The Tank Systems in the Dry Zone Sri Lanka: Evolution, Management and Traditional Knowledge

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Abstract

The dry-zone water-harvesting and management system in Sri Lanka is one of the oldest historically recorded systems in the world. A substantial number of ancient sources mention the management and governance structure of this system suggesting it was initiated in the 4th century BCE (Before Common Era) and abandoned in the middle of the 13th century CE (Common Era). In the 19th century CE, it was reused under the British colonial government. This doctoral thesis predominantly aims at identifying the temporal development and socio-economic meaning of the water harvesting and management system through a systematic analysis of the written and epigraphic sources. Consequently, a critical analysis was conducted to examine the present day management system and the preservation of indigenous characteristics for a sustainable utilization of the resource in future. Finally, the preservation and continuation of the indigenous landscape system for the future was assessed in a heritage management perspective.

This research study was conducted using an interdisciplinary research approach combining different research methods. In general, two major approaches were taken to analyse the socio-economic conditions and implications of past cultures: a) Analysis of epigraphical sources, primary and secondary literature, historical maps and archaeological findings were combined to identify and reconstruct the socio-economic conditions of the ancient Rajarata kingdom during Anuradhapura and Polonnaruwa periods. b) Standardized qualitative interviews and workshops with the main stakeholders involved with the management of the Dry Zone hydraulic landscape were conducted, for the documentation of the present governance structure, land use practices, and existing indigenous knowledge.

In first case study, 255 text passages containing 837 different records on ancient irrigation were compiled as a database for the period from the 5th century BCE to the 10th century CE to reconstruct the diachronic developmet of the system. The second case study aims to identify the ancient water management and governance structure in the Dry Zone of Sri Lanka through a systematic analysis of ancient sources.

Furthermore, colonial politics and interventions during reclamation have been critically analyzed. Basis for this was the already existing database from which 222 text passages containing 560 different records contained relevant information. 201 of these text passages were captured from lithic inscriptions and 21 text passages originate from the chronicles. The spatial distribution of records in general largely corresponds to the extent of the Dry Zone and northern intermediate zone. The analyzed data are not equally distributed throughout the investigated period and show a distinct peak in the 2nd century CE. In conclusion, the conducted analysis documents the potential of the analyzed source genres for the derivation of information on different aspects related to the spatial, temporal and administrative development of the ancient water management system in Sri Lanka.

The third case study aimed to analyze the current management practices and existing indigenous aspects of the Dry Zone irrigated agricultural system from the viewpoint of farmers who are the main stakeholders of the system. Altogether 49 semi-structured interviews were conducted in seven villages in the Anuradhapura district and a detailed survey was conducted in the village of Manewa with a mixed research approach. The basic elements of the indigenous landscape, agricultural practices and management structures based on Farmer Organizations were mapped and examined in detail. The analysis of results shows that the sustainability of the indigenous agricultural system is vulnerable to rapid changes due to modernization, market changes, education levels, and inconsistent management decisions.

This doctoral thesis contributes to the knowledge base of water resource management by addressing policy dimensions, with a special reference to traditional and indigenous knowledge base. Socio-economic implications on the development of the water harvesting systems were systematically compiled and serve to interprete the evolution of the water harvesting systems in a broder context.

Zusammenfassung

In Sri Lanka findet sich eines der ältesten weltweit anhand von historischen Quellen dokumentierten Systeme zur Sammlung, Speicherung, Verteilung und Management von Wasser. Eine beträchtliche Anzahl von antiken Quellen erwähnen die Verwaltungs- und Kontrollstruktur dieses Systems und deuten darauf hin, dass es im 4. Jahrhundert BCE (Before Common Era) initiiert und Mitte des 13. Jahrhunderts CE (Commen Era) aufgegeben wurde. Im 19. Jahrhundert CE wurde es unter der britischen Kolonialregierung restoriert und wieder in Nutzung genommen. Diese Dissertation zielt in erster Linie darauf ab, die zeitliche Entwicklung des Wassernutzungs- und -managementsystems und seine sozio-ökonomische Bedeutung durch eine systematische Analyse der schriftlichen und epigraphischen Quellen zu identifizieren. Daher wurde eine kritische Analyse durchgeführt, um das heutige Managementsystem und die Erhaltung der indigenen Merkmale für eine nachhaltige Nutzung der Ressource in Zukunft zu untersuchen. Schließlich wurde die Erhaltung und Fortführung des indigenen Landschaftssystems für die Zukunft unter dem Gesichtspunkt des Kulturerbemanagements bewertet.

Diese Forschungsstudie wurde mit einem interdisziplinären Forschungsansatz durchgeführt, bei dem verschiedene Methoden kombiniert wurden. Es wurden zwei Hauptansätze verfolgt, um die sozioökonomischen Bedingungen und Auswirkungen vergangener Kulturen auf das System zu analysieren: a) Die Analyse epigraphischer Quellen, Primär- und Sekundärliteratur, historischer Karten und archäologischer Funde wurde kombiniert, um die sozio-ökonomischen Verhältnisse des alten Rajarata-Königreichs während der Anuradhapura- und Polonnaruwa-Zeit zu identifizieren und zu rekonstruieren. b) Es wurden standardisierte qualitative Interviews und Workshops mit den wichtigsten Stakeholdern durchgeführt, die sich mit dem Management der Systeme in der Trockenzone Sri Lankas befassen, um die derzeitige Governance-Struktur, die Landnutzungspraktiken und das vorhandene traditionelle Wissen zu dokumentieren.

In einer ersten Fallstudie wurden 255 Textpassagen mit 837 verschiedenen Informationen zur antiken Bewässerung für den Zeitraum vom 5. Jahrhundert BCE bis zum 10. Jahrhundert CE in einer Datenbank zusammengestellt. Die zweite Fallstudie zielt darauf ab, die antike Wassermanagement- und Governance-Struktur in der Trockenzone von Sri Lanka durch eine systematische Analyse antiker Quellen zu identifizieren. Darüber hinaus wurden die koloniale Politik und Interventionen während der Rekultivierung kritisch analysiert. Basierend auf der bereits existierenden Datenbank konnten hierfür 222 Textpassagen mit 560 verschiedenen Datensätzen ausgewertet werden. 201 dieser Textpassagen stammen aus lithischen Inschriften, 21 Textpassagen stammen aus den Chroniken. Die räumliche Verteilung der Aufzeichnungen entspricht im Allgemeinen weitestgehend der Ausdehnung der Trockenzone und der nördlichen ‚Intermedeate Zone'. Die analysierten Daten sind nicht gleichmäßig über den untersuchten Zeitraum verteilt und zeigen einen deutlichen Höhepunkt im 2. Jahrhundert CE. Zusammenfassend dokumentiert die durchgeführte Analyse das Potenzial der analysierten Quellengattungen für die Ableitung von Informationen zu verschiedenen Aspekten der räumlichen, zeitlichen und administrativen Entwicklung des alten Wassermanagementsystems in Sri Lanka.

Die dritte Fallstudie hatte zum Ziel, die derzeitigen Bewirtschaftungspraktiken und die bestehenden indigenen Aspekte des Bewässerungssystems der Trockenzone aus der Sicht der Landwirte zu analysieren, die die Hauptakteure des Systems sind. Insgesamt wurden in sieben Dörfern des Distrikts Anuradhapura 49 semi-strukturierte Interviews durchgeführt. Weiterhin wurden im Dorf Manewa die Grundelemente der indigenen Landschaft, der landwirtschaftlichen Praktiken und der Verwaltungsstrukturen, die auf einem Zusammenschluss der am Wasser partizipierender Farmer basiert, detailliert erfasst und untersucht. Die Analyse der Ergebnisse zeigt, dass das indigenen Agrarsystems aufgrund von Modernisierung, Marktveränderungen, Bildungsniveau und inkonsistenten Zuständigkeiten hinsichtlich ihres Managements auf rasche Veränderungen vulnerabel reagiert.

Diese Doktorarbeit trägt zur Wissensbasis des Wasserressourcenmanagements bei, indem sie sich mit politischen Dimensionen unter besonderer Berücksichtigung der traditionellen und indigenen

Wissensbasis befasst. Die sozioökonomischen Auswirkungen auf die Entwicklung der Wassernutzungssysteme wurden systematisch erfasst und dienen dazu, die Entwicklung der Wassernutzungssysteme in einem weiterem Kontext zu interpretieren.

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Chapter 1

General Introduction

Sri Lanka is an island situated in the southern tip of India. The first human traces on the island date back to 125,000 BP (Deraniyagala, 2007) followed by the historical epoch which starts from nearly the 4th century BCE (Robin Coningham, 2013). Two thirds of the island are situated in the Dry Zone area, which spreads north, east and southeast of the central highlands and is characterized by a mean annual precipitation of 1750 mm and a distinct dry period during the summer months (Eriyagama et al., 2010). Therefore, the inhabitants of the country faced the challenge of procuring a regular supply of water for agricultural livelihoods and personal needs from the initial periods of settlements. To face this challenge, early settlers of the island developed a sophisticated and unique water harvesting and management system which is composed of a series of human-made tanks or reservoirs, locally called *wewa*, which are interconnected by canals (Madduma Bandara, 1995).

The first Kingdom of the island, namely the *Rajarata*, established in the present-day North central province of Sri Lanka from the 6th century BCE to the 13th century CE, and consisting mainly of two ancient divisions called *Nuwarakalaviya* (Anuradhapura) and *Tamankaduwa* (Polonnaruwa). Irrigation agriculture is regarded as a precondition for the development of the first urbanization of the island in Anuradhapura and Polonnaruwa (Deraniyagala, 1996; Panabokke and others, 2009). The Dry Zone water harvesting and management system in Sri Lanka is considered as one of the oldest historically recorded systems in the world (Gunawardana, 1971), since numerous manuscript and epigraphic sources from 3rd century CE address related aspects as evalution and functioning of the system. This research predominantly aims at identifying the socio-temporal development of the water harvesting and management system through a systematic analysis of the written and epigraphic sources. Therefore, the emphasis is on a distinct source criticism, culminating in an analysis of the usability of the ancient source genres for the deduction of reliable information on early irrigation management in the Dry Zone of Sri Lanka.The indigenous water harvesting and management system of Sri Lanka continued intact for nearly two millennia despite the changes that were carried out in technological, management and sociocultural norms. Up to 10,000 of the tanks in use today were integrated in the landscape during the heydays of the ancient Kingdoms, clearly documenting their significance and sustainability (Dahdouh-Guebas et al., 2005). Consequently, a critical analysis was conducted to examine the present day management system and the preservation of indigenous characteristics for a sustainable utilization of the resource in future. Finally, the preservation and continuation of the indigenous landscape system for the future was assessed in a heritage management perspective.

1.1. State of the Art

1.1.1. Dry Zone water harvesting and management systems in South Asia

The Dry Zone of Sri Lanka depends mainly on irrigation agriculture. From ancient times, the inhabitants of the island constructed irrigation works ranging in complexity from simple dams to an integrated watershed management system (Farmer, 1950). Throughout the historical period, three major irrigation complexes functioned in the Dry Zone of Sri Lanka, in Anuradhapura (*Nuwarakalaviya*), Polonnaruwa (*Thamankaduwa*) and the southern *Rohana* kingdom (*Magama*) (Gunawardana, 1982). The beginning of the irrigation system in the Dry Zone has yet to be determined, although the first mentions in ancient sources are dated to 5th/4th century BCE (*Mahavamsa* X/84-88). According to some scholars and historians, migrants from North India introduced the water harvesting technologies to the island in 6th/5th century BCE. Scholars like Brohier, (1975), Fernando (1980) and Panabokke et al. (2009) introduced the hypothesis, that small rudimentary ponds were dug at topographic suitable situations, which were gradually developed into a unique water conveying system.

The water harvesting and water management systems in the Dry Zone of Sri Lanka are composed of a series of human-made reservoirs, locally called *wewa*, or tanks constructed cascade-like along shallow river valleys (Madduma Bandara, 1995, 1985). Small (*Kulu wewa*), medium, and large tanks are connected by channels and spillways and allow water to be conveyed along the cascade and to irrigate interconnected agricultural fields (Figure 1.1). Small tanks usually do not contain sluices or

combined paddy field and are predominantly used to maintain a high ground water table and to preserve the ecosystem forming a continuous water supply (Jayasundara, 2011). Furthermore, they help to minimize the risk of flood overflows. Medium size tanks in the system have some sluices and water is conveyed through the channels to irrigate the fields below. Similarly, large reservoirs situated downstream of the system, collect water from the outflow of medium reservoirs and irrigate a large command area for paddy cultivation (Bandara, 1985; Jayasundara, 2011). Trans-basin channels are used to convey water between different catchments for maximum utilization of the water resource (Madduma Bandara, 1995). Water harvesting and management systems guarantee the availability of water throughout the year for agricultural production and domestic use, especially during the dry seasons.

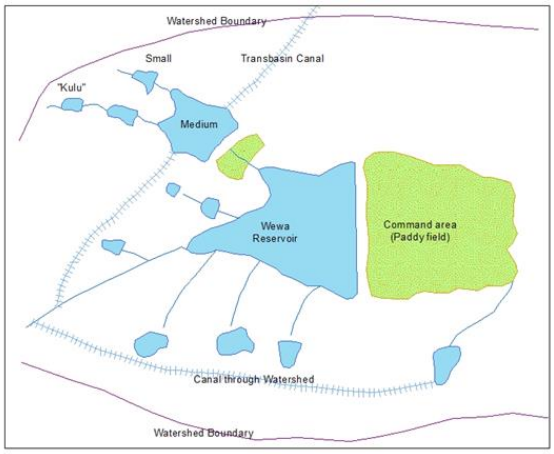


Figure 1.1: Schematic representation of the components of tank cascade system (modified after Jayasundara (2011))

Comparable indigenous water management systems have been identified and examined in several South Asian countries, especially in peninsular India. According to Gunnell and Krishnamurthy, (2003) in peninsular India, small reservoirs or tanks, predominantly supplied by surface runoff have for centuries been dominant in an entire agrarian civilization. Furthermore they illustrate how village communities have been taking advantage of the potential for surface and subsurface runoff harvesting by developing the tank system (Gunnell and Krishnamurthy, 2003) .In a similar manner to the tank cascades in Sri Lanka, South Indian tanks frequently form chains down the axes of shallow inland valleys, within natural drainage boundaries.

It is believed that nearly 10,000 functioning tanks in the current Dry Zone landscape of Sri Lanka originated from the ancient water harvesting and management system (Dahdouh-Guebas et al., 2005). According to another report, the total number of both functioning and abandoned tanks in Dry Zone is 18,387 (Panabokke et al., 2009). The following table shows the distribution of functioning and abandoned tanks in major irrigated provinces in the Dry Zone of Sri Lanka (Table 1.1).

Table 1.1: Number of functioning and abandoned small tanks within each province

Region	Total No. of Small Tanks	Percentage of Functioning Tanks	Percentage of Abandoned Tanks
North Central Province (Rajarata)	4,017	52	48
Southern Province (Rohana)	1,410	46	54
North Western Province (Wayamba)	6,463	65	35
Northern Province	1,424	43	57

* After Panabokke et al (2009)

Irrigation infrastructure in the Dry Zone is categorized into 3 major types including minor irrigation (command area < 80 hectares), medium (command area 80-400 ha) and major irrigation (command area > 400 ha) (Molen, 2001). Maintenance measurements on major irrigation were conducted under the supervision of engineers attached to the central and regional Irrigation Departments. However, medium and minor irrigation schemes are maintained in a participatory manner, coordinated by the divisional officer (DO) in the Agrarian Service Department with the community level Farmer Organizations (FO).

1.1.2. Major theories on historically evolved water harvesting and management systems in the world

According to the distinguished archaeologist Grahame Clark, "…water has reflected the image of society…" (Clark, 1944). The domestication of water is a prelude to the old world civilizations and state societies. The majority of ancient civilizations were dependent upon sophisticated systems of water management (Mithen, 2010). The cultural achievements of ancient civilizations such as of the Indus valley, Egypt and Mesopotamia centered mainly on hydraulic engineering achievements and sophisticated water management skills (Crary, 1949; Helbaek, 1960; Pandey et al., 2003). In an increasingly water-stressed modern world, where water is managed under the assumption of stationarity (Milly et al., 2008), water management is ever more crucial because especially with regard to climate changes, social inequity and poverty.

According to the grand theories on water and society, introduced by authors such as K. Wittfogel and the anthropologist J. Steward (Steward, 1955; Wittfogel, 1959), state societies in Asia depended on the creation of large-scale irrigation works which required organized, forced labor and centralized bureaucratic management. Due to the climatic and territorial conditions, oriental agriculture is mainly based on artificial irrigation by canals and waterworks. Further, Wittfogel illustrate the collective or shared ownership in land tenure in "Asiatic Societies" (Wittfogel, 1959). Furthermore, he illustrates the need of a centralized bureaucratic power of the government for water control (Wittfogel, 1959). Julian Steward advanced a similar hypothesis, saying irrigation was the catalyst for state formation (Steward, 1955).

In partial contradiction to these grand theories of water, recent cross-cultural studies on water and society have revealed more complex and diverse associations and methods of indigenous water management systems (Mithen, 2010; Scarborough, 2003). For instance R. Adams' study on ancient Mesopotamian water management systems indicates that the complex irrigation system comprising canals and water works developed after the appearance of bureaucratic urban centers (Adams, 1966). V. L. Scarborough put forward a comparable hypothesis with his studies on the emergence of the Mesoamerican archaic states (Scarborough, 2003).

1.1.3. Approaches and hypothesis on evolution and management of ancient Sri Lankan water harvesting and management system

The water harvesting and management system of Sri Lanka was subjected to numerous researches and studies starting as early as the Colonial period. R. M. Iverse, J. Forbes and a few others were the pioneers among the colonial travelers, explorers, and researchers who tried to investigate the ruined irrigation landscape in the Dry Zone of Sri Lanka, mainly in the North Central Province (Forbes and Turnour, 1840; Ivers, 1899). These early investigations were limited to the recording the partly collapsed and functioning irrigation schemes in the landscape. In the following century, more elaborated studies were carried out by a few scholars such as Parker, Kennedy and Brohier (Brohier, 1997a, 1935; Kennedy, 1936; Parker, 1909). Brohier attempted to identify the ancient irrigation works illustrated in ancient literary sources with the respective names and their creators. Further, he attempted to outline the story of irrigation in Sri Lanka from the beginning to modern times with special reference to Colonial interventions (Brohier, 2006).

In the latter part of the 20th century, irrigation landscape in the Dry Zone of Sri Lanka inspired many researches focusing on its physical characteristics, environmental perspectives, and techno-engineering by the researchers such as (Bandara, 1985; Ithakura and Abernethy, 1993; Madduma Bandara, 1995; Madduma-Bandara, 1977; Panabokke and others, 2009; Tennakoon, 2001, 1974). In recent

years, tank sediments as archives for environmental reconstruction were investigated by Schütt et al., (2013) and Bebermeier et al., (2017). Withanachchi, (2013, 2014) investigated Sri Lanka's water management systems from a historical perspective with special reference to ancient anicuts and dams.

Some scholars attempted to theorise the evolution and socio economic factors related to the ancient water harvesting and management system in the Dry Zone of Sri Lanka. E. R. Leach is a pioneer among them (Leach, 1961, 1959). In 1961 he published a study of a traditional village irrigation community in Pul Eliya, north-central Sri Lanka, with special reference to traditional land tenure and kinship (Leach, 1961). He also undertook a critical analysis of Karl Wittforgel's concepts of "hydraulic society" and "Oriental despotism" based on information from the ancient water harvesting system of Sri Lanka, for which he identified similarities to European feudalism (Leach, 1959). Leach described the ancient Sri Lankan water management system as "hydraulic oriental" feudalism.

R. A. L. H. Gunawardana is another researcher who interpreted the ancient water management system of Sri Lanka based on material from ancient written sources (Gunawardana, 1971). His special interest was in the role of Buddhist temporalities in Dry Zone landscape management, and he hypothesized a multi-centered society with power devolving on the gentry and the monastic institutions (Gunawardana, 1971)

In most recent times, Coningham attempted to study ancient water governance structures in the hinterland of Anuradhapura based on archaeological and historical materials (Coningham et al., 2007; Robin Coningham, 2013). He described the water management system of the kingdom of Anuradhapura as a theocratic landscape where monastic centers played a dual role of religious and secular administration, based on grants of irrigation works to monastic entities and the absence of towns and lower order administrative centers in the hinterland.

1.2. Research gaps

This doctoral research identified four major research gaps related to the ancient water harvesting and management systems in the Dry Zone of Sri Lanka in the context of chronological, methodological, theoretical and policy frameworks (Figure 1.2). Lack of a chronological framework for the evolution of water harvesting and management systems is a major research problem. Many scholars tried to reconstruct the evolution by analyzing the physiographic features of the landscape and the historical sources (Brohier, 2006; Diksith, 1986; Gunawardana, 1971; Panabokke et al., 1999; Parker, 1909). However, a systematic analysis of the information provided by the epigraphic and written sources on water harvesting and management systems has not yet been carried out, although researchers have shown an awareness of the potential of these source genre

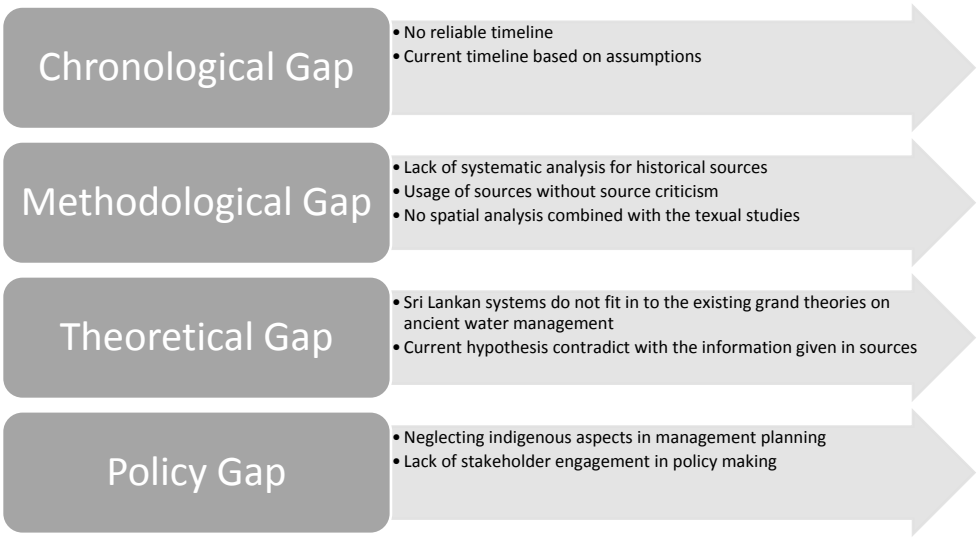


Figure 1.2: Research gaps identified by the doctoral research (Authors illustration)

The evolution of the water harvesting and management system of the Dry Zone of Sri Lanka does not show a linear development. It was started and developed in the historical period, abandoned in 13th century CE and then reutilized in 19th century CE under the British Colonization (Brohier, 1997a). However, little is known about the major contextual changes and impacts that triggered the evolution process. This becomes also obvious as the policy level, indigenous aspects of the current landscape management and socio economic implications are in present day Sri Lanka not regarded as base for the decision making.

1.3. Objectives and thesis structure

The overall thematic objective of this research study is to characterise, reconstruct and analyse management strategies for the water harvesting and management systems of the Dry Zone of Sri Lanka from the ancient kingdoms to present day with a special focus onto information given in ancient sources. The study contributes to the knowledge base of water resource management by addressing policy dimensions, with a special reference to traditional and indigenous knowledge base. Socio-economic implications on the development of the water harvesting systems were systematically compiled and serve to interprete the evolution of the water harvesting systems in a broder context.

Based on introduced research gaps the key research questions of this doctoral thesis are as follows

1. Does the analysed sources engender potential for the derivation of information on different aspects related to the spatial, temporal and administrative development of the ancient water harvesting and management system in Sri Lanka?
2. What are the main characteristics and which socioeconomic implications are visible in the evolution of ancient water harvesting and management systems in the Dry Zone of Sri Lanka?
3. Which meaning do sustainable indigenous management systems have in present day agriculture in the Dry Zone of Sri Lanka?
4. Which traditional knowledge related to the water harvesting systems is still practiced today in a local context?

To address the research questions and the overall research objectives five specific objectives were defined.

1. Systematically assess the information given by epigraphic and written sources on the spatio-temporal development of the water harvesting and management systems in the Dry Zone of Sri Lanka
2. Identify the ancient water management and governance structure and its socio-economic implications in the Dry Zone of Sri Lanka from its historical beginnings to its abandonment in the 13th century CE.
3. Analyze the Buddhist temporalities on the governance of water and irrigated landscape.
4. Critically analyse the Colonial politics and interventions during the reclamation of irrigation landscape.
5. Analyse the current landscape management practice and document the existing indigenous aspects in the Dry Zone irrigation agricultural systems of Sri Lanka.

The thesis is structured into four research papers that elaborate on the research questions and the follow specific objectives. The results of the investigation are presented in four research papers:

Paper 1: Abeywardana, N.; Pitawala, A.; Bebermeier, W.; Schütt, B. Evolution of the Dry Zone Water Harvesting and Management Systems in Sri Lanka during the Anuradhapura Kingdom; a study based on Ancient Chronicles and Lithic Inscriptions. Water History (Accepted).

- Major aim of this paper is to systematically assess the information given by epigraphic and written sources on the spatio-temporal development of the water harvesting and management systems in the Dry Zone of Sri Lanka. 255 text passages containing 837 different records on ancient irrigation were systematically analysed. It was possible to link 173 text passages to a specific king's reign. Altogether 362 records (43.2 %) mention a tank or its construction. The categories "grants of irrigation" and "irrigation incomes" are represented with 276 records (33

%) and 75 records (9 %). Records on canals and irrigation management occur with a share of 8.2 % and 6.2 %, equaling 69 and 52 records.This analysis documents the potential of the analysed source genres for the derivation of information on different aspects related to the spatial temporal and administrative development of the ancient water harvesting and management systems in the Dry Zone of Sri Lanka.

Paper 2: Abeywardana, N.; Bebermeier, W.; Schütt, B. Ancient Water Management and Governance in the Dry Zone of Sri Lanka Until Abandonment, and the Influence of Colonial Politics during Reclamation. Water 2018, 10, 1746. (https://doi.org/10.3390/w10121746)

- This research aims to identify the ancient water management and governance structure in the Dry Zone of Sri Lanka through a systematic analysis of ancient sources. Furthermore, colonial politics and interventions during reclamation have been critically analyzed. Information was captured from 222 text passages containing 560 different records. 201 of these text passages were captured from lithic inscriptions and 21 text passages originate from the chronicles. The spatial and temporal distribution of the records and the qualitative information they contain reflect the evolution of the water management and governance systems in Sri Lanka. Vast multitudes of small tanks were developed and managed by the local communities. Due to the sustainable management structure set up within society, the small tank systems have remained intact for more than two millennia.

Paper 3: Abeywardana, N.; Schütt, B.; Wagalawatta, T.; Bebermeier, W. Indigenous Agricultural Systems in the Dry Zone of Sri Lanka: Management Transformation Assessment and Sustainability. Sustainability 2019, 11, 910. (https://doi.org/10.3390/su11030910)

- This research aimed to analyze the current management practices and existing indigenous aspects of the Dry Zone irrigated agricultural system from the viewpoint of farmers who are the main stakeholders of the system. Altogether, 49 semi-structured interviews were conducted in seven villages in the Anuradhapura district and a detailed survey was conducted in the village of Manewa with a mixed research approach. The basic elements of the indigenous landscape, agricultural practices and management structures based on Farmer Organizations were mapped and examined in detail. The analysis of results shows that the sustainability of the indigenous agricultural system is vulnerable to rapid changes due to modernization, market changes, education levels, and inconsistent management decisions. The case study demonstrates the value of preserving indigenous agricultural systems and the negative outcomes of current management interventions that neglect the indigenous system.

Paper 4: Abeywardana, N.; Bebermeier, W.; Schütt, B. The Hinterland of Ancient Anuradhapura: Remarks about an Ancient Cultural Landscape. 世界遺産学研究= JOURNAL OF WORLD HERITAGE STUDIES, 2017, 37-43. (http://doi.org/10.15068/00148447)

- The ancient hydraulic irrigation landscape, in the environs of Anuradhapura, with its sophisticated adaptation strategies to the local environmental conditions, was the economic basis for the flourishing of the Kingdom of Anuradhapura. It can be identified as an example that clearly illustrates the interrelationship between nature and culture. When Anuradhapura was inscribed on the World Heritage List in 1982, the ancient site, with its architectonical remnants, was considered in the nomination. The cultural landscape, which had developed synchronously with the city, has not yet been included as part of the value of the site. This paper will introduce the highly sophisticated water management system, which is still in use in the Dry Zone of Sri Lanka. By highlighting its uniqueness, its potential as a World Heritage cultural landscape is demonstrated.

Chapter 2

Research Area

Sri Lanka is an island situated in the southern tip of the Indian peninsula with the total extent its landmass being about 65,610 km^2. Low land Dry Zone Sri Lanka is the main focus for this doctoral research study. The research area can be defined into 3 scales as follows (Figure 2.1).

1. Macro-scale: The entire lowland Dry Zone area of Sri Lanka
2. Meso–scale: The North Central Province of Sri Lanka, comprising the Anuradhapura and Polonnaruwa districts
3. Micro-scale: Selected Grama Niladari (GN) divisions, including Manewa in the Anuradhapura district

2.1. Environmental characteristics of the Dry Zone Sri Lanka and Anuradhapura hinterland

According to Cooray, (1984) "…*the physiography of Sri Lanka can be best described as consisting of a central mountain mass, the Central Highlands, rising in a series of tiers or ramparts from a low, gently undulating plain surrounding it in all sides and extending to the sea*…". He goes on to explain that there are 3 plains of erosion or peneplains which make up the principle physiographic regions of the island. (Cooray, 1984) as follows:

- Lowest peneplain: 0-125m
- Middle peneplain: 125-750m
- Highest peneplain: 750-2500m

The study area for this doctoral research is mostly located in the lowest peneplain, mainly in the North Central lowlands. The micro study area, Anuradhapura, is located in the north central lowlands, 89 meters above sea level and is the capital of the North Central province. The relief is gently undulating (Cooray, 1984; Panabokke, 1996) and corresponds to a *planation surface* that is characterised by the occurrence of a large number of small inland valleys (Panabokke, 2002, 1996).

The greater part of the island consists of Precambrian metamorphic rocks (Dissanayake and Weerasooriya, 1985; Panabokke, 1959). The Precambrian basement of Sri Lanka is subdivided into three major complexes as Highland, Wanni and Vijayan (Cooray, 1967,1984). Anuradhapura and its hinterland belong to the Wanni complex and predominantly consist of granitic, migmatitic, charnockitic gneiss and metasediments. The prominent soil group of the area is the Reddish Brown Earths and Low Humic Gley Soils-Undulating Terrain formed under the "mantled plain Undulating" landform. A narrow strip of alluvial soils is visible in this vicinity, along the natural drainage systems such as the river Malwathu Oya (Panabokke, 1996).

Climatically the study area belongs to the seasonally dry tropics (Panabokke, 1996). The mean annual rainfall is less than 1750 mm (Eriyagama et al., 2010). The northeast monsoon (winter monsoon) is from December to February and is considered as the main source of precipitation for the area. Lowland areas record about 27.5 °C mean annual temperature and in 2013, Anuradhapura recorded an annual average temperature of about 28.3 °C (Department of Census and Statistics-Sri Lanka, 2014).

Nine main river basins have a share of the present-day Anuradhapura district (Figure 2.1). These are the basins of the rivers Kala Oya, Modaragam Ara, Malwathu Oya, Parangi Ara, Ma Oya, Mee Oya, Yan Oya, Koddikkaddi Ara and Pankulam Ara (Panabokke, 2001). Anuradhapura is located in the river basin of the River Malwathu Oya. Polonnaruwa is located closer to the river Mahaweli which is the permanent water source throughout the year since its headwater areas are located in the humid central mountains.

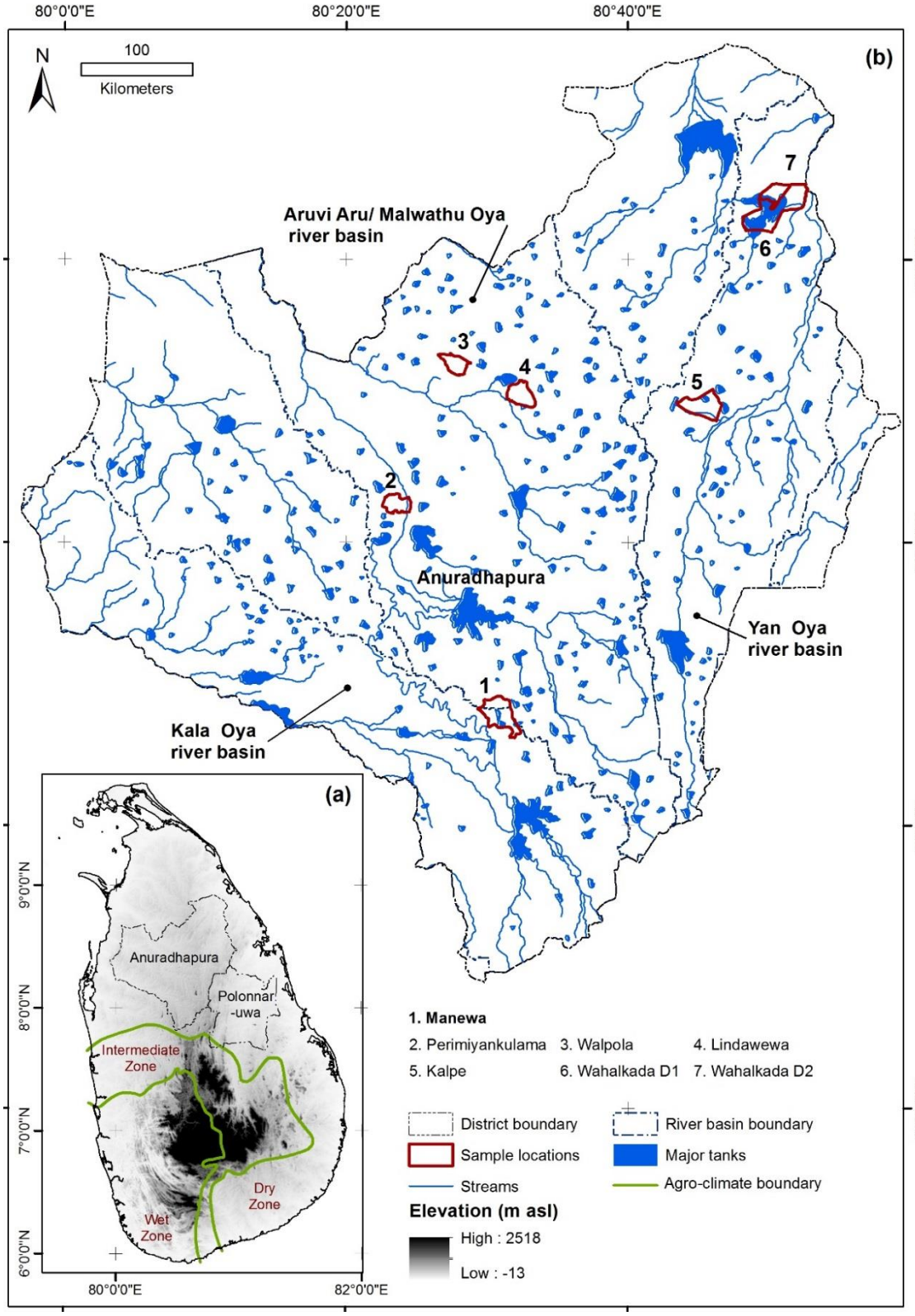


Figure 2.1: a) Topography of Sri Lanka with climatic zones. The Dry Zone represents the macro scale study area b) Water Harvesting infrastructure of present day North Central Province representing meso-scale study area. Sources: DEM (USGS 2017); agro-climatic boundaries are taken from the National Atlas of Sri Lanka (Somasekaram, 1988); river basins are taken from the Water Information System for Sri Lanka – WISSL (International Water Management Institute, n.d.); tanks, streams and administrative boundaries are from Survey Department 1:50,000 digital topo sheets.

2.2. Settlement History

Two different chronological sequences are available for the country and ancient Anuradhapura based on a series of archaeological researches conducted during last century (Table 2.1). The first appearance of human remains in Anuradhapura dates back to the Prehistoric Mesolithic period. Stratified excavations conducted at the Anuradhapura citadel – Gedige revealed mid-Holocene artifacts, comprised of geometric microliths, which have been radiometrically dated to around 5850 *cal* BP (Deraniyagala, 1972, 1992). Besides, a few other sites, such as Jethavana monastery and Vessagiriya, situated in the study area, give evidence on Mesolithic hunter-gathers (Mendis, 2008).

Protohistoric Early Iron Age culture was well established in the Indian subcontinent by 1,200 BCE (Deraniyagala, 2007; Possehl, 1990). Use of iron technology allowed early migrants from India to explore varied environmental conditions. They gradually established permanent settlements in the Dry Zone of Sri Lanka from at least 950 BCE in Anuradhapura (Deraniyagala, 2007). A ceramic sphere comprising the contemporary and related ceramic complexes including the Black and Red Ware (BRW) prove this. The Prehistoric settlement in Anuradhapura is assumed to have been superimposed by the Early Iron Age settlements in 950 BCE as is evident from the absence of any prehistoric stone artefacts within the Protohistoric Early Iron Age horizons of the Citadel of Anuradhapura. There is clear evidence of the use of iron, horses, pottery and small-scale agriculture in this context (Deraniyagala, 1992). Initial Early Iron Age settlement in the Anuradhapura Citadel area have been estimated to be up to 10 hectares in 900 to 800 BCE and extended to at least 50 hectares by 700 to 600 BCE, and it coincided with the second urbanization in the Gangetic Valley in India (Deraniyagala, 1992).

Table 2.1: Chronological sequences of ancient Anuradhapura

Phases by Deraniyagala (1992)	**Period**	**Phases by Coningham (2013)**	**Period**
Mesolithic	c. 3900 BCE	Prehistoric	Before c 800 BCE
Protohistoric Early Iron Age	c. 950 – 600 BCE	Protohistoric	c. 800 – 340 BCE
Basal Early Historic	c. 600 – 500 BCE	Early Historic	c. 340 BCE – 200 CE
Lower Early Historic	c. 500 – 250 BCE	Late Historic	c. 200 – 600 CE
Middle Early Historic	c. 250 BCE – 100 CE	Early Medieval	c. 600 – 1200 CE
Upper Early Historic	c. 100 – 300 CE	Late Medieval	c. 1200 – 1500 CE
Middle Historic	c. 300 – 1250 CE	Kandyan	1500 – 1656 CE
		Colonial	1656 – 1948 CE
		Modern	1948 CE onwards

There is evidence of early Brahmi writing on pottery sherds and imported pottery wares in the Basal Early Historic period from (600 to 500 BCE) (Deraniyagala, 2007). Archaeological excavations revealed postholes, and structures exhibit a rural architectural tradition with circular houses made using organic materials (Coningham, 1999). Furthermore, material evidence indicates the use of domesticated animals and wet rice cultivation (Deraniyagala, 2007).

The Lower Early Historic period (500 - 250 BCE) is a significant period of the landscape development in the area, as it corresponds with the period of the foundation of the city of Anuradhapura (*Mahavamsa* VII/73-76). From the latter part of the Lower Early Historic period, historical records are based on the Early Brahmin inscriptions found in the landscape (Paranavithana, 1970). Interestingly for our research, these inscriptions mention irrigation works such as tanks and canals from 3rd century BCE.

During the Middle Early Historic (250 BCE - 100 CE) period Anuradhapura was considered as one of the ten largest cities in the South Asia (Allchin and Allchin, 1999). Ancient Anuradhapura landscape consists of an inner city, several rings of monasteries and a ring of irrigation networks (Figure 2.2). The city was characterized by a fortification, gateways set in the cardinal directions and roads connected to the entrances (*Mahavamsa* X/73-102). The inner city and the outer areas were zoned according to the functional needs of the city. Different quarters were assigned for the royal palaces, shrines for the goads, the ascetic settlements, traders (*yona*), city workers (*chandala*), cemeteries, agricultural and hunting settlements (*Mahavamsa* X/73-102). Furthermore, an official post had been

established, called *Nagara Guththika* (Guardian of the city) for the administration of the city (*Mahavamsa* X/81).

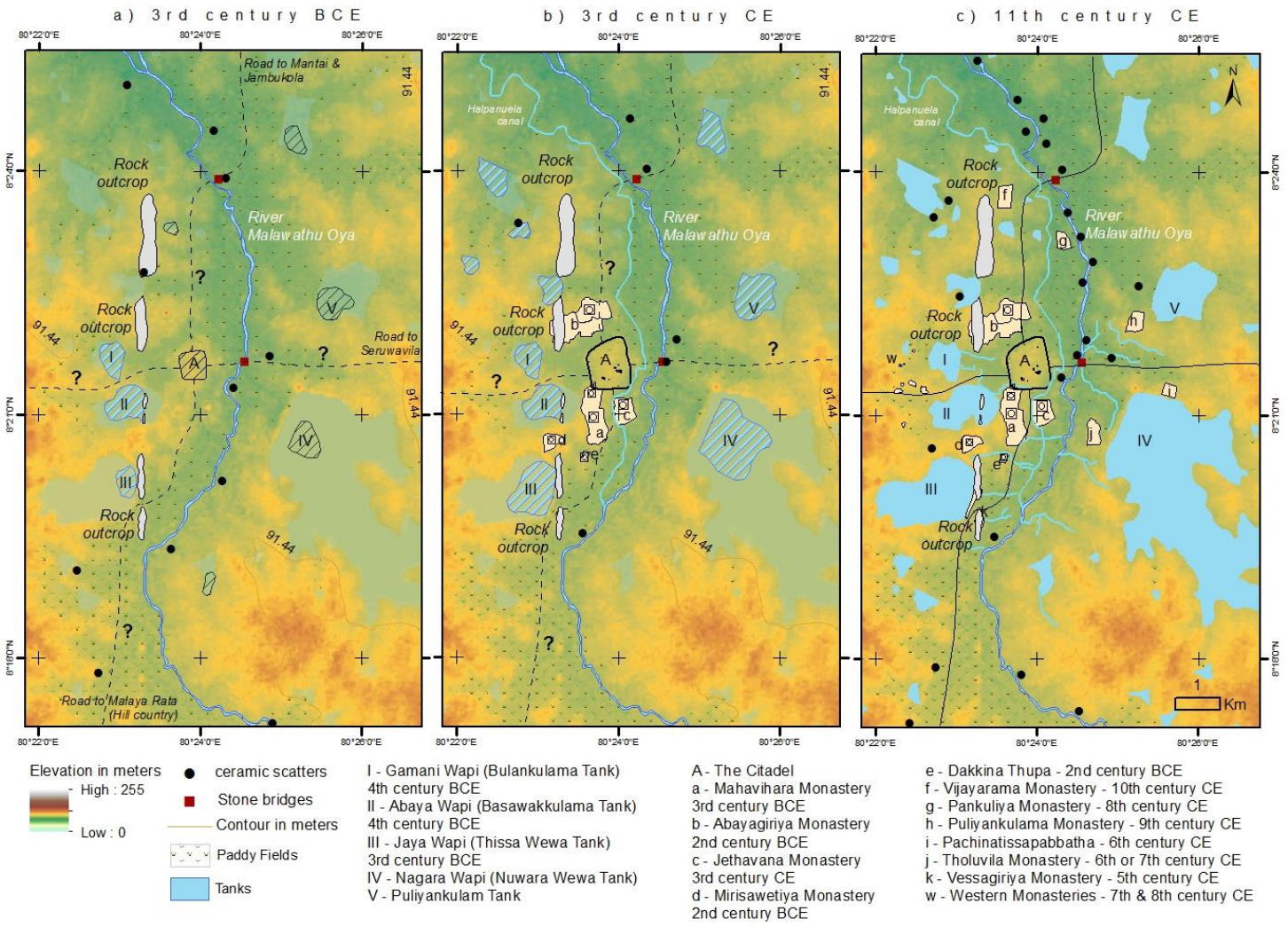
The road system of Anuradhapura is aligned in an orthogonal way, with four major roads connecting the city with *Jambukola* (Jaffna), *Mantai* (Manner), central highlands and Trincomalee (Figure 2.2c). One of the preserved remnants of this road is an ancient stone bridge passing the Malwathu Oya north of the city and it is aligned with the road towards *Mantai*, an ancient sea port, situated in the northwestern coast, which was the main port linked with the Anuradhapura settlement (Carswell et al., 2013; Coningham, 2014). From the eastern gate, a road connected Anuradhapura probably with the East Coast, where Seruwila, one of the main resource areas for copper and iron is located. An exploitation of the rich ore deposits has been analysed by Seneviratne (1995). There are remnants of a stone bridge in Malwatu Oya east of the city, the best-preserved stone bridge in Kanadarawa and remnants of a stone bridge in the catchement of Yan Oya river, which belonged to the ancient Eastern route.

Buddhism was introduced to the area in the latter part of the Lower Early Historic period (Mahavamsa XIII, XIV, XV) and well established in Anuradhapura during the Middle Early Historic period and thereafter, the landscape was directly influenced by the North Indian architectural and town planning concepts (Silva, 2000). In Middle Historic times, with the introduction of Buddhism (Mahavamsa XIII, XIV, XV) an inner ring of major monasteries encircled the inner city (Figure 2.2c). Clockwise these are; a) Abayagiriya monastery constructed in the 1st century BCE (Mahavamsa XXXIII/ 78-83), b) Jethavana monastery constructed in 3rd century CE (Mahavamsa XXXVII 32/35), c) Mahavihara monastery constructed in 3rd century BCE (Mahavamsa XIX 39-43) , d) Dakkinavihara monastery constructed in 1st century BCE (Mahavamsa XXXIII/98/99) and e) Mirisavetiya monastery constructed in 2nd century BCE (Mahavamsa XXVI/6-18). Soon Anuradhapura developed into the complete city with a centralized administration and the power to control outside resource areas, (Carswell et al., 2013). Furthermore, the Dry Zone civilization began to flourish in a structured society with industries, and irrigation agriculture, as well as the infrastructure for its development

During the Upper Early Historic period (100 - 300 CE) Anuradhapura developed rapidly as the main cultural and economic hub of ancient Sri Lanka. Material evidence reveals strong trade networks and cultural associations with the outside world (Deraniyagala, 1972; Ray, 1960). In the Middle Historic times (300 – 1200 CE), the second ring of monasteries added to the outer periphery of the suburbs of Anuradhapura, adjacent to the forest. During 7th and 8th century CE a distinct monastery type was added to the western boundaries of to the city, completing the monastic developments in the area. These fourteen monasteries, are called *Padanagara parivena* (Mahavamsa XXXVI/105; Culavamsa XLVI/11; EZ. III, 277) or meditation monasteries, and have a highly formalized layout. The most prominent archaeological features visible in the present landscape such as the great stupas and monumental architectural features were added during this last phase of the Anuradhapura (Bandaranayake, 1974).

In the 10th century CE, Anuradhapura was abandoned due to the South Indian invasions. Furthermore, it is believed that the deterioration of the city was the result of malaria and other epidemics, damaged irrigation networks and unsecure conditions within Anuradhapura (Jayasundara, 2011). At the beginning of the Middle Historic times, rulers attracted it to the Polonnaruwa area because of the favorable geomorphic conditions for large-scale irrigation schemes. In addition, the economic importance of Gokanna port, situated in the Eastern coast (present Trincomalee), for international trade with the East Asian civilization, attract rulers to the Eastern side of the country, which encouraged the building of a capital in Polonnaruwa (Ray, 1960). The irrigation landscape came to its maximum extent during the Polonnaruwa kingdom (Gunawardana, 1971). In the mid13th century CE Polonnaruwa collapsed due to the South Indian invasions and the Kingdom was moved to the intermediate and wet zones of the country and the irrigation civilization was abandoned (Ray, 1960).

Figure 2.2a. Anuradhapura Dry Zone hydraulic landscape in Early Historic period
Figure 2.2b: Anuradhapura Dry Zone hydraulic landscape in Late Historicperiod
Figure 2.2c: Anuradhapura Dry Zone hydraulic landscape in Early Medieval period (Authors compilation, based on a literature review) Hydrology was based on the 1:50,000 topographic data (sheet nos.25, 26, 30, 31), Ceramic scatters are derived from the Coningham, 2013 and Deraniyagala, 1992. Agricultural fields based on the 1:50,000 land use maps (sheet nos. 25 26, 30, 31), 1:500,000 soil map and SRTM 30m elevation data. Monasteries were based on field mapping and the Chronicles (*Mahavamsa, Deepavamsa, Culavamsa*).



Chapter 3

Materials and Methods

This research study was conducted using an interdisciplinary research approach combining different research methods. In general 2 major approaches were taken to analyse the socio-economic conditions and implications of past cultures.

1. Analysis of epigraphical sources, primary and secondary literature, historical maps and archaeological findings were combined to identify and reconstruct the socio-economic conditions of the ancient *Rajarata* kingdom during the Anuradhapura and Polonnaruwa periods.
2. Standardized qualitative interviews and workshops with the main stakeholders involved in the management of the Dry Zone hydraulic landscape were conducted, for the documentation of the present governance structure, land use practices, and existing indigenous knowledge.

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Table. 3.1: Summary of the main materials, methods and tools that were applied in this research study

	Methods and Materials	Chapter
1.	ArcGIS	4,5,6,7
2.	Coding	6
3.	Content criticism	4,5
4.	Chronicles	4,5,7
5.	Descriptive statistical analysis	4,5,6
6.	Digital Elevation Models (DEM)	4,5,6
7.	Drone photography	6
8.	Epigraphy	4,5,6,7
9.	Excel data base	4,5,6
10.	Geocoding	4,5,6
11.	GIS mapping	4,5,6
12.	Historical sources	4,5,6,7
13.	Individual interviews	6
14.	Interview schedules	6
15.	Legal documents, policy documents and international charters	6,7
16.	Photography	4,5,6,7
17.	Qualitative research design	4,5,6
18.	Quantitative research design	4,5,6
19.	Reports from government agencies, international organizations and non-government organizations	5,6,7
20.	Scientific literature	4,5,6,7
21.	Semi structured interviews	6
22.	Source criticism	4,5
23.	Targeted sampling	6
24.	Timeline	4,5
25.	Topographic data	4,5,6,7
26.	Thematic analysis	6

3.1. Analysis of texts and source criticism

Two separate written and epigraphic sources report on the historical past of Sri Lanka (Ray, 1960). Unknown authors finished the *Dipavamsa*, the first written chronicle of the island, in the middle of the 4th century CE. It describes the history of the country until the end of the reign of King Mahasen in 362 CE (Ray, 1960). Originally written in *Pali* verse, H. Oldenberg translated the *Dipavamsa* into English (Oldenberg, 1879). The second comprehensive chronicle considered in this study is the *Mahavamsa – "the Great Chronicle"* of Sri Lanka, which was also written in *Pali* and translated by W. Geiger into German (Geiger, 1908). The *Mahavamsa* is structured in two main sections: the *Mahavamsa*

(the Great Chronicle) and the *Culavamsa* (the Little Chronicle) (Geiger, 1930). According to Geiger (1930), the whole chronicle consists of four different parts:

- The *Mahavamsa* was compiled by the Buddhist monk Mahanama (5th or 6th century CE) and encompasses Chapters 1 to Chapter 37, Verse 50, covering the period 544 BCE - 362 CE.
- The *Culavamsa*, Part I was compiled by the Buddhist monk Dhammakitti (12th century CE) and encompasses Chapter 37, Verse 51 to Chapter 79, Verse 84, reporting on the period 362 CE - 1186 CE.
- The *Culavamsa*, Part II was compiled by an unknown author and comprises Chapter 79, Verse 85 to Chapter 90, Verse 102; it contains information for the period 1186 - 1333 CE.
- The *Culavamsa*, Part III was compiled by the Buddhist monk Tibbotuvave Sumangala in the 18th century CE and encompasses Chapter 90, Verse 105 to Chapter 100, Verse 292, reporting on the period 1333 - 1781 CE.

When assessing the *Mahavamsa* as a document reporting historical events, it has to be noted that the texts include numerous legendary and mythological incidents as well as literary ornamentation (Adithiya, 1984). Records selected for the database were carefully analysed to filter out only events with a historical kernel related to ancient irrigation landscapes or water management systems. In cases where two sources report the same event, the source chronologically closest to the event was included in the database. In cases where the *Dipavamsa* and the *Mahavamsa* repeat the same information, entries from the *Mahavamsa* were considered since the *Mahavamsa* is regarded as the more complete and trustworthy source (Adithiya, 1984; Geiger, 1930).

Secondly, the lithic inscriptions originating from the 3rd century BCE onwards were systematically analysed to derive additional information not provided by the chronicles and to crosscheck information recorded in the chronicles. From the 3rd century BCE to the 7th century CE these inscriptions were written in Brahmi script and are categorized into cave, rock, pillar and slab inscriptions (Dias, 2001). Paleographically, Brahmi texts are divided into three major categories (according to Dias, 2001):

- Early Brahmi (3rd century BCE – 1st century CE)
- Late Brahmi (2nd century CE – 4th century CE)
- Transitional Brahmi (5th century CE – 7th century CE)

From the 8th century CE onwards most rock inscriptions were written in early Sinhalese script. The inscriptions predominantly address common acts such as grants of cave-dwellings, monasteries, land, tanks and villages as well as revenues from the tanks and lands (Dias, 2001). Additionally, they contain details on bureaucracy, as they were used to publish rules and regulations for the management of the landscape (Dias, 2001). The following compilations of ancient Sri Lankan inscriptions (translated into English) were systematically analyzed:

- Inscriptions of Ceylon Volume I (Paranavithana, 1970)
- Inscription of Ceylon Volume II, Part 01 (Paranavitana, 1983)
- Inscription of Ceylon (IC) Volume II, Part 02 (Paranavitana, 2001)
- Inscription of Ceylon Volume V, Part 01 (Ranawella, 2001)
- Inscription of Ceylon Volume V, Part 02 (Ranawella, 2004)
- Inscription of Ceylon Volume V, Part 03 (Ranawella, 2005)
- Inscriptions of Ceylon Voulme VI (Ranawella, 2007)
- Epigraphia Zeylanica (EZ) Volume I (de Silva Wicremasinghe, 1912)
- Epigraphia Zeylanica Volume II (Wickremasinghe, 1928)
- Epigraphia Zeylanica Volume III (Wickremasinghe and Codrington, 1933)
- Epigraphia Zeylanica Volume IV (Codrington and Paranavitana, 1934)
- Epigraphia Zeylanica Volume V, Part 01 (Paranavitana, 1955)
- Epigraphia Zeylanica Volume V, Part 02 (Paranavitana and Godakumbura, 1963)
- Epigraphia Zeylanica Volume V, Part 03 (Paranavitana and Godakumbura, 1965)
- Epigraphia Zeylanica Volume VI (Paranavitana et al., 1973)
- Epigraphia Zeylanica Volume VII (Saddhamangala, 1984)
- Epigraphical Notes (EN) 1-18 (Dias, 1991)

- Inscriptions Volume II (Wijesekara, 1990)

Records from the chronicles and lithic inscriptions on the historical period were analysed and relevant text passages were extracted and integrated into a database. Subsequently, each text item was assigned to different categories.

3.2. Stakeholder interviews

For the case study number three (chapter 6), stakeholder interviews were carried out based on semi-structured interviews with farmers who participate in farmer organizations in the Anuradhapura district. Semi-structured interviews are used to investigate complex behaviors, opinions, emotions and effects as well as the diversity of experience (Clifford et al., 2016). This method was chosen mainly to acquire qualitative data, since the case study is purely focused on the farmers' perception on management of the Dry Zone irrigated landscape and the preservation of indigenous practices. In total, 49 interviews were conducted on two scales. On the macro level, 7 *Grama Niladari* divisions (GN divisions: smallest administrative units at the village level) located in the 3 major river basins in Anuradhapura (Malwathu Oya, Yan Oya and Kala Oya) were chosen and random samples were collected from each GN division (Figure 1.). Interview schedule with 111 questions of an open, semi-open and closed nature was used to capture the farmers' perception on the management of their irrigated landscape and its indigenous aspects.

3.3. Field methods and analysis

Field observations were carried out in Anuradhapura and Polonnaruwa districts. A detailed survey was conducted within Manewa village situated in the Ipalogama Divisional Secretariat of Anuradhapura district (Figure 2.1.). A mixed method approach (Creswell and Clark, 2017, 2017; Johnson et al., 2007) was used to collect a combination of qualitative and quantitative data sets. Besides the semi-structured interviews, field observations and participatory mapping (Mapedza et al., 2003) were conducted to investigate the indigenous agricultural system and current landscape management aspects. GIS mapping and drone photographic surveys were conducted additionally to map the agricultural landscape in Manewa village.

To analyse the spatial-temporal distribution of the text sources different methods were used. When feasible, single records were geocoded and chronologically assigned to a ruler. Exact geocoding was accomplished by linking locational names given in the sources to present-day settlements or landmarks. Some other scholars have already conducted some parts of this task; in such cases, the relevant literature was cited. If direct geocoding could not be performed, texts from inscriptions were geocoded based on the place of their composition. Geocoded information was integrated to a GIS (ArcMap 10.4.1 and 10.6.1) and assigned to present-day district boundaries and river catchment boundaries which serve as spatial entities for the presentation of geocoded results, as a delineation of the respective territories is challenging. Since no data are available to demarcate the extent of the hinterland of Anuradhapura and Polonnaruwa, present-day administrative boundaries are used to represent this area. Descriptive statistical analyses were performed to analyse information on the spatial and temporal distribution of the text items. Thematic analysis (Aronson, 1995; Guest et al., 2011) was used and codified for the analysis of qualitative data.

Chapter 4

Evolution of the Dry Zone Water Harvesting and Management Systems in Sri Lanka during the Anuradhapura Kingdom; a study based on Ancient Chronicles and Lithic Inscriptions.

Nuwan Abeywardana, Amarasinghe Pitawala, Brigitta Schütt, Wiebke Bebermeier

Water History (Submitted and accepted)

Abstract: A significant number of written sources report on the development of ancient Dry Zone water harvesting and water management systems in Sri Lanka. This paper attempts to address the lack of a systematic assessment of the information given by sources on the spatial-temporal development of the system, using methods of source criticism. After the removal of double entries, 255 text passages containing 837 different records on ancient irrigation were compiled as a database for the period from the 5th century BCE to the 10th century CE. The majority of the 625 analyzed records were derived from inscriptions, 212 records originated from chronicles. Geocoding was successfully performed for 40 records. It was possible to link 173 text passages to a specific king's reign. Altogether 362 records (43.2 %) mention a tank or its construction. The categories "grants of irrigation" and "irrigation incomes" are represented with 276 records (33 %) and 75 records (9 %). Records on canals and irrigation management occur with a share of 8.2 % and 6.2 %, equaling 69 and 52 records. The spatial distribution of records in general largely corresponds to the extent of the Dry Zone and northern intermediate zone. With 490 records, Anuradhapura district shows the highest density of information on the ancient water harvesting and management system. The analyzed data are not equally distributed throughout the investigated period and show a distinct peak in the 2nd century CE. In conclusion, the conducted analysis documents the potential of the analyzed source genres for the derivation of information on different aspects related to the spatial, temporal and administrative development of the ancient water management system in Sri Lanka.

Keywords: environmental history, tank cascade system, sustainability

Chapter 5

Ancient water management and governance in the Dry Zone of Sri Lanka until abandonment, and the influence of colonial politics during reclamation

Nuwan Abeywardana , Wiebke Bebermeier and Brigitta Schütt

Water 2018, 10, 1746. (https://doi.org/10.3390/w10121746)

Abstract: The dry-zone water-harvesting and management system in Sri Lanka is one of the oldest historically recorded systems in the world. A substantial number of ancient sources mention the management and governance structure of this system suggesting it was initiated in the 4th century BCE (Before Common Era) and abandoned in the middle of the 13th century CE (Common Era). In the 19th century CE, it was reused under the British colonial government. This research aims to identify the ancient water management and governance structure in the Dry Zone of Sri Lanka through a systematic analysis of ancient sources. Furthermore, colonial politics and interventions during reclamation have been critically analyzed. Information was captured from 222 text passages containing 560 different records. 201 of these text passages were captured from lithic inscriptions and 21 text passages originate from the chronicles. The spatial and temporal distribution of the records and the qualitative information they contain reflect the evolution of the water management and governance systems in Sri Lanka. Vast multitudes of small tanks were developed and managed by the local communities. Due to the sustainable management structure set up within society, the small tank systems have remained intact for more than two millennia.

Key Words: text sources; tank cascade system; reservoir; Dry Zone Sri Lanka

Chapter 6

Indigenous Agricultural Systems in the Dry Zone of Sri Lanka: Management Transformation Assessment and Sustainability

Nuwan Abeywardana, Brigitta Schütt, Thusitha Wagalawatta and Wiebke Bebermeier

Sustainability 2019, 11, 910. (https://doi.org/10.3390/su11030910)

Abstract: The tank-based irrigated agricultural system in the Dry Zone of Sri Lanka is one of the oldest historically evolved agricultural systems in the world. The main component of the system consists of a connected series of manmade tanks constructed in shallow valleys to store, convey and utilize water for paddy cultivation. Up to 10,000 tanks originating from the heydays of ancient kingdoms are still integrated in the current agricultural landscape. During the last two millennia, this indigenous system has undergone many changes in technological, management and sociocultural norms. This research aimed to analyze the current management practices and existing indigenous aspects of the Dry Zone irrigated agricultural system from the viewpoint of farmers who are the main stakeholders of the system. Altogether 49 semi-structured interviews were conducted in seven villages in the Anuradhapura district and a detailed survey was conducted in the village of Manewa with a mixed research approach. The basic elements of the indigenous landscape, agricultural practices and management structures based on Farmer Organizations were mapped and examined in detail. The analysis of results shows that the sustainability of the indigenous agricultural system is vulnerable to rapid changes due to modernization, market changes, education levels, and inconsistent management decisions. The case study demonstrates the value of preserving indigenous agricultural systems and the negative outcomes of current management interventions that neglect the indigenous system. Therefore, careful interventions and innovations are needed to adapt the tank-based indigenous agricultural system of the Dry Zone of Sri Lanka so as to preserve ecological and socio-economic sustainability.

Keywords: agricultural systems; community based; irrigated agriculture; irrigation landscape; participatory; traditional knowledge; water harvesting; water management

Chapter 7

The Hinterland of Ancient Anuradhapura: Remarks about an Ancient Cultural Landscape

Nuwan Abeywardana , Wiebke Bebermeier and Brigitta Schütt

Journal of World Heritage Studies 2017, 37-43. (http://doi.org/10.15068/00148447)

Abstract: The slightly rolling terrain of the North Central Province in, Sri Lanka, is characterized by a semi-arid climate, with a deficiency of rainfall occurring during the summer months. Rice is the predominant crop, cultivated for the local markets. Irrigation enables rice cultivation and is based on 2,000 years of traditional water harvesting techniques. Reservoirs, locally called Wewas or tanks, are the basis of this sophisticated system. Approximately 10,000 of the tanks that originated during the period of the ancient Dry Zone hydraulic civilization are still in use today. Most of the tanks are smaller scaled, frequently covering less than 5 hectares, and are generally aligned cascade-like alongside shallow valley courses. Canals and spillways connect them and build a complex system for floodwater harvesting, water storage, and water distribution components. The ancient hydraulic irrigation landscape, in the environs of Anuradhapura, with its sophisticated adaptation strategies to the local environmental conditions, was the economic basis for the flourishing of the Kingdom of Anuradhapura. Therefore, Anuradhapura can be identified as an example that clearly illustrates the interrelationship between nature and culture.

Key Words: traditional knowledge, water management, irrigation

Chapter 8

Conclusions

The following global conclusions were derived following the results and discussions in each case study:

A systematic analysis of written and epicgraphic sources was a research desideratum and thus their potential as knowledge base for extracting information on the tank cascades systems was not clear. The first case study clearly shows, that these source genres have a high potential for the derivation of information on different aspects related to the spatial, temporal, and administrative development of ancient water harvesting and water management systems in Sri Lanka. Although the inscriptions, classical texts, and chronicles of Sri Lankan historiography were written following a specific agenda, they still provide trustworthy information on the development of the ancient water harvesting system. Spatial and temporal distribution of the records is a key factor for the trastworthyness of the records, emphasized during the total analysis. The analysis of each source genre showed that the spatial-temporal distribution of the records depends on several factors:

- The location of the ancient capitals and their hinterlands
- The core religious areas and the location of major ritual centers
- The areas of research interest from the Colonial times to present
- The Colonial and Post-Colonial political landscape
- The availability of resources for lithic inscriptions
- The evolution of the Buddhist monastic institution
- the evolution of the kingdoms and their socio-economic implications
- The evolution of social organization
- Indian influences and World political geography
- The personal interests and influences of individual rulers

In a similar manner, the spatial and temporal distribution of the historical records on water management and governance together with their qualitative information reflect the evolution of the water management and governance systems in the Dry Zone of Sri Lanka. Over the centuries, large-scale irrigation works were important to expand and develop the Dry Zone hydraulic civilization throughout the northern lowland plains and to enhance the livelihoods of the people by ensuring water availability throughout the year. In addition, the implementation of the water management and governance systems resulted in ancient times in a strengthened economic situation due to an increase of stable food supply. A centralized bureaucratic administration was set up for the management of these large-scale systems in the later part of the Middle Historic Period (3rd – 13th century CE). As a result, when the central government disintegrated the main irrigation systems were largely abandoned.

In contrast, from the beginning of the Sri Lankan hydraulic civilization the vast multitude of small village tanks were developed and managed by local communities with less sophisticated technical skills. Due to the sustainable decentralized management structure, the small tank systems existed intact for more than two millennia, even after the Dry Zone was abandoned during medieval times. Different layers of management strategies were implemented, blending centralized major irrigation schemes with locally controlled small irrigation systems. Buddhist temporality were used to link the hinterland with the main settlements, not in a secular administrative fashion but in a spiritual and intangible relationship. Likewise, the ancient capital Anuradhapura and its hinterland display a unique example of a water management and governance system developed in harmony with a dual

patronage between rulers and local people. This conclusion is partly contrary to Karl Wittfogel's hypothesis that state societies in Asia depended on the creation of large-scale irrigation works which required organized, forced labor and centralized bureaucratic management.

After nearly five centuries of abandonment, the water management and governance systems in the *Rajarata* kingdom were reutilized under the British colonial regime. However, the initial intervention was caused by political and economic reasons rather than to reactivate the traditional management mechanisms. British colonial rulers only slightly changed the few main elements of the traditional system such as the compulsory labor system called *Rajakariya* and the Buddhist temporalities based on service and land tenure. However, in the later stages British colonial rulers tried to adopt the community-based sustainable nature of the traditional governance structure as documented by the introduction of the *Vel Vidane* system for the small tank cascades.

Throughout the world, for millennia people developed locally adapted agricultural systems. These "indigenous" agricultural systems were highly based on traditional knowledge and were continuously adapted to the changing environmental, social and political conditions; they represent local knowledge, forming a vital combination of social, cultural, ecological and economic services to humankind (Koohafkan and Altieri, 2011). Unlike modern agricultural technologies, indigenous methods often addressed the efficient utilization of resources and helped to preserve cultural diversity and biodiversity with collective involvement. The Sri Lankan small tank cascade systems are an example of such an indigenous agricultural system. They were initiated in the heyday of the ancient kingdoms and since then have undergone several transformation processes. In the 1960s, these processes were triggered by the Green Revolution. Until the Green Revolution the basic elements of the indigenous system and the main ecological and socioeconomic components of the landscape were widely preserved. Current research suggests that these basic elements of the landscape still exist and function to a certain degree despite the forces of modernization, population pressure, economic changes and educational development.

The management structure and mechanisms were changed from the hereditary headman system to a community-based Farmer Organization system. The transformation into a participatory approach seems a productive and attractive evolution of the system. However, the in-depth analysis of the perception of the main stakeholders of the systems—the farmers—revealed that the inseparable bond they had with the landscape and the entire agricultural system was threatened by the current Farmer Organization system: the spiritual connection was converted into a financial and benefit-oriented system. Within the previous *Vel Vidane* system, the farmers participated directly in the tank maintenance and the holistic management of the village tank landscape with its irrigation agriculture. In contrast, within the current Farmer Organizations system, the farmers contribute to the maintenance as daily laborers. With the onset of the Farmer Organizations system the farmers became increasingly alienated from the landscape, leading to the deterioration of the indigenous agricultural system.

The doctoral study demonstrates the value of preserving indigenous agricultural systems and the negative outcomes of the current management interventions that neglect the indigenous system. Therefore, careful interventions and innovations are needed to adapt the tank-based indigenous agricultural systems of the Dry Zone of Sri Lanka so as to preserve ecological and socio-economic sustainability.

Anuradhapura and its hinterland are considered as the center of the ancient hydraulic civilization in Sri Lanka. During past decades, the management process of its heritage focused on its archaeological and cultural attributes. The cultural values of the surrounding cultural landscapes, with its multiple reciprocal human–environmental interactions and sophisticated water harvesting systems, being rooted in the ancient Anuradhapura period, are not yet the focus of heritage management.

The development of an integrated management approach, to protect this 2,000-year-old cultural landscape, would be a great challenge for future interdisciplinary research and heritage management. From the perspective of landscape archaeology, the major objectives are: to enhance the understanding of the development of the ancient water harvesting systems and its effects on the landscape and cultural development, to investigate traditional management aspects and traditional knowledge related to these systems, and to adopt the management strategies of these systems to handle possible socio-economic and environmental evolutions in the future.

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Appendix A

Literature database

Period	Reign	Geocoded information	Inscription location	Description
6th C BCE	Vijaya	Malwathu Oya (Kadamba river) Anuradhapura (Anuradhagama)	NA	Here and there did Vijaya's ministers found villages. Anuradhagama was built by a man of that name near the Kadamba river;
5th C BCE	Panduvasudeva	N/A		Anurhada built a tank and when he had built a palace to the south of this, he took up his abode there.
5th C BCE	Abhaya	N/A		The (boy) was already seven years old when his uncles foundout (where he was) arid charged followers of theirs to kill (with him) the boys playing in a certain pond.
4th C BCE	Pandukabaya	Basawakkulam (Abhaya wewa)		He settled the yakkha Kulavela on the east side of the city, the yakkha Cittaraja at the lower end of the Abhaya-tank.
4th C BCE	Pandukabaya	Thissa wewa (Jayavapi)		When he had caused the (state) parasol of his uncles to be brought and purified in a natural pond that is here, Pandukabhaya kept it for himself and with the water of that same pond he solemnized his own consecration ; and Suvannapali, his spouse, he consecrated queen
4th C BCE	Pandukabaya	Gamanivapi (Bulankulama)		On the further side of Jotiya's house and on this side of the Gamani-tank he likewise built a monastery for wandering mendicant monks, and a dwelling for the ajivakas and a residence for the brahmans, and in this place and that he built a lying-in shelter and a hall for those recovering from sickness.
3rd C BCE	Devanampiya Tissa	Thisa wewa (Tissavapi)		(...) seventh the Tissa- tank, eighth the Pathamathupa,8 ninth the (vihara) called Vessa(giri), then that pleasant (nunnery) which was known as the Upasika(vihara) and the (vihara) called the Hatthalhaka, those two convents as goodly dwellings for the bhikkhums;
3rd C BCE	Devanampiya Tissa	Nagapokuna near Mihintale (Nagachatukka tank)		When the king, who was seated by the rock-basin at the Nagacatukka and was taking his repast, heard the loud summons, (…)

3rd C BCE	Devanampiya Tissa	N/A	The king's consort, that foolish woman, coveted the kingship for her own son and 4 ever nursed the wish to slay the vice-regent, and while he was making the tank called Taraccha she sent him a mangofruit which she had poisoned and laid uppermost among (other) mango-fruits.
3rd C BCE	Devanampiya Tissa	N/A	At that time there was within the enclosure of the royal park a little pond called the Kakudha-pond ; at its upper end, on the brink of the water, was a level spot fitting for the thupa.
2nd C BCE	Duttagamini	N/A	Then nearing Anuradhapura the king pitched his camp south of the Kasa-mountain. When he had made a tank there in the month Jetthamula he held a water-festvial.
2nd C BCE	Duttagamini	N/A	Taking some men with him he began, since he would fain have some fields, (to make) a tank. Making it he, being endowed with great strength, flung away masses of earth such as only ten or twelve men had moved else, and thus in a short time he finished the tank. And thereby he gained renown, and him too did the king summon and, allotting him honourable guerdon, he appointed him to (the service of) Gamani. That field was known as Vasabha's Dam. So Labhiyavasabha abode near Gamani.
2nd C BCE	Duttagamini	Vannikulam tank (Pelivapigama)	In a northerly direction from the city, at a distance of seven yojanas, in a cave opening on the Pelivapikagama tank, above on the sand, four splendid gems had formed in size like to a small mill-stone, in colour like flax-flowers, (radiantly) beautiful
2nd C BCE	Duttagamini	Kalaththava wewa (Kulatthavapi)	The water in the tank there was dyed red with the blood of the slain, therefore it was known by the name Kulantavapi.
2nd C BCE	Duttagamini	Samana wewa (Samanavapiga ma)	In a south-easterly direction from the city, four yojanas distant, near the village of Sumanavapi many precious stones appeared.
2nd C BCE	Duttagamini	N/A	In the Kulumbari-district in the village Hundarivapi lived Tissa's eighth son named Sona
2nd C BCE	Saddhatissa	Mahavihara monastery	Illustrious Saddhatissa made a lump of glass (?). Around the most excellent Mahatupa he constructed a wall, decorated with figures of elephants, a beautiful enclosure; he (also(constructed a quadrangular tank (and gave it) for a certain time (to the Fraternity).
2nd C BCE	Saddhatissa	Padaviya tank	Sedetissa, the younger brother of king Gamunu,having succeeded to the throne, built the Diganaka vehera and Mulgirigala Vehera; constructed 18 tanks, and after a reign of 37 years , went to Tusitapura.

2nd C BCE	N/A	Nachchiyarmalai	The Nacadaka canal in Ambagama, [is given] to the Sangha
2nd C BCE	N/A	Akurugoda slab inscription	The pond of the chief Phussadeva, the revenue officer of the king.
2nd C BCE	N/A	Komarikagala	The water -hole and the cave of Parumaka Data, son of Parumaka Utara son of Parumaka Pulaya, are given to the sangha.
2nd C BCE	N/A	Ritigala	The cave of the chieftainess Dipani, wife of the chief Reta, and daughter of the chief Naguli (flow operator), is given to the Sangha
2nd C BCE	N/A	Avagatiyava	The cistern of Raki-the water cistern.
2nd C BCE	N/A	Mandagala	The cave of Daraka Tissa, daughter of the accountant Nuguya, son of the village-councillor Sataka, is established for the Sangha. A tank has also been caused to be constructed, (namely) Maragama
2nd C BCE	N/A	Tonigala	The son of the chief Mala is the chief Namara; of the Chief Naga, son of the chief Namara-of this (personage)- the cistern is dedicated to the Sangha of the four quarters, present and absent
2nd C BCE	N/A	Mampiti vihara inscription	Two kahapanas of Uttara the officer in charge of canals,…of the lapidary Phussa … a kahapana of …
2nd C BCE	N/A	Matale Aluvihare	Of Vamsa, Summa … the channel…
2nd C BCE	N/A	Dambulla	The cave of Tissa, the irrigation officer, brother of the archer Sumana , is given to the Sangha; [and] of Viyaga
2nd C BCE	N/A	Kandalama	The cave of the chief Uttara, the son of the chief Uttara, the proprietor of the ferry (Parumaka Thota-Bojhaka), [is given] to the Sangha
2nd C BCE	N/A	Sigiriya	The cave of the chief Naguli (Langali).
1st C BCE	Mahaculi Mahatissa	Tonigala	The tank of the chief Tissa, son of the chief Abhaya, was donated to the Sangha of the four quarters, present and absent, in the monastery of Acchagirika-Tissa-pabbata. The great king Gamani Abhaya, the Friend of the ods, dedicated (to the monastery) Acchanagaraka and Tavirikiya-nagaraka. (These), the chief Tissa, son of the chief Abhaya, caused to be dedicated by the king to the Sangha of the four-quarters, present and absent

1st C BCE	Mahaculi Mahatissa		Tonigala	The chief Tissa, son of the chief Abhaya, dedicated this tank to the Sangha of the four quarters in the monastery of Acchagirika-Tissa-pabbata. The great king Gamani Abhaya, the Friend of the gods, dedicated Acchanagaraka and Tavirikiya-nagaraka to the Sangha of the four quarters, present and absent, in (the monastery of) Acchagirika-Tissa-pabbata. The monastery was dedicated (to the Sangha) by thethe chief Tissa, son of the chief Abhaya
1st C BCE	Saddhatissa	N/A		He built the Dakkhinagiri-vihara and the (vihara) Kallakalena, the Kalambaka-vihara, and the (vihara) Pettangavalika, (the viharas) Velangavitthika, Dubbalavapitissaka and Duratissakavapi, and the Matuviharaka. He also built viharas (from Anuradhapura) to Dighavapi, one for every yojana (of the way).
1st C BCE	Kutakanna Thissa	N/A		In the region between the rivers he founded the Pelagamavihara and in the same place (he made) a great canal called Vannaka and the great Ambaduggatank and the Bhayoluppala, and moreover (he made) around the city a wall seven cubits high and a trench.
1st C BCE	Kutakanna Thissa	N/A	Minvila rock-inscription	The channel (named) Degama of Kutakana Abhaya, son of Mahaculi of the Devanampiya family
1st C BCE	Kutakanna Thissa	N/A	Molahitiyavelegala rock-inscription	Success! The reservoir of Dubalagama (is the property) of the Community of *bhikkhus.* The reservior of Pidavika (is the property) of the Community of *bhikkhus.* The senior wife of King Kutakanna, the queen Anula, gave to the Community of *bhikkhus* in the monastery of ....Pilipavata.
1st C BCE	Bathikabaya	N/A	Molahitiyawegala rock-inscription	Success! King Abhaya eldest son of King Kutakanna and grandson of the great king Tissa, the Friend of the Gods dedicated, by means of the golden vase the channel at Galatataka to the Community of *bhikkhus* in the Payelipavata monastery
1st C BCE	Bathikabaya	N/A	Mutugalla rock-inscription	….King Tissa, son of ….. The channel Culanamara… granted the field to the Sangha of jaba, a field of three *karisas*… the minister… the Sabbath house… field…the Sabath house.
1st C BCE	Bathikabaya	N/A	Tumbullegala rock-inscription	Success! Nivatika the mariner of the minister Ahalaya residing in the Agency of Kaladagaviya, gave the proprietor's share of the Ahalaviya tank in the Western Coast to the *Caitya* of (the monastery), of Mahanaka Ahalipavata caused to be built by the Uparaja Mahanaga, younger brother of the great king Tissa, and himself.

1st C BCE	Bathikabaya	N/A	Rajagala rock-inscription	The tank of Kabaduka which has been constituted into an individually-owned property by king Lajaka, is dedicated to the Kubilapi-Tisa-pavata (monastery). The Uparaja Naga, son of Kutakanna Gamini Tissa, having notified the lease-holder, dedicated (the same) to this monastery.
1st C BCE	Bathikabaya	N/A	Bakki-Ala	Success! The great king Lanjaka Tissa, the grandson of the great king Tissa, the Friend of the gods caused the Sangharama named Yajani to be founded for the monastery of Kubilava Tissa-pabbata, ploughed its boundery line with a golden plough, and donated (the Maragama tank) to the Community of *bhikkhus* with their own properietory rights.... of these who have their common dwelling and sustenance.... the tax levied on water has been donated for the purpose of providing the requisites to the community of *bhikkhus*..... the tribute given periodically
1st C BCE	Bathikabaya	N/A	Bakki-Ala (Gal-Oya)	(Success). The great king Lanjaka Tissa granted one part out of three parts of the water share from the Maharaja-ala (the great royal channel) in the stretch of fields Mahalagavi and (produce) at the rate of one *amuna* in one karisa in a field of a seven times hundred karisas having caused that produce to be made free of tax KA 1007. The great king Lanjaka Tissa caused (the tank of) Abala-ketavi to be purchased and doanted (the same) to the monastery of Kubilavi-Tisapavata. The great king Tissa granted one part out of three parts of the water-share from this to the monastery of Kubilavi-Tisa-pavata.
1st C BCE	Bathikabaya	N/A	Duvegala rock-inscription	Success! King Lanjaka-Tissa, having built a *vihara* for the Elder Godhagatta Tissa, gave to this *vihara,* the two categories of revenue of the tanks Vakaravi, Viharavi, Panitakavi, of the lake named Nikula, and of the channel of Kalahanagara
1st C BCE	Bathikabaya		Ritigala Insription 2	…The great king Lanjaka Tissa, having caused the monastery to built, granted the Abadalaka tank to the Sangha. The Minister Sonaka granted (the tanks) Tanakayaka, Tiraganaka and Katakubanaka and…. These tanks to the benefit of the Sangha
1st C BCE	N/A		Handagala	The cave of the lay-devotee Datta, proprietor of the tank (parumaka vapihamika) of Naka-nakaraka, and the cave also of the lay-devotee Huma, [is given] to the Sangha / The cave of the chief Dighadatta, son of the chief Mahadatta, theproprietor of the tank of Nakodapika, [is given] to the Sangha
1st C CE	N/A		Gallena-vihara	The cave of Bakineya Mataya is granted to the Sangha. Half a *karisa* of land at the dam of Aba canal, namely the *panata* of Padavasagoda and

		inscription No.14	the field (named) Avulada in the Yasisa range (of fields)
1st C CE	Mahadatika Mahanaga	Lainamalai rock-inscription	Success! King Abhaya and the great king Naga, sons of King Kutakanna and grandsons of the great king Tissa, the Friend of the Gods, dedicated the channel (named) Dakapunaka and the channel (named) Girigamaka to the community of *bhikkhus* in Sihapabbata The dues from the dams of these two channels have been remitted
1st C CE	Mahadatika Mahanaga	Mihintale Kantaka-cetiya rock-inscription	Success! The great king Devanampiya Tissa gave to the Kantaka-cetiya the two Categories of revenue of Kabavika. The great king Naga gave the two Categories of revenue of Balayata-gamakavi, having purchased and acquired them. Giver….
1st C CE	Mahadatika Mahanaga	Mihintale rock-inscription	Success! By the great king Gamani Abhaya, the Friend of the Gods, grandson of the great king Tissa, the Friend of the Gods,…. To the Community of *bhikkhus* at Cetiyagiri…. Nagara, the tank Pulekavi in…gama-nakarika, the channel Yakasavaha, the Vadaga channel... the *kula-amana* dues in fifty five villages, the channel of Hamanakara...Kutakanna Gamani the Friend of Gods..grandson of ...dedicated for the benefit of Sangha...in Antaranadika...tank.. the tank of Aritagama in the (Mu)jitagamanakarika... and the village...month by month...in Antara samudda.... one grove of coconuts in ...napakili....Punaka ...one grove of coconuts..in Magana-nakarika..tw ..one grove of coconuts in Aganagama.. whtever that has continued to exist for the benifits of the Sangha in Cetiyagiri...the revenue of the villages ...of Cetiyagiri..for the purpose of ..the tank of Mudagutaka in Viharabijaka is for the benefit of the Sangha in Cetiyagiri...the tank Kara in Baralipana...to the monks who maintain..of the images of theelder Mahinda, the elder Bhadrasala, the elder Itthiya of the elder Uttiya.. caused to be made..of each and every king who had resided in Cetiyagiri...for the Good Law to stand for long ..the tank of Cudalagala in Anganakola and the village ...having caused to be made the end of the main channel of the tank named Nagarangana..fields ..the village..the village of Kacaka-avadaka in Nilaraji (...)

1st C CE	Mahadatika Mahanaga		Ratravela vihara rock-inscription	Success! The revenues which the great king Naga, the great king Tissa, the friend of Gods, and son of Kutakanna Gamini Abhaya, gave to his own monastery of Naga pabbata at Bohogiri, for the benefit of the community of *bhikkhus* of the four directions. The tank of A(gana)gama is the property of the Nagapabbata, for the benifit of the community of *bhikkhus.* Velamukaka of Akamukaka and of Hujikadaka the revenue of these (places) is the property of the community of bhikkhus of Nagapabbata at Bohogiri
1st C CE	Mahadatika Mahanaga		Mihintale At-vehera rock inscription	The great king Naga granted the two cateories of revenue in the village of Caladaha and (thirty) one *karisas* of fields in the area irrigated by the Upalava tank for the benefit of the Paribhanda-caitya.
1st C CE	Mahadatika Mahanaga		Vehera-uda-male	By king Mahanaga has been granted to Sangha of the Dakapahanaka-vihara the channel at Girikaota
1st C CE	Mahadatika Mahanaga		Nuwaravava	…The great king Naga granted the tank…yataha to ….naka-caitya
1st C CE	Amandagamini Abaya	Dakkhina Vihara	Anuradhapura	When he had made the Mahagamendi tank on the south side (of Anuradhapura), he, who was clever in works of merit, bestowed it on the Dakkhina-vihara./In the region between the rivers he founded the Pelagamavihara and in the same place (he made) a great canal called Vannaka and the great Ambadugga-tank and the Bhayoluppala, and moreover (he made) around the city a wall seven cubits high and a trench./ Amandagamani, the son of Mahadathika, known by the surname Abhaya, caused a well an also the Gamenditalaka to be dug.
1st C CE	N/A		Yapavu	The tank of Bumahanagara is the property of the Sangha
1st C CE	N/A		Yapavu	The tank of Yapava is the property of the Sangha
1st C CE	N/A		Paramakanda	The cistern of the chief Tissa, the daring mariner, son of the chief Abhaya.
1st C CE	N/A		Galge	Hail! The cave of the three personages, (namely) the lawyer Naga, the lord of Kadahalaka-vavi, Anulaya and the lapidary
1st C CE	N/A		Handagala	The cave of Maha-Vebali, the proprietor of the tank of Anulapi, (is given) to the Sangha
1st C CE	N/A		Handagala	The cave of the chief Dighadatta, son of the chief Mahadatta, the proprietor of the tank of Nakodapika, (is given) to the Sangha
1st C CE	N/A		Awkana	The cave of Siva, son of Mahasiva, the proprietor of the pasture land, has been dedicated to the Sangha
1st C CE	N/A		Awkana	Hail! The overlord's income from the pasture land of the tank of Dinna has been dedicated to this cave

1st C CE	N/A		Awkana	The cave of the chief Uvahajanaka, proprietor of the tank Kadapi
1st C CE	N/A		Awkana	The cave of the chief Dassaka, the proprietor of the tank of Gajadabutaka, has been dedicated to the Sangha
1st C CE	N/A		Ganekanda-Vihara	The cave of the chief Tissa, the proprietor of the tank of Gokanna-gamaka, (is given) to the Sangha
1st C CE	N/A		Kotalakimbiyawa	The cave of the elder Uttiya has been dedicated to the Sangha for the benefit of all relatives. For the purpose of providing undergarments during the Vassa retreat to the members of the Sangha, and so that the community of *bhikkhus* may enjoy what is left (after providing these), the shares of the lay-devotee Datta in the tank of Bakabari-gamaka, have been given as an endowment to this cave.
1st C CE	N/A		Ganekanda-Vihara	Having caused the dam to be constructed and thus made the village content, the king gave nine hundred thousand for the labour of hands and feet
1st C CE	N/A		Sasseruwa	Hail! The cave of Cula-Sumana, proprietor of the Yavavavika tank, (and) of the female lay-devotee Huma, is dedicated
1st C CE	N/A		Gallena-Vihara `	The cave of Bakineya Mataya is granted to the Sangha. Half a *karisa* of land at the dam of the Aba Canal, namely the panata of Paduvasagoda and the field (named) Avulada in the Yasisa range of fields.
1st C CE	N/A		Galgamuwa	King Abhaya gave the revenue of Vaddhamanagama to the great monastery; also the tank.
1st C CE	N/A		Torawa-Mayilava	The cave of the lay-devotee Vinu, the proprietor of the Punapitika tank.
1st C CE	N/A		Torawa-Mayilava	The cave of the lay-devotee Vinu, the proprietor of the Punapitika tank, (is given) to the Sangha.
1st C CE	N/A		Eriyava	The chief Hadana, son of the chief Yasopala, dedicated this tank to the Sangha in the Dipigalla-vihara.
1st C CE	N/A		Halambagala	the tank of Uttara and the water cistern of the elder Tissa have been dedicated for the vassa residence.
1st C CE	Ilanaga	Thissa wewa in Thissamaharama (Thissavapi)	Thissamaharama	As he had heard there the Kapi-jataka from the great thera, the preacher of jatakas, named Mahapaduma, who dwelt in the (vihara) called Tuladhara, he, being won to faith in the Bodhisatta, restored the Nagamahavihara and gave it the extension of a hundred unbent bows in length, and he enlarged the thupa even to what it has been (since then) ; moreover, he made the Tissa-tank and the tank called Dura. / The crowd left the town by the southern gate; there was a pleasure garden called Mahanandana, to the south of the town.

1st C CE	Ilanaga	Vessagiri rock-inscription	Success! Satakara was of the nobel family which came bringing the Mahabodhi. His grandson, the housholder Butaya founded a Bodhi-shrine and to provide antelope skins to be spread within it, granted the tank of Ayibaravika, which belongs to those of this famimly, to the monastery of Isiramana
1st C CE	Ilanaga	Vessagiri rock-inscription	Success! King Mahanaga having caused the spire of the *caitya* named Pitanika at Isiramana to be constructed, and having caused the umbrella to be raised, gave the overlord's share of the tank Ayibaravika of which the ownership was (vested) in him, for the purpose of defraying the expenses of oil (for lamping) and offering to that caitya.
1st C CE	Ilanaga	Sithulpavy fragmentory rock inscription	(…) Land which is cultivated in two seasons from (both of) which water rate is received. (…) the channel of Kababa (…)
1st C CE	Ilanaga	Kaduruvava rock inscription	(…) (He being) established in the office of the Grand Chamberlain of the great king Mahanaga granted the (undermentioned) tanks. (He) granted the two (categories) of revenue from Datavika (tank); (he) granted the two (categories) of revenue from Karaja-vika; (he) granted the interior field of the tank Kataka-nakaraka; (he) granted sixty *karisa;* (he) granted (the tanks) Pehekara-vavi in the district of Badagana. Rajeka Naka gave (the undermentioned) tank; Itata-vavi in Lodoraka, having discontinued the cultivation of fields (on behalf of) Hadaka the arher. The officer of the (Palace) Gate, named Dataya of Atukataka-hakara gave the tank Palata in the Revenue Agency of Gavidaganaka.
1st C CE	N/A	Rock below Mahasaya at Mihintale	Success! In the monastic establishment of Abhaya,….. In the tank of Mahakubaraka… the revenue due to the overlord and the revenue from water-rates…. And the revenue from water-rates, in their entirety …. Of he share due to the overlord from the village of..... one share out of four shares of the water-rates in the village of .... have been granted to the monastery of Cetiyagiri
1st C CE	N/A	Karandahela rock inscription-B	Asaya caused the tank of Gabidatatiri to be purchased and granted it to the Sangha in the monastery of Habutagala. Likewise (he granted) the two categories of revenue of the Dohuliya tank
1st C CE	N/A	Karandahela rock inscription-C	Success! The female lay-devotee Phussa donated her tank Hamanavi to the Sangha of the Habutagala monastery

1st C CE	N/A	Karandahela rock inscription-D	Success! The female lay-devotee Matta donated her tank to the Sangha of the Habutagala monastery of the great king Kakavanna Tissa. The gift has been made on acount of her mother
1st C CE	N/A	Moragalla rock inscription	Success! This is the small pond of which the water was used by the Elder Tissa
1st C CE	N/A	Matiyangene rock inscription	Success! Setting apart the tank of Kada(ha)ka to the Mati-vihara, whaetever revenue of two categories there is from the Silaviya, is the property of the Sangha
1st C CE	Chandramukha Siva		gned eight years and seven months as king. When the lord of the earth had constructed a tank near Manikaragamaka he gave it to the vihara called Issara-samana.
1st C CE	Yasalalaka Thissa	Ipul-vehera slab inscription	Success! The great king Tissa, son of king Mahanaga, gave to the monastery named Mulavasiya, founded by his farther (or by Pitiraja), the revenue from water, after having the tax thereon remitted, revenue from the overlord;s share and that from the share of fish in the channels, in accordance with the total assesment...from the Vadamanaka tank in the distrit of Kadaraji... gave to the Community of *bhikkhus* in the great royal monastery... the tank of Kabaraba...the tank Kubaragoda..main shares...one main share...the main share of one portion out of eight portions...
1st C CE	Suba	Viharegala rock insription	Success! King Saba, having caused the Uposatha hall at the Ekadvarika monastery to be constructed, bought the Upaladonika tank for five hundred (*kahapanas*), caused the silt to be removed (by spending another) five hundred and gave (it) to the community of *bhikkhus.*
1st C CE	N/A	Avukana rock inscription	Success! The tank of Mata of Bahakava, son of Tissa of Vayavada, is a donation to the Sangha
1st C CE	N/A	Karagasvava rock inscription	The tank named Mahapada of Kad and Tissa
1st C CE	N/A	Angamugam a rock inscription	This tank is of the Sangha
2nd C CE	N/A	Veherabandig ala rock inscription	Naka, son of Ba(ma)na, gave ….. The tank…..and the field …. To the Monastery of Lalapahana in Aganakola as its own possession
2nd C CE	N/A	Mihintale rock-inscription	By the great king…. Have been granted to the monastery of Cetiyagiri (the fields) at the spill of Mahidala tank which is situated by the side of outer boundery of the great monastery of Cetiyagiri, the water rates of all the *karisa* at the spill of Naka tank in Maladagana and all the water rates of Javaka kubara

2nd C CE	N/A	Galahitiodai rok-inscription	Success! Prince Pavataya donated all recognised water-revenue from these two tanks, namely Tisavikavi and Bamaviya in the district of Pa…. Nakara, to the monastery of averapavata, for the purpose of spreding arpets. The reminder (after providing for this service.... to the community of *bhhikkhus.*
2nd C CE	N/A	Mandagala rock-inscription	Success! Lady Ajjuna….of the general Magha, gave to the Uposatha-house of the Naga-Ajjunapabbata monastery, the tract of fields at Hotavata, the tract of fields at Kadidora, and the tanks of Tisaavika
2nd C CE	Bhatika Tissa II	Pahala Tammannava rock-inscription	(…) Akalabi, the mother of the … scribe, named Siyata, the Minister, gave the share of fish in the channels of the tank Mana-avani to this Caitya. (…_
2nd C CE	Bhatika Tissa II	Bovattegala rock-inscription	…the great king … ka-Tissa … (ba)ra Nakayai … Mahaga .. Of the field in accordance with all accepted …*karisa* .. At the rate of .. With the stipulation that the overlord's revenue is not received .. Of the tank… the minister Nakayai son of the minister Abagiraya... for the reason ..his ownership .. in the twentieth year of the raising of the umbrella of dominion.
2nd C CE	Bhatika Tissa		He built a wall around the Mahavihara. When the king- had built the Gavaratissa-vihara he made the Mahamani-tank and gave it to the vihara.
2nd C CE	Bhatika Tissa		He built an uposatha-house in the beautiful Thuparama; the king also made the Randhakandaka-tank. / He (also) ordered the pond called Randhakandaka to be dug. In the delightful Thuparama he constructed an Uposatha hall.
2nd C CE	Kanittha Thissa	Situlpav	Success! The great king Tissa, younger brother of the great king Bhatika Tissa, and son of the great king Naga, having paid (the price of) eight hundred and thirty-three *kahapanas,* caused the tank (named) Dakkhina-Tissa-vapi to be purchased as the own property in prepetuity of (the monastery of) Cittalapabbata, and granted it for the benifit of the umbrella and railing on the summit of the Caitya of the great king Naga and for the Elephent Hall at the entrance to the Uposatha house and for ten edifices, which he had renovated, so that carpets may be spread (on seats on the floor) and that renovation work be carried out. The approved water-revenue (from the tank) was given in its entirety
2nd C CE	N/A	Situlpav Akasa Cetiya	Prosperety! The great share of the tank named Gutaviya, belonging to Pusa, son of Chief Nakuta, residing at Gutaviya was dedicated to the Sangha of the monastery named Atada

2nd C CE	Kanittha Thissa	Ruvanvalisaya	Success!of the tank Mataka (situated) on the channel of Mujutagama-nakariya, the share of the fish caught in the channals, and the pasture of the tank, and the site of the tank, the dam, the site of the dam, belonging to this (tank) and a garden of eight *karisas* (these) which were owned by his father and in accordance with the right of succession by which he has enjoyed (possession of them, have been granted by Boghi, (the brother) of the elder Mahasiva, for the purpose of defraying) the expenses of the offerings to the Mahathupa in the Mahavihara. The date (of this grant) is the, full-moon day of the waxing moon in the later month of Pusa, in the first year of the raising of the umbrella of dominion is by the great king Kanittha Tissa, son of the great king Naga.
2nd C CE	Kanittha Thissa	Lainamalai	Success! The great king Kanittha Tissa, having caused to be acquiried in perpetuity, the tank (named) Kadara-maraya, constructed by the Honaya Devaya the *ratthika,* in the time when Naka Mulaya was administreating the Huvavaka (province), formed a new village, gave the water-revenue (thereof) having remitted the taxes (to which it is liable) to the Bodhi-house of the Sipavata monastery; it was also granted as a fixed donation to the great refactory
2nd C CE	Kanittha Thissa	Occappukallu	Success! The great king Kanittha Tissa, the son of the great king Naga, granted the overlord's inome from Cudataka-vavi, and from jabo-avi and from Mataka-avi and from Talavana-avi, from these above-mentioned tanks of Vavalavi Mitaya residing in Magana-nakari - having had taxes due thereform remitted - for defraying the expenses for oil and offerings at the five *Caityas* in the Kube-viharaka, and for the purpose of spreading carpets (on tha asana) in the railing fo the Chatra at the summit of the Caityas.
2nd C CE	Kanittha Thissa	Anuradhapura Museum (from Mahagalkulama)	Success! The Minister Devaba of Mahavilabanaka, together with Mahamataya son of this wershipful personage, and Cumataya, youunger brother of this (person), -these there persons- having paid a hundred thousand, and another seven hundred , and another sixty-three - (having paid) the above stated (number of) *kahapanas* - acquired in its entirety the share of the fish in the channels of the tank of Padahata-raka situated in the revenue district of Devagama and the Minister Devaba granted the same for the requirements of the Refectory in the monastery of Devarabaka The Minister Devaba of Mahavilabanaka paid to the banker Mata Kalaya, (the sum of five thousand *kahapanas* and, having purchased in its entirety, the

			share (due to the overlord) of the fish (caught) in the channels of the tank of Hakanakara in the district of Upalava, granter the same for the purpose of defraying the expanses for oil and offering (to the Caitya) in the monastery of Devarabaka
2nd C CE	Kanittha Thissa	Nelumpatpokuna	Success! The great king Kanittha Tissa, son of the great king Naga, having remitted the taxes on the water-revenue of Mahanakaraka-pideliya, granted the same for the purpose of maintaining the Ariyavasa festival at the great monastery of Gosagala
2nd C CE	Kanittha Thissa	Abhayagiri pavement slab inscription	Success! The great king Kanittha-Tissa, son of the great king Naga (constructed the spire) of the Uttara-Maha, cetiya (raised the) umbrella and granted the overlords revenue of …….. Tank……, having remitted all recognised taxes (thereon). (…) constructed four alters of the Uttara maha-cetiya and for the purpose of spreading carpets thereon and for works of renovations (gave) ..... the tank of ..... and the tank Vanapitavahila vavi and the tank Nadigamaviya and the tank Camadavika and the tank Cudavadamanaka.....the tank.....the tank, and the tank Kubagamaka and the tank Mahabatti-siva along the course of the canal named Susumara and the dam named..... the tanks and the dam herein stated, the great king donated
2nd C CE	Kanittha Thissa	Mahalligedamana rock-inscription	(Success!) The great king Mali Tisa, son of (the great king Naga) granted the tank of Pigalasara of which the ownership is (vested) in him having remitted the taxes on the overlord's income, and having included (in the grant) the village assessment (also), to the Community of *bhikkhus* in the Pilipavata monastery.....sa as to enjoy (the four-requisites)
2nd C CE	N/A	Nattunkanda rock-inscription	Success! The *karisa* at Pajubata in the tract of fields named Navavavi of Siva-Naga, the Treasurer, is dedicated to the Sangha. Also dedicated are a karisa in jabavi and a *karisa* in kabaragama-vavi
2nd C CE	N/A	Nattunkanda rock-inscription	Success! A *karisa* for the Caitya in Vadamanaka, a *karisa* in Sadavi, a *karisa* in Karabavi, a karisa in Datavi, a *karisa* in Honagiriya, a *karisa* in Madaci, a *karisa* in Cahalabalala; a *karisa* in Sivalavi, a karisa in Vijitara, a *karisa* in Culatisavi, a *karisa* in Paliya - the *karisa* for the catiya in all these tanks and tracts of fields are (the property) of the Honagarika-vihara. (Also) a *karisa* in Baradaka and a *karisa* in Kabaragamikavi.

2nd C CE	N/A	Nattunkanda rock-inscription	Success! Kumaraya and Siva-Nakaya sons of the Amati Badahariya, dedicated and donated to the Community of *bhikkhus* in the Honagiriya monastery, Pajini Honagiriya tank and Padi tank, the own property of the monastery of Honagiriya in the Revenue Agency of Utarapara which had been mortgaged to the assembly of Atarajiva, and are redeemed.
2nd C CE	Kanittha Thissa	Dunumandal akanda rock-insription	Success!...gave the tank (named) Pudalajaka to the community of *bhikkus* the half *karisa* due as proprietor's share (bojiha-baka) (in the tract of field named) Tisaviya (he gave) to the refactory; he granted a *karisa* of field in the tract of fields Tulataraviya; in Tinakataviya he donated a *karisa* of field to the community of monks. In the tract of fields named Panahagama, Cirici Abaye donated to the community of monks seven *masakas* of fields
2nd C CE	N/A	Kosavakanda rock inscription	Success! Kudaganaka Vateya, granted to the monastery of Jalukataka, the water-revenue from the tank Akada in Giravi Sehera, for the purpose of spreading carpets at the *caitya,* caused to be built by him, at the railiing on the summit (of the *stupa*) and at the railing at the dome, and in the Bodhi shrine caused to built by him and in the water-pavilion and in the dining hall built by him...to the community of monks
2nd C CE	N/A	Molahitiyawe gala rock-inscription	Success! Vahabha, son of Sena, having caused the tank of Katelavasaka and tank of Ahuraviki to be registered as the own property of Pilapavata (monastery), granted to the Community of *bhikkhus,* the share of *amana* in a *karisa* of the water revenue which belongs to him
2nd C CE	N/A	Nilapanikkan malai rock-inscription	Success! One part of ten parts of the Hayagaraya tank has been donated to the commnunity of *bhikkhus* in the Kalaka-vahanaka monastery
2nd C CE	N/A	Kondavatava na	Success! The Minister Butaye donated (the tank of) Hajamatavika to the Sangha in the monastery of Alarama
2nd C CE	N/A	Kondavatava na	Success! The three hundred *karisas* of the tank Vahabavi belong to the monastery of Ahali-araba
2nd C CE	N/A	Avagatiyava rock-inscription	Success! Phussa, son of Nakuta-jeta, residing in Gutaviya, doanated to the community of *bhikkhus* in the monastery Atada, the main share in his tank of Gutaviya.
2nd C CE	N/A	Tissamahara ma slab inscription	… the Governor of Rohana, son of …. Sabaraya the minister; the establisher of …. The wall of the shrine of …. And the Sabbath house …. So as to be enjoyed by those …. Donated the water revenue of the tanks … tudaka

2nd C CE	N/A	Kayikavala rock-inscription	Success! By the great *thera* Pata, by Sumana the daughter of the Minister Kali, by Abhaya, sister's son of the Minister and Kora Naka, husband of the younger sister (of the Minister), the village and tank of Canakada have been granted. (This) has been engraved so that the grant will not be interrupted again. Should any person contravene this and causes the cessation of this gift (he will become) liable to punishment
2nd C CE	N/A	Hinukvava rock-inscription	Success! Karavabi, the younger sister of the Minister Kalaya, gave five shares of the tank of Kulataka, of which the revenue is at every cultivated harvest (*kanakaya*), to the Mansion which is the residence (*parivana*) of the Elder Naka who resides in the Abhayagiri-vihara.
2nd C CE	N/A	Kandakadu Rock-Inscription	….of the (Kama) rapatiya tank was donated….of the Cittanakaraka monastery. On the fifth day of the fortnight…in the fifth year of…..
2nd C CE	N/A	Habassa rock-inscription	Success! The sub-king Naga, son of the great king Uttara and grandson of the great king Vasabha, gave the channel (named) Ulibikala, and the fields Mataviya and Abaviya and Gavidaviya. (He) gave them to the commuinty of *bhikkhus* in the great monastery of Ulibikala-Naka
2nd C CE	Vankanasika Tiss	Na-ulpatha in Ritigala mountain	The great king Lajaka Tissahaving caused the construction of the Vihara dedicated the Abadalaka Tank to the Buddhist priesthood.. (…)
2nd C CE	Gajabahu	N/A	When the king had made the Gamanitissa-tank he bestowed it on the Abhayagiri-vihara for maintenance in food
2nd C CE	Gajabahu	Palumakichchawa	The greta king Gamani Abhaya, the grandson of the great king Vasabha, and son of the great king Tissa, having borne (the expenses of) five thousand *kahapanas*, caused to be purchased the tank of Vaddhamana in (the district of) Upalavi-bajaka, and granted it to the community of *bhikkhus* in the Thuparama, so that they may enjoy (the income of the said tank) in the form of the four monastic requisites.
2nd C CE	Gajabahu	Torava-Mayilava rock-inscription	Success! In the fourth year (of King Gamani Abhaya) …. Nakayi gave the Tisaviya and Ranaviya and Dalamaviya- the aforementioned (tanks) and eight karisas (of fields), having received one thousand (pieces of money) - 1000 - from the hand of the Minister Maha Anulayi to the monastery of Tissapabbata. On (half) share to the caitya and one (half) share to the community of *bhikkhus*
2nd C CE	Gajabahu	Tamaragala rock-inscription	Success! Cemabi, the daughter of Prince Majjhima donated to the community of *bhikkhus* in Guttapabbata-vihara, the income

				due for debt given, of one share out of four shares of the Pitanaviya tank (and one share) of the Pahanaviya tank.
2nd C CE	Gajabahu		Ruvanvali Dagaba Slab-inscription	Success! The great king Gajabahu Gamani Abhaya, the grandson of Vasabha and son of the great king Tissa, built the monastery of Dakkhina Abhayarama and, having performed the ceromony of the golden vase granted the overlord's income of (the tank) Varukavi for the purpose of spreading carpets in the Uposatha-house. The water revenue (from the same tank he) gave to the community of *bhikkhus* for them to enjoy the four monastic requisites (therefrom)
2nd C CE	Gajabahu		Rathnapasada slab-inscription	Success! The great king Gamani Abhaya, son of the great king Tissa, son of the great king Vasabha having performed the ceremony of the golden vase, gave the tank of Pilagamaka to the Abhaya Gamani Uttara-maha-cetiya
2nd C CE	Gajabahu	Nuwaravava (Nagaravapi)	Thuparama slab-inscription	Success! The great king Gamani Aghaya, the grandson of the great king Vasabha and son of the great king Tissa having poured water from the golden vase into the hand (of the donee) gave to the Community of *bhikkhus* of the Ratanarama Monastery, the revenue from water and the revenue due to the overlord from the Govi-uta-vavi (in the district of) Nagarangana, the purpose of enjoying the four monastic requisities.. the accountant of the City, gave in exchange, the revenue from water of the Nagaravapi
2nd C CE	Gajabahu		Viharegala rock insription	Success! The son of King Vasabha (was) king Tissa. King Gamani Abhaya, son of King Tissa re-granted the Upala-donika tank, first granted by King Sabha, to the community of *bhikkhus,* for the purpose of carpets of antelope skins to the community of *bhikkhus* of the Ekadvara monastery
2nd C CE	Gajabahu		Vilevava rock-inscription	Success! The mother of the great king Gamani Abhaya, having purchesed the tank of Kubaragama after having spent her own welth-having paid four thousand *kahapanas* K1000-4 gave (the same) to the Sangha in her own monastery
2nd C CE	Gajabahu		Peryakadu-vihara rock-inscription	The twelft year of the timo of King Gamani Abhaya. The Minister Ka…ra purchased the share of the fish (caught) in the channels of the great tank of Tulahaka and granted (the same) for the benefit of the caitya and the Community of *bhikkhus* in the monastery of Ekadvara. Given to the Ekad varika monastery
2nd C CE	Gajabahu		Minvila rock-inscription	Success! The great king Gamani Abhaya, the Conqueror in battle, granted the revenue from the village at the royal channel to the Maniagiya Monastery.

2nd C CE	Gajabahu	Kukulava rock-inscription	Success! Pakamitta, wife of Buji, the minister of king Gamini Abhaya, donated the Diga Abahagama tank to the stone stupa in the new vihara built by herself.
2nd C CE	Mahallaka-Naga	Tammannakanda rock-inscription	Success! Of the tank Pajalaka in the district of Upala-ava and of Palaaviya (in the same district) and of the Manikaragamaka tank in the revenue district of Utarapara - of these three tanks - the proprietor's share the great king Naga gave to the community of *bhikkhus* in the Pacina-Naga pabbata monastery, having had the taxes thereon remitted
2nd C CE	Mahallaka-Naga	Timbirivava rock - inscription	Success! The Minister Homiya Nakala of Gagavi, being in the Abhayagiri-vihara and having beaten the drum of proclamation, gave to the Ganapabbata monastery the principal (lit.great) revenues (or share), belonging to him of the tank of three (catogeries of) revenue (or of three shares ie., the tank of Gagavi). It was given to the community of *bhikkus.* The date on which this tank was granted-it was granted in the fourth year of the raising of the umbrella (of dominion) of the great king Naga. It was given on the twelfth day of the fornigt in the Moon which has completed (the year).
2nd C CE	Mahallaka-Naga	Kallanchiya rock-inscription	Success! The water revenue and the overlord's revenue of the tank of Nakava in Mayihina, king Naga donated to the Community of *bhikkhus.*
2nd C CE	Mahallaka-Naga	Diyabatta-vihara rock - insription	Success! By the great king Naga, Punakadaka tank has been granted to the monastery of Tikanaka Erana of Varananikuya (granted) Mahakubare to the Community of *bhikkus*

2nd C CE	Bhatika Tissa II		Nelugala rock-inscription	Success! The Minister Ahalaya, son of the Minister Asagiriya founded the monastic grove named Payagalaka Ahali-pavata-vihara and granted to the community of *bhikkhus,* the water revenue of Vadamanaka Ahalavi, having had it registered in the administrative office as a perpetual gift and having had it proclaimed The great king Naga granted the revenue due to the overlord from the Vadamanaka Ahalavi (tank) for the revenue and for the expenditure in the refactory of the monastery of Payagalaka. Ahalipavata and for the spreading of carpots in the Bodhi-shrine and in the Uposatha-house or the Caitya-shrine (...) He also gave to the same community of *bhikkhus....* kava-kataka which is owned by him, after having had it registered in the administrative offie as a perpetual gift. He purchased, having paid the value of the soil, the tank of Naga Abhaya of Arahaya, and granted it for the spreading of carpets in the (Caitya) - shirine in the same Ahalipavata monastery at Piyagalaka. He also granted, for the benefit of the residents during the vassa, fields of the extent ow twenty *karisa,* the channel and tank of Totagamika, the shares of Mataya of .. davina, the share of Kalaya, son of Humanaya of Tabakavana, after having purchesed and acquired them. (...)
2nd C CE	Vasabha	Mahavilachchiya tank (Chayanti), Manakattiya tank (Mahanikkhavatti tank), Nochcipotana near Manampitiya (Chathamangana Tank), Hiriwadunna tank (Aggivaddhamanaka Tank), Nachchaduwa (Nitupatpana or Pattapasanavapi Tank)		The Cayanti and the Rajuppala-tank, the Vaha and the Kolambagamaka, the Mahanikkhavatti-tank and the Maharametti, the Kohala and the Kalitank/ the Cambuti, the Cathamahgana and the Aggivaddhamanaka : these twelve tanks and twelve canals he constructed, to make (the land) fruitful.
2nd C CE	Vasabha	Nochcipotana near Manampitiya (Chathamangana Tank)		The Cayanti and the Rajuppala-tank, the Vaha and the Kolambagamaka, the Mahanikkhavatti-tank and the Maharametti, the Kohala and the Kalitank/ the Cambuti, the Cathamahgana and the Aggivaddhamanaka : these twelve tanks and twelve canals he constructed, to make (the land) fruitful. (MV 35/94-95) He also constructed these tewelve large tanks , viz.,Nitupatpana (…) (Rajavaliya. p.47)

2nd C CE	Vasabha	Alahara Yoda ala (Alisara canal)		When he had built the Mucela-vihara in Tissavaddhamanaka he allotted to the vihara a share in the water of the (canal) Alisara.
2nd C CE	Vasabha			When the king had constructed many bathing-tanks here and there in the capital he brought water to them by subterranean canals
2nd C CE	Vasabha			For safety he built up the city wall even so high (as it now is) and he built fortress-towers at the four gates and a palace besides ; in the garden he made a tank and put geese therein
2nd C CE	Vasabha		Perimiyankulama rock-inscription	Success! The great king Vasabha and Naga gave the water-revenue and the share of fish (caught in) the channels of the tank of Palonakaraka in the district of Tihalaka to the assembly of Tiragama for the purpose of spreding (carpets of) antelope skins in the meditation hall (named) Sudassana. By Naga, son of the treasurer Bataka and the mariner of Aji Saka, have been granted by beat of the proclamation drum. to the assembly at Amara, for the purpose of spreding (carpets of) antelope skins in the meditation hall (aforesaid), the water-revenue of Ketavalaka tank and the three categories of revenue of the shares (of this tank) owned by his farther, to with, the share of the fish, (the portion of) this water-revenue that has been inherited, and (the revenue of) one share out of six shares.
2nd C CE	Vasabha		Sinadiyagala rock-inscription	Success! The great king Vasabha, having borne (an expenditure) of a hundred thousand and a quarter of *kahapanas* built the Uposatha-house of the Dakkhina-vihara, and, in order to provide for the spreading of carpets, on Uposatha (days)bougth this Kalapahanaka tank, having paid (a purchase price of) five thousand *kahapanas,* caused two hundred *masakas* to be given as the regulated *pitali* from fifty families of Managana-nagara and maing this tank a *dibiti* tank settled it on each of twenty-five families. The water share and the overlord share of this tank, and the fifty famailies he gave in perpetity to the community of the golden vase, so as to provide meals to the community of bhikkus having performed the ceremony, *bhikkhus* who reside there doing the duty of spreading carpets in the Upossatha house.
2nd C CE	Vasabha		Madavala rock inscription	Success! Mayilavi Havara Tissa, having built this *vihara* in the time of King Vasabha, the water revenue of the Amaragalaka tank has been granted for the benefit of the communiity of monks
2nd C CE	Vasabha		Sandagiri piller inscription-II	(The Minister) Badaba of Mahagama gave the tank…. And the Mahavavi and the Abagamaka-vavi, which belong to him, to the Uposatha-house…in the royal monastery

2nd C CE	Vasabha	Sandagiri piller inscription-IV	….twelve….of the tank Gavidagamaka
2nd C CE	Vasabha	Andaravava slab-inscription	Success! King Vahabha gave to the Sangha of the monastery of the Matagopa monastery, having struck the gong one part out of three parts from the whole of his share from the water revenue of the Badamara tank.
2nd C CE	Vasabha	Aluth-Halmillava - Inscription on stone steps	(…) The Uparaja Tissa (has granted) as the property of the Sangha one share of the (three) main shares of the tank of Rajakola
2nd C CE	Vasabha	Ledorugala rock-insription in Okkampitiya	Success! In the reign of the two brother kings, Governor Kalaya gave the (tank) Kala-avi for suuplying carpets to the Uposatha House. The tank was given to the community of *bhikkhus* (It) was given to the Hulagiriya-vihara.
2nd C CE	Vasabha?	Kahatagasdigiliya rock-inscription	By Mahasi…, the daughter of (Va)haba, the teacher, the income of her share of the catch of fish in the (irrigation) channeles of the Kabara-aviya tank -in the manner she had been in possession of (that) hitherto - has been offered to the community of monks in ... magama vihara. Half a *karisa* of the paddy-field, Kalavita, in Mataviya is given to the great community of monks
2nd C CE	N/A	Pahala Tammannava	…..wife of Minister….. And daughter of Vahaba, the teacher…. The income from the share of fish in the channels of the tank of Kabara-aviya ….. In the manner as it has been possessed by herself. …… has been granted to the community of *bhikkhus* in the monastery of Majjhimagama ....half a *karisa* in the field of .... tulaviya has been granted to the great community of *bhikkhus*
2nd C CE		Randenigama rock insription	Mahadeva of Mahapitagamaka and Visa Kadaguta, having accepted money, gave their shares in Abayavika Samana, son of Kadaguta, dedicated his income from the four shares of the Kadaguta tank to the Community of bhikkhus
2nd C CE	N/A	Ilukavava rock inscription	Success! The minister Mahajanaka donated one share of four shares of the tank Kaburaka to the community (of *bhikkhus*) - it was granted to the *caitya.* Also granted was the female slave Anula and the slave Kala.
2nd C CE	N/A	Nagirikanda rock inscription	Success! (Seda) donated to the Sangha one share out of twelve shares of the tank of Velaka karaka in order to provide the expenses for grass at the monastery of Bamanagiriya.

2nd C CE	N/A	Kantaka-cetiya, Mihintale	Success! Sa(ga) Abhaya, the warder of the Generalissimo Nakaraya, granted the tank of Karahika at Dakinigiri in the Mujitagama-nakarika, to the Kantaka-cetiya, for lighting lapps at the four altars, for banners, for bamboo shafts of the banners, and for flags of cloths
2nd C CE	N/A	Puvarasankulam	The great king Ramanayake (…) on account of expenses for oil and offerings to the Caitya for spreading carpets and for provisions to the great Refactory in the royal monastery of Anula-Tissa-pabbata, attached to the great monastery of Abhayagiri, the categories of revenue from (the tract of fields named) Vadamanaketa, situated in the area irrigated by Nakaravavi; the *karisas* dedicated to the Caitya in the fields irrigated by Badakaraha tank, and Vatanakaraka tank, the revenue estimated (*sari*) from Salivaya. Mahakabaragama, Badarakadara tank, Palanakaraka and Salagala tank, the income derived by him from Patagamaka-nakaraka tank, Balaka tank (the *karisa* dedicated to the caitya in these) and the income due to him from Malaka tank, he donated. (...)
3rd C CE	Sirinaga	Periyakadu-vihara rock-inscription	Success! By Mahakanha Tissa, son of Sona, the *ratthika.* I granted one share out of three shares of the share of the fish in the channels of Cigaravaliya tank, which is the share belonging to my family, to the pre-eminent Buddha and the pre-eminent Sangha of the Ekadvarike-vihara. I granted (this) to the Ekadvarike monastery, (...)
3rd C CE	Sirinaga II	Vessagiri rock-inscription	Success! (…) The great king Tissa, son of the great king Sirinaga, son of the great king Tissa…… the villege of Kenahisa and the tank in the village of Manikara situated in the western quarter, the channel Atarisala in this same quarter and the pasture of the tank Culavaya....
3rd C CE	Ghotabhaya	Dematamal Vihara inscription	Success! (This is) the Monastery of King Gothaka Abhaya. If there is no (income due to) in excess of the *Karisas* which are the assessment of the village of Sitalagamaka the water revenue (shall be taken as) belonging to the Hayagala Monastery.

3rd C CE	Ghotabhaya		Thimbiriwewa	Success! The minister Mathula Siyarayi gave to Community of *bhikkhus* in the monastery of Ganga-pabbata, one part out three parts of one share of the three main shares of the tank of Ganga-vapi, which belongs to him. (…) Success! Lady Anula, daughter of the minister Mitaya, son of the minister (Si)yaragage gave to the community of bhikkhus in the Gangapabbata monastery, the income from the share of fish in the channels of the tank (Kalaka) - vapi, which is is the property of her familly (...)
3rd C CE	Jettathissa			He bestowed the Kalamattika-tank onthe Cetiyapabbata (vihara), and when he celebrated the consecrating festival of the vihara and the pasada and (held) a great Vesakha-ceremony he distributed the six garments among the brotherhood, in number thirty thousand / He (also) ordered the pond called Randhakandaka to be dug. In the delightful Thuparama he constructed an Uposatha hall.
3rd C CE	Jettathissa			He bestowed the Kalamattika-tank on the Cetiyapabbata (vihara), and when he celebrated the consecrating festival of the vihara and the pasada and (held) a great Vesakha-ceremony hedistributed the six garments among the brotherhood, in number thirty thousand
3rd C CE	Mahasena	Huruluwewa (Chhallura), Mahakanadaraw a (Khanu), Maminiyawewa (Mahamani), Moravapi or Mora wewa (Dhammaramma), Maha Ratmale tank (Rattamalakanda ka tank), Mahagalkadawal a tank (Mahadaragallak a tank)		To make (the land) more fertile, he made sixteen tanks, the ManihTia, the Mahagama, the Challura, and the (tank) named Khanu, the Mahamani, the Kokavata and the Dhamma-ramma-tank, the Kumbalaka and the Vahana, besides the Rattamalakandaka, the tank Tissavaddhamanaka,8 that of Velangavitthi, that of Mahagallaka, the Clra-tank and the Mahadaragallaka and the Kalapasana-tank. These are the sixteen tanks. On the Gafiga he built the great canal named Pabbatanta.
3rd C CE	Mahasena	Minneriya Tank (Manihira), Kawdulla Tank (Thissavaddham anaka) Pabbatanta canal	Polonnaruwa	To make (the land) more fertile, he made sixteen tanks, the ManihTia, the Mahagama, the Challura, and the (tank) named Khanu, the Mahamani, the Kokavata and the Dhamma-ramma-tank, the Kumbalaka and the Vahana, besides the Rattamalakandaka, the tank Tissavaddhamanaka,8 that of Velangavitthi, that of Mahagallaka, the Clra-tank and the Mahadaragallaka and the Kalapasana-tank. These are the sixteen tanks. On the Gafiga he built the great canal named Pabbatanta.

3rd C CE	Mahasena	Magallavewa tank (Mahagallaka), Niramullawewa in Kimbulvana-oya river (Kumbalaka tank), Hulugalla tank (Sulugalu wewa)		To make (the land) more fertile, he made sixteen tanks, the ManihTia, the Mahagama, the Challura, and the (tank) named Khanu, the Mahamani, the Kokavata and the Dhamma-ramma-tank, the Kumbalaka and the Vahana, besides the Rattamalakandaka, the tank Tissavaddhamanaka,8 that of Velangavitthi, that of Mahagallaka, the Clra-tank and the Mahadaragallaka and the Kalapasana-tank. These are the sixteen tanks. On the Gafiga he built the great canal named Pabbatanta.
3rd C CE	Mahasena	Kalapasana tank (Karambakulam)		To make (the land) more fertile, he made sixteen tanks, the ManihTia, the Mahagama, the Challura, and the (tank) named Khanu, the Mahamani, the Kokavata and the Dhamma-ramma-tank, the Kumbalaka and the Vahana, besides the Rattamalakandaka, the tank Tissavaddhamanaka,8 that of Velangavitthi, that of Mahagallaka, the Clra-tank and the Mahadaragallaka and the Kalapasana-tank. These are the sixteen tanks. On the Gafiga he built the great canal named Pabbatanta.
3rd C CE	Mahasena		Likolavava	Success! The village of Veyalaya (which is at the) spill of the irrigation channel (has been granted) by Count Sangha, son of …., the minister Sangha and Sumaya, the younger brother of this (personage), who all are residents of Hatanakaraka…. Having become of one mind.... for the purpose of accruing their own welfare... the tank of Puranakara..... having asssigned it to (porvide) oil for lampsin the shrine of .. (...)
3rd C CE	N/A		Rasnakava	(…)The mother of the minister Siviyataka Mahasiyara, donated, Kabuba-kubara in the tract of fields named Dahanakara, having remitted the share due to the overlord, of the field and the share of the fish caught in the channeles, of Vihikaviya tank. (…) Mudamara, residing in the village Abadavaranaya, having received from the hands of the Community of monks residing in the Marapagiriya monastery, the sum of sixty kahapanas, donated the income due to him, i.e. the income from the fish caught in the channels. This has been donated to the monastery of Morapagiriya. (...)Anula, a retainer of the Minister Mahinda residing in Tabata, donated the share of the fish in the channels of Alagadaka tank in Mahaviya-karaya.
3rd C CE	N/A		Mahagalkanda	Success! The tank (named) Varuka constructed by King Suvanna-Vahaka, is included among those individual ownership. The revenue of the lands irrigated by the Varukavi (tank) has been granted to the Sangha. The *karisa* (belonging to) the Sangha…. Water-revenue is excluding that

				from the field of Gutta, daughter of the Minister Vassa. Year of Maha Pausa
3rd C CE	N/A		Bimpokuna rock-inscription	Success! (The gift) of the Minister Cadula Naka, to the Caitya, of two *karisas* of field in the tank of Rajadatika Citala and the tank of Nitalavi tika
3rd C CE	N/A		Bimpokuna rock-inscription	Success!The minister Cadula Naka gave to the Nandarama a *karisa* in the tract of fields named Nitilapitika of the Rajadatiya tank
3rd C CE	N/A		Sangappola rock-inscription	Success! Rada, wife of Atula donated to the Garimalaka monastery, one share of sour shares in the tank of Honarivi-gamaka.
4th C CE	Upatissa 1			He had built at various places innumerable and meritoroius works, (such as) the Rajuppala (tank), the Gijjhakuta, Pokkharapasaya, Yalahassa, and Ambutthi (tanks) and the tank of Gondigama, the Khandaraja-vihara and (further) tanks always filled with water.
4th C CE	Upatissa 1	Thopavava		His son, the great Upatissa, built Palawatu Vehera, constructed Topawewa, and reigned 42 years.
4th C CE	Upatissa 1		Panama tank inscription	In the twenty-fourth year of the reign of king Detutis, Bayutari tank was given to the Sangha
4th C CE	N/A		Hinguregala rock-inscription	(…) these soldiers having received twenty *kahapanas* from the hands of the person above mentioned, by this agreement gave Badadavara-kabara and Baba-kabara which are being cultivated with water from the dam at Umanaroda-adara. (…) gave two *payas* of Kayuabaliya-kabara, which is being cultivated with water from the dam of Baba..atara.
4th C CE	N/A		Pilikema - Thelulla	Succcess! The chief officer of eight thousand padhavanaka of the village of Udaridamahagavida; the chief of the ford Varaka; the elder Mahaka and the remaining soldiers took the Abalavatuka dam in the Cukarida river for the purpose of fishing. (…). They gave the water-tax of one karisa and one amuna (to provide) the four requisites for the great assembly of monks at the monastery at Pahanabena
5th C CE	Chattagahaka			The later built the Chattaggahaka-tank and died in the course of the year
5th C CE	Dathusena	Kala wewa (Kalavapi), Balalu wewa, Madatugama tank (Mahadatta), Maddakatiya (Sangamu)		He had eighteen viharas built and provided with revenues for the adherents of the Thera School and (be erected) eighteen tanks on the island.
5th C CE	Dathusena	Panakaman tank (Panagamu),		He had eighteen viharas built and provided with revenues for the adherents of the Thera

		Giant tank (Manamathu)		School and (be erected) eighteen tanks on the island.
5th C CE	Dathusena	Maeliya tank (Maha-eli wewa)		He had eighteen viharas built and provided with revenues for the adherents of the Thera School and (be erected) eighteen tanks on the island.
5th C CE	Dathusena			By damming up the great stream he created fields which were permamently watered. In the Mahapali Hall he distributed rice fare to the *bhikkhus*.
5th C CE	Dathusena			To Kumarasena (his brother) he made over his former revenues and fixed them excatly: (namely) one half to the Kaluvapi and two hundred fields.
5th C CE	Dathusena			This best of men built the tanks Padulaka, Hambatthi , Mahadatta and others, and also eighteen smaller viharas and likewise (many small) tanks which he made over to them.
6th C CE	Kumaradasa		Nagirikanda	Hail! By king Maha-Kumaratasa Apaya were caused to be purchased and granted as donations to the Bamanagariya monastery, the tank [and] wet lands of Chagariya, the tank [and] wet lands of Cugariya, the tank [and] wet lands of Kabuba [and] the wet lands [and] the tank of Katacanakapula. Of these four tanks [and] the wet lands, the water-share has been remitted and the proprietor's share granted to the *bhikkhu* community at the Bamanagariya monastery, for their four requisites. These have been made possessions of the community [of monks]. Of the following tanks which belong to himself, namely, Tavaatank, Nilasa tank, Gajaa tank, and Pada tank-of the above mentioned tanks-. the water-share and the. overlord's share (were given) to the *bhikkhu* community
6th C CE	Silakala			The Rahera canal he made over to the Abhayuttara-vihara. Here
6th C CE	Moggallana II	Malwathu Oya (Kadamba nadhi) Nachchaduwa tank (Pattapasanavapi)		He dammed up the Kadamba river among the mountains forming thereby the Pattapasanavapi, Dhanavapi and Gritara tanks.
6th C CE	Mahanaga			He handed over to the Asecetics a thousand fields (water by the tank) called Duratissa. For the inmates of the Mahavihara he instituted a permenent (dole of) rice soup. The Ciramantikavara (canal) he granted thither, rejoicing at virtuous dealing.
6th C CE	Aggabodhi I	Minipe bund (Manimekala), Minneriya tank (Manihira)		He built the Mahamekhala bund and conducted a great canal from the Manihira tank.

6th C CE	Aggabodhi I	Bulankulam in Mihintale (Mahindatatavapi)	In the Abhaya (giri)-vihara he constructed a large bathing tank and on the Cetiyapabbata he provided a permanent water supply for the Nagasondi tank. After having the Mahindatata tank constructed in the proper way, he decided to set up (the image of) the Thera (Mahinda) on its dike and he decreed that when the Grand Thera Mashinda should be brought to the place, people from the Tsraccha clan should carry him.
6th C CE	Aggabodhi I	Thannimurippu kulam tank (Kurunda tank)	After building the vihara called Kurunda destined for the whole Order (of bhikkbus) and a tank of the same name and (after planting) a cocopalm garden three yojanas in length, he granted it to Mahasiva as his dwelling and in addition to it revenues, honours and distinctions and a hundred monastery attendants.
6th C CE	Aggabodhi I		The province of Dakkhinadesa with the appropriate retinue he made over the Yuvaraja. The latter while he dwelt there, built the Sirivaddhamanaka tank.
6th C CE	Aggabodhi I	(Nagapokuna tank in Mihintale (Nagasondi)	In the Abhaya (giri)-vihara he constructed a large bathing tank and on the Cetiyapabbata he provided a permanent water supply for the Nagasondi tank.
7th C CE	Aggabodhi II	Kantale tank (Gangathata)	He also built the Gangatata, Valahassa and Giritata tanks. He enlarged the Mahapali Hall and set up a canoe for the gifts of rice.
7th C CE	Aggabodhi II	Girithale tank which was fed by the Alahara canal (Girithata)	He also built the Gangatata, Valahassa and Giritata tanks. He enlarged the Mahapali Hall and set up a canoe for the gifts of rice./ ???
7th C CE	Aggabodhi II	Horivila tank (Matombu tank),	His nephew Huda Akbo made 13 tanks; built Velunna Vihara in Gaganavita; made great offerings, and resigned 10 years
7th C CE	Aggabodhi II	Inamaluwa tank (Enderagala Tank)	His nephew Huda Akbo made 13 tanks; built Velunna Vihara in Gaganavita; made great offerings, and resigned 10 years
7th C CE	Aggabodhi II	Madatugama tank (Madata)	He also built the Gangatata, Valahassa and Giritata tanks. He enlarged the Mahapali Hall and set up a canoe for the gifts of rice. / ???
7th C CE	Silameghavanna		In the Abhayagiri-vihara he honoured the stone image of the Buddha by an offering, He had its ruined temple (restored and) brightly decorated with divers precious stones. He dedicated (unto it) the Kolavapi tank to protect the Victor and he ontinually instituted sacrificial festivals at at the gretest cost.

7th C CE	Silameghavanna		Habarana	Success! Of the (villages) Agivadamana-vavi and Ativavi of Agaya, son of the Minister Vesaya of Mujitagama-nakara, of the Atata-vavi and the field Avitaka of Galavaka (residing) in the City - the assessment of this Agivadamana-vavi, including the assesment of all these villages which assessment consists of the original assesment and the assesment that has been subsequently incresed - amounts to two thousand *karisa* and a further forty-one *karisa;* this is the assessment. The great king Maparumaka gave the overlord income from the Aggi-vaddhamana tank to Abalaya (...)so that they give money (in return) made the kula-amana impost to be given from the income from water, caused (this tank) to be reorrded among the tanks (belonging to) the Sangha and thus caused the remission of the taxes due from this overlord's income and granted (the same) as the price of oil and offerings (required) in the etiyaghara (...)
7th C CE	Aggabodhi IV			The Damila by name Pottha-kuttha, who was in his service, erected the wonderful practicing house, called Matambiya and assigned in the Ambavapi (tank) at Bukakalla, the village of Tantavnyikatatika, as well as the village of Nitthilavetthi together with slaves.
8th C CE	Manavamma			The Gondigamika tank which had burst he dammed up as before and to all living beings he gave as a gift whatever they needed.
8th C CE	Mahinda II	Extension of Kalavava-Demada oya was dammed above Nalanda and water was conveyed to Kala wewa via Dambulu Oya		He also strengthened the weir of the Kalavapi tank. Such like meritorious works of his were boundless.
8th C CE	Udaya I			Having built the beautiful monastery Nilagalla, he had a canal laid out which made fruitful much country and granted it (to the monastery).
9th C CE	Mahinda III			To allow of repairs being made at all times on the Ratanapasada he granted it the getthumba canal. / In the Abhayagiri he erected the Mahalekha-parivena.
9th C CE	Aggabodhi IX			When the King heard of it he was dipleased; he granted (the small viharas) the important village of Kanthapitthi, (the village of) Yabalagama, (the village of) Telagama and a well-filled canal and gave orders that the bhikkhus should receive their rice gruel in (their own) vibars.

9th C CE	Sena II	Extended the Minipe canal (Manimekala), Minneriya tank (Manihira)		On the (Mahavaluka-)ganga he had the Manimekhala dam built and on the Manihira tank he built an outlet for the water.
9th C CE	Sena II	Built a dam to Malwathu oya near Katthantanagara (near Maradankadawala) and directed water through a canal to create Mahakanadaraw a tank (Kanavapi)		At Katthantanagara he dammed up the Kanavapi (tank) and on the Cetiya mountain he built a hospital.
9th C CE	Sena II		Mullegala Piller inscription	(These are) the immunities in the ninth (regnal) year of His Majesty Srisamboy in respect of the fish that bless the waters of this pond and the flora around it. This is the edictal stone stup prohibiting anyone committing anything illegal around this pond
9th C CE	Sena II	Mamaduwa tank (Mahidavava)	Mamaduva slab inscription	On the thirteen year of His Majesty; it has been ordered by the Governor De of Manamatta, that if the fish that are being reared in Mahidavava, are appropriated by the Administrator of the Village, may he become a dog or a crow. (Let there be) prosperiy.
9th C CE	Sena II		Tantirimale piller inscription	In the thirteenth year of His Majesty Sirisambo, (it is decreed) that the fish caught in the Ud-Belivava….Basi-atta Bulu…those who would (illegally) take possession of this reservoir or stop supplying fish (caught in this tank) shall be born a crow or a dog. Should anyone who posses no shares of this tank...., the officils of this place..
9th C CE	Sena II		Mihintale plinth course inscription	(it is hereby command that) on the New Moon day of the month of Hila (Octomber November) in the twelfth (regnal) year of His Majesty Sirisangabo: (the dues which are liable to be paid) in gold to the monastery by the Agriculture Officers of the four Districts,.... a *kalanda* of gold which is liable to be paid by the Agiculture Officer of the District of (...) Works Overseer of the said District; (.... *kalandas* of gold liable to be paid by a) .... of the said Distric; ten *kalandas* of gold liable to be paid by the Agricultural Officer who looks after the water courses in the District of Sanaha (...)

9th C CE	Sena II	Basavak-kulam tank (Abhayavava)	Basavak-kulama pillar inscription	(…) set up four pillers at the four corners (of the Abhayavava) in order to safeguard (the said) Abhayavava, and decreed that 'if the *Nuvaraladda* (the City Mayor) falls to keep a watch, arrest, (charge) and punish those who may engage in (illegal) fishing in the Abhayavava, the *Madabi* Officer, who takes care of the property of the Mahavihara, shall impose and collect a fine of ten *hunas* of gold from him; also, after having sent his own monastic officials, he shall confiscate the fishing nets of the culprits; and (in addition) get them to perform (free) labour at this reservoir. Those fishermen who are arrested after keeping a watch at the fishing point of this reservoir
9th C CE	Udaya II	Manik-ganga (river)		He laid out gradens of fruits and flowers at diverse places, enclosed tanks and dammed up the Mahanadi.
9th C CE	Udaya II	Malwathu Oya (Kadhamba nadhi), Mahavilachchiya tank (Mayettivapi) and a spill way		On the Kadamba-river he provided an overflow of water with a strong weir, and he enlarged the dam of the Mayetti-tank. There too the Monarch built an overflow of water and every year he had distributed beautiful, specially fine stuffs (for the making of) the robes.
9th C CE	Udaya II	Mentioned the Mora-oya and the ruined anicut across it	Iripinniyava piller inscription	(…) whereas it was ordered (by the Supreme Council) that the water quota which is (sufficient to irrigate) twelve *kiriyas* (of land), and which is provided to Posonavulla following the farmer custom from the water flowing from Mahamandala to Posonavulla in Sulinnarugama, which had been dedicated to Sen *Senevirad* Pirivena built by Senevirad Kuttha at the Mahavihara, and to Banuvatta adjoining the river-dam across Pekurvasa-oya, shall not be withheld (...)
9th C CE	Udaya II		Adagala piller inscription	(…); whereas it was ordered (by the Supreme Council) that the water quota which is (sufficient to irrigate) twelve *kiriyas* (of land). And which is provided to Posonavulla following the former custom from the water flowing from Mahamandala to Posonavulla in Sulinnarugama, which had been dedicated to Sen *Senevirad* Pirivena built by Senevirad Kuttha at the Mahavihara, and to Banuvatta adjoining the river-dam across Pekurvasa-oya, shall not be withheld; (...)
9th C CE	Udaya II		Marasinha Halmillava piller-slab inscription	Prosperity! Savanakan of Pelan-bima; also Agriculture Officers, the Governors of Districts, the officials of the Inner Treasury, the officials of the Outer Treasury, the Minor Officials of the royal household; (…)
9th C CE	Udaya II		Panduvasnu wara piller inscriptions	(…) Should there be, from this date any obstrution caused by persons (holding the office of) *pitassam-arub* and *vanakkan* of the monastery, on account of the arrangement that

				kabali be taken from these villages for the royal places, having excluded them from (the estate) of the Shrine of the Bodhisatva Statue in the Abhayagiri-vihara. (in such cases) they shall be made to labour at tanks; (...)
10th C CE	Kassapa IV	Padaviya tank	Moragoda piler inscription	(…) And whereas, in regards to the grounds contained within the precincts of the eight scared places (in the tract of lands irrigated by the flow of water stored up) in the tank Padonnaru-kuliya, belonging to the Vadara-pirivena, which was attached to the Mangul-pirivena situated at the Abayagiriya-vihara in the range of (*parivenas* called) Kukulgiri, all these immunities were decalred and granted; namely: Coolies and *melaksi* shall not enter. Heads of districts or keepers of (district) record-books shall not enjoy (this property) The distribution of water supply shall not be appropriated.
10th C CE	Kassapa IV		Pallekagama piller inscription	(…) …., which is situated in Patpahan-bima, and (attached to….) to the effect thaat *Melatti* officers, Bed chamber Attendents, *Kudasala* officers, cultivation officers, Agriculture officers, the officials attached to the department of Agriculture, the officials of the Two Treasuries shall not enter (this village); (...)
10th C CE	Kassapa IV		Sigiriya Piller inscription	(…) the (tusk-less) domesticated elephents shall not be taken to the Twelve Great Reservoirs even when they are breached, and the (tusk-less) domesticated elephents shall not be taken on to the dams or into the beds (of these reservoirs) for work; (…)
10th C CE	Kassapa IV		Kibissa Piller inscription	(…) Agriculture officers (…)
10th C CE	Kassapa IV		Veherala piller inscription	(…) even when the twelve Great reservoirs are breached (cartt-oxen, and buffaloes) shall not be taken on to the dams or into the beds (of those reservoirs) for work; (…)
10th C CE	Kassapa IV		Sennarugama	(…) In keeping with the former custom, the water, which flows from the stream to this village, shall not be obstructed (in its course). (…)
10th C CE	Kassapa IV		Sennarugama	(…); in accordance with the former custom, which is observed in this village, the water that flows from the main canal into all the paddy fields, which are being cultivated, shall not be obstructed.
10th C CE	Kassapa IV	Halpanu Ela canal (Kolomhoya)	Abhayagiirya piller inscription	(…) the water flowing here from the Kolob=canal shall not be hindered; may those who transgress the regulations laid down here and commit unlawful acts become crows and dogs.
10th C CE	Kassapa V		Anuradhapura slab insription	(…) By affording faciclities for the cultivation of fields by means of (the tanks) Podonavulu and Pulundavulu he caused this illustrious Lanka to prosper. (…)

10th C CE	Kassapa V	Madirigiriya piller inscription 1	(…) the Agriculture Committee of five members shall not enter, (…)
10th C CE	Kassapa V	Galnava piller inscription	(…) Agriculture officers and perenattiyam shall not enter; (…) the water flowing from the main canal to this village shall not be hindered; (…)
10th C CE	Kassapa V	Amanakkattuva piller inscription	(…) Agriculture officers (…)
10th C CE	Kassapa V	Dorabavila	(…) Carts, oxen, domesticates elephents and buffaloes shall not be appropriated for (free) service at the dams or in the beds of the reservoirs; even if the Twelve Great Reservoirs re breached, domesticated elephents and buffaloes shall not be appropriated for (free) service; (...)
10th C CE	Kassapa V	Bilibava	(…); also, members of the Agriculture Committee of five shall not enter; (…)
10th C CE	Kassapa V	Polonnaruva piller inscription	(…); also junior Agriculture Officers shall not enter (this village); (…); (domesticated) elephents shall not be taken into the river dams along the two embankments of the canals; (…)
10th C CE	Kassapa V	Tamaravila piller inscription	(…); the members of the agriculture Committee of fve shall not enter; (…)
10th C CE	Dappula IV	Murunkan piller inscription	(…); the Agriculture officers shall not enter; (…)
10th C CE	Dappula IV	Allai piller inscription	(…); the Agriculture officers, and Governors of Districts shall not enter; (…)
10th C CE	Dappula IV	Aturupolayagama piller inscription	(…); even if the Twelve Great Reservoirs are breached domesticated elephenets shall not be appropriated (for the services)
10th C CE	Dappula IV	Girithale Unagala-vehera piller inscription	(…) I, *Mekappar* Siva of Hakurela, I,Sen of Riha and I, Sirina Devaldet of Harikanda, (all of us) who came by commission of the Commander of the Reservoir Guards; (…)
10th C CE	Dappula IV	Munasingama piller inscription	(…), I, Randaga of … himuba, and I, Det of Devolagama, both who came by commision of *Tala-arak Kitaln (wardon of reservoirs);* (…)
10th C CE	Dappula IV	N/A	(…) who came by commission of Kitalna, the commander of the Bodyguard cum Conservator of reservoirs; (…)
10th C CE	Sena III		On the great tanks in Lanka he had the decayed outflow canals renewed and the dams made firm with stones and earth.

10th C CE	Sena III	Gonnava Devale piller-inscription	(...)..... that gifts, toll dues, *suvar* and *mahavar* should not be levied, that one shall not enter [this land] sounding *tudii* and *soli* [drums], that those who have come after committing murder should not be arrested in this village, that *deruvana* shall not enter. that royal messengers shall not enter cracking whips, that *kudasala* and officers in charge of royal conveyances shall not enter, that..... in the localities of the twelve great reservoirs ... and that water should be given so as..
10th C CE	Sena III	Buddanhela piller inscription	(…) Agriculture Officers shall not enter (here) and appropriate cart=oxen; (…)
10th C CE	Mahinda IV	Abayagiriya slab inscription	(…) he built a lofty relic -house; Bamunu …; he made … and dammed the rivers and channels connected (therewith); (he repaired) the dolapidated (tanks and ponds) and by means of the water thus supplied he (put and end to) scarcity of food in the Island of Ceylon. (...)
10th C CE	Mahinda IV	Anuradhapura slab insription	(...) Former alotments …… at places that have follen in to a wild state, tanks having been constructed …… shall devide among them selves …. If there be …. A damage seen by the villagers …. Shall devide among themselves. The expenditure of these (persons) ….. tha tanks and ponds adjoining ..... cultivated in places where the jungle has been cleared ... (The recipients of) two alotments (shall take) the half share recommended by five (village)-residents. (...) .... recipient of two alotments, for tank-work .... Should any dispute arise, the chief clerk ... the warden, the steward, the administrator of law, ... doer of .. all htese (oficials) ... shall render assistence.

10th C CE	Mahinda IV	Thissa wewa, Halpanu Ela canal (Kolomhoya)	Vessagiri slab inscription	(…) Whwereas it is ordered that the fields around the monastery, one hundred and forty four *kiriyas* and one *paya* (in showing extent), which are cultivated using this water shall be suplied with the same from a storage tank by raising the mortar of the tank and allowing the water to flow without interuption until the top of the aqueduct-stone set up in front of the royal sluice, measuring four cubits of water, become visible. Tha supplying of water in this manner shall be maintained in respect of the above mentioned fields around the monastery as well as to the Ranmasu park. the Kela-heya, Uyankeya, and Mahanel keya. The monks shall not be made to loos by acting otherwise allowing the water to flow out into the Kolomb canal. During the time of issuing water the principal official and the park keepers shall not obtain water in the way it is obtain from the monastery for *uthkovaya.* (...) Having collected water from a storage tank for cultivating the the fields and gardens adjoining and all around the monaestory, the *sihin-ati* variety of paddy should be sown, but not that of the *maha-ati* variety of paddy. (...)
10th C CE	Mahinda IV		Tablets at Mihintale - Slab A	(…) One third of (the produce of) trees and plants on Kiriband-pavu, the house rent of the *sang-valla* here, the tank Manuvasara, the two tanks in the upper side and in the lower-side of Lahiniya - pavu (the Swallow rock) together with the *sang-valla* thereof, the land arround the pond Pahana-vil and the land around the pond Poradeni-pokuna-the income derived from all these places shall be appropriated by the vihara. (...)
10th C CE	Mahinda IV		Tablets at Mihintale - Slab B	(…) In all the places irrigated by the water of the Kana-vava tank, the distribution of water shall be utilized for this vihara only, in acordence with ancient coustoms in vogue formerly during the Tamil period (of rule) .
10th C CE	Mahinda IV		Kiri-vehera piller inscription	(…) Agriculture officers,….officials, and the officials of the Alasara (officer incharge of dam and canals) (village) shall not enter here.(…)
10th C CE	Mahinda IV		Raja Maligava (Citadel)	(…); *vel-vassan* (field-inhabitants) and *vel-kamiyan* (field workers) shall not obstruct (the distribution of) water received (for the cultivation of) the garden (appertaining to?) the land irrigated by the Great Canal; (except labourers who have come) …. to the Canal.
10th C CE	Sirisangabo?		Minneriya tank piller inscription	(…) The two categories of tax collected from the four Districts should be submitted to Tatuvan *kiriya,* which had been dedicated by the residents of Kapuvata in Kalatusa to Getiravana in Valala…. Having agreed to this meritorious deed, the future generation and agriculture officers should provide protection to this village and estates

10th C CE	Sirisangabo?	N/A	(…) ; Agriculture Officers and Directors of Agriculture shall not enter. (…)
10th C CE	N/A	Minneriya tank piller inscription	…If there by any agriculture officer or grain collecting officer, who has faild to follow (these regulations) as they are laid down here, the lords of the Secretariat shall levy a fine of five hundred *kalandas* of gold from each of them. The branches of coconut trees and Palmyra trees, which are in this District shall not be felled for the purpose of (feeding) elephents; (...)
10th C CE	N/A	Polonnaruwa Kumara Pokuna slab inscription	(…) …the agriculture officers and grain colectors
10th C CE	N/A	Polonnaruwa Siva devala piller inscription No 2	…; Twenty-four *kiriyas* of forest allotments attached to the Polonnaruva Monastery situated in Polonnaruva; also twenty-five *kiriyas* of *hulu* (fenugreek) that receives water ration for the yala season

Appendix B

Public consultaion questionnaire for farmers

Public consultation questionnaire For Farmers

Number	
GPS location	
Interviewee	
Region	
G.N. division	
Village	
Date	

1. Identification

i	Gender			male □ female □			
ii	Age	< 20 years □	20 to 30 years □	30 to 40 years □	40 to 50 years □	50 to 60 years □	> 60 □
iii	How many people are living in your household (including you):						
	How many generations?						
	Extended family? □			Nuclear family? □			
iv	Were your ancestors already farmers?			Yes □ No □			
v	From whom did you learn farming?						
	Parents / Ancestors □	Community □	By myself □	Other			
vi	Are you a resident of Anuradhapura (name of the area)?						
vii	If not when did you move to Anuradhapura?						
viii	Where did you live before and why did you move to Anuradhapura						
ix	How long you have been a famer? Yes □ No Please specify						
x	Do you have other income rather than farming?						
xi	Do you have animals: Yes □ No □						
	Which? How many?						

2. Land tenure

i	Do you own lands: Yes □ No □					
ii	If yes, how you got the ownership:			by ancestors □	bought them □	other □
	please specify					
iii	Nature of the tenure:	*Sinnakkara* □	*Jayabumi* □	*Swarnabumi* □	Government tenant lands □	
iv	What kind of lands you own:	Home garden □	Paddy field □	Other cultivation land □		
	other □ Please specify					
v	Do your lands connect with an irrigation scheme: Yes □ No □ If yes, please name it					

vi	Are you a part of a communal land tenure system Yes □ No □ If yes please specify				
3. Farmer organization					
i	Are you a member of a Farmer Organization? Yes □ No □ If yes which?				
ii	What is your status?	Head □	Board member □	Member □	Other □
iii	How many farmers are members?				
iv	What is the structure of the organization?				
v	How is the head or board elected/nominated?				
vi	For how many years?				
vii	How is the communication in the farmer organisation organised?				
viii	Who is making the decisions?				
ix	How often do you have meetings:				
x	What are the penalties for not attending meetings and activities:				
xi	How many farmer organisations exists in your region?				
xii	Do the farmer organisation receive founding for the maintenance of the irrigation infrastructure? Yes □ No □				
xiii	If yes, how do you get founding for the irrigation management?	Government □	Provincial Council □	Farmer organization □	Other □
xiv	Why did you joined a Farmer Organization:				
xv	What are your personal benefits of being a member in a Farmer Organization :				

xvi	Since when are you a member of a Farmer Organization :			
xvii	We are interested to know your views on the current situation with regard to Farmer Organization	Satisfy □	Moderate □	Unsatisfied □
xix	Comments			
xx	Do you have connection to any other irrigation & agriculture organisations? Yes □ No □ If yes, which?			

4 Nature of cultivation of Paddy

i	Do you cultivate paddy?				
ii	Is there enough water to crop paddy for two seasons? Yes □ No □ Comments?				
iii	What do you crop if there is not enough water?				
iv	Do you cultivate other crops / plants in the paddy fields? Yes □ No □ Please specify:				
v	What are the reasons for cultivation other crops / plants:				
vi	Your connection to paddy fields	owner □	Tenant □	Agriculture labour □	Other □
	Please specify				
vii	How big is your farmland?				
viii	What percentage of your paddy harvest is for	Own use □	Selling on markets □	Directly selling □	Other:□
ix	How many seasons do you have per year:				
x	Where do you buy your seeds?				
xi	Which type of seeds do you use?				
xii	Do you use fertilisers and pesticides for your cultivation? Yes □ No □				
	Natural □	Artificial □	Traditional □		
xiii	How often are such fertilisers and pesticides used?				
	Natural:	Regularly □	Average □	Rarely □	
	Artificial:	Regularly □	Average □	Rarely □	
xiv	If you use traditional fertilisers and pesticides, what are they:				
xv	Where do you get these fertilizers and pesticides?				
xvi	Who are the producers?				

xvii	Are there any other plant protection system other than chemical of traditional fertilisers? Yes □ No □ Please specify			
xix	What is your cultivation technology?	Traditional □	Modern □	Both □
	Comments:			
xx	Do you use biomass (green manure) for the fertility management? Yes □ No □ Do you know biomass (green manure) for the fertility management? Yes □ No □ If yes what are the plants use: Please describe the process			
xx	Do you use traditional soil management technologies for:	tillage □	soil conservation □	other □
	please specify			
xxi	Explain your tillage process			
xxii	Do you use traditional ploughs? Yes □ No □ If yes type of plough			
xxiii	For trampling do you use	tractors □	buffaloes □	both □
xxiv	Do you use dykes for land preparation Yes □ No □			
xxv	What is the nature of the dykes?			
xxvi	What are the other methods use to prepare weed free cultivation lands?			

xxvii	Do you have rituals link with the land preparation? Yes □ No □ If yes please explain						
xxviii	What do you use to control erosion in paddy fields	Liyadda (bench terrace) □	Niyara (soil ridge) □	Gal weti (stone ridges and leader drains) □	other □		
	Please specify						
xxix	Wat is your harvesting method	Modern □	Traditional □	Both □			
xxx	Do you use combined harvesters? Yes □ No □						
xxxi	What are the traditional harvesting methods being use?						
xxxii	Do you have customs and rituals link with the harvesting? Yes □ No □ If yes please explain						
xxxiii	What kind of traditional believes and rituals do you have link with the paddy cultivation	Astrological practices □	Spirit and gods □	pirith (Buddhist practices) □	Black magic □	Kem □	other □
	Please specify						
xxxiv	What are the other practices adopted to addressed issues emerged during farming	Bethma govithana □	Kekulam govithena □	pangu kariya □	other □		
	Please specify						

xxxv	How you obtain labour for the cultivation:	own □	family □	hire □	communal □	other □
	Please specify					
xxxvi	Did you experience crop failure during the last 10 years? Yes □ No □					
xxxvii	What were the main reasons for crop failure?	Climate □	Diseases □	Animals □	other □	
	Please specify					
xxxviii	If animals destroyed the crops / plants, which ones were it?					
xxxix	Do you cultivate traditional paddy types? Yes □ No □ If yes, which?					
xl	Do you have agricultural rituals? Yes □ No □ Please specify					

5 Nature of cultivation of Chena

i	Are you engaged in Chena cultivation: Yes □ No □					
ii	How often:	regularly □	sometimes □	rarely □	only when the paddy cultivation failed □	
iii	Type of Chena based on seasons	*Maha hen* (main season) □	*Yala hen* (minor season) □			
iv	Type of Chena based on dominant Crop:	*Kurakkan hen* (*Kurakkan* dominant) □	*Aba hen* (mustard dominant) □	*Vee hen* (highland paddy) □	*Thala hen* (Gingerly dominant) □	Other □
	please specify					
v	Type of Chena based on method of land clearance	*Thani hen* (isolated chenas) □	*Yaya hen* (individually operated but tightly adjacent to one another) □	*Mulketa hen* (wheel chenas) □	Other □	
	please specify					
vi	Type of Chena based on type of forest cleared	*Mukolan hen* (high and dense forest cleared to cultivate mainly *kurakkan* and mustard during the *Maha* season) □	*Landu kela hen* (cleared in secondary or scrub jungles during the *Yala* season to cultivate gingerly) □			
vii	Which plants do you cultivate as Chena cultivation?					
viii	When do you in general start with Chena cultivation? (month / year)					
ix	Can you describe how you prepare the land and how you take care on the plants under Chena cultivation?					
x	What percentage of your Chena harvest is for					
	Own use □	Selling on markets □	Directly selling □	Other □		
xi	Do you frequently change the crops / plants? Yes □ No □					
xii	What are your reasons for these changes:					
xiii	How many seasons do you have per year for Chena?					
xiv	Do you use fertilisers and pesticides for your cultivation? Yes □ No □					

	Natural □	Artificial □			Traditional □
	How often are such fertilisers and pesticides used?	Natural:	Regularly □	Average □	Rarely □
		Artificial:	Regularly □	Average □	Rarely □
xv	If you use traditional fertilisers and pesticides, what are they?				
xvi	Are there any other plant protection system other than chemical of traditional fertilisers? Yes □ No □ Please specify				
xvii	Did you experience harvest failure during the last 10 years? Yes □ No □				
xviii	What were the main reasons for crop failure in the past?	Climate □	Diseases □	Animals □	Other □
xix	If animals destroyed the plants, which ones were it?				

6. Irrigation management

i	Which are your water sources for irrigating the fields?	Major irrigation schemes □	Minor irrigation schemes □	Agrarian wells □	Other □
ii	Who is responsible for the management of the irrigation water you receive?	Government □	Provincial Council □	Farmer organization □	Other □
	Please Specify:				
iii	What are your tasks during the maintenance measurements:				
iv	Do you regularly get sufficient water for your fields? If not please specify the reasons Yes □ No □				
v	Who is making the decisions which measurements were carried out?				
vi	Do you use traditional measures and methods on maintenance of irrigation: Yes □ No □ If yes please specify				
vii	Do you have particular rituals and believes on irrigation system: Yes □ No □ If yes please specify				

viii	Are you happy with the maintenance practises of the irrigation system? Yes □ No □				
ix	Are you a member of a water user association Yes □ No □				
x	Did the practise of maintenance measurements changes during the last years? Yes □ No □ If yes, how?				
7. Climatic changes					
i	During the last 10 years, have you noticed any changes in the climatic patterns?	□ Yes	□ No	□ No Idea	
	Comments:				
ii	Was there an aspects of your life changed, due to climatic change?	□ Livelihood	□ Economy	□ Environment	Other □
8. Water rituals					
i	Do you have any rituals regarding water management? Yes □ No □ If yes why and which?				
ii	How often?				
iii	How do you organize?				
iv	Who is taking the initiative?				
Thank you a lot for your participation!					

Curriculum vitae

Nuwan Abhayawardana

Education:

- Reading for Ph.D. in Freie Universität Berlin, Department of Earth Sciences, Institute of Geographical Sciences, January 2016 to present
- M.Sc. in GIS and Remote Sensing, November 2009. Postgraduate Institute of Science, University of Peradeniya, Sri Lanka. (GPA 3.84)
- Degree of Bachelor of Special (Arts), July, 2005. University of Peradeniya, Sri Lanka. (First Class Honours.)
- GCE (Advance Level Examination), August, 1998. Dharmasoka College, Ambalangoda. Obtained one A pass and three B passes (300 marks).
- GCE (Ordinary level Examination), December 1995. Dharmasoka College, Ambalangoda. Obtained four distinctions and four credit passes

Research Interests:

Landscape Archaeology, Heritage Management, Geo-informatics in Archaeology,

Positions:

2011 to present	-	Lecturer in Archaeology and Heritage Management, Rajarata University of Sri Lanka
2009 - 2013	-	Visiting Lecturer in GIS, Department of History & Archaeology, University of Ruhuna.
2009 - 2011	-	Archaeological Research Assistant, Department of Archaeology.
2009/2010	-	Visiting Lecturer in GIS, Department of History & Archaeology, University of Sri Jayewardenapura.
2008/2009	-	Resource Person in GIS and Remote Sensing, Central Cultural Fund.
2008/2009	-	Visiting Lecturer in Archaeology, Department of Humanities, Rajarata University of Sri Lanka.
2006 - 2008	-	Assistant Lecturer in Archaeology, department of Archaeology, University of Peradeniya.
2008	-	Conducted the GIS workshop at the UNESCO Asia Pacific Regional Field School (Training-of-Trainers Programme) – Galle.
2006	-	Livelihoods Field officer, International Federation of Red Cross and Red Crescent societies, (8 months).
2003/2004	-	Training Research officer, Central Cultural Fund, Jethawana Project, Anuradapura, (4 months).
2000	-	Training Bank Assistant, Peoples Bank, Ambalangoda, (1yr).

University Development:

2013 to 2015	-	Principle proposal writer/ Grant coordinator – HETC/IDAS project (28 million rupees)
2013/2014	-	Student Counselor

2013 to 2015	-	Faculty Coordinator for University Website
2013 to 2015	-	Member – University IT committee
2013 to 2015	-	Member – Sports Advisory board
2013	-	Member – orientation Committee for the academic year 2011/2012
2013 to 2015	-	Coordinator – Postgraduate Courses in Heritage Management, Rajarata University of Sri Lanka

National Development:

2013 to present	-	Resource Person for Post Graduates Diploma in Defense Management – (Junior Naval Staff Course), Naval & Maritime Academy, Sri Lanka Navy.
2015	-	Country representative for the Heritage Impact Assessment at Galle Harbor

Professional Qualifications:

2017	-	International Training Program on Application of Very High Resolution Satellite Data in Natural Heritage Management, Wildlife Institute of India, Dehra Dun, India
2016	-	Capacity Building Workshop on Nature--Culture Linkages in Heritage Conservation, University of Tsukuba, Japan
2014	-	Conservation of Built Heritage (CBH14), ICCROM, Rome, Italy
2013	-	Staff Development Course, Staff Development Unit, University of Kelaniya, Sri Lanka
2012	-	Training of Trainers Workshop on "The Primer Series on ICTD for Youth" , UNAPCICT, Kukuleganga, Sri Lanka
2010	-	Advanced Training on GIS on Underwater Cultural Heritage, UNESCO, Chanthaburi, Thailand
2007	-	AAHM Field School on Cultural Impact Assessment & Maritime Archaeology, UNESCO, ICCROM, Galle, Sri Lanka
2005	-	Certificate course in Computer Applications, conducted by the IT Centre, University of Peradeniya, Sri Lanka
2004	-	Short course on office productivity and management of small computer installations conducted by the IT Centre, University of Peradeniya, Sri Lanka
2004	-	AutoCAD course, conducted by the National Youth Services Council, Polgolla, Sri Lanka
2003	-	Certificate course in Environmental Awareness, conducted by the Centre for Environmental Studies, University of Peradeniya, Sri Lanka

Field Experience:

2016	-	Interdisciplinary project "Tank as ancient measurement for integrated watershed management" Freie Universität Berlin and University of Peradeniya.
2015	-	Northern Expressway AIA, Department of Archaeology, Rajarata University of Sri Lanka
2014 to present	-	Avalokitheshwara project in Sri Lanka, University of California, Berkeley
2010	-	Negambo Heritage Town Survey, Department of Archaeology
2010	-	Jaffna Peninsula Survey, Department of Archaeology.
2010	-	Sithulpawwa Akasa Chayttya Survey, Department of Archaeology.
2009	-	Mannar Excavation, Sea link Project (Digital applications- ArcGIS).
2009	-	Anuradhapura Citadel Research Excavation, Sri Lankan and German Governments.
2009	-	Knuckles Exploration, Department of Archaeology.
2009	-	Horton Plains Exploration, Department of Archaeology.
2009	-	Umaoya Archaeological Impact Assessment (AIA), Central Cultural Fund.
2009	-	Giant Tank Archaeological Impact Assessment (AIA), Central Cultural Fund.
2007	-	Veheragala Rescue Archaeological Project, Central Cultural Fund, Resource Person in GIS.
2007	-	UNESCO-Department of Archaeology Project on Cultural Mapping of the Heritage City of Kandy (Digital applications- ArcGIS, MS Access, MS Front page)
2006	-	Anuradhapura Vessagiriya Excavation. Central Cultural Fund Project (Digital applications- MS Access)
2006	-	Vessagiriya Settlement Mound Research Excavations.
2006	-	Vessagiriya Cave Research Excavation.
2006	-	Nilgala Archaeological Project, California State University, Fullerton and University of Peradeniya, field supervisor.
2005	-	Project Knuckles, a scientific study of the unique herpetofauna of the Knuckles mountain range, ARROS and the University of Edinburgh.
2004	-	Jetavana Northern Weli Maluwa Research Excavation.
2003	-	Halpanu Ela Archaeological Exploration.

Scholarships and Awards

2014	-	Full Scholarship for CBH 14, ICCROM, Rome
2007	-	Scholarship for the AAHM Field School on Cultural Impact Assessment & Maritime Archaeology, UNESCO, ICCROM, Thailand
2005	-	University scholarship for academic excellence, University of Peradeniya.
2005	-	Prof. P. Leelananda Prematilake and Dr. Nanda Prematilake prize for archaeology, University of Peradeniya.
1998	-	Mhapola Higher Education Scholarship

Memberships:

- Member-Sri Lanka Council for Archaeology
- Member-Asian Academy for Heritage Management/UNESCO, ICCROM
- Life Member-Geo-informatics society of Sri Lanka.

Miscellaneous:

- Secretary of the Archaeology society of the University of Peradeniya (2003).
- Played basketball continuously for 5 years prior to leaving school.
- Was a member of the university swimming team

Research & Publications

2019	-	Indigenous Agricultural Systems in the Dry Zone of Sri Lanka: Management Transformation Assessment and Sustainability. Sustainability 2019, 11, 910. (https://doi.org/10.3390/su11030910) with Brigitta Schütt, Thusitha Wagalawatta and Wiebke Bebermeier
2018	-	Ancient Water Management and Governance in the Dry Zone of Sri Lanka Until Abandonment, and the Influence of Colonial Politics during Reclamation. Water 2018, 10, 1746. (https://doi.org/10.3390/w10121746) with Wiebke Bebermeier and Brigitta Schütt
2018	-	Water Harvesting in the Tropics. An Introduction of an ancient System in the dry Zone of north central Sri Lanka, Water Harvesting in Drylands, with Wiebke Bebermeier, Ingo Middelhaufe and Brigitta Schütt
2018	-	Ancient texts as source to analyse the ancient water harvesting system in Sri Lanka, 5th International Landscape Archaeology Conference, The McCord Centre for Landscape and the School of History, Classics and Archaeology, Newcastle University and The Department of Archaeology, Durham University
2018	-	Anuradhapura, Sri Lanka; Mapping nature culture values, Cultural Landscape of Asia, Wildlife Institute of India UNESCO C2C, UNESCO New Delhi and DRONAH
2017	-	The Hinterland of Ancient Anuradhapura: Remarks about an Ancient Cultural Landscape, Journal of World Heritage Studies, Tsukuba University, Japan
2016	-	Assessing community values in the management of World Heritage: a Case Study from the Old Town of Galle and its Fortifications, Sri Lanka, The Journal of Archaeology and Heritage Management, Rajarata University of Sri Lanka
2016	-	Settlement Archaeology in Anuradhapura "Deegapasana" rock outcrop, Joint publication with Thusitha Mendis and chandana Withanachchi
2014	-	Geo-physical Methods used in Archaeological Excavations. Journal of Social Sciences. Faculty of Social Sciences & Humanities, Rajarata University of Sri Lanka.
2012	-	Study on Formation & Evolution of Cultural Landscape of the historical port of Godawaya. Sarathi 10: 169-191, Central Provincial Council, Kandy.
2012	-	Remote Sensing Techniques in Archaeological Site Investigation. Welipila 8: 121-136. Central Cultural Fund, Colombo.
2011	-	Geographical Information System (GIS) Data Model for Archaeological Fieldwork and Analysis Based on Anuradhapura Heritage Geodatabase. Sirimal Ranawella Felicitation Volume: 572-607. University of Ruhuna, S. Godage & Brothers, Colombo.
2011	-	Geographic Information System (GIS) in Underwater Cultural Heritage (UCH) Management. Research Papers: National Archaeology Symposium 1(1): 113-119. Department of Archaeology, Colombo.
2011	-	A GIS Based Data Model for Archaeological Field Work & Analysis. 4th Research Conference, Abstracts: 192-193. The Royal Asiatic Society of Sri Lanka, Colombo.
2010	-	GIS Based Archaeological Data Management System for World Heritage City of Anuradhapura. Third International Symposium, "New Horizons in Humanities

		& Sciences towards Sustainable Development", Abstracts: 262. Sabaragamuwa University of Sri Lanka, Belihuloya.
2010	-	Development of a GIS based generic Information Management System for Heritage City of Anuradhapura. Abstract Volume, The Socirty of South Asian Archaeology, Third International Congress: 1. Center for Sout Asian Studies, University of Kelaniya, C Center for Sout Asian Studies, University of Kelaniya.Colombo.
2009	-	Geo-spatial Information System for Heritage City of Anuradhapura. Proceedings on National Archaeological Symposium: 35-39. Department of Archaeology, Colombo.
2009	-	GIS Mapping at Jethavana Stupa- An Integrated, development approach in heritage management. Jethaavana Puranaya: 98-113. Central Cultural Fund, Colombo.
2008	-	GIS mapping at Vessagiriya. Annual Archaeological Report (2006):97-101. Central Cultural Fund, Colombo.
2006	-	Cultural Landscape and Archaeology. Welipila 7:143-158. Central Cultural Fund, Colombo.
2003	-	(Joint author with A. De Silva, R.M.M. Chandraratne, S. Goonewardene, W.M.R.P.K. Chandradasa and D. Ellepola). Evidence of Prehistoric Cave Dwellers Inhabiting the Knuckles Massif: Preliminary Archaeological Findings. The Herpetofauna of the Knuckles Range: 185-190. The University of Edinburgh
2003	-	(Joint author with A. De Silva, R.M.M. Chandraratne, S. Goonewardene, J. Darke, W.M.R.P.K. Chandradasa and J.A.D.M.M. Jayasuriya). Some Archaeological Monuments and Traditions of North East Knuckles. The Herpetofauna of the Knuckles Range: 197-200. University of Edinburgh

Eidesstattliche Erklärung/Affidavit

Hiermit erkläre ich, Nuwan Abeywardana, dass ich die Dissertation " The Tank Systems in the Dry Zone Sri Lanka: Evolution, Management and Traditional Knowledge" eigenständig und ohne Quellenangabe außer den von mir und Aids angegebenen abgeschlossen habe.

Ich erkläre ferner, dass die Dissertation in dieser oder einer anderen Form noch nicht in einem anderen Prüfungsverfahren vorliegt.

……...
Berlin, 28. November, 2019