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**WATER RESOURCES
AND
BUFFALO AND CATTLE REARING
IN
SRI LANKA
A HISTORICAL PERSPECTIVE**

W. I. SIRIWEERA



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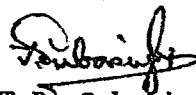
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FOREWORD

In mid 1979 the Agrarian Research and Training Institute in collaboration with the Reading University in UK, commenced a research study on 'Farm Power, Water Use and Criteria for decision taking in the Dry Zone of Sri Lanka.' The main purpose of this project was to study the economic and social implications of alternative use patterns of farm power and its inter-relationship with water use in the small farm sector in the dry zone of Sri Lanka.

This study on water resources and buffalo and cattle rearing in Sri Lanka was conducted by Dr. W.I. Siriweera of the Department of History in the University of Peradeniya as a sub-study under the main project. Here an attempt is made to compare the current practices in the husbandry and use of draught animals with those that had existed in historical times. I sincerely hope that the findings of Dr. Siriweera which are incorporated in this publication would be of great use to all interested in agrarian history and agronomics. My thanks are due to him for undertaking this consultancy in the midst of his other duties and submitting the report within the stipulated time.



T.B. Subasinghe
DIRECTOR

ACKNOWLEDGEMENTS

The author is grateful to Mr. John Farrington, Colombo Plan Advisor and Mr. Fredrick Abeyratna of the Agrarian Research and Training Institute for making valuable suggestions for the improvement of the first draft of this study; to Drs. S. Pathmanathan, P.V.J. Jayasekara, Merlin Peris, B.S.S.A. Wickramasooriya and to Messrs. Aubrey Kuruppu and M.D. Nelson who kindly assisted him in the preparation of the manuscript. The author also wishes to express his appreciation and gratitude to the Director and the staff of the Agrarian Research and Training Institute for affording all necessary facilities to complete this study within a period of two months.

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ABBREVIATIONS

<u>CALR</u>	<u>Ceylon Antiquary and Literary Register.</u>
<u>CCC</u>	<u>Ceylon Coins and Currency, H.W. Codrington, Colombo, 1924.</u>
<u>CCMT</u>	<u>Culture of Ceylon in Mediaeval Times, ed. by Heinz Bechert, Wiesbaden, 1960</u>
<u>CJHSS</u>	<u>Ceylon Journal of Historical and Social Studies.</u>
<u>CV</u>	<u>Cūlavamsa</u>
<u>EZ</u>	<u>Epigraphia Zeylanica</u>
<u>JRASCB</u>	<u>Journal of the Royal Asiatic Society, Ceylon Branch.</u>
<u>MV</u>	<u>Mahāvamsa</u>
<u>SMC</u>	<u>Society in Mediaeval Ceylon, Colombo, 1956</u>
<u>SSO</u>	<u>Sinhalese Social Organisation, Ralph Peiris, Colombo, 1956.</u>
<u>UCR</u>	<u>University of Ceylon Review.</u>
<u>UHC</u>	<u>University History of Ceylon.</u>

**WATER RESOURCES AND BUFFALO AND CATTLE REARING IN
SRI LANKA: A HISTORICAL PERSPECTIVE**

W.I. Siriweera*

METHODOLOGY

The main objective of this monograph is the reconstruction of the history of animal draught and buffalo and cattle rearing in the Dry Zone of Sri Lanka from the earliest times to the middle of the twentieth century, with special emphasis on the manner in which animal power was used for agricultural operations. As the material for this study is derived from a variety of sources, extending from the sixth century B.C. to the twentieth century A.D., it may be useful to summarise briefly the nature of the sources and the methodology adopted here.

The information available on the subject for the period prior to the sixteenth century is confined to archeological material and incidental notices in chronicles and other literary texts. The practices relating to animal draught and cattle rearing in relatively recent times could also provide useful insights into such practices in earlier times. Some of these, which have been in existence until recent times, may be said to have come down from very early times. Such an impression is confirmed by the fact that the evidence based on observations of recent practices is largely in accordance with the brief descriptions recorded in texts of an early period. However, one has to use such types of evidence with great caution and arrive at definite conclusions only in instances where one could find corroborative evidence from elsewhere.

* The author is a Senior Lecturer at the University of Peradeniya.

For the period covered by the seventeenth, eighteenth and early nineteenth centuries, there is substantial literature in the form of administrative records and accounts left by Europeans who had some acquaintance with the conditions prevalent in the island. Among these, the latter relate mainly to general social and economic conditions in different parts of the country. Even the evidence from these works has to be handled carefully. Some general observations made in them without any particular reference to a specific locality in which the practices described were prevalent, could be misleading. Therefore one has to take into account the variations in land formation and ecology which determined the nature of animal draught power, the extent of its utility as well as the facilities required for stock-breeding.

From about the mid-nineteenth century onwards, specific and detailed accounts relating to this subject are to be found in the Blue Books, Sessional Papers, Administration Reports and several scholarly works and articles written mostly by British Civil Servants. Some of these are not completely devoid of ambiguities. Frequently no clear distinction has been made between bullocks and buffaloes. The reliability of the statistics provided in the Blue Books and other official records is also open to question. Yet, they are extremely valuable as they provide considerably detailed information about the use of animal and stock-breeding.

Besides the original sources, secondary works have also been used and quoted extensively whenever they have been found reliable and useful for our study. B.H. Farmer's "Pioneer Peasant Colonisation in Ceylon"¹ and Ralph Peiris' "Sinhalese Social Organisation"² are two noteworthy studies which need to be mentioned in this connection.

In the following pages the subject matter is treated under seven broad categories: the first of which is an introductory section on the utilisation of water resources in the Dry Zone. The other main sub-headings are: The Use of Animal Power for Agricultural Operations; Subsidiary Uses of Cattle in the Dry Zone; Types of Cattle Ownership; Rearing Patterns, and Cattle Diseases. In the concluding section some pertinent facts regarding the implications of the so called "modernisation" or "mechanisation" process are being pointed out.

UTILISATION OF WATER RESOURCES IN THE DRY ZONE

The early civilisation of Sri Lanka began during the second half of the first millenium B.C. in the Dry Zone which covers about seventy percent of the total land area of the island. The Dry Zone comprising the nothern, eastern and south-eastern portions of the island, receives an average rainfall of fifty to seventy five inches per year. In this whole region only the Jaffna Peninsula and a stretch of land on the north-western coastal belt with water-retentive lime-stone rock strata afford scope for extensive well-irrigation for cultivation purposes. Rain-fed cultivation is at best adequate only for one crop of the main staple, rice. The early settlers therefore developed means for the local storage of rain water by damming streams and rivers or building embankments to retain water in natural depressions. At least from the fourth century B.C. onwards³ small village tanks were built and they brought into being a society based on a "one tank - one village" ecological pattern. A large number of these village irrigation works in ancient Sri Lanka were constructed with communal labour and were the collective property of the villagers.⁴ The ownership of irrigation works by individuals also is evident from the occurrence of the term *vapi-hamika* or tank-owner in Sinhalese inscriptions from earliest times.

The growing pressure of population and the demands of a developing civilisation for an increase in agricultural production would have underlined the need for large-scale state enterprise in the utilisation of water resources. As a result, in the first century A.D. in the region of Vasabha (65-109 A.D.), the first steps were taken towards the construction of larger reservoirs. In time, the scale of the water reservoirs was expanded and canals and anicuts were used to develop complex feeder systems. By the end of the fifth century, the irrigation engineers of Sri Lanka had succeeded in developing two complexes of irrigation works - one based on the Mahaveli river and its tributaries, and the other drawing on the waters of the Malvatu Oya and the Kala Oya. In the subsequent centuries these two main complexes of irrigation works were further developed, and they achieved their last and most important stage of development in the reign of Parakramabahu I (1153-1186).

The Province of Ruhuna covered a large part of the Dry Zone in the south-east and paddy cultivation there was based primarily on a multitude of independent reservoirs which clustered round rivers like the Valave, Kirindi and Manik. There were hundreds of minor village tanks in Ruhuna but large reservoirs were few in the region and are not comparable either in size or in the technological ability they display with the major irrigation works in the Kala-Malvatu and Mahaveli complexes. Nevertheless, the two major hydraulic complexes of the Kala-Malvatu and Mahaveli rivers, as well as the reservoirs in Ruhuna and the small village tanks, spread over most parts of the Dry Zone, provided both a back-drop to, and a foundation for a civilisation which flourished in the period up to about the thirteenth century A.D.

As the proper utilisation of water resources was of utmost importance for the development of agriculture, a specific set of rules and regulations governing the maintenance of irrigation works and the distribution of water seems to have existed in ancient Sri Lanka. Some of these regulations are embodied in the *Samantapāsādikā*, the commentary on the *Vinaya*, written by Buddhaghosa in the fifth century A.D. According to these regulations breaching the dam of a reservoir was considered an offence tantamount to a theft. If any person damaged the dam of a reservoir by driving cattle over it, it was also considered an offence. If one caused village boys to drive cattle over the dam of a reservoir and thereby breached the dam, the person who caused the cattle to be driven had to accept the responsibility for breaching the dam. Whenever the bund of a reservoir was breached by the cattle led into it, the person who led them or who caused them to be so led was responsible for any damage done. In terms of these regulations those responsible for damaging or breaching the dams of reservoirs had to pay compensation. According to the same regulations when one cut or caused someone else to cut a tree growing in the waters of a reservoir, and if the waves raised thereby breached the dam, the responsibility devolved on that person who caused the damage himself or caused another to damage it. This was also tantamount to a theft.⁵

When a dam was weakened by a person and thereafter if the cattle that came, either on their own or led by village children, raised waves in the reservoir, or a tree cut down by another person fell into the water raising waves leading to the breaching of the dam, the person who originally weakened the dam was liable to pay compensation.⁶ These regulations were applicable to all irrigation works irrespective of their size. But there were also specific regulations which governed the maintenance of small irrigation works in villages.

According to these regulations, if any person breached the reservoirs belonging to him, but situated above another's, so that water rushed out sweeping away the dam, it was considered an offence because such an act could have damaged the lower reservoir. If any person tried to divert water which led to another's reservoir or to a field it was also considered an offence.⁷

There was also a well organised system of distribution of water as it was necessary for every farmer to get an equal share of water during the periods of scarcity. The farmer's share of water was called *diyamura*⁸ and for this he had to pay a stipulated amount to the king, the local authority or the individual tank-owner. As Perera points out, in the early Anuradhapura period, this payment was called *dakapati*⁹ and in the late Anuradhapura period it was known as *diyabedum*.¹⁰ In the Polonnaruwa era the water rates were termed *diyabada*¹¹ but none of the sources throw any light on the amount paid as water rates in ancient and mediaeval Sri Lanka.

The large reservoirs, and the canals that issued from them were considered public property (*Sabbasādhāraṇa*) and water from those main canals was diverted to the paddy fields by smaller ones which ran through the fields. The latter were owned by groups of agriculturists who had an exclusive right to the water in those branch canals.¹² When the water in the reservoirs was reduced during times of drought, the distribution of water was done in turns. In such circumstances receiving water out of turn was considered a case of theft.¹³

To check malpractices the king appointed officials to supervise the distribution of water and the irrigation works. The term *piyovādarana* found in the ninth and tenth century inscriptions may be interpreted as "supervisors of irrigation works" or "supervisors of the supply of water."¹⁴ Two other terms *velayutpasdena* and *velayutsāndaruvan* found in the inscriptions belonging to almost the same period¹⁵ may mean "five superintendants of fields" who were also perhaps entrusted with the supervision of the distribution of water in the late Anuradhapura period.

Having its capital at Anuradhapura till the eleventh century and subsequently at Polonnaruwa, the kingdom of Rajarata was the centre of cultural and religious development as well as of economic development. Leaving allowance for vicissitudes in agricultural production, it could be safely generalised that with the extensive network of reservoirs and canals in the Dry Zone, agricultural production was enough to sustain the population of the country without additional imports or any grave hardship. The *Sahassavatthupakarana* and the *Anguttaratthakathā*, datable to the early Anuradhapura period, refer to three year old scented paddy (*tivassikagandhasāli*) which was processed by storing paddy in granaries on various layers of aromatic drugs for three years. If such scented rice was ever partaken of in Sri Lanka it was by members of politically and socially dominant groups, namely royalty, nobility and the priesthood. It was among them that the fiscal resources of the country, which consisted mainly of land revenue, were distributed. The fifth century *Vibhanga Atthakathā* of Buddhagosha states that a quantity of grain that could sustain 12,000 monks for three months was always stored at the Tissamaha Vihara and also at the Cittalapabbata Vihara, both situated in the southern part of the Dry Zone. Assuming the reliability of the assertion, this certainly required a surplus in agricultural output. The large scale construction of dagobas as well as other architectural and irrigational works of imposing magnitude would also not have been possible if there had been no appreciable quantity of surplus food to feed a substantial work force.¹⁶

The king, by virtue of his sovereignty, could mobilise the workmen who were obliged to render corvee duty or forced services - *rājakāriya* - for a certain period of the year. The *rājakāriya*

services could take various forms and ranged from military duty to civil construction work and the upkeep of roads. The earliest direct reference to *rājakāriya* is found in the thirteenth century Sinhalese classic *Saddharmaratnāvali*, which indicates that all laymen had to perform *rājakāriya*. The *pūjāvaliya* belonging to the same period refers to this practice by the term *sēvakām* which means service. In the inscriptions of the ninth and tenth centuries, *vari* or *variyan* is the general term used for corvee labour and this was also related to *mangmahavar* and *gangkandat vari* or *vav mehe*, which mean labour on the roads and labour for irrigation works respectively. The term *vari sāl* found in these inscriptions is probably the impost on the villagers to feed this labour force. It may be that when those who performed *rājakāriya* went to various areas for the performance of their duties, they were to be maintained by the villagers of those areas.¹⁷

The *rājakāriya* system continued in its various forms until the British abolished most of it in 1832/33. But the kingdom of Rajarata in the Dry Zone, where the *rājakāriya* system originated, had almost been abandoned by the middle of the thirteenth century. The hydraulic civilisation of the Kalā-Malvatu and Mahaveli complexes had virtually come to its end.¹⁸ In the fourteenth and fifteenth centuries Sri Lanka had become dependent on India for supplies of rice and annually imported rice from the Coromandel and the mainland of India.¹⁹ By the end of the fifteenth century only the ruins of the old cities and the silted reservoirs remained as stark reminders of the once flourishing civilisation of the Dry Zone. The bulk of the Sinhalese population had drifted to the south-western parts of the island while most of the Tamils had drifted to the north and east. Political authority over those who remained in most of the earlier settlements in the region had passed into the hands of local chieftains called the *Vanniyars*. In the subsequent centuries, the once proud cities of Anuradhapura, Polonnaruwa and Tissamahārama, and the gigantic reservoirs around them stood in ruin, a prey to the jungle which was steadily encroaching upon them.

When Portuguese, Dutch and British travellers first visited the Dry Zone there were only two sizeable areas with anything approaching a high density of population; the Jaffna Peninsula and the coastal strip running from about 20 miles north of Batticaloa to about 40 miles south of that town. The Jaffna region, largely peopled by Tamils, was conquered by the Portuguese in the early part of the sixteenth century, and the Dutch made Jaffna a principal port and fortress. Already, in the time of the Dutch, the Jaffna Peninsula and Islands were so densely settled that there was talk of moving people to the jungle-covered region immediately south of the lagoon that separated the Peninsula from the mainland. The schemes of the Dutch came to nought, however, and accounts of 17th, 18th and 19th century travellers testify that the densely-settled Peninsula and Islands stood in striking contrast to the emptiness of the Nuvarakalāviya, Tamankaduwa and Vanni districts.²⁰

The Batticaloa coastal region referred to above, was primarily peopled by Tamils and Muslims. On the island side of the lagoons were deltaic low-lands, which contained large scale extents of paddy fields. The Dutch, at one time, had high hopes of exploiting the obvious potentialities of the Batticaloa region. They constructed a canal and renovated the Ampara tank, increasing the paddy revenue four-fold, but the unwillingness of the Dutch East India Company to invest any more capital prevented further progress in the region during their times.²¹ The Dutch also had to import rice for the troops from Batavia and the coast of Canara.

The topographers of the Dutch and early British periods found only occasional densely populated spots in the Dry Zone outside the Jaffna and Batticaloa regions. These were Mannar, Trincomalee, Kottiyar on the south side of the Bay outside Trincomalee and Puttalam. Puttalam was famous for its salterns and other regions mostly acted as forts or trading stations. Until recently the rest of the Dry Zone outside these areas was desolate. But there were jungle-encircled villages which had been ruled by *Vanniyars* or the feudatories of the Kandyan kings. These villages were grouped mainly around irrigation tanks and the economic life of the villagers revolved round paddy and *chena* cultivations.

According to the 1871 census the Nuvarakalāviya (modern Nuvaragam, Kalā and Hurulu areas) had a population density of only about 21 per square mile in its 2,800 square miles of territory. The figure may be low owing to difficulties of enumeration. Even this figure was higher than that for any other large Dry Zone region and this density had only risen to 29 persons per square mile by 1931. In the period 1931-46 population density in Nuvarakalāviya increased from 29 to 42 persons per square mile. The atmosphere of desolation and decay hung more heavily over most of the remaining regions of the Dry Zone of the 19th century than it did over Nuvarakalāviya.²² John Davy in the second decade of the 19th century found only a solitary field beneath the great reservoir of Kantalai and stated that the region was almost deserted.²³

Ruhuna, the traditional south-east coast region, had only a few settlements in the early 19th century. These were almost confined to the western part of the coastal lowlands between Tangalla and Hambantota. The late nineteenth century restoration of irrigation works did, however, attract people in fair numbers to the stretch between the Wet Zone boundary and Tissamahārama.²⁴

There remain three other regions: Bintenna (between the east coast and the hills), the Vanni of the north and Tamankaduwa. The Sinhalese kings of Kandy held sway over Bintenna and Tamankaduwa in the 17th and 18th centuries while the Vanni region was largely in the hands of the Vanniyars. Of these three areas, Tamankaduwa, which had only four persons per square mile at the census of 1871, was a region abounding in great ancient reservoirs such as Minneriya, Giritale and Parakramasamudra.

The increase in the overall population of the Island, particularly with the increase in Indian immigrants, the rise in the average annual rice import²⁵ and the alarming situation of the food supply in the country led the British colonial administrators to embark on a policy of restoration of the irrigation works from the middle of the nineteenth century. Besides, in contrast to the governors of the first half of the nineteenth century, there now came persons such as

Sir Henry Ward, William Gregory, Arthur Gordon and Arthur Clark who were more understanding, enlightened and in closer touch with the indigenous sections of the community. The improving financial balance of the Treasury also helped the Government's new attitude to bear practical results.²⁶ The revival of traditional institutions and customs was part of a policy which laid great emphasis on the village tanks in the Dry Zone and on minor village works in general. As a result of these trends an estimated total of nearly 13.5 million rupees was spent on irrigation works between 1855 and 1904.²⁷

This expenditure was fairly distributed among those provinces with large portions of their land area within the Dry Zone, with the North Central Province receiving the most attention. However, the distribution of expenditure is only a crude indicator of the localities of restoration. A coloured map provided in Captain Keane's "Report on Irrigation in Ceylon" serves as a more specific guide to the locations of the irrigation works. This map reveals that, within the Dry Zone, the South-Eastern part of Sri Lanka lying between Ampara and Kataragama, including the Uva and Tamankaduwa and Bintenna Districts, were relatively neglected.²⁸

It must be stated that irrigation and water resources in Sri Lanka in the 19th century context posed quite a few problems. There was hardly any research done at that time on the country's water resources and the problems to be faced with water conservation. The major tanks restored during this period, the Tissamaharama tank (1877) and the Minneriya tank (1903), needed links with local streams to replenish their stock to the full capacity and also to redirect excess water during the times of flood. As far as village tanks were concerned, they had not been linked as yet to a major irrigation work and were dependent on rainfall for their water supply. Hence, their restoration did not provide absolute insurance against crop failures. There was also no comprehensive plan for a viable colonisation scheme and an administrative machinery to look after the tanks and channels. In certain areas the beneficial influence of the restoration of irrigation works was greatly limited by the want of a sufficiency of cattle to cultivate a larger area of land.²⁹ It was due to the lack of such planning that, once the reservoirs were restored, it was difficult to colonise the area surrounding them.

The Irrigation Department suspended all work on new major projects in 1903, on the basis that they "could not be shown to be business proposals." In the first three decades of the twentieth century the government generally recognised that the Dry Zone had to be colonised. It was also accepted in principle that settlement in the Dry Zone was dependent on irrigation, and that it had to be done on traditional lines. But not a great deal was, in fact, done to restore ancient works or to provide new ones. Public works of necessity, took second place during the first world war, and after it the emphasis was more on the utilisation of land under existing works than on the provision of further irrigation schemes. The new tank at Unnichchai was, however, completed in 1919, the Verugal anicut in 1928. Work was also done in the period on the Valave ganga Left Bank Scheme. But the acreage sown under major irrigation works increased only from 142,947 acres in 1922 to 162,797 acres in 1930. The Dry Zone still had a bad reputation for remoteness and for diseases such as malaria. It was only after 1931 that Dry Zone colonisation and the development of agriculture and irrigation became an accepted need for the economic growth of the island.³⁰

THE USE OF ANIMAL POWER FOR LAND PREPARATION, THRESHING AND OTHER AGRICULTURAL OPERATIONS

The occurrence of fossil buffalo teeth in the gem sands of the Ratnapura area at depths of from six to thirty feet below the surface suggests that wild buffaloes were abundantly found in that area in pre-historic times. In the Dry Zone jungles buffaloes and neat cattle would have been found even in greater numbers as suggested by various fossiliferous deposits found in the region.³¹ It may be assumed that during the neolithic age semi-pastoral tribes living in the island domesticated cattle for dairy purposes as in India.³² The early settlers who migrated from India and colonised the island by vanquishing these tribes in the sixth century B.C. were an agricultural people and they started settled agriculture in the Dry Zone regions. Most likely they used domesticated buffaloes and neat cattle for agricultural and dairy purposes as they were used to in the mainland.

The number of domesticated buffaloes and cattle had increased substantially by the fourth century B.C., as indicated in the *Mahāvamsa*, the chronicle of ancient Sri Lanka. It refers to cowherds in a village at Dvāramandala near Dīgahavāpi, in the south-eastern part of the Dry Zone.³³ The *Mahāvamsa* also refers to a caste of cowherds in the third century B.C.³⁴ By the fifth century A.D. the importance of cattle-rearing was so much recognised that even scholar monks, who dedicated their time to writing Pāli texts, knew exactly how cattle should be brought up and tended.³⁵ Several inscriptions of the ninth, tenth and subsequent centuries refer to buffaloes (*mivun*), oxen (*gon*) and milk cows (*kiri geri*) in small hamlets or villages.³⁶ Thus, there are clear indications that buffaloes and neat cattle were an integral part of the village economy of the Dry Zone.

The buffaloes were used to press down the soil of the rice fields to make them ready for sowing. For this purpose a dozen or more of these stout animals, strung shoulder to shoulder were driven over the swampy surface of the fields.³⁷ The *Rasavāhini*, written during the Polonnaruwa period, in referring to a ploughing festival arranged by a wealthy person in Mahelanagara, close to Anuradhapura, states that pure white oxen (*sabbaseta balivadde*) were used on this occasion.³⁸ The thirteenth century Sinhala classics, the *Saddharmaratnāvali*, while describing the process of paddy cultivation, mentions that paddy lands were ploughed thrice. The second ploughing and the third ploughing are referred to as (*desī*) and (*tunsi*) respectively in this text.³⁹ Harrowing or levelling the ground with a board or a plank (*pōruḡāma*) before sowing is also referred to as an additional exercise. The same text describes a man as taking a plough and a pair of oxen or buffaloes (*gongeya*) on his way to the field.⁴⁰ The *Pūjāvaliya*, belonging to the same period as the *Saddharmaratnāvaliya*, states categorically that ploughing the field three times was considered ideal.⁴¹

Although ancient Sri Lankan society as a whole was not static, practices relating to agriculture do not seem to have changed considerably until the modernisation or mechanisation process began in the mid-twentieth century. Neither do they show strikingly contrasting regional differences. Robert Knox, writing on the conditions in the

Kandyan Kingdom⁴² in the seventeenth century, states that for the first ploughing buffaloes were used to drag the plough. Knox also makes a remarkable observation that the heavy trampling of the buffaloes turned the soil even more effectively than the light plough they were made to draw. For the second ploughing (*deh̄ya*) which took place some six weeks after the first, often no ploughing was used, only buffaloes being driven over the muddy ground. Subsequently the field was smoothened by the edge of a board four feet long (*p̄ruva*) being drawn horizontally over the surface by buffaloes⁴³ (See appendices A, B and C).

Knox refers to only two ploughings as being done in the Kandyan Kingdom but Ievers, writing in 1880, specially on the Kegalle District, refers to a first, second and third ploughing and also to the practice of harrowing, closely resembling the practices mentioned by the thirteenth century author of the *Saddharmaratnāvali*. Ievers states that "buffaloes with clappers of bamboo tied round their necks" were tethered for ploughing and that harrowing or levelling was done with a large board (*p̄ruva*) dragged on its edge by buffaloes.⁴⁴ The farmer waited behind the plank and manipulated this leveller as and when necessary. Similar accounts are given by John Davy in writing about the interior of Ceylon, R.E. Lewis in relation to the Sabaragamuwa District and H.C.P. Bell in relation to the low-country areas.⁴⁵

In the Dry Zone regions, buffaloes were used for ploughing, generally in pairs, but sometimes as many as three, four or five were used. In regions such as Chundikulam, where soil is sandy, bullocks were used instead of buffaloes. The ploughing was not commenced until the tank, which supplied water, was full.⁴⁶ This clearly indicates that there was a very close relationship between the farm-power and water resources. In the Jaffna District, oxen or bulls were also considerably used for agricultural operations. A paddy field was usually ploughed three times at intervals of two or three days. In fact, the time gap in Jaffna between the first ploughing and the second or the third was shorter than in other areas, perhaps due to the heavy dependence on rain water rather than on artificial irrigation. Consequently there was usually one crop in the year. There was no mud levelling in the Jaffna District, except occasionally in Punakari and Karachchi.⁴⁷

There is no literary or inscriptional evidence which contains any reference to the techniques adopted in threshing paddy in the pre-colonial era. But, judging by the practices of subsequent periods, one would not be wrong in assuming, as Geiger has assumed,⁴⁸ that buffaloes, and perhaps even oxen, were used for threshing paddy. Robert Knox writing in the seventeenth century, has clearly stated that the farmers treaded out their paddy with cattle and that it was a far quicker and easier way than any other form of threshing. Further, he states that, in a day forty or fifty bushels of paddy could be treaded out with the help of half a dozen cattle.⁴⁹ (See appendix D)

The practice of threshing, particularly in the Kandyan regions in the seventeenth, eighteenth and nineteenth centuries, has been lucidly described by Ralph Peiris and relevant portions of his account may be summarised here. If the quantity of paddy is large in the threshing floor (*kamata*) one or two teams of buffaloes are yoked together to thresh the paddy and are driven round and round the circular threshing floor, trampling the sheaves from dusk to dawn. Two or three hours after first driving the buffaloes, the hay that has moved to the edge of the threshing floor is tossed with a fork (*datigoiya*) on to the centre heap and the buffaloes driven over it again.⁵⁰ Bell, referring to the low-country areas, states that some six pairs of bullocks are used for threshing and that buffaloes were driven over the heap of paddy, not twice, but thrice.⁵¹ J.P. Lewis' observations on the threshing practices in the Jaffna and Batticaloa Districts in the nineteenth century are not very much different from the observations of Bell and would certainly give a clue to the manner of threshing paddy in the Dry Zone. According to him, "Three pairs of buffaloes or bullocks, having been linked together in a row, are led into the heap of paddy and the biggest of the six is tied to the stake. A man then drives them round and round the stake, abreast of each other. Until the grain is trodden out the oxen are not released."⁵² How far the practices described above may be projected back in time and from region to region may be a debatable point and a futile exercise. But it is almost certain that such practices have continued to the present day in some villages, both in the Dry Zone and in the Wet Zone, as confirmed by the studies of Bryce Ryan and Leach.⁵³

SUBSIDIARY USES OF CATTLE

Farm-stock was not only important in agricultural operations but also in generating a supply of dairy products which formed important items of diet. In the whole range of Pali and Sinhala literature there are many references to the five products of the cow (*Pancagorasa* in Pali and *Pasgorasa* in Sinhala).⁵⁴ These were milk (*kiri*); curd (*dī*), whey or butter-milk made by churning curd (*yoda*), ghee (*gitel*) and butter (*venderu*). In this connection it is interesting to note that the fifth century Pali commentary *Papancasūdani* has stipulated the manner in which a cow should be milked.⁵⁵ The inscriptions of the ninth and tenth centuries make particular mention of milk cows (*kiri geri*) in the Dry Zone villages.⁵⁶ Mahuan, the Chinese traveller who came to the Island in the fifteenth century observes that butter was a "necessary ingredient" in the food of the people.⁵⁷ Mahuan's remark certainly testifies to the importance of stock breeding in the economic life of the country. Similar observations have been made by several other subsequent writers.

Although there is some archaeological evidence to suggest that beef was consumed at certain periods in the early history of the Island there are no grounds to assume that cattle were ever reared exclusively for the supply of meat. Among the animal bones found at Gedige, Anurādhapura, in recent excavations there were two specimens of *Bos* (neat cattle) approximately datable to a period between 400 B.C. and 200 A.D.⁵⁸ Since these specimens display marks inflicted with metal knives and ash and charcoal deposits were found in association with them it is reasonable to believe that they are food remains. The consumption of beef, had, since the first century A.D. according to literary sources, been considered extremely base⁵⁹ and the late historical period high caste Sinhalese considered eaters of beef as being low and unclean. Since artefact assemblages indicate that occupants of Gedige possessed a relatively high social status, it appears as if these prohibitions on beef eating were introduced into the island somewhat later. Remains of *bos indicus*, at times possessing knife marks, have been found also at Arikamedu in South India in eras horizons ranging from the pre-Arretine phase to 100 A.D. as well as within a megalithic culture context in India.⁶⁰ It appears as if beef

was eaten during the period 800 B.C. - 100 A.D. by the average person in Peninsular India and Sri Lanka. It is possible that the 'taboo' on beef eating was imposed in Sri Lanka during the late Anuradhapura period when there was a marked increase of Hindu influence in Sinhalese culture. However, since the fourteenth century, when the Muslim element in the population became substantial, consumption of beef assumed a new significance. Later, due to the impact of western influences, successively under the Portuguese, Dutch and the British, traditional views regarding beef-eating lost their hold on the population and many people seem to have taken up to beef-eating.

Cattle particularly bullocks were used extensively as draught animals for transport. The chief means of transport for the people in pre-colonial Sri Lanka and also to a considerable extent in the subsequent period was the cart drawn by bullocks. References to bullock carts (*gala*) and draught oxen (*galgon*) are found in the *Mahāvamsa* as well as in numerous inscriptions belonging to the ninth and tenth centuries.⁶¹ These inscriptions, mostly confined to the Dry Zone, record immunities granted to villages or hamlets by the king. The evidence from these inscriptions and literary sources⁶² clearly suggest that draught oxen and carts drawn by bullocks were a normal feature in the social and economic life of the villagers. There were special roads meant for bullock carts and these were referred to as *gal maga* and the bullock cart was known as *sakata* or *gala*. Long-distance travel was undertaken by bands of ox-wagons organised under a leader referred to as *sāttunā*.⁶³

Apart from being used as draught animals drawing carts, oxen and bullocks were also used as pack-animals for the conveyance of commodities in bulk over long distances, as suggested by the Badulla Pillar Inscription of the tenth century.⁶⁴ Bands of such pack animals were referred to as *tavalams* and they were commonly used by organised groups of mercantile communities. There are references in mediaeval inscriptions to traders or *cettis* transporting commodities in this manner.⁶⁵ This system of transporting commodities is referred to by several writers of the subsequent periods.⁶⁶ During the time of the Kandyan kings it was mainly the Muslims who transported the king's grain on pack-oxen and traded in salt and other commodities brought from the coastal areas.⁶⁷ When Major Forbes visited the Dry Zone in the

early nineteenth century he found several Muslim traders returning from the coast with salt, conveyed upon droves of loaded bullocks. He states that these were the only beasts of burden used for transporting commodities at the time.⁶⁸ Even in modern times, despite the development of an advanced communication system with motorable roads and railways the importance of pack animals has not diminished considerably. Today the *tavalam* is not an uncommon sight in the remote villages of both the Dry and Wet Zones in the island and the bullock cart is by no means a strange sight even in Colombo.

Apart from being used for transport, bullocks were also used for operating contrivances (*Cekku* in *Tamil* and *sekku* in *Sinhala*) for crushing oil out of coconuts and oil seeds such as gingelly and margosa. According to Emerson Tennent, who has observed the manner of the crushing of the coconut for the extraction of the oil in the Jaffna Peninsula in the nineteenth century, they "erect their creaking mills under the shade of the groves of the palm trees near their houses. These consist of the trunk of a tree hollowed into a mortar, in which a heavy upright pestle is worked round by a pair of bullocks yoked to a transverse beam."⁶⁹ (See appendix E). It is reasonable to believe that this practice has come down from ancient times.

There had been several other minor uses of cattle, particularly buffaloes, which may only briefly be noticed here. Buffalo hides were used for some domestic purposes. They were used as a sort of ceiling or a canopy (*viyan*) according to circumstances.⁷⁰ Buffalo horns had been used for making combs and ornamental items.⁷¹ Buffalo skeletons and small chips taken from the hair and the tail of the buffalo were used for rituals performed in connection with paddy cultivation practices.⁷²

The extent to which cowdung was used as manure for fields cannot precisely be determined due to the paucity of sources. Yet, the practice of manuring paddy fields had been prevalent in ancient times as testified by the *Butsarana* written during the Polonnaruwa period.⁷³ But unfortunately this text has not specifically mentioned the substance that was used as fertiliser. It is possible that the cultivators used

cowdung and leaf manure as fertiliser. By the nineteenth century at least, the farmers adhered to the practice of sprinkling of bone manure in the paddy fields.⁷⁴

OWNERSHIP PATTERNS, CATTLE TRADE AND PRACTICES OF HIRE

The buffaloes and cattle formed an important item of property from ancient times. There is evidence to suggest that the king, the religious institutions and individuals were the three categories of the owners of cattle. The *Cūlawamsa* and the *Rajaratnākeraya* state that cows and buffaloes were bestowed by kings as gifts on temple or monasteries together with villages and fields.⁷⁵ This clearly suggests that in pre-colonial Sri Lanka the king owned livestock, but the extent of such ownership is difficult to determine. The Portuguese sources state that the king owned *kiripatti* or dairies; for instance he possessed six *patti* in the *atakalān korale* yielding about seven hundred and fifty measures of ghee annually. He also owned pack-bulls and some herdsmen in Kotte were required to spend part of their time in looking after them.⁷⁶ In the Kandyan kingdom, in the sixteenth, seventeenth and eighteenth centuries, the king's cattle keepers were known as *Pattivīdānes* or *Nilanakkara (Patti)* shepherds. They were given service lands in return for the services rendered to the king by way of looking after his cattle.⁷⁷ Even the British Government, in the nineteenth century, owned cattle which were kept in government Kraals.⁷⁸

The King also had the right to commandeer draught oxen and buffaloes to perform various tasks in the kingdom, such as ploughing fields belonging to him and transporting grain to his granneries. In about forty published grants of immunities made to monasteries by the king in the 9th and 10th centuries, one of the most common immunities stipulated was the exemption of buffaloes (*mīvan*), draught oxen (*gon*) and carts (*gal*) from liability to being drafted for royal services.⁷⁹ In the 15th and 16th centuries, cattle owners in the Kotte kingdom had to supply animals for the state for the purpose of transporting food grains as well as for agricultural purposes. For instance, the cattle owners of the village of Mandalagam in the Kinigoda Korale were obliged to supply four hundred bulls for the king's service. Those of another village in the same korale had to supply a hundred bulls for

the same purpose.⁸⁰ In the Kandyan kingdom the Muslims who possessed pack-bullocks were expected to transport the king's grain. For these onerous services they possessed no service land but they were given permission to reside and trade in the king's territory.⁸¹

Apart from the king, the monastic establishments also held large amounts of property including cattle. They were endowed with large extents of fields, irrigation works and even salterns. The monasteries required large numbers of cattle for the cultivation of their lands and for the transport of agricultural produce from the fields to the granaries. Besides, dairy products were also used for diet as well as for ceremonial and ritual purposes in Buddhist and Hindu temples. In this connection, it may be worth noting that ghee was used as fuel for burning lamps in temples and monasteries during the time of the Rajarata civilisation. It is also interesting to note that the *Samantapāsādikā*, the commentary on the *Vinaya*, written in the 5th century, prescribes the proper procedure for the acceptance of cattle donated to the monasteries. An inscription of Kassapa V (914-923) lays down that the king's officials should not misappropriate oxen used for transportation purposes of the Abhayagiri monastery.⁸² A Tamil inscription of the eleventh century records the grant of 84 cows by a certain *Atittappēnaraiyan* for the maintenance of perpetual lamps in the Velgam monastery situated at Periyakulam in the Trincomalee District.⁸³ Two other donations: one of thirty five cows and five buffaloes (*Erumai*) and another of ten cows and 10 buffaloes made to the Velgam monastery by certain Tamil individuals are also recorded in inscriptions from the same locality.⁸⁴ Another Tamil inscription found at Atakada in the North Central Province refers to a donation of 20 cows to the Saivaite temple called Uttamacolaisvaram by a person named Arankan Ramesan.⁸⁵ The Galapāta monastery inscription of the thirteenth century also lists cattle and buffaloes among various types of property granted to that monastery and it refers to cowherds (*endēra*) among employees of the monastery.⁸⁶ An inscription from Lankatilaka datable to the middle of the 14th century states that the General, Senālakadhikāra, donated four hundred heads of cattle, including neat cattle and buffaloes to the monastery there.⁸⁷ Another inscription indited about a decade later at Alavala Amuna in the Hewawissa Korale

of the Kurunegala District, states that the king granted land, farmers, herdsmen (*endēra*) and cattle (*sarak*) to the Lankatilaka monastery.⁸⁸

The evidence cited earlier in various instances on agricultural operations, village oxen, milk cows and buffaloes, and donation of cattle to monasteries by individuals clearly suggests that individual ownership of cattle was very widely prevalent in Sri Lankan traditional society. As testified by the *Papancaśūdani*, cattle were branded with identification marks in the shape of the trident (*trisūla*), arrow and other objects.⁸⁹ The same text suggests that the herds of some individuals consisted of more than a thousand animals. Such ownership patterns have continued until modern times. In the middle of the nineteenth century there was a landed proprietor in the Eastern Province who owned a thousand head of cattle.⁹⁰ In the early twentieth century cattle-brand-marks consisted of letters indicating the name and the village of the owner. Besides, various symbols such as the lotus flower, the potter's rod and the plier were impressed on the right hip of the animal so as to indicate the caste ranking and social status of the owner. Every social status group was assigned by custom a particular symbol. For instance, the *Vanniarnehes* or the noblemen had as their status symbol the lotus flower. The washermen and blacksmiths were assigned the symbols of the washing stone and the plier respectively. The Muslims had the crescent as their status symbol. The branding was done normally when the calf was eighteen months old.⁹¹

The indigenous physicians or *Vedarālas* had used different kinds of branding for therapeutic purposes. In the process a certain amount of unnecessary cruelty was inflicted as the brand marks were sometimes large and deep and were impressed with a hot iron rod. In order to avoid malpractices in this connection and also for purposes of enumeration the colonial government initiated the practice of appointing Cattle Registrars or Udaiyyars for superintending the branding of cattle. Regulations relating to the branding of cattle were made under the provisions of Section 4 of "The Cattle Ordinance, 1898". This ordinance was amended in 1917 and, since the 1920's the Government made efforts to formulate a uniform scheme of branding. As

a result of these measures the branding had to be done in the presence of an authorised officer, usually a Cattle Registrar or a Village Headman, and registers had to be maintained by the officer concerned.⁹²

There are references in literary sources to cattle trade from ancient times.⁹³ In certain instances the average price of a cow or bull is also mentioned. In pre-colonial times it normally varied from 8 to 12 *kahāpanas*.⁹⁴ In the Kotte kingdom in the sixteenth century the normal price of an ox was four *larins* and this was within the reach of an average peasant.⁹⁵ In the Kandyan kingdom pack-bullocks for transport purposes were mostly owned by Muslims, who bought them from indigenous owners.⁹⁶ Superior breeds of cattle required for transport and agricultural purposes were also imported from Tanjore and Madurai during the Colonial period.⁹⁷ The opening up of coffee plantations in the nineteenth century led to a greater demand for imported cattle⁹⁸ as the coffee beans had to be transported from the hill country to the ports chiefly by means of bullock carts and convoys of pack-animals. Between 1870 and 1900, for instance, 368,533 cows, bulls and buffaloes were imported to Ceylon from British India, the annual import being roughly 12,200 animals.⁹⁹

As all agriculturists and transporters did not possess buffaloes or oxen, the practice of hiring animals had prevailed throughout the historical period. The *andē* system, or crop-sharing basis of cultivation, which existed in ancient Sri Lanka and has continued up to the present time, suggests that animals were hired for agricultural purposes. According to the normal *andē* system, the land-owner supplied seed paddy and buffaloes and received fifty percent of the produce from the cultivator.¹⁰⁰ When the land-owner could not supply buffaloes he had to pay the cultivator the yoke-hire or *viya-kuliya*.

In the *Tesavalamai*, or traditional laws and customs of the Tamils, specific reference is made to rules regarding cattle-hire, indicating that cattle-hire was a widespread practice among the Tamils. The *Tesavalamai* code states: "When any person has hired one or more beasts in order to plough his land, the proprietor of such beasts is not obliged to furnish the person who has hired the same with fresh beasts

in case such as were hired become sick or happen to die during the time that they were used to plough the land. In case any person borrows from another, any beasts for his use with the free consent of the proprietor, according to the custom of the country, he may not demand from the borrower any indemnification for such of the beasts as are hurt or have broken their legs, but must consider the loss as accidental and consequently bear the same."¹⁰¹

Although sufficient data is not available on hire charges for all the regions in the Dry Zone, there is some evidence as far as the Vanni Districts and the Batticaloa region are concerned. In the Vanni Districts, the average cost of hire for a pair of buffaloes was 10 *marakkals*¹⁰² in 1807. For some time previous to 1842 the hire of a pair was said to have been 24 *marakkals* and in 1845 it had risen to 30 *marakkals*. It was understood that the pair of buffaloes were to plough for this hire not more than thirty *marakkals* of sowing extent of land. Thus, an owner could hire his pair of buffaloes twice in the season.¹⁰³ In the Batticaloa District too the payment for hire was made in paddy in the nineteenth century. This payment varied from six *amunas* in the southern region of the district to four *amunas* in the northern region for a ten *amunas* extent of paddy land. In the northern region the cost of hire was less, because cattle were more plentiful in proportion to the available area in that region.¹⁰⁴

While buffaloes were hired for the cultivation of paddy fields, bullocks were hired chiefly by the Muslims for transport purposes since the 15th century. In the Sabaragamuwa District many varieties of horned cattle were bred in the 19th century and the Muslims hired them at certain periods of the year to transport various commodities to the low country. On their return journey they brought salt, coconut, fish and other commodities to the interior provinces for trade. Horned cattle were also widely used for traffic on roads between Galle, Colombo and Kandy.¹⁰⁵

The available sources do not give any information regarding the cattle population in the island until the mid-nineteenth century. Since 1869, the *Blue Books* give figures on the total cattle population

in the country, but too much reliance cannot be placed on these figures, which are based on returns sent by Village Headmen to the Government Agents. In the official reports no clear distinction was maintained between buffaloes and neat cattle. The *Blue Books* pose other problems. The numbers of livestock in Ceylon are recorded in a statistical abstract at the start, whereas a more detailed provincial breakdown is included with the statistics pertaining to agriculture. As Michael Roberts has correctly pointed out, at times the sum total of the provincial figures do not correspond to that provided in the abstract.¹⁰⁶ Despite their limitations, however, the statistics found in the *Blue Books* are given in the Table A, which may indicate a rough estimate of the cattle population in the island between the years 1869 and 1931.

Table A : Total Number of Horned Cattle in the Island: 1869-1931

1869	955,671
1871	996,729
1881	1,056,000
1891	1,065,000
1901	1,465,000
1921	1,386,000
1931 Buffaloes	528,000
Neat cattle	1,052,000

REARING AND GRAZING PATTERNS

In a Dry Zone village in the past, as in the present, village houses were ordinarily located immediately below the tank bund, so that they were situated between the tank and the fields, which it served. Fruits and vegetables could be grown in the home garden and most of the highland surrounding the village was used for cultivating legumes, vegetables and some coarse varieties of grain. The cultivation in such tracts was practised by the slash and burn techniques on a rotational basis, so in each season there was a substantial portion of land which remained uncultivated and was used as grazing ground. Besides, cattle were allowed to graze in the fields over-grown with grass during the months they remain fallow. Straw also might have been used as a principal item of fodder.

But in times of drought large herds of cattle had to be driven to the jungles for grazing. In such circumstances the herdsman played a more important role in the livestock industry. The *Papancaśūdanī*, written in the fifth century A.D., makes a clear distinction between the owners of cattle (*gōśānikā*) and herdsmen (*gōpālaka*).¹⁰⁷ As mentioned previously, the *Mahāvamsa*, which was written about a century later, refers to a caste of cowherds (*Gōpālakula*).¹⁰⁸ Most likely, it was the evolution of this social group which resulted in the formation of the *paṭṭi* caste (cowherds), a sub-caste of the *govī kula* in the sixteenth century and later.

The *Papancaśūdanī* is the best source available for a proper understanding of the grazing patterns in pre-colonial Sri Lanka. According to this text, it was the duty of the responsible herdsman to know the exact number and the different colours of cattle in his charge in addition to knowing the symbols branded on them. When grazing cattle, he was expected to take his cattle to the same spot only once in five or seven days, which means that he had to change the venue of grazing. Obviously this was necessary to allow new grass to grow in pasture lands. He also had to select suitable spots in the rivers or fords when cattle were to be taken for water. When quenching their thirst, particularly during times of drought, the herdsman had to see that the stronger and bigger animals did not obstruct the smaller and weaker ones. The *Papancaśūdanī* also admonishes the herdsman to look after the leader of the herd (*gopayināyaka*) by giving special attention to it by providing it with good food and massaging its body etc., so that it would protect the herd always.¹⁰⁹

This text refers also to cow-pens in which cattle were kept. It stipulates that the herdsman should prevent the breeding of insects in the cow-pen, especially during the rainy season. If flies and insects were to be found in the cow-pen, he was expected to cleanse the atmosphere in the cow-pen with smoke with a view to dispelling the insects.¹¹⁰ Although similar references are not found frequently in the subsequent literature, it may be assumed that such practices were prevalent in the Dry Zone, and perhaps even in the Wet Zone, throughout the historical period.

During the time of the Kandyan kings, in the Nuvarakalāviya region, forest land surrounding a village was used for rotational *chena* cultivation exclusively by the peasants who had shares in the village tank and fields. But when certain areas of this forest land was not used for *chena* cultivation, cattle of adjoining villages and *tavalams* were permitted to graze there "in much the same way, as they would be allowed to graze on a common in England."¹¹¹ In certain regions of the Northern Province, where land space was limited, cattle were folded in shady pens and well-enclosed fields except on occasions in which they were used for draught purposes.¹¹² However, it seems that all such grazing patterns were considered inadequate by several British writers in the nineteenth century and they have recommended the improvement of pasture lands, feeding patterns and the breeding establishments.¹¹³ In this connection it is worthwhile to quote at length some of the recommendations of the Cattle Disease Commission of 1869 on improving grazing and feeding patterns.

"Believing that the cattle of this country suffer greatly from the want of good and sufficient grazing during seasons of drought and from the exposure in their search for food in the rainy months, we would suggest the desirability of inducing village cattle owners to husband their paddy straw under shelter to serve as fodder for their animals during the inclement seasons of each monsoon, as there can be no doubt that their herds would be much benefitted by stall-feeding during such periods."

"Mauritius grass, dried and stored against seasons of prolonged drought or excessive rain, would form an admirable adjunct to paddy straw for purposes of stall-feeding, and we strongly urge its introduction into the rural districts of the country. It is a grass acclimatised, requiring no cultivation and of rapid growth, and it would be well suited for ravines in the hill districts and for swampy ground in the low country. The slight trouble involved in protecting it by fence or ditch from destruction by wild cattle, would be amply compensated for in the valuable supply of excellent dry fodder it would afford, whilst the manure that would be accumulated in the cattle stalls at such times, could be employed in aiding the fertility of adjacent paddy lands."

"We believe that the "Prairie Grass" of Australia is also well suited to the climate of this country, and might be extensively introduced in pastoral districts with great advantage. It is a very hardy perennial plant and grows to a great height if left uncut, and when grazed over, makes a fine compact and enduring sward, capable of withstanding the effects of severe droughts...."

"With a view to providing better and more extended grazing in certain localities, such for instance as in the Badulla, Hambantota and Matara Districts, we would suggest that a sufficiency of Crown *chena* land in the vicinity of each village or group of villages be set apart for this purpose, and the cultivators allowed to clear it from underwood, leaving only a few of the larger trees for light shade beneath these, if the ground be kept free from undergrowth and weeds, good nutritious grazing could soon be obtained, which would be available for cattle in seasons when the grass on the lower and more exposed lands would be parched and burnt up."¹¹⁴

Some interesting references are found in the *Sinhala Sirith Sangrahaya* in regard to the rearing of cattle in the Dry Zone in the latter part of the nineteenth century and the early decades of the twentieth century. It may be that these are practices that have come through somewhat earlier periods, although there would have been slight variations from region to region. Nevertheless, the general principles underlying them would not have been different throughout time. According to this text, when a calf is born it is kept in an enclosure called the *vahuge*. The calf is sent twice a day to the mother-cow for feeding. Milk is obtained from both cows and she-buffaloes. All cattle should be branded to indicate the ownership when they are eighteen months old and those that are not branded are confiscated. When an owner of a big herd dies, the king could claim a buffalo, a cow and a calf as death duty known as the *maralabadda*. The *pattivalayo* or *gepallo* undertook to look after the cattle of the king, the noblemen and the affluent ones. Even other individuals not belonging to the *patti* caste could obtain a few cows from those who have in excess, for rearing purposes. In such cases rearing was the responsibility of the

latter, and when calves are born the first is given to the owner and the second is kept by the person who maintains them. In the case of buffaloes the first two calves are given to the owner.¹¹⁵

CATTLE DISEASES

The works of the early Greek and Latin authors contain ample proof of the antiquity of cattle disease. Its ravages throughout the various regions of Continental Europe, at irregular intervals, from the fourth to the early part of the eighteenth century, are recorded with an amplitude varying with the extent of its devastations. In ancient Sri Lanka too, cattle disease was not unknown, although the frequency of occurrence and the extent of the damage cannot be determined with any degree of certainty.

The fifth century Pāli commentary, the *Papancaśūdani*, refers not only to cattle diseases but also to preventive techniques. According to this text, when small wounds occur, due to piercing by thorns and by 'pointed pieces of wood,' flies lay eggs (*asatika*) on them. If these are neglected the wounds get larger and worms breed in them and, if proper treatment is not given, animals could die of these wounds. When injured cattle come into contact with others in the herd, the disease could spread. The text further states that a sagacious herdsman should remove fly-eggs from small wounds; if the wounds are large they should also be bandaged with the bark of a tree.¹¹⁶ Perhaps, there would have been a special kind of bark used for this purpose, but neither this text nor any other literary reference gives a clue to the kind of bark used in bandaging the wounds of cattle.

Although any other evidence on cattle disease is lacking as far as the earlier periods are concerned, the Report of the Cattle Disease Commission of 1869¹¹⁷ gives a clear picture of the widespread existence of cattle murrain or rinderpest in nineteenth century Sri Lanka. Since the period 1840-41, the disease has made its appearance with greater frequency and devastation. The situation was aggravated by the eighteenth sixties and, as Table B shows, the loss from cattle disease in the Island during the three years 1865 to 1867 was not less than seventy thousand heads yearly. This represents, by the most moderate cultivation, a loss to the people of at least £ 60,000 per annum. It is not however in terms of the actual money value alone that

the extent of these losses is to be estimated. The constant hindrances to agricultural operation caused by the loss of cattle and, not infrequently, the loss of an entire season to the paddy cultivators is of far greater moment to the peasant than the money value represented by the lost cattle.¹¹⁸

Table B : Mortuary Returns of Cattle for three years ending 1867

	1865	1866	1867	Average mortality from murrain
Western Province				
Colombo District	7,996	15,159	2,061	
Sabaragamuwa District	5,618	16,346	1,035	
Three and Four Korales	2,079	5,675	1,465	
Total	<u>15,693</u>	<u>37,180</u>	<u>4,561</u>	19,144
Southern Province				
Galle District	-	- no returns -	-	
Matara District	6,400	6,400	6,400	
Hambantota District	5,246	6,660	5,746	
Total	<u>11,646</u>	<u>11,060</u>	<u>12,146</u>	11,617
Eastern Province				
Trincomalee District	1,692	2,035	714	
Batticaloa District	1,062	4,514	267	
Total	<u>2,754</u>	<u>6,549</u>	<u>1,008</u>	3,437
Northern Province				
Jaffna District	1,856	6,534	3,466	
Mannar District	1,264	904	1,165	
Mullaitivu District	-	111	759	
Nuwarakalaviya District	5,351	5,824	6,089	
Total	<u>8,471</u>	<u>13,373</u>	<u>11,479</u>	11,107
North-Western Province				
Kurunegala District	32,717	2,476	6,847	
Puttalam District	-	- no returns -	-	
Total	<u>32,717</u>	<u>2,476</u>	<u>6,847</u>	14,076
Central Province				
Kandy District	-	- no returns -	-	
Badulla District	-	3,396	22,401	
Nuvara Eliya District	- no returns -	-	50	
Matale District	- no returns -	-	1,824	
Total	-	<u>3,396</u>	<u>24,275</u>	13,835
Total Average				<u>73,216</u>

Source : Report of the Cattle Disease Commission, p.69.

The Table C gives a list of the principal diseases stated to have existed amongst cattle in Sri Lanka in the middle of the nineteenth century. The first three in the Table enumerated under A, were merely different forms of one disease resembling the cattle murrain of contemporary Europe. The second category was universally regarded as the most fatal. It resulted in the extension of the disease to the throat and larynx and the causing of suffocation.¹²⁰

Table C¹²¹ List of Cattle Diseases as known in Sri Lanka in the Nineteenth Century

<u>English Name</u>	<u>Sinhalese Name</u>	<u>Tamil Name</u>
a) Ordinary Murrain with purging	Pacana Lede	Vedippu
Ditto with constipation	Malabadda Lede	-
Throat Disease	Uguru Lede	Paruvu
b) Mouth Disease	Kata Lede	Wai Kanai
Hoof Disease	Kura Lede	Kal Kanai
c) Distended Stomach	Kummoda Adappan	U'duwala
Staggers	Kallamari	-

The Commissioners of 1869 did not show the exact causes of cattle murrain in the mid-nineteenth century, although they enumerated the factors that led to the disease.¹²² In their opinion, the cattle, due to promiscuous and premature breeding, drought, insufficient and inferior grazing and want of care on the part of villagers, have become susceptible to disease.¹²² However, it is worth noting that widespread cattle disease was not an isolated phenomenon in Sri Lanka at the time. Almost at the same time South India experienced a severe outbreak of cattle disease which resulted in the passing of an Act (Act No. 11 of 1866) by the Government of Fort St. George for preventing the spread of the disease. After the eighteen sixties Sri Lanka experienced sporadic outbreaks of cattle disease until the early twentieth century,¹²³ but it seems that the disease was brought under control subsequently.

CONCLUSION

Since pre-colonial times, tanks and channels of the Dry zone formed essential features of settled agriculture in the island. As animal power was the only form of farm power in traditional Sri Lanka,

the rearing of buffaloes and neat cattle was also an important economic activity. The cultivation of paddy and the attendant problems of control of water resources, tended to create compact communities based on mutual aid and collective labour. Collective economic effort also created political and social institutions such as village councils which were essentially democratic bodies. Work, leisure and recreation had only marginal differences in this traditional form of economic and social life.

Since the fourteenth and fifteenth centuries, paddy cultivation was neglected due to several factors and it was from the late nineteenth and early twentieth centuries that an appreciable interest in increasing paddy production was shown. Yet, even at present, only a small proportion of the total land area (16,228 million acres) is being utilised for paddy cultivation. The extent under paddy has increased significantly only after 1946, from 913 acres to 1,250,000 acres by 1970. Of this, the major proportion is in the Dry Zone and depends on irrigation works.

On the whole, paddy in Sri Lanka is essentially a small holders crop with almost fifty percent of the holdings less than two acres in extent. Despite the development of a capitalist economic system, there was no significant expansion of paddy cultivation on a large scale and on a capitalistic basis. Nevertheless, the use of imported mechanised power, fertilisers and pesticides have brought capitalist relations to the small scale paddy cultivators. Consequently, their lives have come to be dominated by the capitalist intermediaries such as tractor owners and businessmen who supply these inputs. Even improved production does not necessarily mean prosperity for the paddy cultivator, because the benefits arising therefrom do not reach him under the existing relations of production. Besides, the improvement of production cannot be considered purely as a technical task because it involves a restructuring of the relations of the existing system of production.

These are — aspects worthy of investigation in detail by economists as well as sociologists.*

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NOTES

- 1 B.H. Farmer, Pioneer Peasant Colonisation in Ceylon. Oxford University Press, 1957
- 2 Ralph Peiris, Sinhalese Social Organisation. Ceylon University Press Board, 1956.
- 3 Conclusive evidence regarding the construction of tanks is found from this period. But it is likely that tank-building started even earlier. On ancient irrigation system of Sri Lanka there are several scholarly studies including those of Henry Parker (1909), R.L. Brohier (1934-35; 1941), C.W. Nicholas (1959) and R.A.L.H. Gunawardena (1971).
- 4 S. Paranavitana, "Some Regulations Concerning Village Irrigation work in Ancient Ceylon," CJHSS, Vol. 1, No. 1, 1958, pp. 80-124.
- 5 Samantapasadika, P.T.S., Vol II, ed. J. Takakasu and M. Nagai. London, 1927, pp. 344-345.
- 6 Ibid.
- 7 Ibid.
- 8 Vissuddhimargasannaya, Vol. 1, ed. M. Dhammaratana. Colombo 1890, p. 428.
- 9 L.S. Perera, Institutions of Ceylon from Inscriptions. Unpublished Ph.D Thesis, University of Ceylon, 1949, pp. 271-274.
- 10 EZ, I, No. 12 pp. 167-171 note 1; p. 199 note 8.
- 11 EZ, V, No. 17.
- 12 Samantapasadika, op.cit., pp. 344-346.
- 13 Ibid. The general practices, according to which lands adjoining an irrigation canal in the Uva Province were worked in the 19th century have been described by Bailey, from whose report it appears that all land-holders benefitting from the canal were bound to take an equal share in the repairs of the canal. Each land-owner was responsible for the proper repair of a certain portion of the canal and sudden and unforeseen accidents were attended to by the joint labour of all. No person was entitled to water if he neglected

to contribute to the repairs of the dam or canal. No new land could be cultivated to the detriment of the existing fields. During the dry season fields were irrigated in rotation. When the volume of any supplying stream was insufficient for the irrigation of all the lands depending on it, they were divided into portions of such extents as would admit of each being properly irrigated and these portions received the whole volume of water during succeeding seasons in rotation. Report of the Central and Provincial Irrigation Boards for 1888, pp. 1-2.

- 14 EZ, I, Nos. 12, 13; EZ, II, Nos. 2, 5; EZ, III, No. 28; EZ, IV, No. 22
- 15 EZ, II, Nos. 6, 8.
- 16 W.I. Siriweera, "Agriculture in Mediaeval Sri Lanka," Ceylon Historical Journal, Nos. 1-4, Vol. XXV, 1978 pp. 48-49.
- 17 W.I. Siriweera, "Land Tenure and Revenue in Mediaeval Ceylon," CJHSS, Vol. II, 1972, pp. 27-28.
- 18 For an examination of the causes that led to the decline of the Dry Zone civilisation from the Middle of the 13th century see: The Collapse of the Rajarata civilisation in Ceylon and the Drift to the South-West; published symposium, Ceylon Studies Seminar, Peradeniya, 1971.
- 19 Duarte Barbosa, A Description of the Coast of East Africa and Malabar in the Beginning of Sixteenth Century; Tr. by Henry E.J. Stanley, Hakluyt Society, London, M.DCCC.LXVI, p. 167; The Travels of Ludovice Di Varthems, ed. J. Winter Jones, Hakluyt Society, London, M.DCCC.LXVII, P. 191-192.
- 20 Robert Knox has left a graphic account of the route to Anuradhapura for he travelled the Dry Zone in his attempt to escape from the Udarata in the mid-seventeenth century. Northwards from the border of seven korales, the villages were widely dispersed and the route to Nuvarakalaviya was through high forest, full of "Wild elephants, tigers and bears." It was impossible to discover, where there were villages until one came within earshot of them. "From Anuradhapura it is two days journey further through a desolate wilderness before there are any more inhabitants." In the northern extremity of the kingdom, the vegetation consisted

of short, shrubbed jungle.

Robert Knox (1681), An Historical Relation of Ceylon Together with somewhat concerning Several Remarkable Passages of my Life that Hath Happened Since my Deliverance out of my Captivity. London, 1911, pp. 253-265.

- 21 B.H. Farmer, op.cit., pp. 6-8.
- 22 Ibid., pp. 10-11.
- 23 John Davy, An Account of the Interior of Ceylon and of Its Inhabitants, 1809-1821; first unabridged reprint, 1969, Colombo, p. 5.
- 24 B.H. Farmer, op.cit., p. 13.
- 25 On rice imports see Henry Marshal, Ceylon - A General Description of the Island and of its Inhabitants, 1809-1821; first unabridged reprint, 1969, Colombo, p. 5.
- 26 A.C.M. Amir Ali, "Rice and Irrigation in Nineteenth Century Sri Lanka," The Ceylon Historical Journal, XXV, 1978, pp. 258-60.
- 27 Michael Roberts, "Irrigation Policy in British Ceylon during the Nineteenth Century," South Asia. Journal of South Asian Studies, No. 2, 1972, pp. 56-58,
- 28 U.H.C., III, pp. 153-154.
- 29 Report of the Cattle Disease Commission, Government of Ceylon, Sessional Paper of 1869, p. ix.
- 30 B.H. Farmer, op.cit., pp. 101-141.
- 31 P.E.P. Deraniyagala, the Wild Buffalo of Ceylon: A new subspecies, Spolia Zeylanica, Vol. 27, Pt. I, 1953, pp. 103-106; The Pleistocene of Ceylon, Ceylon National Museum Natural History Series, Colombo, 1958, pp. 6, 33, 37, 141-146. W.W.A. Phillips, Manual of the Mammals of Ceylon, London, 1935, see Section of Babulus bubalis bubalis.
- 32 E.g. See F.R. Allchin, Neolithic Cattle Keepers of South India. Cambridge, 1963.
- 33 MV, X, 12-17

- 34 MV, XIX, 2.
- 35 E.g. See Papancasūdani:Majjhimanikāyatthakathā of Buddhaghōsācariya ed. by J.H. Woods and D. Kasombi, Pt. II, P.T.S. London, 1928, p. 258, ff.
- 36 EZ, II, Nos. 3, 6, 9, 35; EZ, III, Nos. 10, 26; EZ, IV, No. 25; EZ, V, Nos. 24, 31, 32, 33, 34, 35
- 37 CCMT, p. 91
- 38 Rasavāhini, ed. Kirielle Gnanawimala, Colombo, 1961, p. 270.
- 39 Saddharmaratnāvali, ed. by D.B. Jayatilake, 1930, Colombo, p. 151.
- 40 Ibid., p. 740.
- 41 Pujāvaliya, ed. by Bentota Saddhissa, Panadura, 1930, pp. 355-356.
- 42 The Land Area of the Kandyan Kingdom varied from time to time. In the Seventeenth Century, it generally covered Kandy, Matale, Sabaragamuwa, Bintenna, Vellassa, Tamankaduwa, Nuvarakalaviya, Seven Korales and the Vanni Districts.
- 43 Robert Knox (1681), op. cit., pp. 14-18.
- 44 R.W. Ievers, "Customs and Ceremonies Connected with Paddy Cultivation," JRASC, VI, 1880. Ievers also mentions a hand leveller (atpōruva) worked by men.
- 45 John Davy, An Account of the Interior of Ceylon and Its Inhabitants with Travels in the Island (1821). Reprinted by Tisara Publishers, Colombo, 1969, p. 202; R.E. Lewis, "Rural Economy of the Sinhalese more particularly with reference to the District of Sabaragamuwa with some account of their superstitions," JRASC, II, No. 4, 1848, pp. 31-32; H.C.P. Bell, Sinhalese Customs and Ceremonies Connected with Paddy Cultivation in the Low Country, JRASC, VIII, 26, 1883, pp. 44-93.
- 46 J.P. Lewis, Manual of the Vanni Districts (Vayuniya and Mullativu) of the Northern Province, Ceylon, Colombo, 1895, pp. 165-166.
- 47 J.P. Lewis, "Tamil Customs and Ceremonies connected with Paddy Cultivation in the Jaffna District," JRASC, 1884, Vol. III, No. 29, pp. 304-333.
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- 51 H.C.P. Bell, 1883, op.cit., p. 51
- 52 J.P. Lewis, 1884, op. cit., p. 314.
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- 55 Papancasūdani, op. cit.
- 56 EZ, II Nos. 9, 35; EZ, III Nos. 10, 28.
- 57 K.A. Nilakanta Sastri, Foreign Notices of South India from Megasthenes to Mahuan, Madras, 1939, p. 300.
- 58 Ancient Ceylon, Journal of the Archaeological Survey Department of Ceylon, No. 2, December 1972, p. 159.
- 59 H. Ellavala, Social History of Early Ceylon, Colombo, 1969, p. 67.
- 60 Mortimer Wheeler, Ancient India, 1946, p. 115; Banerjee, Iron Age in India, 1965, p. 211.
- 61 MV, XXXV, 42; EZ, I, No. 16; EZ, II, Nos. 3, 6, 35; EZ, III, No. 28; EZ, V, Nos. 24, 31, 33, 34. The term gal mivun found in some of these inscriptions has been variously interpreted as "draught-buffaloes," "cart-buffaloes" and "carts and buffaloes." Judging by circumstantial evidence it looks that the last interpretation seems to be more appropriate.
- 62 See Ellawala, op.cit., pp. 116-117; SMC, p. 344.
- 63 EZ, i, p. 158; EZ, IV, No. 25; UMC, I, pt. II, p. 550; John M. Seneviratna, "The Chariot, State Car And Other Vehicles in Ancient Ceylon," CAIR, Jan. 1919, p. 135.
- 64 EZ, Pt. II, No. 16. The term used here is goni gon. Goni is found in current Sinhalese meaning a 'sack'. The word also occurs in an inscription discovered from Anuradhapura. EZ, III, p. 133.
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- 66 T.B.H. Abeysinghe, Portuguese Rule in Ceylon, 1594-1612, Colombo, 1966, pp. 168-69; SSO, pp. 111-112; S. Arsaratnam, "The Kingdom of Kandy: Aspects of its External Relations and Commerce, 1658-1710," CJHSS, Vol. III, No. 2, 1960, pp. 109-127; R.E. Lewis, op.cit., pp. 49-50.
- 67 SSO, pp. 111-112.
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- 69 James Emerson Tennent, Ceylon: An Account of the Island Physical, Historical and Topographical, Vol. II, London, 1860, p. 342.
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- 73 Butsarana, ed. Labugama Lankananda, Colombo, 1923, p. 247.
- 74 Bell, 1883, op.cit., p. 47
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- 79 E.g. See EZ, II, Nos. 3, 9, 33; EZ, III, Nos. 10, 28; EZ, V, Nos. 24, 31, 32, 33, 34, 35.
- 80 C.R. de Silva, op.cit., p. 94
- 81 SSO, pp. 111-112.
- 82 EZ, I, No. 4.
- 83 EZ, VI, No. II; Epigraphia Tamilica, Pt. I, ed. K. Indrapala, Jaffna, June 1971, p. 41.

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- 85 A. Velupillai, Ibid., p. 23.
- 86 EZ, IV, No. 25.
- 87 S. Paranavitana, "Lankatilaka Inscriptions," UCR, XVIII, 1960, p. 5.
- 88 Ibid., pp. 38-45.
- 89 Papancasūdani, op.cit., p. 258
- 90 Report of the Cattle Diseases Commission, p. VII.
- 91 Sinhala Sirit Sangrahaya. Essays on Various Aspects of Social Life in the North Central Province submitted by candidates in a competition organised by the late Mr. C.L. Wickramasinghe, Government Agent, Anuradhapura, (Original manuscript in the JRASCB Library, Colombo), ed. D.E. Hettiarachchi, Colombo, 1979, pp. 90-94.
- 92 Sessional Paper, XXXVIII of 1925
- 93 Ellawala, op.cit., p. 134.
- 94 Ibid, Kahapana, was a small gold coin containing about 68-70 grains of gold. (CCC, p. 53). The gold content of these coins depreciated after the eleventh century.
- 95 C.R. de Silva, op.cit., p. 94. The larins were first used in Sri Lanka in the sixteenth century. This coin was one of the principal modes of exchange in trade in the Arabian Sea and in all probability it was introduced to Sri Lanka by the Muslim merchants. It is mentioned constantly throughout the Portuguese period and was widely used along with gold and silver fanams. About 1581-1584 both larins and fanams were struck by Captain of Colombo presumably in the name of the king of Kotte. 20 fanams of silver was equivalent to one larin. (CCC, pp. 95-96).
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- 98 Report of the Cattle Diseases Commission, p. VI, p. XXI.

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- 101 Tesavalamai, The Laws and Customs of the Inhabitants of the Province of Jaffna: Promulgated by the Dutch Government of Ceylon in the year 1707, and referred to in the Government Regulations No. 18 of December 9, 1806; ed. T. Sri Ramanathan, Colombo, 4th ed., 1972, p. 87.
- 102 A measure of capacity such as amuna and pāla or bushel. A marakkal was equivalent to 6-7 measures, i.e. about one fourth of a bushel.
- 103 J.P. Lewis, Manual of the Vanni Districts, op.cit., p. 166
- 104 E. Elliot, "Rice Cultivation Under Irrigation in Ceylon," JRASC, IX, No. 31, 1885, pp. 166-170.
- 105 R.E. Lewis, 1848, op.cit., pp. 49-50.
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- 107 Papancasūdani, op.cit., p. 258 ff.
- 108 MV, XIX, 2.
- 109 Papancasūdani, op.cit., pp. 258-261.
- 110 Ibid.
- 111 SSO, p. 47; also see: T.W. Rhys Davids. "Report on Nuvarakalāviya," 1871, Ceylon Government Administrative Reports, p. 90; B.F. Hartshone, Report on the Nuvarakalāviya District, Ceylon Government Administrative Reports, 1872, p. 72.
- 112 Tennent, op.cit., p. 531.
- 113 Report of the Cattle Disease Commission, p. XX; Herbert White, Manual of the Province of Uva, Colombo, 1893, pp. 83-84.
- 114 Report of the Cattle Disease Commission, p. xx.

- 115 Sinhala Sirit Sangrahaya, op.cit., pp. 89-95
- 116 Papancasūdani, op.cit., pp. 258-260
- 117 op.cit., The Three member commission consisted of a doctor, a veterinary surgeon and a mahamudaliyar. John Capper served as the Secretary to the Commission.
- 118 The Report of the Cattle Disease Commission, p. VI.
- 119 Source, Report of the Cattle Disease Commission, p. 69.
- 120 Ibid., p. X.
- 121 Ibid., p. X.
- 122 Ibid., pp. VI, VII.
- 123 E.g. see Administration Reports, Ceylon Government, 1871 and Sessional Papers 20 of 1891; 21 of 1900; 7 of 1903 and 13 of 1909.