyke and dam. After the dyke was finished the river's course was altered, moving northwards. As a result, the rice fields were protected from the floods and the traders who used the watercourse had their expectations met.

The inscription contains several interesting points. The first is that this inscription shows clearly how the king intervened in water infrastructure affairs. Such a direct royal order to build a water-control structure is very rare in Old Javanese inscriptions. However, if we study it in detail, it is obvious that the involvement of the royal court was limited to giving the order to establish the *sīma*. All expenses related to the building of the dyke and dam and their upkeep were charged to the local community: the construction was built by a corvée and

in Western Indonesia: 503. However, when I re-read the word on the original stone inscription, it is very obvious that it has to be read as "*amatl*ū", so then it should be translated as "has been divided into three".

91 In Brandes' transcription the words "*anak th*āni" (translated as villagers) are missing, only the aksara "*ni*", perhaps cannot be read. But, Sutjipto Wirjosuparto suggests it should be "*anak th*āni" and so that it fits with its context. See: Wirjosuparto, "Apa Sebabnja Kediri dan Daerah Sekitarnja Tampil Kemuka dalam Sedjarah": 16.

the upkeep was in the hands of a religious foundation that received the required money from tax breaks. Moreover, the security of the dam and the dyke was the responsibility of the people of Kamalagyan, some of whose inhabitants were settled near the construction to oversee it and look after it.

Another interesting point is found in lines 18 to 22 of the inscription:

18. *…. ḍalānyan lmaḥnya ḍinawuhan śrī mahārāja, dumadyakan kṛtāniṅ rāt, mwaṅ punarjīwanibhuktyan saṅ hyaṅ sarwwadharmma, sīmaparasīma, kalakalagyan*
19. *thāni jumput, wihāra, śāla, kamulān, parhyaṅan, parapatapān kabeḥ, makatĕwĕka paṅḍiri śrī mahārāja makaḍatwan i kahuripan, an sira sākṣāt sumiram ikīṅ rāt kabĕḥ riṅ anurāgāmṛta, mahudanakan kīrtti, u*
20. *maṅun sakaparipūrṇnākna saṅ hyaṅ sarwwadharmma, ri paměpěgni kayowanāniran sinīwi ri yawadwīpamaṇḍala, hetuniran paṅlrākan dharmmakuśalamūla, tirutirūniṅ rāt kabeḥ, kapwa magawaya yaśa, āpan maṅkana pinakaswabhāwanikaṅ*
21. *sira ratu cakrawartta, umaṅun pamaṅgihanikāṅ rāt hita pratidina, paṅliṅgānanikāṅ sabhuwana ri tan swartha kewala śrī mahārāja, yāwat kawaṅunaniṅ yaśa donanya, an kapwa kinalimbaṅ juga denira, sahana saṅ hyaṅ sarwwadharmma ka*
22. *beḥ, ….*[92]

Translation:

18. … the land was converted to a dam by Śrī Mahārāja, [it] would bring about prosperities to the world, and to revive the advantages of Saṅ Hyaṅ Sarwwadharmma, [to] all *sīmas, kalagyans*,
19. *thāni jumput, wihāra, śāla, kamulān, parhyaṅan,* [and] all *patapān*. It was the [best] moment of the reign of Śrī Mahārāja, who had his capital at Kahuripan, as if he poured the elixir of life upon the entire world, to give a rain of merit,
20. to build every perfection of Saṅ Hyaṅ Sarwwadharmma. From youth to old age, he serves the maṇḍala of the island of Java. His motive for spreading the origin of the holiness of *dharmma* should be a worthy example to the whole world and also a virtue; this is his nature as
21. a *cakravartin* (an ideal world-ruler), to build a place where the welfare of the world is found every day, as a leader of the whole world, not merely for Śrī Mahārāja's own benefit, but [also] creating merits for the world. All are noticed by him, all places of Saṅ Hyaṅ Sarwwadharmma.
22. …

92 Brandes, *Oud-Javaansche Oorkonden*: 136

These passages show the religious merits of constructing the dam and dyke and demonstrate the ruler's supernatural power, described by the expression "as if he pours the elixir of life upon the entire world". In this metaphor, as water streams from a dam, so does the ruler's duty as *cakravartin* lead to virtues for the entire world.[93] It seems, therefore, that the benefit of the dam and dyke for the local people was merely a cover for a ruler advancing his own interests.

Another inscription, Kuśmala inscription 1272 Śaka (1350 CE), details, in a slightly different way, how the building of a dam was associated with the glory of the king himself. Again, it shows how the waterworks were also used to increase and celebrate the ruler's power. As well as the king being showered with praise such as "causing of welfare to the world, creating the happiness of the inhabitants of the eastern valley of Daha" and "to build a meritorious benevolent life, to the delight of the world", the inscription also highlights the good work of Raṅga Sapu, who carried out the construction of the dam. He is praised as having been of good character, skillful, and full of virtue. Lines 2 to 16 of the inscription are below:[94]

2. *... irikā diwaśa ni kasampurnnan ikanaṅ rawuhan śilamat i*
3. *kuśmala de rakryan dĕmuṅ, saṅ martabun raṅga sapu, makamaṅgala rakakiṅ amurwwa*
4. *bumi, mapariwāra raṅga hawarawar, ju... saṅ apañji pupon makana saṅ ājña*
5. *pāduka bāṭare matahun śri bāṭara wijaya rājasānantawikramotuṅga*
6. *dewa, jāgaddhita hetu, magawaya sukani parasāmya sakahawat luraḥ*
7. *wetan i daha, samaṅkana bilāsa pādukā baṭare matahun ama*
8. *ṅun kirttyanurāgātmaka kasukanirāt raṅga sapu karo wiku pakṣa sampurnna*
9. *ni rawuhan. Siddhir astu amānuṣa kadarśaniya nikanaṅ yaśa ra*
10. *wuhan atita durgga mahalĕp, tlas maparipurnna de rasika raṅga sapu tu*
11. *hu widagdha tiṅkahiṅ ulah, ndatan sah aṅāran pupon rasika pa*
12. *ñji pinujipuji sadhu śaktiguṇawan wnaṅ gumawaya, i saṅ prabu tama*
13. *n palĕpalĕh inutusnira narapati. yaśa atiśaya śobita ahalĕ*
14. *p asuṅ paramasukanikaṅ janāsiṅ umulat, sira rakwa tikaṅ rakṣa ni*
15. *tya pamuliḥ kali marawuhan arddhapalĕ mapagĕh. Mawipraksa*
16. *ti śewadharmma ri naradhipa.*

93 Compare with: Christie, "Water from the Ancestors": 18-19.

94 The inscription is only of 18 lines; the first line to the first half of second line contains mostly a dating of the inscription and the line 16 to the end of line 18 is a closing part of the inscription. The transcription of the Kuśmala inscription is taken from: P.V. van Stein Callenfels, "De Inscriptie van Kandangan", *TBG LVIII* (1919): 337-338 and, van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band II:* 370.

Translation:[95]

2. … this is the time of the completion of the Śilamat dam[96] at
3. Kuśmala by Rakryan Dĕmuṅ [and] Saṅ Martabun Raṅga Sapu, with the approval of the elder brother of
4. Amurwwabhumi, under the protection of the Raṅga Hawarawar, ju… Apañji Pupon, this is what the order of
5. Pāduka Bāṭare Matahun Śrī Bāṭara Wijaya Rājasanantawikramotuṅgadewa,
6. who looks after the welfare of the world [and] creates happiness for the inhabitants of the eastern valley of
7. Daha. Thus, the desire of Pāduka Bāṭare Matahun is to build a
8. meritorious benevolent life, to the delight of the world. Raṅga Sapu with Wiku[97] firmly decided to make
9. the dam complete. May there be perfection.[98] The dam work has a heavenly quality of beauty and it is
10. very strong and excellent. Having finished his completion [of the dam], Raṅga Sapu is truly
11. skillful in the performance of all acts. Indeed, it (his expertise) is inseparable with the name of Pupon, the *Pañji*,
12. who is getting praised for his good character, his extraordinary strength and virtue.
13. He has the right to carry it out for the king and to be ordered by *Narapati*[99] (the King) without negligence. This superior, splendid, and beautiful work

95 Compare my translation with Van den Veerdonk's and Van Stein Callenfels', in: Van den Veerdonk, De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band II: 371; Van Stein Callenfels, "De Inscriptie van Kandangan": 339.

96 I have a different translation of the term "śilamat" with Jan van den Veerdonk and van Stein Callenfels' translation. They translate "*rawuhan* śilamat" as "*de stenen dam*". However, actually śilamat is the name of the dam as it is seen in lines 17-18 of the inscription: "*huwus makangāran kĕta śilamat i kuśmala prakaśita*" (At last, it is called as the Śilamat in Kuśmala, so be widely known as it). See their translations in: Van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band II:* 371; Van Stein Callenfels, "De Inscriptie van Kandangan": 339.

97 The wiku was probably one of the priests or monks in the village of Kuśmala. Van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band II:* 371; Van Stein Callenfels, "De Inscriptie van Kandangan": 339.

98 *Siddhir astu*.

99 The inscription uses the terms *narapati* and *naradhipa*—which have the same meaning—to refer to the king. The writer also mentions the king's full name: Pāduka Bāṭare Matahun Śrī Bāṭara Wijaya Rājasanantawikramotunggadewa, who was the king of Majapahit.

provides the highest joy
14. to all who see it. He is indeed the man who takes care of it continually as a means of
15. restoring the river, dam constructing, completely joined and sturdy. May it protect
16. the Śiwa virtues of *Naradhipa* (the king)…

The ancient East Javanese people also built canals to irrigate their rice fields. The Suměńka 981 Śaka (1059 CE), Hariñjiń A 709 Śaka (787 CE), and Hariñjiń B 843 Śaka (921 CE) inscriptions record the efforts made by the local community to provide water for their agricultural lands. The Suměńka inscription, which was found around the area of Surabaya, mentions a *sīma* grant from the king to the local community of Suměńka that would help them repair a canal that had been built by Paduka Mpuńku, a former ruler.[100] Unfortunately, some parts of this inscription are unclear, so it does not provide much information regarding the repair of the canal. The Hariñjiń A and B inscriptions were written on the same stone block, with Hariñjiń A on the front and Hariñjiń B on the back. The content of the inscriptions relates to a *sīma* granted to Bhagawanta Bari for the benefit of a *mulaḍawuhan*, a religious foundation with a dam and a canal.[101] Inscription B is a confirmation of the original *sīma* grant, which was inaugurated in 921 CE and is recorded in inscription A. The inscriptions were found at Sukabhumi plantation, Siman, Pare, on the slopes of Mount Kelud, and were issued in the early ninth and tenth centuries, suggesting that an irrigation system existed in the area in the early ninth century.

An inscription that records a water pipe in ancient Java is the Kubukubu inscription from 905 CE. This records a *sīma* grant for Rakryan Hujuń Dyaḥ Mańarak and Rakryān Matuha related to a water pipe in Samunduń and Kubukubu:

1. *…. tatkāla ḍapunta mañjala. muań sań mańha*
2. *mbin sań diha. sań dhipa. ḍapu hyań rupin. sumusuk iki tgal i kubu kubu bhadrī śīma i rakryān hujuń dyaḥ mańarak. mwań rakryān matu*
3. *ha rěkai majawuntan mańjurwa iń pakaraṇan i himad mańiwhī caru ańkan juluń. sańkāna ni wway nya i sań-apatiḥ i kahyunan. mana*
4. *mpil talań rwań tapak °i samuduń tka ri kubu kubu patań tapak*…[102]

100 Paduka Mpungku was identified by Boechari as Airlangga: Boechari, "Sri Maharaja Garasakan", *Madjalah Ilmu-ilmu Sastra Indonesia* 4/1-*2* (1968): 1-26. The transcription of this inscription is in Louis-Charles Damais, "Etudes d'épigraphie Indonésienne: IV. Discussion de la date des inscriptions", *Bulletin de l'Ecole française d'Extrême-Orient* 47 (1955): 142.

101 The transcription of these are in: Van Stein Callenfels, "De inscriptie van Soekaboemi": 115-130.

102 Boechari, *Prasasti Koleksi Museum Nasional I*: 156-158.

Translation[103]:

1. … when Ḍapunta Mañjala and Saṅ Maṅha
2. mbin Saṅ Diha, Saṅ Dhipa, and Ḍapu Hyaṅ Rupin demarcated *tgal* (dry fields) in Kubukubu Bhadrī to be a *sīma* of Rakryan Hujuṅ Dyaḥ Maṅarak and Rakryān Matu
3. ha. Rakai Majawuntan, acting as Juru in Himad, gives offerings (*caru*) each Juluṅ.[104] Because water was brought to Kahyuṅan
4. by *talaṅ* (a water pipe), 2 *tapak*[105] in Samuduṅ, to Kubukubu 4 *tapak*…

The inscription is now kept in Museum Nasional Jakarta, and unfortunately the precise location of its origin is unclear; according to Boechari, it used to be the personal property of someone in Malang.[106] This is a particularly important inscription because it confirms that the East Javanese community had knowledge of the technology required to move water through pipes. In Old Javanese *kakawin* literature, we occasionally find the term *talang* denoting a type of waterpipe used by the ancient Javanese in the ninth century CE. It is often mentioned that this was made of bamboo.[107] However, waterpipes made of clay have been found in Trowulan, so it is probable that *talaṅ* could also refer to such earthenware pipes.[108]

In addition to the above inscriptions, there are three more very interesting inscriptions related to ancient Javanese irrigation and hydraulic infrastructure: the Seloliman inscription, the Jenggring inscription, and the Keputran inscription.[109] These three inscriptions are related to tunnel construction and give very important data about the dates the tunnels were constructed. The Seloliman inscription, which was found in a tunnel near the village of Seloliman, a sub-district of Trawas, in Mojokerto, is a 12 x 20 cm stone block with the following Old Javanese text: "*tithi yaśa tiga kaki purṇa 1280"* (the time [when] the meritorious work of Tiga Kaki has been completed, in 1280 Śaka [= 1358 CE]).[110] The Jenggring inscription gives a date

103 Other translations of this inscription, for a comparison with my translation, have been published by: H.B. Sarkar, *Corpus of the Inscriptions of Java* vol. I (Calcutta: Firma K.L. Mukhopadhyay, 1972): 53-54, and E. Wurjantoro, *Anugerah Sri Maharaja. Kumpulan Alihaksara dan Alihbahasa Prasasti-prasasti Jawa Kuna dari Abad VIII-XI* (Depok: Departemen Arkeologi, Fakultas Ilmu Pengetahuan Budaya, Universitas Indonesia, 2018): 429-436.

104 *Julung* is a name of the *wuku*.

105 *Tapak* is a unit of measurement.

106 Boechari, *Prasasti Koleksi Museum Nasional I*: 155.

107 See: Chapter 4.

108 See: Chapter 6.

109 These three inscriptions were first reported in *Oudheidkundig Veslag* 1936; see: W.F. Stutterheim, *Oudheidkundig Veslag 1936* (Bandoeng: A.C. Nix & Co., 1937): 16.

110 In the *Oudheidkundig Verslag* 1936 page 16, footnote 1, it is translated as "*Het tijdstip van het voleindigen van het waterwerk der Tiga kaki (letterlijk: drie grootvaders) is 1358*

Fig. 4.2. Seloliman inscriptions (left) and Jenggring inscription (right). The photo of the Jenggring inscription in *Oudheidkundig Verslag 1936* was set upside-down, so I have turned the photo the right way up. (Photos: A. Gall via: OV, 1936: 592.

for the construction of a tunnel in Jenggring (Jabung), probably also in Mojokerto: 1276 Śaka (1354 CE). This inscription was carved on a stone block, but it was inscribed on and written over an older stone block inscription. Most of the earlier inscription is illegible, while the younger script can be read as "*kaśarupama[…]i* 1276". Stutterheim's report in *Oudheidkundig Verslag 1936* deciphered it differently, namely as a chronogram or *sĕngkalan*: "*kaśa rupa mati gaguṅira*" or 1010 Śaka (1088 CE).[111] However, it is clear to me that the second line of the inscription should be read as the year 1276 Śaka (1354 CE). Paleographically, my reading is supported by the fact that the style of the script is similar to that of the Seloliman inscription, particularly if we compare the *aksara* "1" and "2" in the last line of both inscriptions, which is convincing evidence that the final line of the Jenggring inscription does indeed record a year. Unfortunately, the meaning of the "*kaśarupama*[…]*i*" remains unclear.

A.D."

111 In *Oudheidkundig Verslag* 1936, page 16, footnote 2, the chronogram is deciphered as *kaśa* = *alang alang* but also (*ak*ā*śa*) means airspace = 0; *rupa* = 1; *mati* = 0; and *gaguṅ* (*gaga* = 1) or in Śaka year is 1010. However, as it says in the report this reading remains uncertain. See: Stutterheim, *Oudheidkundig Verslag 1936*: 16.

The third inscription, the Keputran inscription, was found in Keputran, near Kutorejo, in Mojokerto, has dimensions of 16 x 39 x 88 cm, and reads: "*iki yasanira (k)i puput hālaḥ papan* 1277" (this is the meritorious work of Ki Puput Hālaḥ Papan in 1277 Śaka [1355 CE]). Since the three inscriptions were issued in the years 1358 CE, 1354 CE, and 1355 CE, they indicate that, at that time, the construction of tunnels in the area in question (southern Mojokerto) was highly developed. Moreover, the most important contribution of these inscriptions to research into tunnel construction in East Java is that they provide definitive dates for the tunnels where previous research had given them only approximate ones.

In sum, these inscriptions provide us with remarkable information related to the construction of water works in East Java. It also confirms that the building of various pieces of water infrastructure, both large and small, had started several centuries before the most powerful polities ruled the area. Moreover, the information contained within the inscriptions suggests that there was deep involvement by both commoners and local officials in the construction of the water infrastructure and that its upkeep and maintenance were in the hands of the local inhabitants, local officials, and religious foundation(s). However, several of the waterworks built were claimed, by the king, to demonstrate his great supernatural power.

4.6. RIVERINE COMMERCIAL ACTIVITIES

The inscriptions regarding ancient East Javanese trade are limited in nature, specifically because East Javanese epigraphic sources are primarily *sīma* inscriptions. Most of the data on trade can be found in the part of the inscriptions that describes the regulation of taxes following the establishment of a *sīma*. In that part of the inscriptions, one of the groups of people occasionally mentioned are the *masamwyawahāra* (those who engage in commerce). They had four ways to move their wares around: by *pikul* (transporting them using a carrying-pole slung over the shoulder), carts, pack-horses, and water transport.[112] This part of the chapter will focus on the trade activities carried out by water transport, especially those along the Brantas river.

The Old Javanese texts—especially *kakawin*s—and inscriptions never mention the local names of the rivers when they describe them; instead, most of the *kakawins* mention the names of the rivers using Indian terms, and for that reason it is difficult to determine the rivers in question. However, some stanzas in the *Pararaton* and *Kiduṅ Harṣawijaya* give an indication of the location of a river that we can infer as being the Brantas, although its name is never mentioned in these Old Javanese texts. Instead, they call the river *baṅawan* or *baṅawan Caṅgu*, as mentioned in Kidung

112 Christie's work discusses the ancient Javanese traders in detail, but this sub-chapter will be more focused on commercial activities along the Brantas river. See: Christie, *Patterns of Trade in Western Indonesia: Ninth through Thirteenth Centuries A.D.*: 132-288.

Harsawijaya, which certainly refers to the Brantas river.[113]

A trading route along the Brantas river is recorded in a number of inscriptions, including Kaladi 831 Śaka (909 CE), Manañjung, Dhimaṇāśrama (undated, probably Airlaṅga's reign), Kamalagyan 959 Śaka (1037 CE), and Caṅgu/Trowulan I 1280 Śaka (1358 CE). The most famous and busy port on this river was Hujuṅ Galuh, a place to which traders came to meet, and this even included traders from other islands (*dwīpāntara*).[114] The Manañjuṅ and Rĕmpaḥ ports, mentioned in the Manañjuṅ inscription (undated, probably from the early eleventh century), were also important ports on the lower Brantas river.[115] The Dhimaṇāśrama inscription, which probably dates from the tenth or early eleventh century and was found in the Brantas delta region, suggests that there was a busy port near the Dhimaṇāśrama monastery because it mentions many kinds of boats.[116] The Caṅgu inscription lists ports and crossing places along the Brantas and Bengawan Solo rivers, and I quote these lists below; these are found in plate V.a. and V.b.:[117]

V.a

1. *nuṣa, i tĕmon, parajĕṅan, i pakaṭekan, i wuṅlu, i rabutri, i bañu mṛdu, i gocor, i tambak, i pujut,*
2. *i mirĕṅ, iṅ dmak, i kluṅ, i pagḍaṅan, i mabuwur, i goḍoṅ(?), i rumasan, i caṅgu, i raṇḍu gowok, i wahas, i nagara,*
3. *i sarba, i wariṅin pitu, i lagada, i pamotan, i tulaṅan, i panumbaṅan, i jruk, i truṅ, i kambaṅ srī, i tḍa, i gsaṅ, i*
4. *bukul, i śūrabhaya, muwaḥ prakāraniṅ naditīra pradeśa sthānaniṅ anāmbaṅi i maḍantĕn, i wariṅin wok, i bajrapura, i*
5. *sambo, i jerebeṅ, i pabulaṅan, i balawi, i luwayu, i katapaṅ, i pagaran, i kamuḍi, i parijik, i paruṅ, i pasi*
6. *wuran, i kĕḍal, i bhaṅkal, i wiḍaṅ, i pakbohan, i lowara(?), i ḍuri, i rāśi, i rewun, i tgalan, i dalaṅara, i*

113 Berg, *Kidung Harṣa-Wijaya:* 65 and 156. Berg identified *baṅawan* Canggu as "*naam van de Brantas ter hoogte van Canggu*".

114 See the transcription and translation of lines 12-13 of the Kamalagyan inscription in the previous sub-chapter.

115 Christie, *Patterns of Trade in Western Indonesia: Ninth through Thirteenth Centuries A.D.*: 242.

116 A.S. Nugroho, "Aktivitas Perekonomian di Delta Brantas pada Abad Ke-10 Masehi", *Pattingalloang. Jurnal Pemikiran, Pendidikan dan Penelitian Kesejarahan* 7/3 (2020): 273-283

117 See the transcription in: Boechari, *Prasasti Koleksi Museum Nasional I*: 116-117; Van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band II:* 378 and 380; Pigeaud, *Java in the Fourteenth Century. Vol I*: 110.

V.b

1. *sumbaṅ, i malo, i ṅijo, i kawaṅen, i suḍaḥ, i kukutu, i balun, i marĕbo, i turan, i jipaṅ, i ṅawi, i waṅkalaṅ,*
2. *i pnūḥ, i wuluṅ, i baraṅ, i pakatelan, i wareṅ, iṅ amban, i kĕmbu, i wulayu, sarwwe, ika ta kabeḥ, nadītīrapradeśa, sthā*
3. *nanya ṅ anambaṅi sayawadwīpamaṇḍala, …*

The list ends with the phrases: "*sarwwe*, *ika ta kabeḥ, nadītīrapradeśa, sthānanya ṅ anambaṅi sayawadwīpamaṇḍala"* (All those are the villages on the banks of the rivers, places of the river-crossings of all regions of the Island of Java). The ports along the Brantas river are listed in plate V.a. lines 1-4, while the harbors along the Bengawan Solo are given in V.a. 4- V.b. 2. Unfortunately, plate IV of the inscription, which most probably mentioned the names of other harbors, is missing. On the extant list are the names of 34 harbors along the Brantas river. The location of 20 of these cannot be identified. The location of the other fourteen can be located on the basis of similar village names that are still known and inhabited today. The locations of these are highlighted on the map below (Fig. 4.3.).

These ports are listed, in order, from upstream to downstream on the Brantas river, with the exception of Wringin Pitu, Pamotan, and Tulangan, which are no longer on the Brantas, instead being far to the south now. Van Stein Callenfels and Van Vuuren have suggested that the Brantas river had, at that time, split off near Serbo, to the south to Wringinpitu, before going eastward, passing through Tulangan and Pamotan on its way to the sea.[118]

The Caṅgu inscription seems to confirm that the ports and river crossing harbors along the Brantas river played an important role in the transportation infrastructure of East Java. For this reason, the king granted the port villages an inscription ensuring their protection and upkeep. Moreover, the ruler also issued regulations, recorded in the inscriptions, to protect the ferrymen's profession.[119] The records indicate that the royal court paid significant attention to the stability and security of ferry transport. Thus, it had the authority to impose regulations concerning river transportation. The inscription also makes clear that the transportation regulations were issued by the court, not the local authorities.

Another commercial port on the Brantas delta was located near Kaladi-Gayam-Pyapya, as recorded in the Kaladi inscription 831 Śaka (909 CE), which Jones assumes was located on the east coast of Sidoarjo district.[120] The Kaladi inscription

118 Van Stein Callenfels and Van Vuuren, "Bijdrage tot de Topographie van de Residentie Soerabaia in de 14de Eeuw": 69-70.

119 Plate IX and X of the inscription. See the transcription and Dutch translation: Van den Veerdonk, *De Tekstuele Structuur van de Oud-Javaanse Vorstelijke Inscripties uit de Periode Singhasari –Majapahit, 1255-1486, Band II:* 382-387.

120 Jones, *Early Tenth Century Java from the Inscriptions*: 178-179.

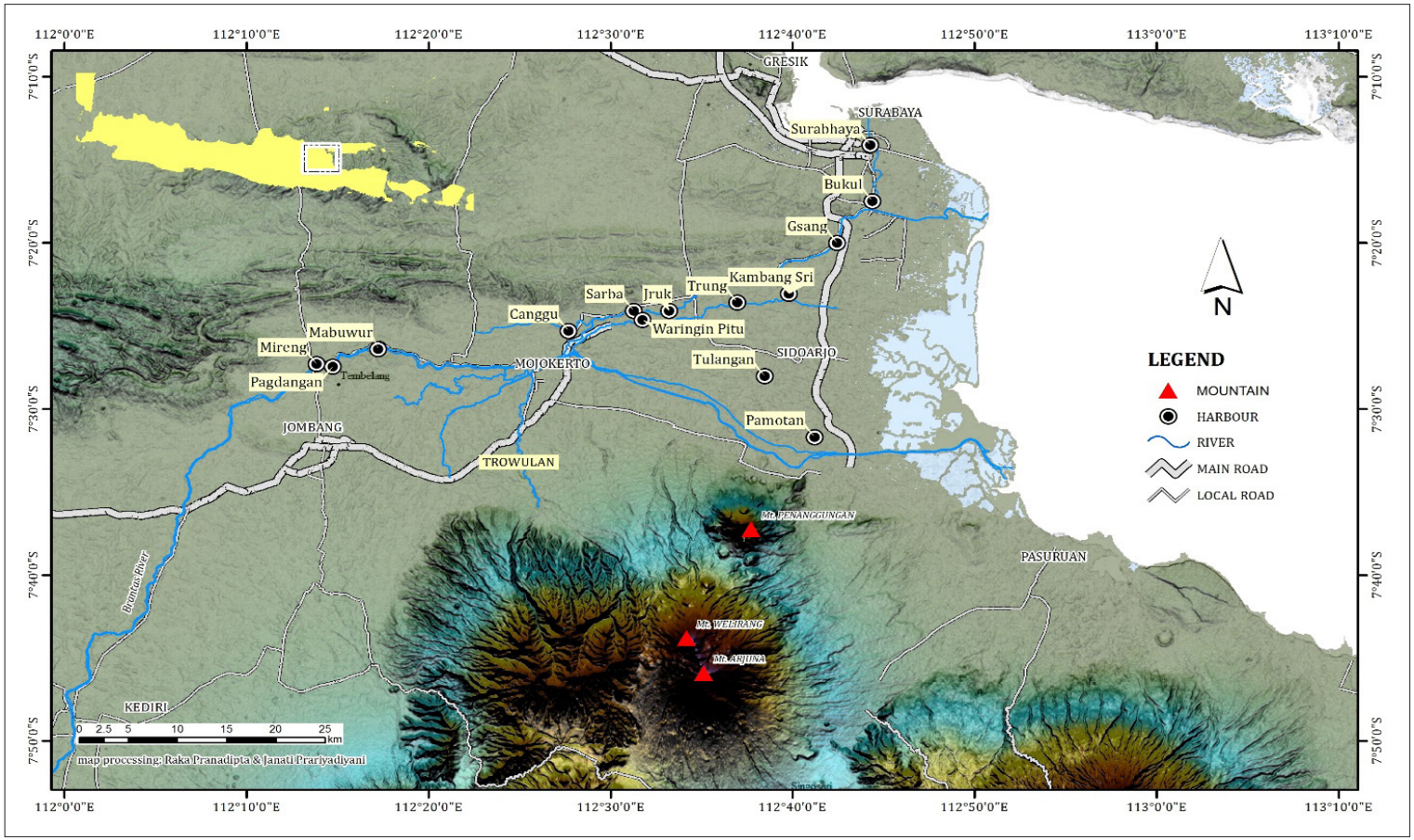

Fig. 4.3. Harbors along the Brantas river recorded in the Caṅgu inscription. This map is based on Van Stein Callenfels' interpretation; see: P.V. van Stein Callenfels and L. van Vuuren, "Bijdrage tot de Topographie van de Residentie Soerabaia in de 14de Eeuw", *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap* 41/1 (1924): 68-70, and the Appendix. (Map by Tjahjono Prasodjo). See notes in the next page.

Notes:

1: Mireṅ	=	Mireng	8: Tulaṅan	=	Tulangan
2: Pagḍaṅan	=	Gedang Kulon, Jombang	9: Jruk	=	Jeruk Legi
3: Mabuwur	=	Buwur,	10: Truṅ	=	Terung
4: Caṅgu	=	Serbo	11: Kambaṅ Śrī	=	Bangsri
5: Sarba	=	Canggu	12: Gsaṅ	=	Pagesangan
6: Wariṅin Pitu	=	Wringinpitu	13: Bukul	=	Bungkul
7: Pamotan	=	Pamotan Wetan	14: Śurabhaya	=	Surabaya

was issued to establish a *sīma* for three villages: Kaladi, Gayam, and Pyapya. One of the reasons for this was that traders on the river (known as *hilirān*) were being threatened by bandits, and it was hoped that the criminals would disappear after the area had become a *sīma*. The inscription also details that the *sīma*'s borders were defined by rivers.[121] The presence of traders in the villages shows that there was probably a port there that facilitated inland-coastal trading; this may have been a small local port located on one of the Brantas tributaries.

These inscriptions reveal the various kinds of boats that were used by traders or fishermen in navigating the Brantas river. The inscriptions from East Java that mention boats are: Watukura 1A 824 Śaka (902 CE), Palĕbuhan 849 Śaka (927 CE), Saṅguran 850 Śaka (928 CE), Liṅgasutan 851 Śaka (929 CE), Jĕrujĕru 852 Śaka (930 CE), Cuṅgraṅ I 851 Śaka (928 CE), Sarahan 852 Śaka (929 CE), Manañjuṅ, Dhimaṇāśrama, Kambaṅ Putih, and Kamalagyan 959 Śaka (1037 CE). Of all these, it is the Dhimaṇāśrama inscription that provides the largest number of boat-types.[122] The relevant information is written in the part of the inscription that provides a list of those people engaged in commerce (*sambyawahara*) who should not be subjected to royal tax collectors. The various types of boat found in the inscriptions are listed below:

- *Maramwan* (owing-boat)
- *parahu masuṅhara (*boats with masts)
- *parahu hiliran* (downstream boats)
- *parahu akirim agöṅ* (large shipping boats)
- *parahu akirim tāmbātābā* (boats for shipping medicinal spices)
- *parahu amayaṅ payaṅ* (drag-net fishing boats)

121 See the transcription of this inscription in: Boechari, *Prasasti Koleksi Museum Nasional I*: 147-153.

122 Christie, *Patterns of Trade in Western Indonesia:* 504-512; Brandes*, Oud-Javaansche Oorkonden*: 243-247; F.H. van Naerssen, Inscripties van het Rijksmuseum van Volkenkunde te Leiden", *BKI 97* (1938): 501-515; P.V. van Stein Callenfels and L. van Vuuren, "Bijdrage tot de Topographie van de Residentie Soerabaia in de 14de Eeuw", *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap*, 41/1 (1924): 57-81.

- *parahu amukĕt kakap* (sea perch drag-net fishing boats)
- *parahu amukĕt kŗp* (grouper drag-net fishing boats)
- *parahu* ataḍaḥ (?)
- *parahu aṅlamboan* (? Boats)
- *parahu amariṅ* (*waring* cast-net boats)
- *parahu aṅlam* (?)
- *amuntamunta* (?)
- *parahu pukĕt ḍago* (sprat drag-net fishing boats)
- *parahu kirim dwal baryyan* (boats which ship various commodities)
- *parahu kirim pañjaṅ* (long shipping boats)
- *parahu aṅlaha*[ṅ] (sugar-palm sap boats)
- *parahu añjala* (cast-net boats)
- *parahu añjalāwirāwir* (hanging down/cast-net boats)
- *parahu añjariṅ balanak* (boats with fixed gill net to catch grey mullet fish)
- *parahu jariṅ kakab* (boats with fixed gill net to catch *kakap*/snapper fish)
- *parahu añjala bsār* (large cast-net boats)
- *parahu amuwūwuwū* (large fish trap boats)
- *parahu amintur* (creel-trap crab boats)
- *parahu añjariṅ kwaṅkwaṅ* (kawaṅ fish/ *Scomberomorus* boats)
- *parahu amibit* (line fishing boats)
- *parahu wariṅ sugus* (net boats)
- *parahu wariṅ tuṇḍuṅ* (tuṇḍuṅ net boats)
- *parahu wariṅ taḍah* (taḍah net boats)
- *parahu aṅhilīhilī* (downstream boats)
- *laṅkapān: (?)*
- *wlaḥ galaḥ* (boats equipped with paddles or poles)
- *kalima tuṇḍan* (boats with 5 decks)
- *parahu pabawa* kalima tuṇḍan (*pabawa* boats with 5 decks)
- *parahu pakbowān sawiji kapāt tuṇḍan* (cattle boats with 4 decks)
- *parahu jurag* (*jurag* boats)
- *parahu paṅgagaran* (paddle boats)
- *parahu palawijan* (horticultural product traders' boats)
- *parahu paṅṅayan* (*paṅgayan* boats)

This list shows that there were three main boat-groups, categorized by function: fishing boats, trading boats, and all-purpose boats. Most were fishing boats. These had various types of fishing tools and could operate on both the river and the sea. From the equipment they used it seems that the boats equipped with nets for catching sea fish—such as *kakab* (snappers), *kŗp* (groupers) and *kwaṅkwaṅ* (mackerel)—operated at sea. Some boats caught estuary fish, such as *balanak* (grey mullet), which are coastal species that are often found in estuaries and rivers. These

boats and fishermen indicate that these communities were from the Brantas delta region. The transport boats were probably used by traders and ordinary people; the *kirim dwal baryyan* were likely boats used to transport various commodities and which travelled along the Brantas river. Other boats carried specific goods, such as the *palawija* (which transported non-rice horticultural products) and *aṅlahaṅ* (sugar-palm sap). All-purpose boats are probably what they called *parahu hiliran* and *parahu aṅhilīhilī*, and these went back and forth along the Brantas river.[123]

The interaction between hinterland commodity production and river transport has been explored by a number of scholars. Kenneth R. Hall explains this relationship as follows:

> Because of the increased external demand for Javanese rice, there emerged a hierarchical market network that united communities of local exchange with Java's coastal ports. Yet at the topmost levels of this marketing system there was a conscious separation of political and commercial function. Ports of trade were not political centers, and the state's political center was not a major commercial center. Majapahit's capital was located well in the interior up the Brantas River from the coast, where it was less likely to have been subject to direct contact with outsiders.[124]

However, Bennet Bronson has a different view about the role and status of the centre of the exchange network. As we have seen already in Chapter 1, Bronson proposes a hypothetical model of economic and political interactions between upstream and downstream, one that took the form of an exchange network: "The model focuses on a single hypothetical class of ancient exchange networks, one which involves the control of a drainage basin opening to the sea by a centre located at or near the mouth of that basin's major river."[125] This hypothesis is drawn in Figure 1.1, and it explains how the political and economic centre being located in a river estuary allowed it to serve as the, or at least a, centre of power for managing and controlling an exchange network. This concept has been adapted by Pierre-Yves Manguin to explain the socio-spatial structuration process of coastal political systems in insular Southeast Asia, and specifically Sriwijaya, on the basis of Malay literary texts and

123 In some parts of the story of Wijaya's journeys in *Kidung Harṣa-Wijaya*, during his struggle to re-take power from Jayakatwang it is said he took some trips from Madura to Canggu (the name of a port on the bank of Brantas river) in a boat. To reach Canggu from the Madura strait, Wijaya and his followers had to travel by water along the Brantas river. See: Berg, *Kidung Harṣa-Wijaya*: 65 and 156.

124 K.R. Hall, *A History of Early Southeast Asia: Maritime Trade and Societal Development, 100-1500* (Lanham, MD [etc.]: Rowman & Littlefield, 2011): 278.

125 B. Bronson, "Exchange at the Upstream and Downstream Ends: Notes toward a Functional Model of the Coastal State in Southeast Asia", in: *Economic Exchange and Social Interaction in Southeast Asia: Perspectives from Prehistory, History, and Ethnography*, ed. Karl L. Hutterer (Ann Arbor: Center for South and Southeast Asian Studies, The University of Michigan, 1977): 43.

both epigraphic and archaeological data.[126] He argues that the Sriwijaya political system was a harbor-centreed one which played a significant role in permitting the emergence of that system. Furthermore, he suggests that the Sriwijaya harbor city was not only connected with its "vassals" in the river basin but with other political centres outside Sumatra—Sriwijaya's political and economic peripheries—as well. Indeed, there was in Sumatra the territorial concept of *negeri*, which was primarily a mercantile polity that controlled trade along a river. Based on *Hikayat Raja Raja Pasai*, Hill defines a *negeri* as "a fairly large community, centred usually on a river estuary, an entrepot for foreign merchants, with some political influence over the surrounding territory".[127]

In mainland Southeast Asia, polities such as Bagan, Dvārāvatī and Ayutthaya, except Angkor, used the river to connect coast and interior, transporting both goods and people up- and downstream. Bagan is a good example of a capital that was situated high upstream in the country's agricultural heartland, yet being perfectly able to control the middle and lower regions through the Irrawaddy. The Ayutthaya polity, however, was a polity where the capital was closer to the coast and as such was at a short distance from both agricultural produce and, through the estuary of the Chao Phraya, to maritime commerce.

For the East Javanese polities, the situation comes quite close to that of Ayutthaya. In In the eleventh century, East Java's main port was at Hujung Galuh, while in the fourteenth century Cańgu seemed to be the main port of the Brantas river, while the political centre of the first port was located in Kahuripan and the latter was in Trowulan, both of which were situated at some distance from the Brantas river estuary.[128] Like most *nagara* states of the mainland and quite different

126 P. Manguin, "The Amorphous Nature of Coastal Polities in Insular Southeast Asia: Restricted Centres, Extended Peripheries", *Moussons* 5 (2002): 73-99.

127 A.H. Hill, "Hikayat Raja-Raja Pasai", *Journal of the Malayan Branch of the Royal Asiatic Society*, Vol. 33, No. 2 (1960): 173.

128 The location of Hujuṅ Galuh is still debated. Some scholars, like Van Naerssen, think that it was a coastal port; see: F.H. van Naerssen, "The Economic and Administrative History of Early Indonesia", in: F.H. van Naerssen, F., & R.C. de Iongh, eds. *The Economic and Administrative History of Early Indonesia* (Leiden: E.J. Brill, 1977): 67. However, I agree with De Casparis who explains that Hujuṅ Galuh was located far enough from the estuary: *"Tentang letaknja Hudjunggaluh tsb. pada umumnja dikatakan bahwa bertempat di Surabaja jang sekarang. Kami berpendapat bahwa itu tidak mungkin. Karena dalam prasasti Kelagen dikatakan bahwa pengaturan sungai itu sangat menggembirakan para pedagang dari pulau² jang lain jang sekarang dapat belajar terus sampai ke Hudjunggaluh, maka Hudjunggaluh tsb. tentu letaknja lebih disebelah hulu sungai dari Kelagen. Tempatnja mungkin tidak djauh dari Modjokerto jang sekarang"* ("Regarding Hudjunggaluh's location ... in general it is said that it is in present-day Surabaja. We argue that this is impossible. Since, in the Kelagen inscription, is said that the management of the river was very pleasing to the other islands' traders who could now sail all the way to Hudjunggaluh, it means that Hudjunggaluh was, of course, located further upstream than Kelagen. It may not be far from the present-day Modjokerto").

from the *negeri* Sriwijaya in Sumatra, Majapahit was a polity that thanks to the Brantas river could combine the best of both worlds, connecting the rich agricultural resources of the interior to the commercial wealth of the ports along the coast.[129] It were the hinterland river ports that served as internal terminals to collect local agricultural products to be transported for sale to the coastal ports. Obvioulsy, these same terminals and ports served as ideal tax offices for the court. In other words, thanks to the river network that linked court to ports, political control could be more indirect than direct, more remote than territorial.

After the second half of the fourteenth century, when the Surabaya port is recorded for the first time in the Caṅgu inscription (1358 CE), further developments in maritime trade occurred in East Java.[130] As was also experienced by other polities in Southeast Asia, such as the Thai, Myanmar, Vietnam, and Sumatra polities, the rise of global maritime trade triggered the development of commercial activities in the ports of Java, particularly those on the northern coast of east Java where we witness the emergence of new ports like Śurabhaya, Gresik and Tuban, already anticipating the later shift of political power towards the coast under Muslim and Dutch rulers.[131]

4.7. CONCLUSION

In sum, the East Javanese inscriptions provide significant data regarding the economy, society, and politics of the communities in the Brantas river basin. In addition, it is important to understand that these inscriptions are not historical documents in the sense of having been written as historical records; rather, they are legal documents by which rulers granted a *sīma*. However, these issues should not prevent the use of the inscriptions as historical sources, and this chapter has

See: J.G. de Casparis, *Airlangga* (Surabaja: Penerbitan Universitas, Universitas Airlangga, 1958): 20. For the role of Caṅgu as a river port, see also M.B. Sanjoyo, "Pemanfaatan Sungai Brantas pada Masa Kerajaan Kediri Hingga Majapahit". *Santhet (Jurnal Sejarah, Pendidikan, dan Humaniora)* 5/ 2 (2021): 138-146; M.B. Sanjoyo, "Canggu: Pelabuhan Sungai Masa Majapahit Abad XIV – XVI", *Mozaik. Jurnal Kajian Sejarah* 10/2 (2019): 1-16.

129 Kathirithamy-Wells has emphasized one characteristic of the relation between a port, which was located separately from its political center, with that center: "Even when port and polity were located separately, they were inherently linked, as in the case of Funan and Oc-eo, Majapahit and the river port of Canggu, seventeenth century Pegu and Syriam, or Ayutthaya and coastal Bangkok". See: Kathirithamy-Wells, "Introduction: An Overview": 2.

130 S. Pinardi and Winston SD Mambo, "Perdagangan pada Masa Majapahit", in: *700 Tahun Majapahit. Suatu Bunga Rampai*, eds. Sartono Kartodirjo, et al. (Surabaya: Dinas Pariwisata Daerah Propinsi Tingkat I Jawa Timur, 1993): 177-204.

131 A. Reid, *A History of Southeast Asia: Critical Crossroads* (Chichester: Wiley Blackwell, 2015): 77; B.W. Andaya and L.Y. Andaya, *A History of Early Modern Southeast Asia, 1400-1830* (Cambridge: Cambridge University Press, 2015): 31-35, 85, 87-90.

attempted to demonstrate the usefulness of using them to reconstruct ancient East Javanese life in the Brantas river basin.

The information supplied by the East Javanese inscriptions described above reveals, among other things, that there was a working relationship between the rulers and the local communities regarding water management. The intervention of the royal court is, in fact, seen in only a limited number of cases, and usually control of the water used for irrigation rested on the local communities. The royal court would intervene in the control of water only in cases of water-related hazards and water levies; day-to-day water management was handled by the local communities. As such, I tend to agree with Jan Wisseman Christie's opinions rather than those of N.C. van Setten van der Meer and F.H. van Naerssen. Based on her research on *sawah* in ancient Java, Van Setten van der Meer argues that the rulers of the ancient Javanese kingdoms played a significant role in controlling the water system[132] and suggests that there were supra-village institutions that managed the irrigation system.[133] On the other hand, Christie argues that it was managed by the local religious institutions.[134] However, as I have argued, Christie's opinion is not wholly accurate, as the court still played the important role of setting the water taxes or fees and imposing regulations related to the security and protection of the water control infrastructure, as recorded in the Wulig and Kamalagyan inscriptions.

Another important conclusion is that most of the agricultural centres where water control was needed were located throughout the inner part of the Brantas river basin, on mountainsides or the alluvial fans of mountain ranges (see Fig 4.4), and that water management endeavours were required in these regions. In the inner region of the Brantas river basin sits, at its centre, a group of mountains (Penanggungan, Welirang, Arjuna, Kawi, and Kelud) that are encircled by the Brantas river. As a result, there is a relatively steep area of land where water control is required for *sawah* cultivation. Fig. 4.4 highlights several irrigated agricultural centres on the basis of clusters of water management-related inscriptions: (1) around Malang, (2) Pare, Kediri, (3) the southern region of Mojokerto, (4) a region between Mount Penanggungan and the Porong river, and (5) the Brantas delta. While the four clusters are situated on mountain slopes and alluvial fans, another is located in the Brantas delta.

132 N.C. Van Setten Van Der Meer, *Sawah Cultivation in Ancient Java: Aspects of Development during the Indo-Javanese Period, 5th to 15th Century* (Canberra: Faculty of Asian Studies in Association with Australian National University Press, 1979): 22-23.

133 F.H. van Naerssen and R.C. De Iongh, *The Economic and Administrative History of Early Indonesia* (Leiden: Brill, 1977): 27, 56-57. See also: S. Kartodirdjo, "Masyarakat dan Sistem Politik Majapahit", in: *700 Tahun Majapahit. Suatu Bunga Rampai*, eds. Sartono Kartodirjo, et al. (Surabaya: Dinas Pariwisata Daerah Propinsi Tingkat I Jawa Timur, 1993): 34-35.

134 J. W. Christie, *Theatre States and Oriental Despotisms: Early Southeast Asia in the Eyes of the West* (Hull: Center for South-East Asian Studies, 1985): 25-27; Christie, "Water from the Ancestors": 19.

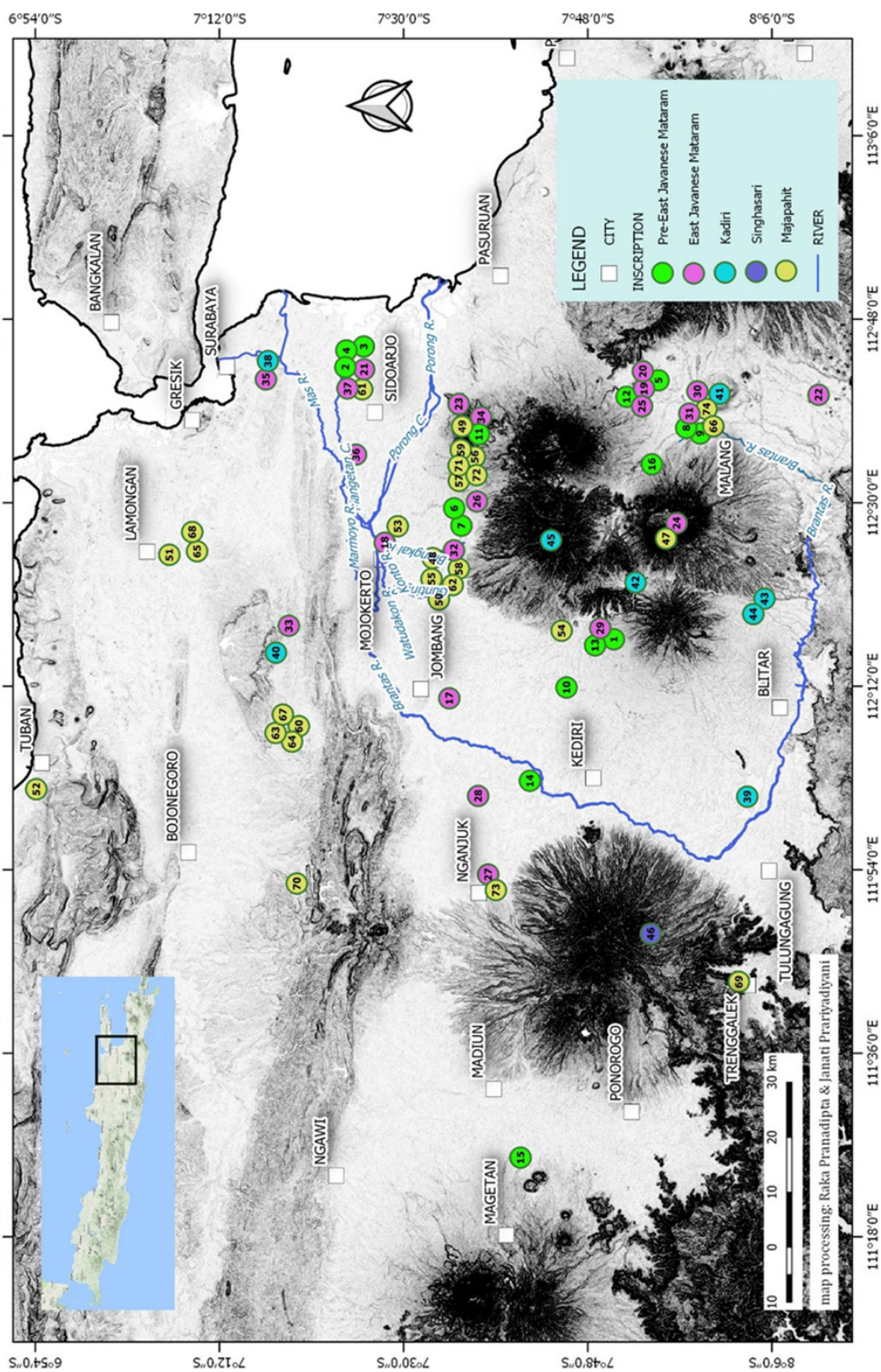

Fig. 4.4. The distribution of inscriptions dealing with water management in the Brantas river basin (Map by Tjahjono Prasodjo). See notes in the next page.

Inscriptions

1 Hariñjiṅ A, 787
2 Waharu Kuti, 840
3 Kañcana, 860
4 Waharu I, 873
5 Baliṅawan, 891
6 Watukura I, 902
7 Ketanen, 904
8 Kubu Kubu, 905
9 Kubukubu, 905
10 Ganesa Pare, 908
11 Kaladi, 909
12 Sugih Manek, 915
13 Hariñjiṅ B, 921
14 Kinawĕ, 927
15 Palĕbuhan, 927
16 Saṅguran, 928
17 Poh Rintiṅ, 929
18 Saraṅan, 929
19 Guluṅ guluṅ, 929
20 Liṅgasuntan, 929
21 Waharu II, 929
22 Turyyan, 929
23 Cuṅgraṅ I, 929
24 Cuṅgraṅ II, 929
25 Jru jru, 930
26 Wulig, 934
27 Añjukladaṅ, 935
28 Hriṅ, 937
29 Paraḍaḥ, 943
30 Kanuruhan, 943
31 Muñcaṅ, 944
32 Kamban, 971
33 Cane, 1021
34 Terep I dan II, 1032
35 Baru, 1034
36 Kamalagyan, 1037
37 Gandhakuti, 1042
38 Sumĕngka, 1059
39 Padlĕgan, 1116
40 Patakan, 11th Century
41 Manañjuṅ, 11th Century
42 Hantaṅ, 1135
43 Panumbaṅan, 1140
44 Talan, 1136/1146
45 Jariṅ, 1181
46 Pĕnampihan/ Sarwwadharmma, 1269
47 Kudadu, 1294
48 Dhimaṇāśrama, 13th/14th century
49 Sukamĕrta, 1296
50 Balawi, 1305
51 Balambangan/ Jayanagara/ Lamongan, early 14th Century
52 Kambaṅ Putih, early 14th Century
53 Tuhañaru/ Sidatĕka, 1323
54 Kusmala, 1350
55 Pĕlĕm, 1350-1389
56 Jenggriṅ, 1354
57 Keputran, 1355
58 Caṅgu/Trowulan I, 1358
59 Seloliman, 1358
60 Biluluk I, 1366
61 Bungur B, 1(367)
62 Karaṅ Bogĕm/ Tirah/ Trowulan V, 1386
63 Biluluk V (Karaṅ Bogĕm), 1387
64 Biluluk II, 1391
65 Śelamaṇḍi I, 1394
66 Lumpang/ Katiden II, 1395
67 Biluluk III, 1395
68 Śelamaṇḍi II, 1395
69 Wariṅin Pitu/ Surodakan, 1447
70 Pamintihan, 1473
71 Trailokyapuri I, 1486
72 Trailokyapuri IV, late 15th century
73 Saṇḍuṅan, n.d.
74 Kalimusan, n.d.

(N.B.: all Dates are in CE.; n.d. = no date)

These clusters represent the most intensive areas in East Java where irrigated rice fields (*sawah*s) were cultivated. The *sawah*s were located near settlements of a village which were composed of several hamlets and the inhabitants of the village did rice farming. In Old Javanese texts this paddy field landscape is called *pasawahan*, and the activity of working in paddy fields is *asawah-sawah* or *masawah*.[135] The farmers also constructed water works. The Old Javanese *Kakawin* Arjunawijaya informs us about the irrigation system. According to Supomo, the local inhabitants built a dam constructed with stones, trunks, and branches to irrigate the rice fields. By damming the river, it was possible to divert water to some small canal to irrigate rice fields.[136]

The riparian communities in the Brantas river basin were not solely dependent on agricultural activity. According to the Old Javanese text, Sumanasāntaka, the village inhabitants had occupations of cattleman, rice farmer, fish farmer, and salt manufacturer.[137] The epigraphic sources give evidence of fishing and commerce being parts of life along the Brantas river. In contrast to the role of the court in regard to the water control system, which does not seem to have been significant, it seems that the court did have a large degree of control over commercial river activities along the Brantas river. This was specifically to gain both politically and economically and in order to maintain and strengthen its political power. River trade was one of the ways in which the East Javanese states generated income, primarily through commodity- and transportation taxes, while controlling and managing the Brantas river, both upstream and downstream, also played an important role in their efforts to keep their grip on political power.

135 Zoetmulder, *Old Javanese-English* Dictionary: 1715.

136 Supomo, *Arjunawijaya. A Kakawin of Mpu Tantular. Vol. I: Introduction and Text* (The Hague: Martinus Nijhoff, 1977): 58.

137 P. Worsley, *et al*., *Mpu Monaguṇa's Sumanasāntaka: An Old Javanese Epic Poem, Its Indian Source and Balinese Illustrations* (Leiden: Brill, 2013): 635. See also: T. Prasodjo, "Penggambaran Lanskap Jawa Kuno dalam Kakawin", in: Kuasa Makna: Perpektif Baru dalam Arkeologi Indonesia, ed. D.A. Tanudirjo (Yogyakarta: Departemen Arkeologi, Fakultas Ilmu Budaya Universitas Gadjah Mada, 2019): 174-175.