Negotiating power and constructing the nation : engineering in Sri Lanka

Witharana, B.D.

Chapter 1

"Engineering is in our blood": a popular narrative of Sri Lankan Engineering

In a message to the centenary commemoration publication of the Institution of Engineers Sri Lanka (IESL) in 2006, President Mahinda Rajapakse claimed that "engineering is in our blood" (Sivasegaram 2006). Even though he did not specifically say Sinhala blood - the blood of the majority Sinhala community, the reference was to the engineering skills of the Sinhalese. The statement by President Rajapakse was made at a time when he was providing political leadership to the war against the Liberation Tigers of Tamil Eelam (LTTE), the powerful Tamil militant group which fought for a separate state for Tamils, or Eelam. It was a time when the rhetoric of Sinhala nationalism was running high. President Rajapaske's regime led the final phase of the decades-long civil war that started in 2006 and ended in 2009 with the defeat of the LTTE[13]. In the same message he further stated that "we have a proud engineering past. Let us make the future even greater" (Ibid).

1.1 The three cases

The aim of this chapter is to describe a prevailing popular narrative of Sri Lankan engineering in more detail and highlight the key features that are used to maintain the narrative's relevance. In the absence of any authoritative text, three cases selected from the academic, professional and public spheres are used for this purpose; a course offered by the Faculty of Engineering Technology of the Open University of Sri Lanka entitled "History of Technology"; a documentary film "A Hundred Year Renaissance" produced as a part of the centenary commemoration of the Institution of Engineers Sri Lanka (IESL) and a ceremony held to re-launch the book *Wewa* (the tank) written by Udula Bandara Avusadahami, a well known commentator on the ancient irrigation systems of Sri Lanka[14]. These three cases taken together provide material to create a quick overview of how mismatches and incompatibilities between the

[13] The history of the armed struggle for the separate state, Tamil Eelam, goes back to a past of two to three decades. The war has led to the loss of eighty thousand to hundred thousand lives, heavy damages to the infrastructure and colossal loss of wealth. The final phase of the war from 2006 to 2009, known as Eelam war IV with three more phases before and ceasefires in between, can be considered as the most ruthless and devastating which was fought under the leadership of president Rajapakse who was elected to power in the 2005 presidential elections. With initial setbacks the Sri Lankan government forces moved ahead and captured territory held by the Tamil Tigers step by step to crush the resistance in May 2009 with the killing of the supreme leader of the LTTE, Velupillai Prahbakaran. Parallel to the process of war victories one could observe a surge of Sinhala nationalism the island had never witnessed before.

[14] *Wewa*, the human-made tank or a reservoir of different scales, is considered as the foundation stone or the basic unit of the ancient irrigation systems.

stories of the two traditions of Sri Lankan engineering (the pre-colonial tradition that goes back to the ancient past, and the colonial and postcolonial modern tradition introduced since the time the British occupied the island in the nineteenth century), are made invisible for a common goal, to boost the agendas of Sinhala nationalism. The popular narrative of engineering as informed by the three cases is about a continuous tradition of engineering illuminated by the engineering skills of the Sinhalese and their engineering works. In this narrative, advances in engineering in areas such as irrigation, water management, metallurgy, civil construction and town planning are represented by living monuments such as reservoirs, the cascade systems of tanks, multi-storey structures, iron smelting furnaces and Buddhist stupas. The superiority of Sri Lankan engineering is marked by precision of design and construction, complexity, uniqueness, grand scale and environmental sustainability.

The course titled "History of Technology" (MPJ4131), one of the few interdisciplinary courses offered as an optional course to engineering undergraduates at the Open University of Sri Lanka, is the first course on the history of technology offered within the Sri Lankan university system. It takes students on a journey into Sri Lanka's past using three case studies[15]. The first is a discussion on the ancient wind-powered iron smelting technology that reached its zenith during the first millennium AD. High-quality Sri Lankan steel was produced in mass scale in the monsoon-fanned furnaces built into the windward slopes of Sri Lanka's hills[16]. The second case study discussed in the course focuses on the Sri Lankan irrigation system which was advanced at the time of its early appearance circa fifth century BC, declining in the thirteenth century BC and renewed later, during the British colonial era of the nineteenth and the twentieth centuries. The traditional cascade system of tanks used to capture, store and efficiently utilise rainwater, a system that is seen by many (e.g. Madduma Bandara 1985; Panabokke 2000; Tennakoon 2000) as a model for sustainability and an advanced system of water management, and this

[15] The three-credit course "History of Technology" consisting of a course team mainly of engineers is offered at the third level of the five-level degree programme, Bachelor of Engineering Technology. The printed course material which I use for this discussion consists of two units, one on the history of engineering in Sri Lanka, and the other on the history of engineering in the world. Case studies are used to facilitate discussions among the students on both the Sri Lankan and the global cases. For the purpose of this chapter I pay attention only to the unit on Sri Lankan engineering (The Open University of Sri Lanka 2009).

[16] By quoting the research work done by archaeologist Gill Juleff, lessons allocated to discuss this technology describe how these unique devices, wind-driven furnaces, produced one-step steel that took competing technologies several steps. The invention of numerous iron smelting sites on summit hills in the region of Samanalawewa in 1988 has led Juleff to conduct excavations in 1990-1991 to find out remains of a furnace that was used to smelt iron. Juleff recreated the furnace out of remains she found to prove the theory which was just a hypothesis till then that the furnace used winds of the southwest monsoon to smelt iron (Sadanandan 2008). Juleff's findings were published in *Nature* in 1996 under the title "An Ancient Wind-Powered Iron Smelting Technology in Sri Lanka" – and provided ground material for the section on ancient iron smelting in the course "History of Technology" (Juleff 1996).

is presented with diagrams[17]. The thriving shipbuilding industry that is said to have developed between eleventh to thirteenth centuries AD is the third case study[18]. While discussing how Sinhala mariners engaged in voyages to different parts of the world for diplomatic, trade and religious purposes, it also describes the types of craft used (including craft used for inland fishing and transport), the types of wood used in construction as well as descriptions of the major ports in operation at the time (The Open University of Sri Lanka 2009).

The twenty minute and fifty eight second long documentary, "A Hundred Year Renaissance", the second case used in this discussion recreates an environment of engineering practice in ancient times along with scenes of modern engineering, to relate a story of a continuous engineering tradition. The frequent references to a history of Sri Lankan engineering extending beyond two thousand and five hundred years into the past as described in the documentary, relates perfectly to the time span of the history of the Sinhala nation - a history which is considered the official history of the island and is taught in primary and secondary schools. The images that appear in the narrative of ancient engineering of buildings, temples and reservoirs, are the same images that appear in the narrative of the Sinhala nation. The documentary displays the images of *Lovamahapaya* (the remains of the nine storey structure, the tallest building of the island during the first millennium AD, located in the Buddhist holy city of Anuradhapura), *Ruvanweli Seya* (the sixty meter high Buddhist stupa in the holy city of Anuradhapura), *Abhayagiri Seya* (the ninety five meter high second largest Buddhist stupa in the world located in the holy city of Anuradhapura), *Jethavana Seya* (standing one hundred and twenty meters high the tallest Buddhist stupa in the world located in the holy city of Anuradhapura), *Kalawewa* (the massive reservoir spread over an area of two thousand and six hundred hectares located in the ancient kingdom of Polonnaruwa) and *Yoda Ela* (the canal connecting the ancient kingdoms of Polonnaruwa and Anuradhapura) (*A Hundred Year Renaissance* 2006). The greatness of the works of ancient engineering of the Sinhalese is central to the narrative. The ancient technological systems are considered to be engineering marvels on par with or even exceeding engineering standards in many parts of the world during this period. High quality steel smelted in wind-driven furnaces in the Sri Lankan hills is said to have been manufactured for export purposes and the famous Damascus swords are said

[17] Interestingly, the section allocated for ancient irrigation is annexed with a discussion on irrigation practices in colonial and postcolonial times for the mere purpose of comparison and to highlight the superior features of the ancient system. Examples used to discuss irrigation and agriculture under the postcolonial period; the colonisation of the dry zone, the green revolution and the Kotmale Project that belongs to the Accelerated Mahaweli Development Programme are seen as failed attempts either socially, environmentally or technically (The Open University of Sri Lanka 2009).

[18] The article by Kamalika Pieris titled "Sailing Crafts in Ancient Sri Lanka" that appeared in *The Island* newspaper on the 10th August 2005 is used to facilitate this discussion.

to have been made of Sri Lankan steel. Ancient irrigation engineering in particular is hailed as superlative in terms of water management, while Sri Lanka's ships are said to have been the largest sailing the Indian Ocean in the eighth century BC (The Open University of Sri Lanka 2009).

The book Wewa was re-launched on the 2nd of February 2016, at the Librarian Services Board auditorium in Colombo. This was the third case used for this discussion, about the living works of engineering of ancient times and about how engineering is enmeshed with the politics of Sinhala nationalism. The *Wewa* or village tank, is the basic unit of water storage of the ancient irrigation system discussed as the second case study of the course "History of Technology". The new edition of the book which was originally written in 1999, was dedicated at the re-launch to the community of Buddhist monks "for the service they have rendered to preserve and enhance the knowledge base that was built by having *wewa* and *dageba* (the stupa of Buddhist temple) as the centre of Sinhala civilisation and for leading people in the island for a way of life governed by such knowledge". The event was chaired by leading monks of the two main Chapters of the Sri Lankan Buddhist institutions, *Malwathu* and *Asgiri*, and was addressed and attended by several leading members of the contemporary Sinhala nationalist movement, showing how the modern narrative of ancient engineering is adjusted to incorporate the contemporary challenges of Sinhala nationalist politics[19].

1.2 The narrative of engineering as a discussion of heritage

Conducting a lengthy discussion on the past and heritage Lowenthal (2015) observes that the narratives of the past (i.e. memory and history) such as the ones described by the three cases above derive and gain authority from physical remains. "They confirm or deny what we think of the past, symbolise or memorise communal links among generations, and provide archaeological metaphors that illuminate history and memory". They create a bridge between then and now (p. 20). Literature presents several debates that can be used to position a discussion about the popular narrative of Sri Lankan engineering. The role of materiality and grandiosity in the construction of past-oriented identity is a topic that is discussed widely. For Wickramasinghe (2013) there are at least two main routes to the past: history and heritage. By favouring history as a better academic practice to investigate the past, she positions the narrative of an authentic Sinhala past that was grounded in the age-old technologically-advanced

[19] In addition to the presence of a large number of Buddhist monks, the ceremony was attended by leaders of the Sinhala nationalist movement such as Gunadasa Amarasekara (the prominent Sinhala writer and poet and a leading member of the Patriotic National Movement), Wasantha Bandara (General Secretary of the Patriotic National Movement and a leading member of the ultra-nationalist political party, National Freedom Front) and Bengamuwe Nalaka (General Secretary of the Patriotic Bhikku Front).

hydraulic civilisation or in other words, a past as represented by the popular narrative of Sri Lankan engineering in the "heritage route". In doing so she refers to the traditional meaning of heritage that was generated out of a discourse identified by Smith (2006) as 'authorised heritage discourse'. According to this, heritage is understood to be static. It is a frozen past that is fossilised in its material fabric (Weerasinghe 2016). By referring to traditional definitions of heritage such as "that which a past generation is preserved and handed on to the present and which a significant population wishes to hand on to the future" as an example Harvey (2001) highlights the role of the "very physical and artefactual" presence in the idea of heritage (p. 327). Material or tangible heritage provides a physical representation of those things from 'the past' that speak of a sense of place, a sense of self, of belonging and community (Smith 2006, p. 30). Not only that the monuments, the objects of nationalist heritage, are artefactual and physical, they are grand in size. The 'authorised heritage discourse' says Smith (2006) "privileges monumentality and grand scale, innate artefact/site significance tied to time depth, scientific/aesthetic judgement, social consensus and nation building" (p. 11). Grandiose monuments such as tall stupas, grand reservoirs, long canals or complex water distribution webs became witnesses to history that took on a commemorative role in triggering certain public memories and values (p. 19). According to Elgenius (2005) the significance of monuments lies above all in their symbolic character to represent the nation (p. 284).

The common understanding of heritage, "authorised heritage discourse" in Smith's (2006) terms, where tangibility (i.e. materiality, objects, artefacts and monuments) played a central role in meaning construction however, seems to have changed as a result of interventions by scholars in the recent past. This new understanding of heritage provides fresh tools to revisit the popular narrative of Sri Lankan engineering along the 'heritage route'. Writing an introduction to her famous work "Uses of Heritage" Smith (2006) declares that her work starts from the premise that all heritage is intangible. The recent tendency therefore is to view heritage not as a 'thing' or a 'site' any more but as a discourse or a process. Representing this dynamic nature, Harvey (2001) defined heritage as a "verb". Grandiose monuments are treated no more as products of technology containing stories of the past freezed within themselves but as mere cultural tools that can facilitate the construction of a narrative of the past (Smith 2006, p. 44). Therefore "heritage is not only about the mediation of cultural and social conflicts, but is ultimately about the mediation of cultural change (Smith 2010, p. 64). According to this, heritage has two functions; to promote "a conscious version of history by state sanctioned cultural institutions and elites", and to be "a resource that is used to challenge and redefine received values and identities by a range of subaltern groups" (Smith 2006, p. 4).

This shift from tangibility to intangibility and from the centrality of grandiose monuments to the key role played by discursive inputs provides an alternative way of engaging with the popular narrative of Sri Lankan engineering. Literature indicates three prominent features of the narratives of heritage; silence (on people, events and time slots), the presence of the present in narratives of the past, and the role heritage plays in nation building. The rest of this Chapter draws from these insights to discuss the ways in which the popular narrative of engineering uses silence as a tool to construct an unproblematic story of engineering excellence of the Sinhalese and how gaps are negotiated and a smooth narrative is built by extending the present to the past as a strategy. An attempt is also made to discuss the extent to which the narrative of engineering and the contemporary politics of Sinhala nationalism are enmeshed.

1.2.1 Silences

Narratives about pasts are always about what people remember and what they forget (Harvey 2001). By paraphrasing what Crouch and Parker (2003, p. 396) quote, it can be said that "we only retained the memory of events that have 'created' us at the decisive instants of our 'pasts'". What is perhaps more important and interesting in a narrative of heritage can be things that are neglected, forgotten and silenced. Narratives of heritage often involve the selective use of history to substantiate its credentials (Lowenthal 1994; Crouch and Parker 2003). The dominant discourse constitutes the idea of heritage in such a way as to exclude certain social actors and interests by active engagement from the start and throughout the entire passage of time (Smith 2006; Lowenthal 2015). The popular narrative of Sri Lankan engineering maintains a silence on certain topics.

1.2.1.1 Silence on modern works of engineering

While the history of engineering in Sri Lanka has the ambition to record practices from the recent to the ancient past, all three case studies of the course "History of Technology" (e.g. wind powered iron smelting, irrigation and ship building) were about engineering skills of Sri Lankans who lived thousands of years ago. It is interesting to note that the modern tradition of engineering with a history that goes back to the colonial occupation and which contributed to the building of the modern Sri Lankan state remains unrepresented, as if there is no case study from that period that is worthy of attention.

Modern engineering was indeed introduced to Sri Lanka during the Dutch colonial rule (1640-1796)[20]. However, it was during the British occupation (1796-1948) and thereafter in post-independence Sri

[20] The involvements on a limited scale were in introducing their distinctive architecture, in constructing forts and fortresses, in restoring some of the irrigation works and in constructing canals and waterways for which they are world famous.

Lanka that the practice of modern engineering was properly established on a foundation of related institutions and infrastructure. The island went through great changes during the British era. A large number of modern buildings appeared in main towns. A road and a railway network with connecting bridges spread across the country, while the transport system was upgraded. Pipe borne water was introduced. The ancient irrigation network was rehabilitated and new irrigation schemes were introduced. Telegraph services were established, telephones were installed and radio broadcasts began. Power stations were built to supply power to domestic, plantation and industrial sector applications. The modern Sri Lanka with the major cities, high-rises, mega-reservoirs, power stations, highways and industries one sees today, was built after independence. Infrastructure for technical education was established[21] to fulfil the needs of the new nation-state. The state institution structure started operations as the Public Works Department, with multiple expertise in irrigation, electrical engineering, water supply and drainage, highways and bridges and railways. The Public Works Department was later separated into individual departments, boards and authorities. The Engineering Association of Ceylon was formed in 1906 to regulate the engineering profession. It originated as a small gathering of engineers, surveyors and archaeologists in the ancient city of Anuradhapura in the North Central Province and celebrated a hundred years of existence as the Institution of Engineers Sri Lanka, in 2006 (Engineers Association of Ceylon 1906; Bingham 1921; Balasingham 1968; Perera 2002; Sivasegaram 2006, Fernando 2014[2013]; Munasinghe 2015).

The lack of interest in modern engineering shown by the popular narrative of engineering is further revealed when one turns to the second case. The documentary "A Hundred Year Renaissance" after introducing the glory of ancient engineering, moves quickly on to narrate the history of the Institution of Engineers Sri Lanka, with little or no discussion of even some of the works of modern engineering[22]. Even when the history of modern engineering is described, as can be seen in the centenary publication of the IESL: "History of Engineering in Sri Lanka: A Brief Overview", the degree of interest shown in

[21] The Ceylon Technical School was established in 1893 for technical level engineering education and was re-designated as the Ceylon Technical College in 1895. Polytechnics were introduced in main cities outside Colombo. Technical education was further strengthened by establishing faculties of engineering attached to main universities in the island since 1950 (Sivasegaram 2006).

[22] Instead the documentary introduces by its end a list of five outstanding engineers of modern times; D. J. Wimalasurendra (the pioneer in introducing hydro electricity to Sri Lanka, around whom I construct my second chapter on the Aberdeen-Laxapana Hydro Electric Scheme), E. O. E. Pereira (the 'father' of engineering education), R. H. Paul (the leader in introducing engineering education in Sri Lanka), B. D. Rampala (who contributed a great deal in improving railways in Sri Lanka) and A. N. S. Kulasinghe (who introduced the application of pre-stressed concrete and appears in the third chapter in my discussion on the Accelerated Mahaweli Development Project) (*A Hundred Year Renaissance* 2006).

describing the excellence of the tradition can be seen to be low, in comparison to the emphasis on discussing the glory of the engineering works of the forefathers of the nation.

1.2.1.2 Silences on who had expertise in pre-colonial engineering

What is noteworthy in the popular narrative is also the absence of information on 'engineers' who were involved in the design and construction of grand engineering works of ancient times. The course "History of Technology" is silent on who provided expertise. The content of the course is confined to discussing technical details of the works under consideration. This silence on technical expertise, according to some, is a common feature shared by all records of Sri Lankan history. Conducting a discussion on "professions and occupations in the early Sinhalese kingdoms" Nicholas (1956) brings to light the contradiction in Ceylonese Chronicles[23] and epigraphical records of the availability of detailed descriptions on grand engineering works on the one hand and the lack of detailed information on the professionals who designed and built them, on the other (pp. 68-69). According to De Silva (1998) there was no ancient local text on how (technical) knowledge and (technical) labour were organised in the ancient times. Kamaladasa (2007) elaborates this aspect further when she says, "this is a very strange fact that in a country where nicely written and preserved documents on Buddhism, royal dynasties and temple cultures are available, no trace can be made on the engineering approach of the ancient system on which the stability of the social structure fully depended" (p. 43).

The twenty minute and fifty eight second long documentary, "A Hundred Year Renaissance", the second case that is used as an illustration of my argument attempts, however, to fill this lacuna. By trying to visualise the lives of 'engineers' in the ancient times, the film recreates two settings; one with a man in traditional attire (most probably a 'junior engineer') arriving to the 'field' on horseback and providing instructions to his assistants by drawing diagrams on a sand plate and the other, a 'senior engineer' on a bench clarifying things to a group of 'junior engineers' who were sitting on the ground. The narrator of the documentary names the second setting as "an earlier forum of engineering practice" (*A Hundred Year Renaissance* 2006). With no reference to systems in place through which knowledge on ancient engineering was produced, disseminated within the society and transmitted from generation to generation, the film simply serves the purpose of filling a vacuum with constructed images of a nostalgic past by using the two settings mentioned above. For De Silva (1998) the complex irrigation system, a

[23] In addition to the *Mahavamsa* there are many other chronicles that describe historically significant events, objects and people (See chapter 3 for more details). *Dipavamsa* (the Chronicle of the island) and *Mahavamsa* (the Great Chronicle) are the most famous.

leading pride of Sri Lankan engineering, collapsed by the end of kingdoms in Anuradhapura and Polonnaruwa, along with the related social organisation that facilitated them.

Interestingly, two lines of discussions that could have provided hints on the question of technical expertise remain under-investigated, leading one to take an easy path as in the documentary "A Hundred Year Renaissance" where the audience was invited to allow his/her imagination to be active and visualise a setting similar to the present. A strange silence is maintained on the possible influence of technology transferred from India at different times and recorded in history texts and on the possible role of members of the Navandanna caste, the manufacturing caste, who according to Dewasiri (2008), played a role in technological affairs in pre-colonial Ceylon.

Technology transfer from India

Indian craftsmen skilled in many trades are reported to have arrived in the island at different times[24]. The *Mahavamsa*,[25] the Great Chronicle, refers to at least two of such occasions (Meyer 2006, pp. 58-59). The first contingent of a thousand families of eighteen service castes landed during the times of Prince Vijaya[26] in the sixth century BC. They reached the island along with the daughter of a Pandyan[27] king who was brought to be married to Vijaya. The second group of craftsmen belonging to eight service castes is said to have arrived in the island a few centuries later, with Bikkuni Sanghamitta who brought with her a branch of the Bo tree under which the Buddha attained enlightenment (Nicholas 1956; Gunawardana 1985a; Adithiya 1984/85). Sources other than the *Mahavamsa* have also referred to the arrival of artisans from India. Pallava artisans[28], who arrived in the island between the sixth and the eighth centuries are said to have introduced the Tamil style of architecture to build Mahayana edifices (Indrapala 2005, p. 192). Artisans had arrived in the island even later (Codrington 1909; Meyer 2006). The principal smith families in the central hills were descendants from Pandyan and other Indian

[24] According to Adithiya (1984/85), "Indo-Aryan colonists ... brought the technical know-how of town and country planning, hydrological engineering - yet in its elementary stages and all relative sciences" (p. 76). When Adithiya talks about "Indo-Aryans" he refers most probably to Prince Vijaya (see the footnote below), who is supposedly of Aryan origin, and not to artisans who arrived from South India as discussed later in the chapter. .

[25] Mahavamsa is considered as the national chronicle that carries the official history of the island. It provides the narrative of an unbroken national past from the time of Buddha in the fifth century BC to the fourth century AD.

[26] It is the common belief that Sinhalese descend from the Aryan Prince Vijaya who arrived in the island from North India in 543 BC. He became the first of the continuous list of monarchs who ruled Sri Lanka,

[27] The Pandyan Empire is one of the four Tamil dynasties (Pallava, Chola and Chera being the other three) that ruled South India from pre-historic times until end of the fifteenth century. The Pandyan kings at the height of their rule were considered the rulers of one of the wealthiest states in the world and expanded their empire into Telugu country and the Northern part of Sri Lanka (Mishra et al 2012).

[28] According to Indrapala (2005) activities of Mahayanists have led to the arrival of artisans from the Pallava kingdom. They erected Mahayana structures and produced sculptures, particularly Buddha and Bodhisayyva images. Evidence of Pallava influence in sculpture is said to be spread in the island and can be seen in Central, North Central and Eastern provinces (p. 191).

craftsmen settled in Ceylon by the kings in the fifteenth and sixteenth centuries (Codrington 1909, p. 222). As per the myth of Gajabahu, a "colonisation myth" according to Obeyesekere (1984), these smith families were the descendants of 12,000 Sinhala men who had been taken as prisoners by the Chola king Karikala to work in his dam building sites in the Kaveri Valley and brought back to the island by the Sinhala king Gajabahu, together with 12,000 more South Indians (Meyer 2006, p. 62).

Navandanna caste

In comparison to the other caste communities linked to trades such as farming, fishing cinnamon peeling, toddy tapping, the Navandanna community, the Achari caste, was specifically concerned with 'technical' work (Ryan 1953). It is arguably a kind of a pre-colonial version of modern engineering that they performed. Categorising castes as agricultural, manufacturing and service, Dewasiri (2008) lists Navandanna under the category of manufacturing castes. Codrington (1909) observes nine professional groups to serve under the Navandanna caste in the Kandyan kingdom[29]; blacksmiths, gold and silversmiths, stone polishers, stone cutters, painters, lacquerers of arrow and spear shafts, turners of ivory and buffalo horn, brass founders and carpenters. As it was with the case of other professions (e.g. gem mining, catching, taming and raising elephants, transporting goods, etc.), technology oriented professions were organised under a department in each district by the name *Kottal-badda* (De Silva 1998). While the ordinary members of Navandanna community were involved in general, with meeting the day-to-day 'technical needs' of villagers, *Kottal-badda* consisting of especially skilled members from the same community provided services for the king and the kingdom. Duty bound to do any 'technology related work' assigned, each branch of *Kottal-badda* in the Kandyan kingdom consisted of seven carpenters, five turners, five painters, fourteen arrow makers, fourteen of those who furnish and execute fine work, four silversmiths, one stone cutter and thirty-eight blacksmiths who were relegated with different responsibilities (Codrington 1909, pp. 223-24).

1.2.1.3 Silences on technological developments elsewhere

The portrayal of Sri Lankan engineering as something that originated within the island, evolved within the boundaries of the country and was introduced to other parts of the world by the Sinhalese is one of the key features of the popular narrative. The three technologies discussed in the course "History of Technology": wind-powered iron smelting, irrigation engineering and shipbuilding, are considered to

[29] With Kandy as the ruling capital, the Kandyan kingdom extended beyond the central hills into the low lands and the exact territory coming under the authority of the kingdom changed over time.

have taken such a course[30]. Were the advances in engineering a phenomenon specific to the island and the Sinhalese, a nation with engineering blood as the popular narrative of ancient engineering used to claim, or were there exchanges of knowledge that led to the emergence of equally skilled nations in the Asian and South Asian regions? Scholarly literature on ancient irrigation points to several theories that can be assumed valid for other technologies as well. They are concerned with the direction of the net flow of knowledge in the field of water engineering. Jayawardana and Wijithadhamma (2015) describe this reality of exchanges when they say, "no society is isolated or self-sufficient to claim that it has never obtained some aspects of its technology from outside sources" (p. 45). While Adithiya (1984/85) credited Indo-Aryan colonists from North India for technical know-how of Ceylonese hydraulic engineering, Bailey as far back as in 1855 in his report on irrigation assumed the knowledge to be derived through Arabian and Persian merchants who traded between Egypt and Ceylon and, Tennent assigned in 1859 the origin of such knowledge to South India or China (Jayawardana and Wijithadhamma 2015, pp. 45-46). Taking a global view Needham (1971) in his classic work on "Science and Civilisation in China" notes that the hydraulic works of great civilisations of South and East Asia combined in various proportions the Egyptian inundatory irrigation techniques and Babylonian perennial irrigation techniques to form more mixed and flexible systems (p. 365). For him South Asia shared similar advances in irrigation engineering while maintaining differences. South Asia, the region of India and Sri Lanka, differed from the regions of Europe and China with its signature reservoir (tank) culture that had started spreading in the region since the eighth century (p. 373). Exchanges between South India and Sri Lanka were the focus of investigation by Indrapala (2005) who proposed Kerala, Tamil Nadu, Southern parts of Karnataka and Andra Pradesh (i.e. South India) and Sri Lanka (SISL) as a single cultural region. For him it was a case where the island was close enough to maintain contacts with mainland India, yet not be overwhelmed by its influences. Writing on labour circulation between Sri Lanka and South India Meyer (2006) identifies these exchanges as a structural process by which the main economic, social and cultural features of the island took shape and were constantly remodelled (pp. 57-58). Scholars have identified a range of technologies and technology related social organisation such as basic metal technology, the potter's wheel, the plough, paddy cultivation, dam and tank irrigation, a greater degree of craft specialisation, etc. as main elements of civilization common to the cultural region of South India and Sri Lanka (e.g. Seneviratne 1985 in Indrapala 2005, p. 57). As noted by

[30] The course "History of Technology" includes a section on the developments of science and engineering in the ancient world such as paper and printing in ancient China, mathematics in the Arabic region and Islamic engineering. However, expertise in areas of iron smelting, irrigation and shipbuilding was not discussed in relation to other countries and was reserved only for Sri Lanka.

Gunawardana (1984) the influence of South Indian irrigation technology spread to Sri Lanka in proto-historic times, while there was a reverse flow from Sri Lanka to South India, in historical times (p. 140). However, after these initial interactions, the separate developments of more than a millennium in the field of irrigation engineering in Sri Lanka and Tamil Nadu reached their peaks at the same time, in the eleventh and the twelfth centuries (Indrapala 2005, p. 268). Even though there is no agreement from where the ancient Ceylonese learned their first lessons, there seems to be a convergence of opinion that the subsequent experience in irrigation practice gained for centuries allowed Sri Lankans to build their own types of systems and their own brand of expertise. Needham (1971) argued thus: "yet it was never in India that the fusion of the Egyptian and Babylonian patterns achieved its most complete and subtle form. This took place in Ceylon, the work of both cultures, Sinhalese and Tamil, but specifically the former" (p. 368). The discussion so far suggests two scenarios within which exchange of technological knowledge is possible. It can either be unidirectional where the knowledge flows from a technologically advanced region to a region less advanced. The inflow of knowledge to Sri Lanka at the beginning and the outflow from Sri Lanka to other countries later after attaining maturity in hydraulic engineering, can be taken as examples for the first scenario. The other scenario within which exchanges of technological know-how take place is when two technologically advanced regions learn from each other. Indrapala's (2005) reference to exchanges between South India and Sri Lanka in the eleventh and the twelfth centuries comes under this second scenario.

1.2.1.4 More questions than answers

The discussion on three key areas of silences mentioned above leaves more questions than answers. Silence on modern works of engineering leads to a set of questions. Is it that modern engineering has little to offer to mobilise the imagination of Sinhalese or even Sri Lankans as a nation, the reason for it to go unnoticed in the popular narrative of engineering? Or is it a case where references to such advances in modern engineering were suppressed[31]? The issue of how labour was organised and who was involved with technology related work leads to another series of questions. Were castes the basis of social organisation of labour since the arrival of the eighteen guilds during the time of Vijaya? One wonders exactly when the caste system was established as the mechanism of organising labour, at least

[31] Meyer (2006) observes that "social anthropologists and historian notably Gananath Obeyesekere, Stanley J. Tambiah, S. Arasaratnam, A. Liyanagamage and J. C. Holt, have underlined the strong South Indian component in medieval Sinhala culture, and pointed out how the rise of Sinhala Buddhist nationalism led most twentieth century writers to neglect or erase these developments" (p. 56).

for certain professions such as 'technology related work'[32]. If most people employed in occupations other than rice and garden cultivation were of rather recent South Indian origin, as Meyer (2006, p. 70) suggested, an important question one could ask is, who was responsible for the engineering related works done in early times? Was the division of labour in the ancient times organised in a pattern different to the structure defined by castes? Or was it a case where people in general had all the skills they needed in their day-to-day lives and groups with specialised skills were formed only when it came to very special professions? One wonders who exactly were involved with the designing and construction of engineering works of ancient times. If they were master builders, what institutional structure did they emerge from? It is interesting to know why there was no reference in the records of history to a community of people who were particularly involved with ancient irrigation engineering. If the fact that irrigation related technical work did not arrive in the island as a caste from India indicates that this profession evolved within the island, it is reasonable for one to wonder why a reference to such an authentic expertise was missed by the authors of the Chronicles and by authors of other historical texts. A relationship between the ancestors of Navandanna caste and the ancient practice of engineering was claimed by members of the present generation whom I interviewed, and this is another terrain that remains unexplored (Informants 3, 6 and 7). Is it the low caste status of Navandanna that has prevented a wider discussion of the community's involvement in technological work in pre-colonial Ceylon[33]? Or does the absence of a discussion in the records of history on the questions mentioned above mean that the discussion is avoided for some reason? What are the reasons for silences maintained? One can speculate that the link to South Indian Tamil Kingdoms from where most of the

[32] Caste is not considered as a strict guideline in understanding the profession of a person. Farming, the professional involvement attached to Govigama caste, provides the best example for this. Farming is said to have done by people belonging to all castes. Making an observation on the inability to draw a direct relationship with the caste status and the professional involvement De Silva (1998) refers to instances where Goyigama people were involved with fishing and Karavas were involved with carpentry work.

[33] In a comparison of caste rankings conducted by several Europeans over three centuries (from seventeenth to nineteenth centuries) Ryan (1953) places Navandanna (or related castes) at second, third, fourth or fifth position in the caste hierarchy. By paying attention to seven references listing caste hierarchies, five by European authors (i.e. Robert Knox, Francois Valentyn, Governor Van Gollonesse, Governor Loten and John Davy) and two by indigenous sources (i.e. Janavamsa and Niti-nighanduva) Dewasiri (2008) concludes that there is no clear cut caste hierarchy in forming the social order in Ceylon and it depends on the region under investigation, the time of consideration and arguably the possible self-interests of the authors who documented social groups. While the general experience of the members of the Navandanna community with whom I maintain contacts for the purpose of this research is of inferior treatment by other castes that occupy top positions in the caste hierarchy, scholars have referred to instances in the past where situations were not so. *Shipeen* (artisans) occupied a higher position in the society and Navandaana *achari*, according to Knox, had his own authority within his own territory (De Silva 1998). Master builders of the ancient kingdoms who were assigned major construction works were selected after careful screening, were said to have completed their tasks with assistance of divine power and were rewarded with lands and wealth by the king (Codrington 1909; Nicholas 1956; Adithiya 1984/85). This was the case during the colonial era with the colonial economy serving to strengthen manufacturing castes. The amounts of *accommodessan* grants received by *Achari* caste (e.g. headmen of smiths and foremen of stone-cutters, goldsmiths and blacksmiths), the right granted to an artisan to use the income of a cultivated land till his or her services are provided to the 'lord of the land', are taken by Dewasiri (2008) as proof for this (p. 126).

artisans arrived in the island, was problematic to mention prominently in a narrative on ancient Sri Lankan engineering, a story exclusively reserved for Sinhalese. Was the mobilisation of imagination of Sinhala nation against its enemies, against its 'other' (i.e. South Indians and Sri Lankan Tamils as per the history text) the reason for silence - on the possible advances in technology in South India, on subsequent exchanges of technological know-how between South India with Sri Lanka (as argued by Needham (1971) and Indrapala (2005)) and also on the involvement of Sri Lankan Tamils in the ancient Sri Lankan hydraulic civilisation (as argued by Needham (1971))[34]?

The lack of records, in general, prevents one from taking a tour to the ancient past in search of hints to answer the list of questions, above. The best one can do is to speculate and to suggest that the silences are maintained to present a story of Sri Lankan engineering that is in line with the conventional story of the Sinhala nation. Rather than trying to answer these questions, this dissertation intends to visit modern engineering sites in the following chapters to address the research problem and specific questions.

1.2.2 The present in the past

Writing on Buddhist heritage sites in Sri Lanka, Wijesuriya (2005) identifies the aim of his paper as to show that the 'past is living in the present'. His title resonates with the first statement of the book "The Past is a Foreign Country – Revisited" by Lowenthal (2015), 'the past is everywhere'. There seems to be a general understanding among scholars that the past we see everywhere however, is a construction of the present or in other words a case of 'the present in the past'. For Wickramasinghe (2013) heritage is an essentially present-centred cultural practice and an instrument of cultural power. "All heritage is produced completely in the present", says Lowenthal (2015, p. 325). The present selects an inheritance from an imagined past for current use and decides what should be passed on to an imagined future (Tunbridge and Ashworth 1996). Not only that the past in a discourse of heritage is constructed at present, it is being revised and reworked along with the changes of cultural, social and political needs of the present (Smith 2006, p. 4) and in relation to our present temporal and spatial experience (Harvey 2001, p. 325). It is those who control the present who control the past (Crouch and Parker 2003). While

[34] According to the official history the South Indian invasions are considered the prime reason for the collapse of the hydraulic civilisation by the thirteenth century (De Silva 2005). Advances in engineering and collaboration in exchanging know-how with Sri Lanka are features that go against the image of South Indians displayed in the narrative of Sinhala nation. It is the same case with Sri Lankan Tamils who are seen as late arrivals to the island, the civilisation of which is built by the Sinhalese. The argument by Gunawardana (1985a) that the descendants of the thousand families of eighteen guilds of workmen who arrived in the island with the daughter of Pandyan king, perhaps the first group of technically skilled personnel to arrive the island, were not included into the category of Sinhalese till the twelfth century provides material, one can argue, to understand this silence.

conducting the Ponnambalam Ramanathan Memorial Lecture at the University of Jaffna, Weerasinghe (2016) described the ways in which the present affects the past, in the narrative of Sinhala heritage.

> "When a Sri Lankan archaeologist claim, upon finding an archaeological data pertaining to, for example, prehistoric technology, that this is how ancient Sri Lankans lived, what that archaeologist is doing is not seeing the difference between the past and present. This is so simply because there was no Sri Lanka, or Sinhalese or Tamils, as we understand these terms today, in the past…… The insertion of the past in to rhetoric of 'sameness' does only one thing, that's the 'creation of a fictional unity of a collective consciousness' ….and prevent us from asking the most important critical questions from our archaeological data" (p. 38).

The popular narrative of Sri Lankan engineering shows a number of ways in which the past is made at present. Strategies in use are diverse. The present is extended to the past not just through the category of the designer or the user of ancient technology, "Sinhalese", as Weerasinghe (2016) used to suggest, but through technology itself. Not just the category of Sinhalese is assumed unchanged, technology too is treated as a category that has not changed. The three cases based on which this chapter is built show different ways the ancient technology, an unknown entity by now, is constructed as an extension of modern engineering to the past. It creates a 'fictional unity' between the two engineering traditions, ancient and modern. A brief discussion on this is held under the titles, "(modern) scientific explanation of remains", "(modern) scientific restoration of remains" and "establishing an illusion of continuity". Even though all three titles are interconnected, they are treated separately within the context of this chapter by considering the different functions they play in the popular narrative of engineering constructed here.

1.2.2.1 (Modern) scientific explanation of remains

It is common practice to use principles of modern engineering to discuss ancient technological systems. Out of the three, the case study of wind-driven iron smelting discussed in the course "History of Technology" provides the best example. How the wind blows over the wall, creating a low-pressure between the furnace top and the tuyeres of the furnace, thereby generating a heat of 1500 centigrade to smelt iron, is explained using sketches, diagrams and photographs. The unique features of ancient technological systems are also described using modern engineering principles. Two prominent examples in relation to ancient irrigation, the spillway or sluice work with European type valve pits and the low gradient maintained in *Yoda Ela*, can be noted. Spillway or sluice work used more than two thousand two hundred years ago, is one of the technological inventions considered by Gunawardana (1978; 1985b) as an important precondition for the large-scale irrigation enterprise that bloomed during the third and the ninth century AD, and has been treated both by colonial and Sri Lankan engineers as a

proof of the engineering excellence of ancient Sri Lankans, in modern terms. The low gradient of *Yoda Ela* too appears often in the popular narrative of Sri Lankan engineering. Six inches per mile gradient maintained for the first seventeen miles of *Yoda Ela*, the fifty-six-mile-long water canal constructed in the fifth century carrying excess water from *Kala Wewa* to *Tissa Wewa* in the North Central Province, is considered as a proof of the sophisticated status of engineering of ancient times (Sivasegaram 2006). This practice of providing (modern) scientific explanations to describe ancient engineering works gives one the impression that the principles of modern engineering were in continuous application and were the basis of major engineering works designed by 'engineers' of ancient times.

Exposing the presence of the present at work in constructing the past, recent work by Jayawardana and Wijithadhaama (2015) poses a challenge to the dominant understanding of sluice work. For them the colonial narrative of ancient engineering which was accepted and unchallenged up to date was too simplistic (i.e. being incomplete and also incorrect in certain cases). The 'ancient sluice' is therefore a colonial construction. By following the peripheral tradition set by some scholars of reconstructing the religious and social history by bypassing colonial interpretations, Jayawardana and Wijithadhamma too use Buddhist commentarial work to reconstruct the history of irrigation in the island and to reach the above conclusion[35]. Colonials missed capturing the full spectrum of centuries-long changes that the sluice technology underwent, they argued (p. 17). Against the popular belief held that the main function of a sluice is to release water from a reservoir by saving the earthwork of the embankments from damage (Gunawardana 1985b), Jayawardana and Wijithadhamma (2015) refer to a "control structure combined with a breaching mechanism was used as spillway" (P. 16). At least some of the spillways constructed during this long stretch of time were expected by design to be breached as a way of water management. By taking the discussion on the (mis)understanding on sluice further, where water is thought by the colonial discourse to be discharged from the bottom of the reservoir, they refer to a sluice where water is released from the surface[36]. The superiority of this type to avoid salinity when discharging water is argued by Jayawardana and Wijithadhamma as the reason for the sustainability of irrigated land for several centuries (p. 18).

[35] *Samantapasadika*, the Buddhist commentary that was translated into Sinhala in the third century BC, handed down in the same language and translated into Pali in the fifth century AD, is the source used (Jayawardana and Wijithadhamma 2015, p. 8).
[36] According to Gunawardana (1985b) sluices were positioned at various levels in ambankments.

1.2.2.2 (Modern) scientific restoration of remains

An important question one could ask in relation to this discussion on the present in the past is how this ancient tradition of engineering that was linked to the ancient hydraulic civilisation that, according to Gunawardana (2008) faded away during the ninth and the thirteenth centuries, continue to survive in the collective memory of Sinhalese and appear prominently in discussions on Sri Lankan engineering. It was during colonial rule, in general during the Dutch and in particular during the British occupation in the nineteenth and twentieth centuries, that steps were taken to repair and restore some of the engineering works of ancient times from the status of ruins (Jayawardana and Wijithadhamma 2015, pp. 6-7). In the absence of any written document to refer to or of locally accepted or developed directions or guidance to follow except for the scattered evidence in the field, what was restored, however, by colonial engineers, archaeologists and surveyors, as Kamaladasa (2007) correctly pointed out, was a modern version of ancient engineering. According to Kamaladasa "there was no record available at least giving the basic location data let alone the complicated engineering information" (p. 43). Ruins of ancient works interpreted, arranged and restored using modern engineering principles laid the initial foundation of the contemporary narrative of great engineering works of the ancient times. Detailed drawings, surveyor reports, cost-benefit financial analysis, technical manuals and engineering interpretations of the colonial era provided the basis of restoring ancient works (Jayawardana and Wijithadhamma 2015). How Anuradhapura, the ancient kingdom of technologically advanced hydraulic civilisation, was reinvented by colonial archaeology and technology provides further proof for modern scientific restoration of remains (Nissan 1989; Jeganathan 1995).

1.2.2.3 Establishing an illusion of continuity

While the course "History of Technology" maintains silence on who provided expertise to build the age-old hydraulic civilisation, the documentary "A Hundred Year Renaissance" applies an interesting strategy to fill the gap and maintain continuity. Rather than trying to present ancient engineering as a practice radically different to the practice of modern engineering, the documentary presents the story of Sri Lankan engineering as a continuation of a single practice from the present to the ancient past allowing one to look backward and apply the same tools to examine the entire spectrum. In a way it disconnects the ancient practice of engineering from the pre-colonial and ancient social context that is ambiguous at best or problematic at worst and connects with the modern practice that was established solidly since the nineteenth and the twentieth century. The documentary, while accompanying the viewer with the 'junior engineer' who is on a 'field visit' on horseback, displays a series of images of modern engineering

in between (e.g. a close view of a train, an image of a dam of a mega reservoir, a sight of a modern worksite with machinery, a view of a multi-storey building in construction, images of a bridge and a power station) and hence mixing the ancient with the modern, suggesting in a subtle way an unbroken tradition from the present to the past. Even though positioned in two distinct points on the time axis (i.e. the past and the present) it was about a single practice with common features (e.g. 'field visits', 'lectures', 'forums of engineering', etc.) which can be easily identified through a modern lens. Selection of actors for the two main roles, the 'senior engineer' and the 'junior engineer', helps to strengthen this idea of continuity even further. The same two actors, two engineering academics serving in the Sri Lankan university system, who play the roles of senior and junior engineers in the modern context, play the same roles also in the ancient setup. The same actor playing the role of 'junior engineer' in the ancient scene also plays the role at first of a student at a secondary school, enters the Institution of Engineers of Sri Lanka for further studies to later become a Chartered Engineer while the same 'senior engineer' in the ancient context conducts lectures at a modern auditorium where the 'junior engineer' metamorphosed into a modern engineering student, is also present. Modern terms such as 'engineers' and 'technical personnel' are often used when pre-colonial technical practice is discussed. Being based comprehensively on the *Mahavamsa*, Adithiya (1984/85) finds 'architects' and 'craftsmen' as the two groups of specialised labour involved with ancient 'town planning' (pp. 80-85). In the opinion of Adithiya, architects or the master builders played a role similar to that of chief engineers of modern times and were involved with "success-pre-mediated, calculated and conscious planning". Working under the instructions of master builders, an army of skilled artisans such as workers in iron, turners, bamboo workers, blacksmiths, potters, goldsmiths, painters, bricklayers, carpenters and masons provided the supportive 'technical' role.

The centenary commemoration publication of the IESL, "History of Engineering in Sri Lanka: A Brief Overview", is the best example to showcase this idea of continuity from the ancient to the modern. The chapter breakdown "From Earliest Times to 500 AD" (Chapter 2), "From 500 AD to 1500 AD" (Chapter 3), "From 1500 AD to 1800 AD (Chapter 4), "1800 AD to 1950 AD: From British Colony to Independence" (Chapter 5) and "Post-Independence from 1950 to date" (Chapter 6) leaves no gaps in the long time stretch under investigation[37]. The continuity that "extends beyond two thousand five hundred years into

[37] While Chapter 2 reserves space to discuss ancient irrigation systems and structure in detail, Chapter 3 provides a discussion on engineering works of ancient kingdoms of Anuradhapura, Polonnaruwa and Kotte and on technical details of ancient smelting technology. Chapter 4 covers the works in the Kandyan kingdom and in the Northern and Vanni regions and the works of engineering by Portuguese and Dutch colonisers. Chapter 5 is reserved entirely for British Rule and Chapter 6 to the involvements after independence.

the past “, as per the narrator of the documentary, "A Hundred Year Renaissance", allows one in the absence of its own context to position the practice of ancient engineering in a context similar to modern engineering. It is this imagination of continuation from present to past that allows the free use of modern engineering principles to describe operations of systems of ancient times and the free use of terms such as engineers and engineering profession to describe those who were involved with the ancient practice.

The close relationship with Sinhala nationalism is the third feature of the narrative of engineering I would like to pay close attention to.

1.2.3 Bridge between the narrative of engineering and Sinhala nationalism

While the identity of the Sinhalese nation is so heavily dependent on the narrative of technological excellence of the forefathers who built technologically advanced kingdoms in the past, the construction of the narrative in return, is done on a Sinhala nationalist platform. The claim by President Rajapaske that "engineering is in our (Sinhala) blood" is the ultimate testimony of this relationship.

The high degree of intimacy and interdependence between the modern narrative of ancient engineering and Sinhala nationalism however, was best exposed at the re-launch of the book *Wewa*. The monk who delivered the welcome speech thanked the Buddhist monks for attending the event at a time they found themselves busy defending the interests of *Rata* (the country) and *Jathiya* (nation), which were in danger. He was in fact referring to the process of constitutional reforms initiated by the new government elected in 2015, which the Sinhala nationalist lobby saw as a threat[38]. Delivering the main speech Madagama Dhammananda Thero, the registrar of the *Asgiriya* Chapter, saw the constitutional reform process with proposals for power sharing among ethnic communities as a threat to the unitary nature of the Sri Lankan state and the suggestions by some to award equal status for all religions as a serious threat to the prominent position occupied by Buddhism under the existing version of the constitution. He identified three groups; *sarva agamika bikkus* (bikkus who worked for inter-religious harmony), "so-called Marxists" and "gang of NGO people" who, according to Dhammananda, receive

[38] By following a pledge given at the presidential and general elections in 2015 to reform the constitution, the newly elected government appointed the Public Representations Committee on Constitutional Reform (PRCCR) on the 22nd of December 2015. The Committee which started gathering public opinion through public sitting held island wide generated enthusiasm among civil society and citizen's group and the minority communities on the one hand and fear and protest among the Sinhala nationalist lobby on the other. The Committee which gathered public viewpoints on a wide variety of topics including national flag, national anthem, nature of the state, religion, degree of power devolution and fundamental rights, itself, was seen by the Sinhala nationalist lobby as a part of a conspiracy to unseat the majority Sinhala Buddhist community from the privileged position they occupy within the Sri Lankan society (Public Representations Committee on Constitutional Reform 2016).

“Dollars, Deutch Marks and Euros” for their anti-nationalist service as those who were at the forefront of the campaign for reform. If the documentary "A Hundred Year Renaissance" established the continuity of engineering practice from the ancient to modern times, the re-launch of the book *Wewa* by moving a step further, erased the gap in time between the ancient and modern and made the narrative of ancient engineering and narrative of contemporary nationalistic politics a single dialogue. While discussing *wewa* as an "expression of engineering excellence of Sinhalese", Dhammananda referred to three other recent threats faced by the Sinhala nation. For him the Accelerated Mahaweli Development Project, the mega irrigation scheme initiated during the last part of the twentieth century, was a conspiracy by Israel, the United States of America and Europe to wipe out the *wewa*-based Sinhala culture that has survived for thousands of years. The focus of the United Nations Human Rights Council on the status of human rights and consecutive resolutions passed by the Council to ensure accountability of the government on human rights were considered by Dhammananda to be an assault against the country[39]. The allegations made at the Council were fabricated, said Dhammananda. The third case he referred to, was the supposed unfair treatment received by a group of "war heroes"[40], a group of Sri Lankan government soldiers, who were in remand custody for abducting and killing the journalist Prageeth Ekneligoda[41]. Dhammananda revealed details of his visit to the prison hospital[42], a visit he made when he was on his way to the book re-launch. Dhammananda met the suspects when he paid a visit to the prison hospital to see Galabodaaththe Gnanasara thero, the leader of *Bodu Bala Sena*, the ultra-nationalist Sinhala Buddhist group known for conducting hate campaigns against minority communities in the island[43]. It was when he visited Gnanasara who was also in prison for contempt of

[39] The series of resolutions passed at United Nations Human Rights Council with regard to the crimes committed by both parties, The Sri Lankan armed forces and the Liberation Tigers of Tamil Eelam (LTTE), at the final stages of the civil war that ended in 2009 with the defeat of the LTTE and to the post-war reconciliation process, is considered by the Sinhala nationalist lobby as an aggression towards the island. The willingness to cooperate shown by the new government to work with the United Nations to investigate allegations under a special court is seen as a betrayal of the armed forces that saved the island from LTTE terrorism.

[40] 'War heroes' is the popular title awarded by the Sinhala community to Sri Lankan government soldiers who fought and defeated the LTTE. It is a term now being used to identify members of the entire armed forces.

[41] Prageeth Ekneligoda went missing on the 24th January 2010, two days before the presidential polls in Sri Lanka. Ekneligoda campaigned for the opposition candidate who lost the election. His wife Sandya Ekneligoda's longstanding struggle to find perpetrators received attention both locally as well as internationally, and made it one of the many decisive factors that led to the defeat of Sinhala populist Mahinda Rajapakse regime at the next 2015 elections. Investigations commenced after the election of the new regime led to a special unit of army soldiers being taken into custody.

[42] It is a common practice by the powerful sections of the Sri Lankan society to fall sick and stay at the prison hospital or at a government hospital when they are ordered to serve term in prison.

[43] Bodu Bala Sena, a group led by Buddhist monks and lay people, has a track record since 2012 of hate speech and violence against other regions and ethnicities. Their anti-Muslim campaign culminated in 2014 when mobs attacked and burnt down properties belonging to Muslims living in the coastal towns of Aluthgama and Beruwala, mass scale. Gnanasara with his followers used to visit Homagama magistrate courts where the case of Ekneligoda was heard to show solidarity with the accused soldiers who according them were war heroes.

court for threatening the wife of Ekneligoda within the court premises, he said he had the opportunity of meeting the innocent soldiers who were responsible for defeating the Tamil militants - the Liberation Tigers of Tamil Eelam. For Dhammananda, the entire episode of imprisonment was staged for the benefit of 'foreigners'. The popular narrative of engineering therefore, is not only about engineering but also about Sinhala nationalist politics, a version goes beyond a description of the technical aspects of a glorious technological past perceived through a lens of modern engineering. This feature of intimacy between the two narratives has made Dhammananda's speech sound normal to the packed audience seated at the auditorium of the Librarian Services Board, a speech which under normal circumstances would have sounded totally incongruous.

1.3 Placing chapters in context

The present chapter focuses on the popular understanding of Sri Lankan engineering through an analysis of three cases, namely the content of a course offered for engineering undergraduates, details of a documentary film produced by a professional institute representing engineers and the statements made by various parties present at the re-launch of a book on ancient irrigation systems. Filled with grandiose monuments and stories of the glories of the past, the popular perception of engineering is laced with a narrative constructed in an uncomplicated manner, with no roots to a detailed socio-political context of the past. Chapter 1 sets the stage for a focused discussion in the following chapters, introducing the key idea in the thesis that pertains to the narrative of engineering as a continuous source of pride for the Sinhalese. It identifies some of the areas where a popular narrative maintains silence and explores how the gaps created by silences are made invisible by using the modern context and idiom (e.g. use of modern engineering principles, use of terminology of modern engineering and use of modern categories such as Sinhalese) to discuss the past. Chapter 1 is also a discussion on tensions in the sphere of engineering (e.g. between the pre-colonial and modern traditions) and non-engineering (e.g. how Sinhala nationalism is defined by inclusion and exclusion), thereby providing a backdrop to issues dealt with in the following chapters, that examine the links between specific modern engineering sites and developments in Sinhala nationalism at particular moments of the twentieth century. The narrative of engineering as described in Chapter 1 represents a late-twentieth-century- and- an-early-twenty-first-century static view of a continuous process of a narrative construction that is being reconstructed, modified and revised over time leaving the following chapters to establish its dynamic nature and to address the research problem in full.