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Preprint · January 2021
DOI: 10.13140/RG.2.2.36337.56166

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A review on *Diyakaliya* in Yoda Ela. An unique structure of the canal irrigation system of ancient Sri Lanka.

Nāgānanda International Journal of Humanities & Social Sciences

Vol: II , No. 1, 2021, pp. 30-42

http://www.niibs.lk

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Received : 01 July 2021
Revised : 01 August 2021
Accepted : 03 November 2021
Published : 01 December 2021

TO CITE THIS ARTICLE:
H.H.A.Karunarathna. A review on Diyakaliya in Yodha Ela. A unique structure of the canal irrigation system of ancient Sri Lanka. Nāgānanda International Journal of Humanities and Social Science.1:2, Pp. 30-42

Abstract:

Long extending canals, distributing water for vast areas are one of the ancient irrigation structures of Sri Lanka. Normally, in terms of functionality, these canals are of four types. One; supply of water for paddy fields located at the destination point of the canal. Second; supply of water for small tanks located alone the canal which ultimately feed paddy fields. Third; canals that distribute water for the entire downstream area enabling people to use free water or water diverted by temporally earth dams or *Amuna* (anicuit). Other types of canals were made to provide water to tanks located alone its way as well as to its destination reservoir. Yoda ela, the longest and marvellous canal built by our ancient irrigation engineers belongs to the latter category. It starts from a large reservoir called Kalawewa being passed about 54 km to its destination reservoir *Tisawewa* located in Anuradapura ancient city. Yoda ela is mostly famous for its engineering aspect of carrying a large volume of water maintaining the same flowing capacity for a distance of 17 mile even though higher amount being provided for surroundings agricultural lands. On the other hand, Yoda ela has been constructed mostly in higher elevated sites in the downstream opposite to contours. The research explored that actually Yoda ela is not only a canal of water carrying, but also a water source freely flown on the ground can be denoted as a flown tank. At some places even today this is evident. In addition, archaeological investigation confirmed hundreds of small village tanks had been directly fed by the canal. Research exploded in addition to tanks, many other unusual structures had been there. One of them is *Diyakaliya* that differs from tanks. The main concern was given to study these ancient structures focusing attention on their engineering, hydrological and water management aspects and the functionality. Present paper as an outcome of that research, first discusses structural layout of the *Diyakaliya* from engineering point of view and then highlights its functionality from a hydrological engineering and environmental perspectives. Research was basically undertaken with field investigation together with topographical map interpretation. By the present as Yoda ela canal has been damaged and subject to modify under the *Mahaweli* Development project undertaken in 1970s.Thus ruins and limited remnants of the canal were the focal point of concern of this research. A number of Archaeological excavations were done at that sites. Opinions of old persons in the area were also used to understand the ancient layout of the *Diyakaliya* and its functionality. Research explored that ancient *Diyakaliya* is a means of intensifying water flowing capacity of the canal. Furthermore it worked as an instrument of water purifying, sediment and flood controlling of the canal itself and the surrounding. It is also evident that these structures have played a considerable role in the canal based water management systems. Therefore *Diyakaliya* is an unique feature that our attention should be further focused.

Keywords:- ***Hydrology, Water Management, Irrigation, DiyaKaliya***

Introduction

Irrigation water management systems in ancient Sri Lanka were consisted of many structures. Village tanks that impounded free water from their individual catchments, medium scale tanks organised into cascading systems based on streams, large reservoirs of water storing and distribution, and canals diverting water from streams or from large reservoirs. Canal system is not a new thing to the world now, but it is evident that Sri Lanka has a long history of canal irrigation that goes back to 1st century BC. Evidences are available that impounding water for agricultural purposes in small ponds has been practiced by our ancient people even in the protohistoric times (Deranigala, 1992). After beginning of the written history, with migrations of Vijaya and his companions (according to our great chronicle *Mahavamsa)* this water impounding system, developed with construction of tanks. When they continued settling down in the river basins, they realised the necessity of harnessing water using advantages of the topographical conditions, monsoonal climate and drainage systems of the undulating land surface. In tank building, they have utilised technology they brought from their mother land (India), with the existing knowledge hardworking experiences of the aborigines. With the increase of population over the settled areas (Northern and Southern Dry zone) building of tanks became gradually developed with the advancement of technology. As a result, by the 3rd century B.C large tanks damming rivers came into existence. They understood that small tanks built based on steams are not sufficient to store water for long dry periods. They wanted to collect a large amount of water in reservoirs so that to convey water to necessary points such as small tanks and other irrigable lands. Accordingly, the concept of building long extended canals came into popular. Some canals functioned as connecting large tanks. Some were planned to directly provide water for paddy fields. Another type was to bring water for end tank while providing with water for small tanks as well as for irrigable lands located alone the canal area. Yoda ela belongs to the latter category.

Yoda Ela is a long canal of about 54 km miles runs from *Kalawewa* tank to *Tisawewa* tank in Anuradhapura city. Historians believe this canal has been made to provide necessary water for Anuradapura city requirement. But many researches have shown that the purpose might be irrigation water supply for a vast irrigable area where no other water sources were available (Brohier, 1935; Panapitiya, 2010). According to the contemporary irrigation works and spatial distribution, Yoda ela has been constructed in 3rd century of during the period of Anuradapura kingdom. The canal started at the point of sluice where water from the tank was released. At the beginning *Kalawewa* was a small tank, but time went on they realised a considerable amount water in *kalaoya* could be impounded. Thus it is evident at several times in the history *Kalawewa* has been expanded under patronage of King Dhathusena (459-477), in modern time in 1977 the first phase of *Mahaweli* Development Program implemented in this area and instead of Yoda ela a new canal (jaya Ganga) was constructed starting from a new sluice from *Kalawewa*. The old Yoda ela has been damaged at some places and at some sites Jaya Ganga connects to the Yoda ela. Under this complication, fully recognising of the structure old Yoda ela is a difficult task. However historical, archaeological and field investigations show that there had been a marvellous water management systems based on Yoda ela. In this regard, the main concern of the present study is given to view the specific structural of the canal *Diyakaliya* from hydrological environmental and water management perspectives.

Methodology

Yoda ela has been constructed high elevated ground, instead of the low laying valley bottom that normally engineers are used. Topographical survey on Yoda ela has done using contours analysing method. Accordingly, it was understood that the canal had flowed in a same contour line (300m) In order to confirm this, Geographical Position Systems (GPS) along the canal was used. The structural form of the canal route was identified with the use of software (GPS-Track option) with positioning of irrigational features, topographical variations of the area as well as structural changes of the canal. Topographical maps, contour data and aerial photo interpretation were also used to verify this information. Field investigations on broken parts of the ancient canal were done. Some information on functionality of canal in the past, were collected by hearing to the old persons in the area. Chronicles and other historic documents were referred to get essential information with regard to history of canal.

Result and Discussion

Diyakaliya is a feature exits in the canal at the bending parts of meanders. At this site, normally water flowing speed get slow down and some quantity is remained there being flown the rest into the normal flow. This feature is like ox-fold lakes formed naturally in rivers in the lower valley. The noteworthy fact that meanders in Yoda ela have been made by ancient engineers purposely to convey water for high grounds where there was a need of water for irrigable lands.

At the narrow parts of the bend, earthen dams or dam's stony dams have been made in order to remain a considerable amount of water in the *Diyakaliya*. When canal flow is zero, water in these elements remains for a considerable time enable to use water in the dry season. The normal size of this feature is about 35/40 the dam is about 500m length. Depth is about 20 feet. Investigation explored that these features have been constructed in high value counters being actual canal in the lower contours (fig. 1) the survey explored 50 *Diyakaliya* located within 17 miles of the canal.

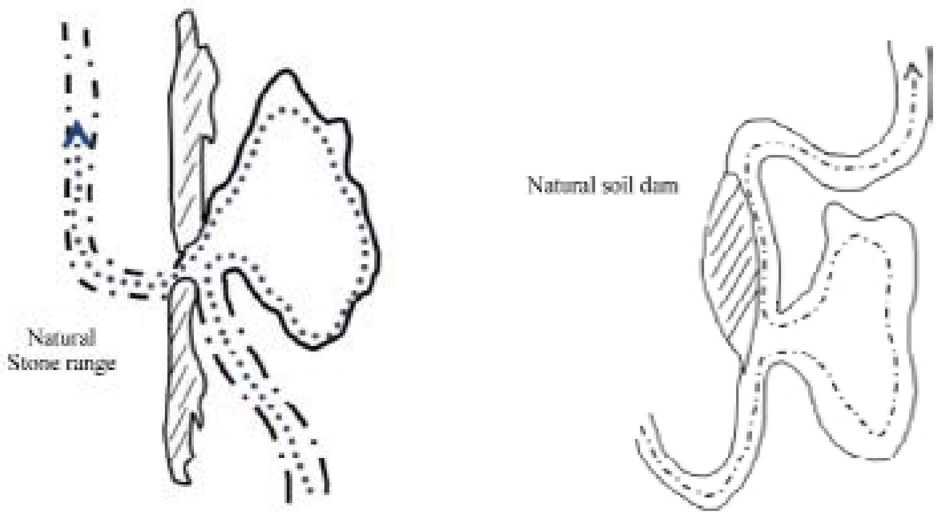
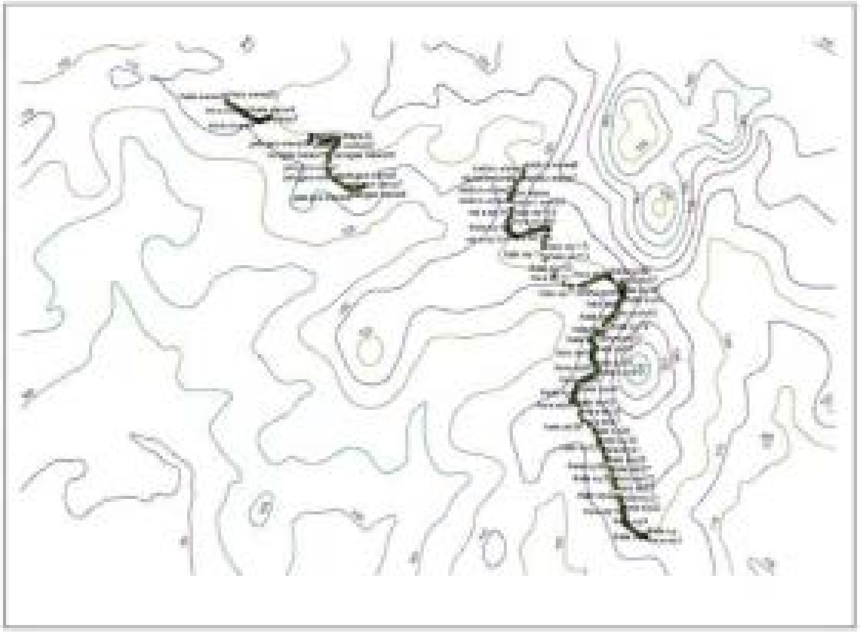


Fig 1.Located of *Diyakaliya* in *Mahailupallama*



Map 1: Distribution of contour in Upper basin of *Kala oya*

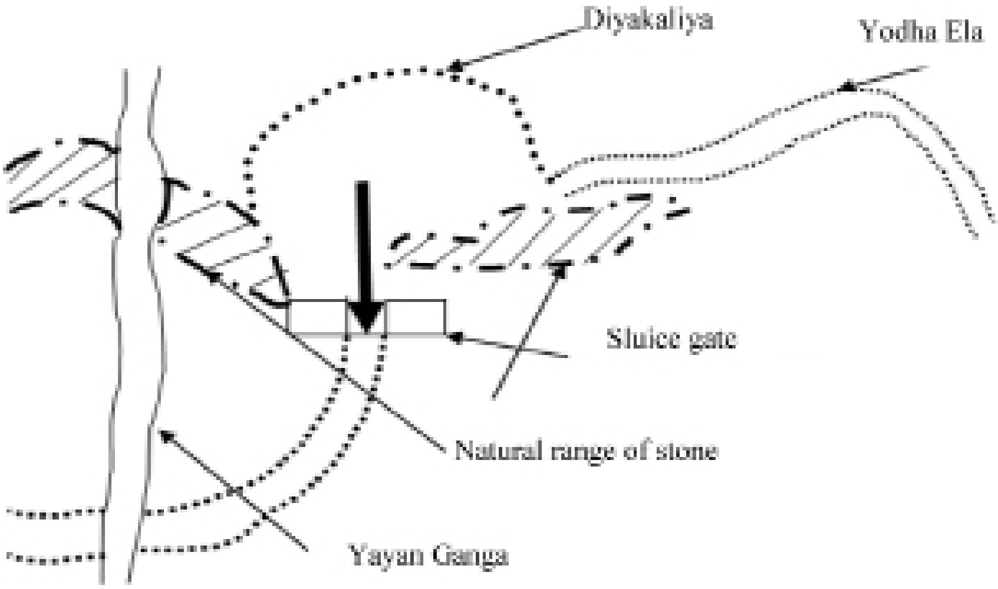


Fig.2: Function of *Diyakaliya* in *Mahailluppallama*

No	*Diyakaliya*	*Wawe*
1	Position of higher land	Position of tank from high land to low land
2	Canal being connected to the *Diyakaliya*	Construction of canal in order to flow around the Tank
3	*Diyakaliya* being connected to natural stone ridge	Dam being contracted up to higher contour
4	Issue of water through a natural functioning	Release of water to tank through sluice installed on the bank of Yoda Ela canal
5	Controlling the Sediment	Controlling the sediment and providing water to tank
6	Providing water to land cultivate through *Diyakaliya*	Combined with settlement and cascade

Table No.01 Different of *Diyakaliya* and *Wewa*

Source. Field survey

In this research attention was paid to understand how *Diyakaliya* was built harnessing the topographical conditions of the canal area. It was confirmed that the altitudes above the mean sea level was higher in the sites of *Diyakaliya* located. Recovery shape of *Diyakaliya* named *Amunukolya* and *Mahailluppallama* good examples. They are located at about 103-107 m from mean sea level where *Yoda ela* flows about 93-98m elevation. It is apparent that the ancient irrigation technicians have worked and acted with a profound understanding and sound knowledge of geographical features. This can be revealed from the map which shows the gradient of the relevant earth zone.

Diyakaliya as an Instrument for Sediment Controlling.

Investigation revealed that *Diyakaliya* positioned at a high altitude from the canal unlike normal tanks (Panabokke, 2009). Points out it has been used as a unit in which sediment gets deposited. As *Yoda Ela* has been planned to flow through elevated grounds in the left side of *Kalaoya* basin, water mixed with sediments flows to the canal on a higher scale. Therefore, the problem that arose here was whether sediments brought by the canal flowed for 54 miles or a technological method was adopted to collect them. Therefore, in order to control the impact made on the circulation of water by the sediments and to provide the kinetic power for water to flow ahead, *Diyakaliya* has been fixed in a zone with an even altitude. Just before scaling up a high land, the pressure caused by collecting a vast volume of water in the *Diyakaliya* would help flow water ahead.

When canal flowing characteristics are considered it is apparent that *Diyakaliya* has done a considerable role in sediment controlling of the *Yoda ela*. It is revealed from many researches that ancient irrigation systems of Sri Lanka has given an extraordinary attention on controlling of soil sedimentation in tanks. Hence ancient tanks, were equipped with three sluices placed at three level of the tank. The (high level) sluice was used to release water for irrigation when water available at full capacity of tank. The middle sluice was used when water levels goes down to tanks half capacity. The lowest sluice locally called *Mada sorowa* used to remove sediments deported in the bottom of tank (Brohier, 1937; Parker, 1909; Awsadahami, 2015; Vithanachchi, 2015). It is apparent that this concept has been applied in yoda ela through *Diyakaliya*. The process of depositing sediments in the *Diyakaliya* has a direct connection with the distribution of the contour lines of the relevant zone. After flowing for 1 1/2 miles, water gets collected inside *Diyakaliya*. There are three water levels inside the *Diyakaliya*; Top water level, filling water level and down water level (fig 01). The top and second water levels constantly fluctuate or sway around the *Diyakaliya* during which sediments gradually gets deposited in the bottom. At the third level, with a new flurry of water, the old water level emerge up and the pressure caused by it, the water flows ahead

Diyakaliya as a Water Storing Element

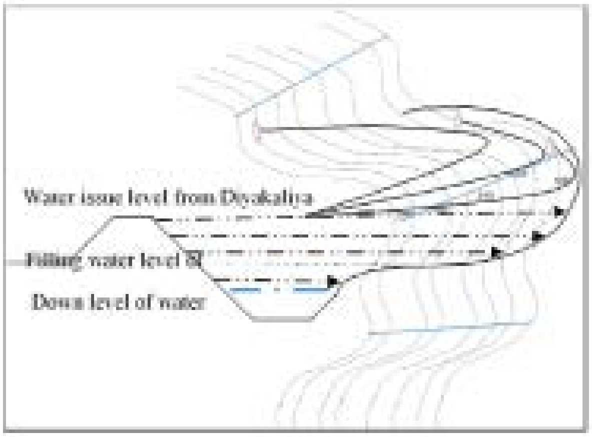


Fig.03: Distribution of contour in *Diyakaliya* Area

It is evident that *Diyakaliya* functioned as a water storing element like a pond. According to the people, at least for about 6 months, in the driest seasons water remains in these *Diyakaliya* even under the status of no flow of the canal. During that time, people who lived in the vicinity of *Diyakaliya* used water for homestead, drinking and sanitation and for small plots of paddy lands. There are some evidences small scale sluices have been made to take water from *Didiyakaliya* for their paddy lands located in between canal and *Diyakaliya*. Aarcheological survey conducted by the present research confirmed that a large number of villages have been concentrated around these water storing ponds.

Hydrological Significance of *Diyakalia*

Hydraulically in a case of a river, water capacity, depth, its bottom characteristics, width and the land slope gradient are the major determinant factors of the water flow. In a strength linear canal, water flowing velocity is normally higher than that of meander shaped canal. Also in deeper canals, water flow is slower than wider canal unless slope is gentle. If the purpose is only carrying water to its destination point, canals path is designed to linear shape as possible as to flow maximum volume. But *Yoda ela* has been designed covering a large area to provide maximum water for its vicinity. Thus meander shape has been purposely planned in elevated area where water is essentially needed. Under this situation, *Diyakaliya* positioned in the bends of the canal, was a good structure that water could be impounded. On the other hand, it was understood that most parts of the area along the canal are high grounds, characterised with dryness. Thus ground water table in this land is very deeper than the surrounding area. Hence it is apparent that *Diyakaliya* has provided considerable discharge to ground water for the surrounding dry lands likewise what happened in small tanks in the Dry zone. Furthermore, it can be assumed that *Diyakaliya* has functioned as an element of rising up of water table.

When the shape and structure of *Diyakaliys* were studied deeply, it was understood that after water filling up of the *Diyakaliya*, excess water enters the main flow through a narrow gap of the bund. By this way, increased water pressure constituted by kinetic energy given from *Diyakalia* caused to increase the speed of water flow. When the difficulty of flowing the canal over the flat plains for 54 miles is taken into consideration, this extra pressure constituted by *Diyakalia* has been a good support to speed up of the flow. This is likewise structures made in modern canals.

Irrigation Water Management Aspect

There is no evidence to prove how *Diyakaliya* has been used for irrigation and water management. As *Diyakaliya* lies in higher elevation than the canal there is no possibility of carring water for high ground beyond them, No extra canal or other technology has been used. But it is evident that *Diyakaliya* has been used for water supply for paddy fields located in the low land between the canal and the *Diyakalia*. The human settlement or villages located nearby it and people used it for domestic water purposes like drinking sanitation home grading and cattle feeding.

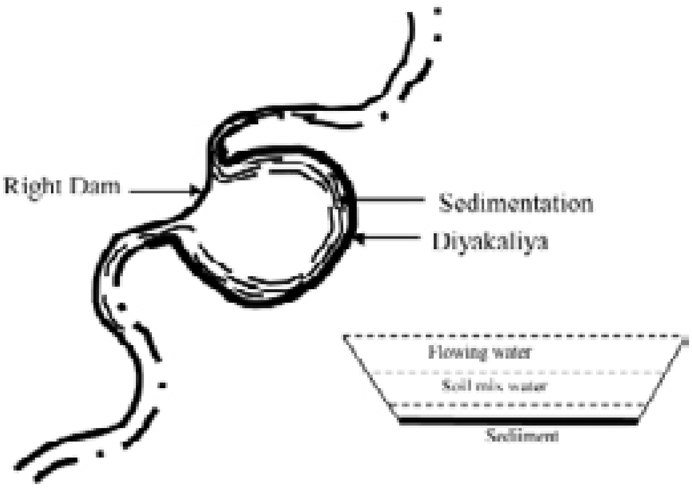


Fig.04: Sediment deposit process of Diyakaliya
Source: Field study

Maintaining of Soil Water Balance

Water relatively remains low than that of other zones. The main factor for this is the location of the bed rock. When constructing the *Yoda Ela* and positioning its irrigation devices and features, great care and attention has been paid to the maintaining of ground and soil water at a higher level. The most important factor that confirms and affirms this is the technology used for the construction of the *Diyakaliya* and its functioning. And working. As the state of balance between water and soil which are the two main factors needed for agricultural pursuits and activities is of vital importance for this, *Diyakaliya* can be introduced as an irrigation device or feature that performs this task very successfully and effectively. As the *Diyakaliya* is positioned in a plain valley at a higher altitude, it has a very close and constant connection and relationship with the bed rock. At the same time as there is a stable level of water being preserved, the circulation of soil-water too takes place well. As a result of the ground being excavated deeply in the process of constructing the new Jaya Ganga (river), the level of the ground and soil water has dried up.

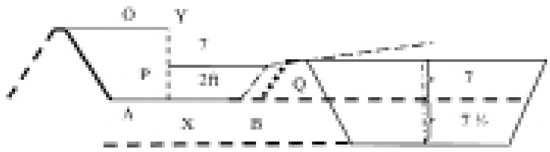


Fig.05 Ground water structural Functioning of Mahailluppallama Diyakaliya and Ancient Yodha

The main goal of constructing the Yoda Ela is to provide water to the human settlements found in the upper valley of the Kala Oya. As the altitude of the land is located towards the gradient or incline of Kala Oya, it has become quite a difficult task to provide water to the upper part of the land. In order to overcome this geographical difficulty, Kala Oya has been constructed across those valleys. The state of low level of water that exist of in this zone serves as a barrier for agricultural pursuits and such phenomena. As a remedy for this problem, the ancient irrigation technician had adopted two types of technological methods in the process of constructing the Yoda Ela i.e. enabling it to flow over the land and the Diyakaliya stretching across a large area of the upper zone of the Yoda Ela. Although water is provided to the lower tanks by the Yoda Ela, Diyakaliya provides water to the upper and lower land as groundwater.

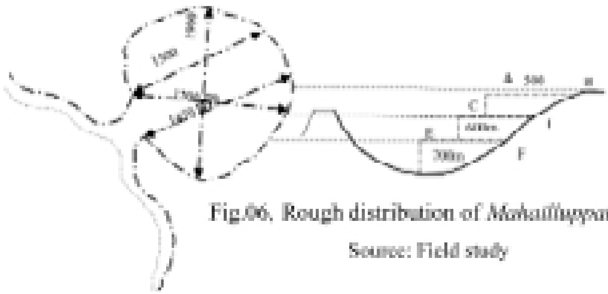


Fig.06. Rough distribution of *Mahailluppallama*
Source: Field study

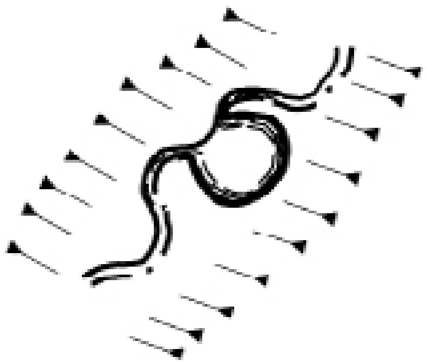


Fig. 07, According to slope menu level in Mahailluppallama
Source: Field study

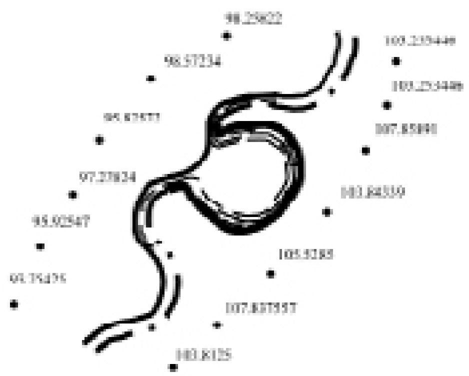


Fig. 08, Levelling distribution and slope in Mahailluppallama
Source: Field study

According to the structural design, section indicated as E-F contributes to maintain the level of the ground water at a higher rate while A-E/C-D contributes to nurture and foster the level of the soil water. Maintaining the water level of E-F contributes to maintain the water level of A-E/ C-D at a definite rate, therefore, it has been of immensely helpful to build a very desirable and suitable zone for agricultural pursuits and activities.

Environmental Significance

Diyakaliya is an important feature that would help control the environmental evaporation and temperature, According to the geophysical setting and location of the North Central Province, it belongs to the Dry Zone resulting in a higher degree of evaporation and temperature. There are thorny shrubs and bushes and trees that can adapt and accommodate to this environmental condition. If the water level cannot remain the same due to evaporation, wilting and growth of trees will be hampered. Maintaining the humidity at a higher degree is the solution to this problem. As the water remains in the total area of the *Diyakaliya*, it has helped to maintain the humidity at a higher degree. As the evaporation becomes less, it has contributed to build an agricultural friendly environment.

The factors that influenced to position a *Diyakaliya* in the *Yoda Ela* have been found. Only the right bank of the *Yoda Ela* can be identified and the left bank has been made according to the slope of the land. Rain water that falls on to the upper land flows to the canal route from the right bank. This water is heavily mixed with sediments and as it is added to tanks or canal route makes a great the impact on the flow of water. Considering this situation, it is apparent that steps have been taken to build *Diyakaliya* in the areas with minimum longitudes where Yoda Ela flows. To maintain this *Diyakaliya* is considered an obligation of those who use water in those areas. In investigating the rules and regulations relevant to irrigation industry, old rules and regulations which were in force pertaining to maintenance of can be revealed. Accordingly, among the features of *Yoda Ela* irrigation technology, *Diyakaliya* serves as an important feature in water management and sustainable development in irrigation industry.

Engineering Aspect

Diyakaliya and its utility can be considered as a technological creation out of *Yoda Ela* irrigation industry. It is an irrigation feature which helps storing water, providing kinetic power for water to flow ahead, controlling the environmental temperature and evaporation, protecting moisture and controlling sediments brought by *Yoda Ela*. In order to confirm the quality of the research scope of this irrigation feature, both foreign and local research were taken use of. As there is limited research done on this subject, as a theoretical approach the book titled "Small Tank System of Sri Lanka: their Evaluation, Setting Distribution and Essential Functions" indicates that the pond built at the end of the canal is a strategy to collect sediments ^Panabokke, 2009&. In order to confirm the longitudes of *Diyakaliya* found in upper lands, the height of the real mean sea level of the *Mahaillupallama Diyakaliya* was calculated and its gap between the upper lands is 103-108 MSL and height of lower land is 98-93.Thus *Diyakaliya* was situated on an upper land. This location made an impact on the internal functioning of *Diyakajiya* and Tennakoon has pointed out that when water flows from upper tanks to lower tanks, water is filtered ^Tennakoon" 2005:40&. This is an approach to *Ellanga* system of tanks but the functioning and utility of *Diyakaliya* built being connected to Yoda Ela is investigated as a more complex process. According to the Channel Morphology and typology experiment in 1992 has pointed out that when the slope and bends of the canal route increase, the stability of the canal route decrease resulting in the increase of sediments (Church, 1992). As Yoda Ela flows winding its way, depositing of sediments is on the increase. As *Diyakaliya* is built on a higher longitude, it was indicated that sediment gets collected easily. As Kellerhals points out in his study, the shape of the canal has a direct bearing for the sediment to deposit (Kellerhals etal, 1976). The scope of the research here falls within the double bank canal research. But the old *Yoda Ela* researched is a single bank canal. However, as the nature of the slope of the land on the right side performs the task of a canal or tank it is desirable to use the theoretical approach for this.

In building double bank canals, it has been pointed out that the shape and form and slope of the canal directly affects the depositing of sediment (Kellerhals etal, 1976; Church, 1992&. As the single bank of old Yoda Ela involves a complex nature to this condition, depositing of sediment is very high compared with that of double bank canals i.e. the speed with which canal scale up a high land and flows down a low land and the fact that the right side of the canal serves as a catchment area will be greatly conducive for the depositing of sediment. As the right bank is slanted towards the area where the canal water flows and the rain water that falls on the upper land flows to the canal there is a high possibility of depositing a large heap of sediment in the canal. In order to prevent this condition, *Diyakaliya* has been positioned as a special irrigation feature in building *Yoda Ela*. Research has been done on the manner in which sediment gets deposited in canals or in tanks, but no study has been done on the alternative methods that should be taken. It can be pointed out that *Diyakaliya* positioned in the *Yoda Ela* in order to prevent the canal from being blocked by sediment is a method by which sediment can be collected to one place (Plan No. 01).

The biggest threat to irrigation industry is the functioning of sediment. The different remedies and solutions to this problem can be traced and confirmed through literary and archaeological sources and irrigation technician were able to control it through handling and dealing with landscapes. Dharmasena has drawn attention on how the functioning of sediment in rural tanks occurs and its resultant problems. The research on ‘Magnitude of Sedimentation in village’ shows that the amount of depositing sediment depends on the spatial arrangement of the area where the irrigation industry originated and three factors that affect this condition are also mentioned with the limitation of volume for water is collected the amount of sediment that gets deposited is on the rise. The effect of this condition irrigation industries is replete with sediment and water circulation will be inactive (Dharmasena, 1992). They are 1.less capacity for storing water, 2.Narrow surface on which water falls from upper land and stagnation of sediment caused by sluice gats and canal ways being blocked are which importance (Dharmasena, 1992:5-6). As a theoretical approach comparing conclusion of set experiment with the spatial arrangement of the *Yodha ela* and in managing the landscape of ancient *Yodha ela* irrigation industry attention has been paid to the above mentioned facts. As the right bank from which rain water falls is slightly slanted and remains as a catchment area of the *Yodha ela*. Its surface has a wider area. Accordingly upper land is subject to minimum erosion and the collecting of sediment is minimally controlled. It was pointed out that with the limited capacity for storing water the accumulation of sediment is on the rise. As a consequence of this condition, within relatively a short period the *yodha ela* irrigation Industry will be replete with sediment and the water circulation will be inactive. *Yodha Ela* irrigation industry can be identified as a irrigation industry because due to the fact that *yodha Ela* perfors a task of a long tank in addition to its normal work and due to rain water from upper land catchment area and water from *Kulu wewa* and *Olagan Wewa* and warter from *kala wewa* get collected to *yodha Ela*, distribution of water throughout the year is done. According to the geophysical location of the canal although a high tendency of accumulation of sediment is indicated the construction technology and spatial arrangement have been made in order to control this condition. According to the structural design and irrigation features being positioned in the canal circulation of ground water and surface water for has been preparation. According in order to minimize the impact of sediment on the canal and sluice gates. Being fixed in lower contour in order to maintain water circulation process smoothly can be identified.

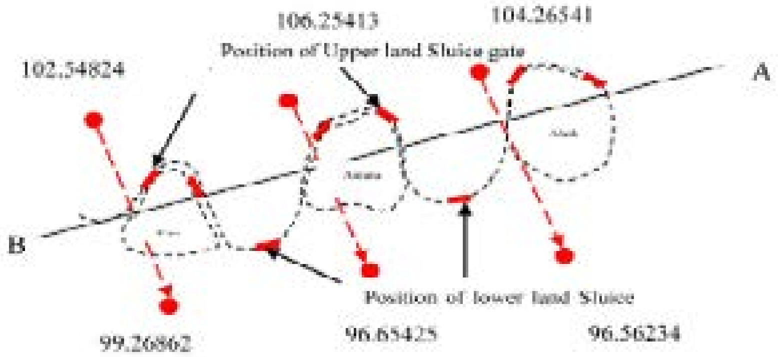


Fig. 08, Upper land and Lower land sluice gate of Yodha Ela
Source: Field study

As *Diyakaliya* has been positioned in higher contours and sluice gates have not been fixed, there is no alternative method to remove sediment being deposited. Therefore, removing the sediment is the responsibility of the people who use the water in the relevant part of the canal. It is mentioned in the *Samanthapasadhika* commentary on how to distribute water thus "…… this means from the common large pond (Could be a large tank) Digining a large canal common to all from this canal digging small canal and digging pit at the end of this. Canal for their personal use it is mentioned that the canal will be preserved during the time of water being taken (*Hewavitarana*" 1967:316). Accordingly it is the responsibility of the commonly to maintain the *Diyakaliya*.

Church and Jones who reveal that bank construction technology will impact on the controlling of sediment in the canal in their experiment "*Channel bars in gravel-bed rivers-in gravel Bar Rivers"* shows that bank construction technology and structural design of bank affect the controlling of the sediment in canal. Here four systems of bars have been introduced i.e 1. Longitudinal and Crescentric bars, 2. Transverse bars, 3. Media bars, 4. Diagonal bars, 5. Point of lateral bars (Church and Johes, 1982). It can be concluded that among these systems the *diyakaliya* connected to *Yodha ela* slanted to the left has been constructed according to the point of lateral bars or pointed of lateral bars. It has been clear that by fixing *Diyakaliya* slanted to the above lateral bars, the space has been arranged in such a way that the water mixed with sediment brought by the canal get collected and flows head.

It has not been emphasized through previous research on geographical features of the strategies used for deposition of sediment. Depositing sediment depends on the stagnation of deposits brought by water and *Diakaliya* is an important creation with a suitable landscape. Here, the *Diyakaliya* connected to the *Yoda Ela* is located in a higher land with a plain valley. *AluthWewa*, *Amunukolaya, Mahailluppallama* as places where *Diyakaliyas* are located by focusing on geographical features. Here, the *Diyakali* connected to the canal and inclined to the left is built at a slightly lower elevation. The landscape is adjusted so that the water that collects in the *Diyakaliya* rests and on depositing sediment the waters flows ahead (Plan No: 15). Fifteen such *Diyakali* can be identified in the *Yodha Ela* (canal). The mean sea level elevation analysis revealed that such irrigation elements may have influenced the geophysical and location area during the formation of the *Yodha Ela* (canal) (Fig.07).

Conclusion

Diyakaliya is a unique to the *Yodha Ela* canal irrigation industry that cannot be identified in other irrigation industries. Due to the structural nature of the canal, it maintains a high ground water level which is related to its operation. It performs a number of functions including, providing water for land cultivation, Evaporation control, providing water to the wild beats, Sediment control, Maintaining high level of ground water, obtaining the kinetic energy required for the canal to flow forward. Nearly 50 such water bodies can be identified in the Yodha Ela and they are connected to the *Mahailluppallama, Amunukolaya, Eppawala, Kuttikulama, Koon wewa, Kiralogama, Ihalawewa, Aluthwewa* tanks and other places where there are no water sources such as *Migessagama, Yakallegama, Puliyankulama, Medagama,Ihalagama, Getadiula, Kaduruwewa, Yakallegama*. It is clear that these irrigation features are designed with a broad understanding of environmental and water conservation.

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