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The proto-historic irrigation in Sri Lanka: a retrospect

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Introduction

Water is a main factor that shows the development of a country or a region. So it was very important to society. Sara O'Hara points out that poverty begins with the scarcity of water and the mismanagement of water resources (2003: 13). The scarcity of water is a big problem for the gradual agricultural development, and this problem has existed since proto-historic times, and this can be identified from the certain evidence of that period. The social archaeology has influenced the development of the ancient irrigation system of Sri Lanka, and it seems that it should be analyzed fully to understand it. The irrigation system did not come into existence naturally, it was created by the people to fulfill their water needs and so it was developed gradually b them. the main purpose of this essay is to analyze the Social archaeological process of the proto-historic period in which the irrigation system of Sri Lanka have existed for a long time and examine its existence, from this essay, I hope to analyzed the origin of the irrigation system of this country. The last quarter of this period is named by me as the post proto-historic area. While there were more and more social activities in the proto-historic period, the new transitional features can be seen less in the first century B.C. there was a new social gradual development here and this situation had existed up to 350 A.D.

Review

Many of the ancient societies of the world have existed in the river valley civilizations. The basis features of these civilizations are the settlements that were created by the people in certain limited reviver valley areas for example, the Nile, the Tigris and Euphrates, the Huang ho and the Indus which were very fertile river valleys of the ancient civilizations (Korovkin 1985).When the ancient society of Sri Lanka is analyzed, it is quite clear that the civilization of the country was not bases on rivers or streams as the limited areas. It is quite clear that they have settled in the river valleys as well as faraway areas from them and this shows according to the spread of the early Brahmin and later Brahmin inscriptions this country (*Ic.*Vol.i - 100; *Ic.* Vol. ii:1-123). We can identify that the tanks and dams were constructed to feed the faraway lands from the valley. The irrigation oriented civilization lasted in the ancient society of Sri Lanka. This civilization originated in proto-historic times in this country, and when we study this further, we see that there is cultural evidence to understand this concept, and we can see this situation from the ancient irrigation system. The irrigation civilization originated in this country in proto-historic times, and it is quite clear that it was a basic investment of that society which represented the irrigation civilization. It was the main wealth of the country. The specialty of these basic irrigation civilizations the use of natural water resources in the main and sub river valleys by means of irrigation system. In addition to this, rain water management can be identified in the basic irrigation civilization. A large number of small tanks in the dry zone and the intermediate zone of Sri Lanka were fed by rain water, and it is clear that the rain water was stored in reservoirs and used for agriculture and other social needs formally. There is evidence that the basic step for this was taken in the proto-historic period. We can identify the world's oldest

example of the basic rain water management in the irrigation civilization that was built in the dry zone of Sri Lanka in the proto-historic period. The entrance of the irrigation works.

It is important to analyzed the human settlement of the proto historic period in this country, the origin of the irrigation works and there archaeological identification. The age- old organized human settlement of Sri Lanka lasted in the proto-historic period, and it is clear that those settlers found out the suitable farming land to carry on their livelihood. They reared animals and depended on subsistence agriculture instead of hunting and food gathering, and had simple economic style, and this is the main feature of the proto-historic period (Senevirathne 1984). In this period, they led monotonous life style, and later it was changed according to the environment they lived and formed their economic diversity according to it. According to this, we can see that people who lived in the proto-historic period created their permanent settlements where they did all their activities, and led their lives to fulfill their all needs easily. We can identify these places of settlements and their special features of this period from the megalithic burial grounds and the black and red earthenware from the nearby areas. With these features, the culture of the proto-historic period is introduced as *Megalithic Black and Red Ware Culture* by the scholars. The first proto-historic *Iron Age culture* of Sri Lanka has lasted nearly from 2400 B.C. to 350 A.D. (Paranawithana 1956: 14; Indrapala 1969: 51; Begly 1981: 49-95; Deraniyagala 1992 b: 717-8,723,740- 2; Senavirathne 1996 : 279; Withanachchi, Mendis 2016; Somadewa et al 2008: 13; Deraniyagala 2007: 69).

It is clear that according to the Great Chronicle or the *Mahavamsa* and the other main historical sources, *Yaksha, Naga* and *Dewa* tribes lived in Sri

Lanka in the sixth century B.C., and they had an organized social system (*Mv.* i,vii). There were several activities from 900 to 600 B.C. in the proto-historic society, namely the permanent human settlements, the Knowledge of using iron, the use of horses, the use of the black and red earthenware, the practice of rice cultivation and the domestication of animals (Deraniyagala 1992 b: 740). It is clear that they had improved their literacy from 600 to 500 B.C. (*ibid*: 740-2). When we compare the information of the chronicle with the archeological evidence, we can think probably that *Yaksha, Naga* and *Dewa* tribes were the civilized local people of this country who represented the great Stone Age culture of the Proto-historic period.

They settled in the dry zone that was suitable for agriculture and animal breeding because it had a dry climate and a plain landscape, and settled in the coastal plain because the ocean resources were available for fishing industry, and settled in the highland and west zone that were suitable for the industry of mineral resources and spices, and these are the main features of this period. The important evidence of the human settlement of this period can be traced by the megalithic burial grounds of the proto-historic period. The evidence of the many burial grounds that have been identified at this moment is situated in the dry plains, the coastal regions and the low highland regions of this island (Seneviratne 1984: 240-62; Senanayake 1993: 07; Somadewa et al. 2008: 13; Withanachchi 2009 b: 1-5; Jayarathne 2011: 99-102; Withanachchi 2012: 43-64).

1. **The dry zonal plain**

Mamaduwa, Thekkam, Aluthbomuwa, Karambankulama, Thammennagodella, Gurugalhinna, Kalpewadigawewa, Kok - ebe, Diulwewa, Rambewa, Machachchagama, Sandanamkulama, Anuradhapura, Ibbankatuwa, Pinwewa, Rajanganaya, Yatigalpotta,

Kekegama, polpitigama, Siyambalagaswewa, Ridiyagama, Godawewa, Eruwewa, Kataragama, Anakatawa, Kandalama, Rotawewa, Sigiriya, Siyambalawewa, Nelubewa, Ranchamadama, Kalawelpothana, Neelagiriya, Gurugoda, Mawathawewa, Andarawewa, Wahalkada.

2. **The coastal plain**

Kareinagar, Aneikodde, Kandarode, Mantai, Thekkam, Pomparippu, Makewita, Kadiraweli, Yala.

3. **The highland and wet zonal area**

Asmadula, Ruwanwella, Padawigampola, Elahera, Nalla, Unalugala, Haldummulla, Udumagama, Kalatuwawa, Dewelapola.

Proto-historic human settlements of Sri Lanka are mainly situated in the dry zone which is suitable for farming (Seneviratne 1984: 240-62). It is clear that according to the spread of human settlements and burial grounds. This area has a dry climate and fertile soils that are suitable for farming, and because of the long time dry weather the artificial irrigation system have been constructed to irrigate the paddy-fields, and so human settlements spread in this area rapidly. According to that the people who lived in this area in the proto-historic period are the people who first constructed the irrigation system of this country. The megalithic burial grounds and the proto-historic human settlements of the river valleys give evidence to the existence of ancient irrigation systems in dry zone.

I. **Yan Oya Valley**

Gurugalhinna, Thammennagodella, Kalpe, Wadigawewa, Rambewa, Kok - ebe, Mawathawewa, Diulwewa, Siyambalawewa, Sigiriya, Gai - andakatuwa, Paluketuwewa (Walahidda wewa).

II. **Malwatu Oya Valley**

Anuradhapura, Thekkam, Aluthbogamuwa, Siyambalagaswewa, Eruwewa, Sandanamkulama, Manthai, Nelubewa.

III. **Kala Oya Valley**

Karambankulama, Rajanganaya, pomparippu, Yatigalpotta, Ibbankattuwa, Kandalama, Anakatawa, Kelegama.

IV. **Deduru Oya Valley**

Pinwewa, Polpitigama.

V. **Mee Oya Valley**

Andarawewa, Gurugoda.

In proto-historic period, there were small human settlements in the dry zone of this country. We can decide it according to the spread of the burial grounds in that period. It is clear that these settlements probably lasted as tiny settlements. On the basis of these facts, we can hypothesize that when these tiny rural settlements were selected by them, they probably considered the nature of the land. They probably considered soil structure that is suitable for agriculture, and thought of water that needs for both agriculture and other purposes, and thought about the construction of the irrigation system.

The reservoirs were constructed to deal with the problem of water in the dry zone in the proto-historic period because the agriculture needs a large volume of water. We can show that the ancestors of the people who settled in the dry zone in the proto-historic period constructed temporary ridges,

ditches, ect, across the streams to irrigate their paddy- fields. But this irrigation system was not sufficient when the population increased, and so that horizontal ridges and the highlands of inland plain were used to construct small reservoirs which were used to store rain water for agricultural activities. It is clear that the people who lived in that period had a good knowledge about the natural situation of the inland plain, and so they were able to construct these irrigation systems.

Eba is a Sinhalese world which means that a deep water - hole, and we can show that this simple irrigation system was constructed by the people who lived at the beginning of the proto-historic period. Some people pronounce this Sinhalese word as *Eba* (æba), and the others as *Heba* (heba), and we can introduce this *eba* as the very ancient simple irrigation system of this country. *Eba* was a deep water- hole that was constructed by the people near a river or a stream to store water during the floods, and this was low land near a river bank. *Eba* was long wide ditch shape water-hole that was constructed by digging the ground. Sometimes water had been taken by digging a short ditch from the water resource for some *ebas*. Although there was not a permanent technical method to take water from the *eba*, the big wooden scoops were probably used for it. *Kok-ebe, Wahalkada eba, Kalu eba and Habawila near the* Yan Oya and *Ebawalpitia eba near the* Deduru Oya are some of the examples for *ebas*. We can see such *ebas* on the river banks of *Malwatu Oya, Kala Oya* and *Mee Oya* (Withanachchi, 2012: 66-7). At the beginning of this period and at the outlet of the Iron Age, the simple metal tools were probably used to dig river banks and created the early irrigation systems such as *ebas*. The Kok-ebe burial ground is situated near *Yan Oya*, and there is an *eba* that is called *Kok- ebe*, and there is another eba below the Wahalkada megalithic burial ground, and *Kalu eba* is situated near *Habawila* where several megalithic burial grounds can be seen, and it is clear that

there are close relations between proto- historic human settlements and these *ebas*. When there were no water collecting natural lowlands or ponds in an inland plain, an *eba* was probably constructed as an alternative irrigation system.

Photo 1. The eba of Kok-ebe on the left bank of Yan Oya

The people of the proto-historic period and the early Iron Age constructed small tanks or reservoirs (*Wewa*) according to the situation of the land and the environment, and natural ponds (*Pathaha*) and lowlands were used to construct these small tanks reservoirs, and small dams were built to bring water to these small reservoirs. There are small reservoirs near the megalithic burial grounds of the dry zone, and so we can show them as the evidence for this. The *Idamoralu wewa* reservoir near *Ibbankatuwa*, the several small reservoirs at *Kondadeniya* in Yapahuwwa near the burial grounds, the reservoirs of *Gurugalhinna, Sandanamkulama* and *Siyambalagaswewa* near the burial grounds the reservoirs of *Pomparippu* near the burial ground, the reservoirs and the canals of Kok-ebe near the burial ground, the small

reservoir of *Tammennagodella* near the burial ground, the two reservoirs of *Kalpe Wadigawewa* near the megalithic burial ground, the reservoirs of *Rambewa, Mawathawewa, Diulwewa, Siyambalawewa* and *Paluketuwewa* near the proto-historic burial grounds on the bank of the Yan Oya, and we can hypothesize that the origin of these reservoirs probably belongs to this period. At the outlet, the bunds of these reservoirs were very small because the people had small amount of paddy - fields, and later with the increase of population, they probably had to construct large reservoirs, and then the bunds of them were very big and long. The reservoir near the megalithic burial ground of Pomparippu was once inspected to find out the relations between the reservoir and burial ground (Begley 1981: 59).

The natural big pond that situated near the megalithic burial site at *Andarawewa* in the Mee Oya valley was probably used by the proto-historic people for their water needs. This is one of the natural ponds that has been found, and it is not deferent from others which shows the basic features of such on.

Photo 2. The natural pond (Pathaha) of Andarawewa on the bank of

According to the legends of the chronicles, in the sixth century B.C. there was a vast development in the proto-historic settlements of this country. During this period, for the first time, there is a record about the villages of this country (*Mv.* vii: 10). In those days, there was a kindom in this country, and *Kuveni* helped Prince *Vijaya* for his victory, and she helped him to kill *Yaksha* tribe to capture their kingdom (*ibid*: 21-2, 32). According to the chronicle, in those days, there were towns in this country, and *Sirisawasthipura* and *Lankapura* are the examples for these two cities (*ibid*: 33).

In those days, there were methodologies to store water in this country, and there is evidence for this. The story of Prince *Vijaya* and *Kuveni* deals with the ponds (*ibid*: 12), the story of King *Pandukabhaya* deals with the lake of *Timbiri Yahana* (ibid. x: 53), and these are the examples for them. Instead of this, in those days, stone ridges were probably built across the streams to irrigate the reservoirs. Kala Oya and Yan Oya flow through the dry zone, and there are several dams across both these rivers which have primitive features of construction, namely the situation of the rocks and the nature of the construction, and this shows the basic stage of a dam.

The *Neeli Bemma* dam of Kala Oya has been built with shapeless big rocks. This has been built on a natural rock ridge that is situated across the Kala Oya. The natural shapeless big rocks and broken wide rock slabs were used step by step to build this dam. Some big rocks are about 7.35 meters long and about 3 meters wide. We can guess that these rocks weigh approximately about 15 tones.

When we compare this dam with the other ancient dams of the country, we can identify that it have more primitive features than the others. According

to this primitive style, it is clear that the creation of this dam probably belongs to the first period of the construction of the irrigation system of this country. We can see that a simple technical methodology has been used here when a dam is built across a stream. According to it we can think that very simple iron tools were used to built this dam in the proto-historic period. We can analyze some shapeless stone slabs at this dam that are similar to the lid stones of some megalithic burial grounds of this country. According to it we can guess that the burial grounds of the proto-historic period were constructed using the stone slabs, and this methodology was probably used by the builders of the dams in those days. In that period, iron tools were probably used one by craft guild for the construction work of rocks.

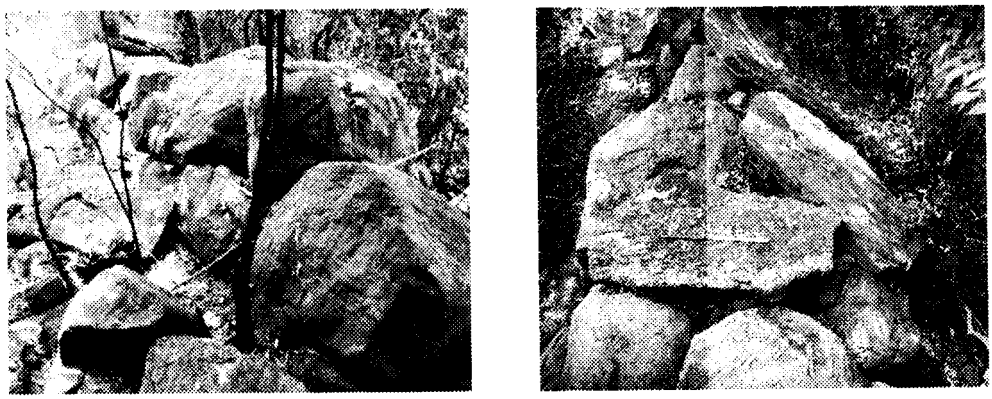

Photo 3. This is the *Neeli Bemma* primitive dam of Kala Oya which has been built by using shapeless rough rock blocks and slabs

Photo 4. These are the shapeless lid stone slabs of the *Wahalkada* megalithic

In the proto-historic period, such as small irrigation systems were started by the people who had the knowledge of technology, and they probably used iron tools to constructed them at the beginning of the Iron Age. In this period, we can see that steel tools were probably used to break rocks to create burial grounds, and to make tools for agriculture and the other needs. According to this, we can think that steel tools were probably used to construct reservoirs.

Seneviratna has shown that that at the end of the proto-historic period there is another development of that culture itself (1996: 279). In general, that period is considered as the beginning of the organized society of Sri Lanka. We can find out more information about this period from the early-brahmin inscriptions which deal with the spread of population and the other details about the human society. The social structure of that period and the responsibilities of the people reveal many information. In particular, that does not disclose the historical sources of this country, namely social groups, names of their occupations and their responsibilities. We can show that these groups engaged in social and cultural activities, and they originated at the beginning of the proto-historic society.

District	Amount of Early - Brahmin inscriptions	Percentage
Anuradhapira	269	40%
Kurunegala	169	25%
Polonnaruwa	51	7.6%
Matale	60	8.9%
Other neighboring areas	122	18%

Table 1. The amount of the early-brahmin inscriptions that are situated in the dry zone of Rajarata and the neighboring areas and their percentages

We can identify that the Early - Brahmin inscriptions spread largely in the dry zone of this country where the irrigation system was launched. When the first volume of inscription of Ceylon was published, 1105 early-brahmin inscriptions had been identified in this country (*Ic.* Vol. i: 1-100). Among them, there are more than 671 inscriptions in the dry zone of Rajarata and the neighboring areas. As a percentage, it is about 60.7% (Look at the table 1).

In general, we can identify that the spread of those inscriptions in river valleys thus: Deduru Oya 103, Kala Oya 123, Malwatu Oya 162 and Yan Oya 85. It is Quite Clear that after the proto-historic period too, the people of this country were very interested in the dry zone (Look at the table 2). At the beginning of that period, this area was suitable for the social and cultural activities, and human settlements were probably started during the post proto-historic period.

River valley	The amount of Early- Brahmin inscriptions	Percentage
Deduru Oya	103	9.3%
Kala Oya	123	11.2%
Malwatu Oya	162	14.6%
Yan Oya	85	7.7%

Table 2. The amount of the Early-Brahmin inscriptions that are situated in the dry zone of Rajarata and the neighboring areas, namely in the river valleys and

According to the spread of these inscriptions, it is clear that during the post proto-historic period, this region was represented by North-West, North Central and the neighboring regions, and the population of this area had increased gradually. The gathering of people from a variety of social strata

and their guilds lasted gradually, and we can identify this from the inscriptions and their designations. Clarisse shows that the stratum of the communities is based on economic and social activities, and the administration system is organized according to these factors (Claessen and Skalnik 1978: 545-6). We can see that idea is confirmed further when the social structure of Sri Lanka in the post proto-historic period is analyzed. Mandis has said that in the first historic period of Sri Lanka, the social stratum can be identified clearly (2010). It is clear that the entry for it probably had come in to existence in the post proto-historic period. This social stratum can be identified in the dry zone of Rajarata in Early-Brahmin epigraphs, for example, *Parumaka, Gamika, Barata, Batha, Asha* etc (Look at the table 3). We can identify this process and information from these epigraphs and the people who gave the leadership for them. These names are *Parumaka, Gapathi, Gamika, Batha* etc, and they may be the name of the tribes or the leaders who gave the leadership to create the settlements. R. A. L. H. Gunawardana says that *Parumaka, Gamika, Gamani, Gapathi* etc are the names of the designations and they show the guilds of the society and we can understand the political and social situation of that period (1978b: 261; 1981: 133-154).

The name of the social stratum	The amount of the Early-Brahmin inscriptions	Percentage
Parumaka	243	58.8%
Gamika	52	12.5%
Barata	21	5.0%
Bata	85	20.6%
Asha	12	2.9%

Table 3. These are the Early-Brahmin epigraphs that were situated in the research area, and they deal with various social strata, and the amount of epigraphs and percentage

The social group that bears the name *Parumaka* was the forerunners in the social stratum during this time, and this is confirmed by the Early-Brahmin epigraphs. Seneviratna has said that there is a more prominence in the very ancient proto-historic burial grounds about the word parumakas that shows in the inscriptions that are situated near the burial grounds and they have widely spread (1989: 114). According to it, we can decide that the origin of parumakas have existed since the proto-historic period. We can see the word parumakas (*Ic.*Vol.i: Nos. 106, 107, 119, 120, 125, 127, 130, 131, 133a, 148, 152, 153, 159, 161, 162, 163, 166, 169, 170, 174, 180, 182, 183, 196, 203, 838, 847, 848, 854, 586, 1043, 1044) in the Early-Brahmin cave inscriptions near the megalithic burial grounds of Sri Lanka and the areas of settlements, and on the basis of these facts, we can hypothesize that these leaders have existed from a traditional indigenous tribe. We can decide that this designation would be popular in the proto-historic period in this country because it was always used in the 2nd and 1st century B.C. The name of parumaka was used in the dry zone of Rajarata 58.8%, and this amount is high (Look at the table 3). Sithrampalam says that parumakas were a social group in that period, and they were the forerunners of that society (1986/87: 13).

According to the inscriptions, we can identify that parumakas were not a social group that did a particular activity in that contemporary society. According to it, we can see that parumakas had worked to fulfill the social needs. It is clear that there was a close relationship among the social, economic, political and religious fields. In those days there was a group that had a relationship with political and administrative process (Seneviratne 1989: 108). According to the inscriptions, parumakas had consolidated their power in all sections of the contemporary society (*Ic.* Vol. i: Nos. 2, 22, 59, 63, 64, 230, 251, 319, 355, 471, 507, 606, 620, 621, 650, 665, 703, 724, 761, 837,

860, 899, 947, 1002, 1035). On the basis of these facts, we can hypothesize that parumakas had probably played a vital role in the irrigation system of this country. We can identify that at the beginning of the historic period, some of them were the guardians of the reservoirs (*ibid.* : Nos. 1130,1132,1151,1153) (Look at the table 4).

Early - Brahmin inscription (*Ic.* Vol. i)	**Name of parumaka**
Handagala 1130	wapi hamika parumaka mahawebaliya
Handagala 1132	wapi hamika parumaka mahadaka
Aukana 1151	wapi hamika parumaka uwajanaka
Aukana 1153	wapi hamika parumaka dasakaha

Table 4 The Early-Brahmin inscriptions show the parumakas who were the guardians of the small reservoirs

Agriculture was the main occupation of the human settlements in the post proto-historic period in this area, and they probably found mineral resources here to consolidate their settlements. The inscriptions show that there were iron industries and various craftsmen in the North Central Province, North Western Province and neighboring areas (*ibid.*: Nos. 490, 925, 1049, 1136). *Tambakara* or coppersmith (*ibid.*: 319,350 - 1, 750), *Kabara* or blacksmith (*ibid.*: 161), *Kolagama* or *Lokurugama* (the village of blacksmiths) (*ibid.*: 815), *Topasha* or tinker (*ibid.*: 370) are the jobs that are described in the inscriptions. Instead of these details, inscriptions give more information about the jewelers and gem industry (*ibid.*: 74, 209, 791, 830). Sometimes, there were business enterprises (*ibid.*: 356-7, 897) in this area, and so people

probably established settlements here. In this situation, during the post proto-historic period water supply probably needed not only to agriculture but also to the other field too, and so there was a development in the irrigation system of the region. According to that, small reservoirs were probably enlarged to store water, and multi-purpose village reservoirs were created to supply a large volume of water to the people.

After the sixth century B.C., the south Indian people migrated the places of this country where natural resources were abundant, and this is a very important in side in the history of this country (*Mv.* vii-ix). Because of this migration, the identification of the proto-historic indigenous tribes of Sri Lanka was probably mixed with the migrants. A complex society was started in Sri Lanka because of this human mixture; for example, agriculture society, craft guide and commercial society are some of them. A permanent state was created because of this change, and that situation influenced the irrigation system of this country directly for its development. However, it is clear that these South Indian migrants represented the South Indian post proto-historic period. According to some information of the chronicle, when these migrants came to Sri Lanka, it was transitional era of the proto-historic period of this country.

According to the chronicles, the Indian communities came to Sri Lanka in the sixth century B.C., and established their settlements in the northwest and the southeast of this island (*ibid.*: vii- viii). We can hypothesize that the Indian communities first migrated to the island via the northwestern shallow sea coast of the country. The people who came from western India landed on the northwestern sea coast; the people who came from eastern India landed on the southeastern sea coast, and established their basic settlements in the neighboring areas. We can hypothesize that this

happened according to the change of the wind blowing direction in the Indian Ocean. According to it, it is clear that the first Indian human migration occurred in the northwestern and the southeastern arid zones of the country and they established their settlements there. This region was not suitable for agriculture. Because the temperature of that area evaporates the water from the soil. As there are *latsol* in the soil in this area, rain water is quickly absorbed into the ground, and so this area was not suitable for the construction of the irrigation works. So they left this area and entered the interior of the country to find out the suitable land for agriculture and irrigation works. With the experience received by the land, some of the Indian migrants entered the interior dry zone plain, and the others established their settlements in the fertile coastal regions. *Anuradhagama* was established on the river bank of *Kolom Oya, Upatissagama* was established on the river bank of *Gambhira Nadee* and *Uruwelagama* was established on the river bank of *Kala Oya*, and these are the examples for their settlements (*ibid* vii :43-6). It is clear that King *Pandukabhaya* developed *Anuradhagrama* further (*ibid.* ix: 9-11), and he understood the value of river valleys in the dry zone. There were close relationships between the Indian migrants and the indigenous people of this country, and they probably mixed rapidly and established their settlements in the interior, too.

The indigenous people who lived in Sri Lanka and the north Indian communities who migrated to this country via south India and the Indian Ocean practiced subsistence agriculture including rice cultivation (Brohier 1975: 3).According to it, it is clear that they constructed small irrigation works in the plains of the dry zone in Sri Lanka according to its situation. The Indian migrants probably had experiences about that they received from India. Brohier has shown that there were two main irrigation factors to establish the early human settlements in the dry zone.

1. Small lakes were constructed to store rain water, and ditches were made to irrigate the paddy-fields.
2. Temporary dams were constructed across the streams with timbers and rocks, and ditches were made to supply water for their needs (Brohier 1975: 5; Nicholas 2001: 214).

It is clear that indigenous people and Indian migrants created their settlement on a common style. Mainly, timber posts and wattles were used to build these houses, and they were built in a circular style. Archaeological evidence can be found for this from the excavation of the citadel (ASW 2) at Salgahawatta in Anuradhapura (Coningham 1999: 126). At Present, the houses of this tradition are used by the tribal people of South India, and this is the evidence for its continuation (Look at the photograph 5). A small reservoir with a small bund built by hand was constructed by them near their houses, and they was probably the farmland under it, and this reservoir had several acres in extent. According to it, we can hypothesize that the early village of the dry zone was probably established near the reservoir. According to this, we can name these small reservoirs as rural tanks.

We can identify that there were a large number of rural tanks in the early human settlements. We can find out clear evidence from the Early- Brahmin inscriptions that there were human settlements near these rural tanks. Nettukkanda inscription mentions "*Erakapi*" village, this name of the village derives from Erikawapi reservoir (*Ic.* Vol. i: No. 168), Mihintale inscription mentions " *Lonâwapi*" these two words join together thus, " *Lonapi*" this is a name of a place (*ibid.*: No. 25), Handagala inscription mentions " *Anulapiwapi*" (*ibid.*: No. 1130), Mihintale Rajagiri Kanda inscription

Photo 5. The house of this tradition are used by the tribal people of India
http://www.opusenergyblog.com/smart-villages-reshaping-indian-communities

mentions " *Upalavi*" (Upalawapi) - village name (*ibid* .: No. 112; *Ez.* Vol. v: 225) these are the examples for them. Since ancient times, rural tank were very important to the lives of the people, and we can confirm this from the names of the places which last from the pre- Christian era (Withanachchi 1999: 96). According to the Early-Brahmin inscriptions that have spread everywhere in the dry zone of the island, we can think that there were human settlements but the population was probably rather thin. So rural tanks were probably sufficient for their agricultural activities. In 1904, according to some research, 11,200 such rural tanks had been found in the Anuradhapura district and the Northern Province (Brohier 1975: 6).

The involvement of the political process in the post proto-historic period

The chronicle says that there wear a large number of small and middle scale reservoirs that were built in the post proto-historic period. When Minister Anuradha built the village of *Anuradhagrama,* a reservoir was constructed, and this is the oldest information about a tank (*Mv.* ix: 11). When King *Pandukabhaya* established Anuradhapura town, three reservoirs were constructed, namely *Jayawapi, Abhayawapi* and *Gaminiwapi* (*ibid.* ix: from 83). Sub-king *Mahanaga* built a reservoir in the third centurr B.C., and its name was *Tarachchawapi* (*ibid.* xxii: 4). One of King *Dutugemunu*'s gaint, *Labhiya Wasabha,* had constructed a reservoir (*ibid.* xxiii: 92-5). We can show that Prince *Saddhatissa* probably constructed a large number of reservoirs in the *Deeghawapi* area to help his agricultural development (*ibid.* xxiv: 2-3). *Hundiriwapi* and *Weherawegmapi* were the two reservoirs, and the village were formed near them (*ibid.* xxiii: 49, 90). Instead of this, the chronicles have disclosed that many reservoirs were constructed during this period.

In the post era of the proto-historic period, the king was responsible for the economic development of the country, and he had to develop agriculture that was one of the main features of the economic development. In that time, there were several leaders who gave the leadership to the political process. Before Prince *Dutugemunu* subjugated Anuradhapura, King *Kawantissa* who was ruling in the kingdom of Rohana encouraged Prince *Saddhatissa,* Prince Dutugemunu's brother, to develop agriculture, and this is the example for it (*ibid.* xxiv: from 2). The *Poojawaliya* says that King *Saddhatissa* (137 - 119 B.C.) built 12 reservoirs (*Puja.*: 18), and the *Rajawaliya* says that he built 18 reservoirs (*Raja* .: 44). However, it is clear that these reservoirs were not large. The inscription at Minwila says that the "*Degama*"

canal was built by King *Kutakannatissa* (44- 22 B.C.) in the first century B.C. (*Ic.* Vol. ii: No. 01). Nicholas says that this was started from a dam of the River Mahaweli (1961: 293). According to this, it is clear that reservoirs, dams and canals had been constructed under the patronage of the kings.
We can think that when the first century B.C., every village in the dry zone had a small reservoir. However, in this period, there were two water supply systems, and there is evidence for this.

i. Permanent small dams were built arose the streams with rocks, timbers, clay or other things, and irrigated the paddy - fields through small canals.
ii. The earth ridges were built to store water, and irrigated the paddy - fields below them (Nicholas 1964: 214).

Although small rural tanks in the dry zone were the base of the agriculture water supply in that area, we can identify a special feature at the end of the first century B.C., namely rural tanks concept was changed into large reservoirs. Consumption increased than the production because of the rise in the population, urbanization and commercial development, and so the agricultural production capacity had to be increased, and the shortcomings of the rural tanks were maintained to increase more production than before. There are many shortcomings that can be identified in such reservoirs.

1. The water capacity of the reservoirs was very low, and so during the drought seasons there was not enough water to irrigate the paddy - fields.
2. As the water capacity of the reservoirs was low, farmland had to be reduced.

3. During the heavy rainy season these small reservoirs were not able to store enough water, and sometimes they broke destroying the farmland.
4. During the drought season, these small reservoirs dried completely, and neighboring whole area dried, too.
5. These small reservoirs got filled with silt easily.

We can identify that after the first century A.D., the proto-historic features gradually died down, and organized society was formed there, and they established their settlements in this region, and there was a large development. The inscriptions and chronicles disclose information about this. An organized state administration probably lasted for this. As the population density gradually increased during this period, we can see that there was a development in the settlements. Inscriptions disclose the names of places and villages, and from them we can understand the population spread. Thus population increased gradually, and so various steps were taken to supply human needs. As a result of this, the regular irrigation system was created for agriculture and the other water needs. State patronage was received for it, and it was done privately, too (Look at the table no. 5).

Although large irrigation systems were created, rural small tanks were not abandoned, and they were maintained further. According to it, it is clear that during this period small irrigation systems were constructed in the dry zone of the island to develop agriculture. Among these irrigation creations, most of them were probably independent, and we can see that they were used freely.

Large reservoirs were constructed instead of rural tanks to increase the capacity of water with the social change and experiences in the post proto-historic period, and big rock dams and canals that can take water for several kilometers. However, because of this change the rural tanks were not abandoned, and some tank were probably enlarged under this programme.

King *Mahachulika Mahatissa* (77- 63 B.C.) built *Mandawapi* reservoir (*Mv.* xxxiv: 9) during his reign, and this was probably such a reservoir. Mahavamsa says that King *Makalantissa* (44-22 B.C.) built a canal named *Warnaka,* a big reservoir named *Amudurga* and a reservoir named *Bayaloppalu* (*ibid.* xxxiv: 32-3). An inscription says about the above - mentioned canal named *Warnaka,* and there, it is named as *Wanaka Ali* (*Ez.* Vol. iii: 157; *Ic.* Vol. ii: No. 10). During this period, we can find out more information about the irrigation systems that were received royal patronage from the Later Brahmin inscriptions (*Ic.* Vol. ii: Nos. 1, 3, 7, 9, 10, 13, 14[4], 15, 16, 18, 19, 21 , 23, 26, 31, 37, 38, 39,). From these inscriptions, we can find out very important information about the constructions of canals besides reservoirs. According to this, we can probably think that the constructions of the dams were developed concurrently. It is clear that society has taken a step to create irrigation systems, and it happened in the proto-historic period and post technological era.

Ownership of reservoir	Later Brahmin inscription and No.
Kadahalaka wapi hamika	Galge 1122
Naka naraka wapi hamika	Handagala 1129
Anulapi wapi hamika	Handagala 1130
Nakodapika wapi hamika	Handagala 1132
Kadapi wapi hamika	Aukana 1151
Gokanagamaka wapi hamika	Ganekanda Temple 1200
Yawa wapi hamika	Sesseruwa 1210
Punapitika wapi hamika	Torawa Mailewa 1217 - 1218

Table 5. Later Brahmin inscriptions of the ownership of reservoirs

After the identification of the people's needs, reservoirs, dams and canals were constructed to supply water for human needs, and these irrigation systems were essential for the people of the country. The identification of the need > the creation of impressions > exemplification > encouragement > involvement in irrigation system > and direction are the activities of the creation of the irrigation systems in the country. There should be a firm principle to provide common services to the people, and it is clear that this concept has arisen among the people. The main purpose of this is the social and economic development of the people, the participation of the community, encouragement and the joining of rural community organization, and their contribution. The inscriptions up to the third century

A.D. deal with the large scale irrigation systems of the country, and so we can understand clearly about this development (look at the table 6).

The social status of the proto-historic or prehistoric period is different in the Christian Era because during this period the water management was done by direct political process in the dry zone of this country. We can identify many social process of water that lasted at the time. According to the possession of water resource, these activities happen in society, namely cultural development, complex activities among the people, spiritual development and social communication, and economic development of individuals and families. Lindn say that there is a connection between water management and politics (1979: 2). Peter P. Mollinga has shown that "water management" is a political structure that is based on human process and decision (2008: 8-9). There is a social meaning in the management of water resources (Withanachchi: 2008). So there was a direct connection between water and various social activities. This social meaning had been understood by the many rulers of the Anuradhapura and Polonnaruwa period of this country and so they paid attention to construct irrigation systems and water management. Proto-historic cultural people of Sri Lanka have given an opportunity to enter the irrigation system of this country, and this can be understood by the analysis of the historical expansion of the irrigation system of Sri Lanka.

Conclusion

The proto-historic or prehistoric system of irrigation in Sri Lanka is different from what was developed after the Christian Era. The post proto-historic water management had direct political involvement in the dry zone of the island resulting the private possession of water resources. A separate culture was generated within the society what is referred to as agriculture. It

is an unprecedented cultural development with complex activities among the people which gave tremendous boost to spiritual development and social communication. The economic development of individuals and families predominantly visible at this juncture. Lind says that there is a connection between water management and politics (1979: 2) whereas Peter P. Mollinga points out that "water management" was empowered bypolitical structure that is based on human process of decision making (2008: 8-9). A social meaning for the management of water resources (Withanachchi: 2008) too emerged. The ultimate result was the emergence of a connection between water management in a cultured society. This is a factor that had been even understood by the many rulers of the Anuradhapura and later those of Polonnaruwa as well. Accordingly, there had been constant and foremost attention of the rulers drawn towards agriculture, irrigation systems and water management. This solid base was laid down by none other than the proto-historic people of Sri Lanka.

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