

Impact of the Government Policy on the Mechanization of Paddy Land Preparation in the Dry Zone of Sri Lanka

Ulluwishewa, Rohana

Seminar of Econometric Analysis in Agriculture, Faculty of Agriculture, Kyushu University

Tsuchiya, Keizo

Seminar of Econometric Analysis in Agriculture, Faculty of Agriculture, Kyushu University

<https://doi.org/10.5109/23803>

出版情報：九州大学大学院農学研究院紀要. 29 (4), pp.167-177, 1985-06. Kyushu University
バージョン：
権利関係：

Impact of the Government Policy on the Mechanization of Paddy Land Preparation in the Dry Zone of Sri Lanka

Rohana Ulluwishewa* add Keizo Tsuchiya

Seminar of Econometric Analysis in Agriculture, Faculty
of Agriculture, Kyushu University 46-07, Fukuoka 812

(Received January 23, 1985)

Farmers' shift from hand labor and animal draught power to mechanical power in farm operations is always not a spontaneous process. Government's policies designed to raise the agricultural production stimulate the agricultural mechanization. This is particularly true in the case of mechanization of paddy land preparation in the dry zone¹⁾ of Sri Lanka. This paper points out that at the initial stage of the mechanization government's direct intervention and then the incentives provided in various forms have considerably contributed to the present achievement of the mechanization.

INTRODUCTION

In any country farm mechanization is closely related to the development policies adopted by the government. In Sri Lanka, the achievement of self-sufficiency in paddy cultivation has been a declared aim of policy since national independence. The concept of self-sufficiency is an important economic and political issue because the nation's export earnings are hardly adequate to pay for food imports. Consequently, the critical foreign exchange situation adversely affect the all development efforts. Therefore the all policy measures taken by the government for economic development has been basically designed to raise the national paddy production, the staple food of the nation. In view of the development of the available arable land in the dry zone and the possibility of relieving population pressure on the land in the wet zone, the government's policy has aimed at the establishment of new settlement schemes in the dry zone by providing irrigation water which is the major constraining factor. For this purpose medium and large scale new settlement schemes have been built up on the basis of the renovated ancient irrigation tanks and newly constructed large scale water reservoirs²⁾. All development plans mainly focussed on the development of the paddy cultivation in the dry zone. The policy measures taken to achieve these objective, have stimulated the mechanization. The objective of this paper is to observe

* Present address: Department of Geography, Sri Jayawardenapura University, Nugegoda, Sri Lanka

- 1) Dry Zone: North-East part of the island with a rainfall of less than 20 inches for the South-West monsoon (May-September) period.
- 2) Farmer, B. H. 1957

the impact of this policies on the mechanization of paddy land preparation in the dry zone.

DISCUSSION

Government started to establish large scale irrigated settlement schemes in the late 1930 s and it gathered momentum in the 1940 s and 1950 s. This period coincided with the increased interest of the government toward mechanization. It was due to two reasons.

- a. The land allotments given to the settlers in new settlement schemes some 3 ha of irrigated land was too large for the available family labour, especially during the peak periods. Besides, jungle clearing and primary land levelling required machines with greater horse power.
- b. In view of the greater cost incurred in irrigation water, utilization of water for pre-softening of paddy soil was perceived as a waste. Mechanization of paddy land preparation as a means of advancing and synchronizing cultivation to permit increases in the productivity of irrigation water occurred.

At the initial stage, in the 1940 s, some trials conducted by the Department of Agriculture in the Eastern Province of the dry zone in order to assess the feasibility of the use of tractors for paddy land preparation showed encouraging results. It is worthwhile to describe one of these field trials and its results because these results substantially influenced the government's policy.

This trial³⁾ was carried out in the Maha 1943-44 in the Eastern province with a view to popularize the use of machinery particularly in paddy cultivation and to show that peasants could adopt this type of cultivation by organizing themselves into co-operative farmers' societies. An area, 203 acres in extent, of privately owned fields was taken up for this purpose late in July, 1943, on the agreement that the cultivators should pay a sum of Rs. 12 per acre for all operations from ploughing to sowing. The land was handed back to the cultivators who would be responsible for such subsequent operations as fencing, irrigation, weeding, watching and harvesting.

The whole area (203 acres) was ploughed by tractors and fertilized with the manure mixture consisting of bonemeal and groundnut cake (3 cwt. per acre) and then harrowed. About 81 acres were sown dry and the rest of the area sown wet with pureline "Vellai Iilankulayan" paddy. Sowing commenced in late October and was completed by late November. After that the paddy holdings were handed back to the cultivators, but the cultivators did not properly fulfill their part of the agreement. They did not fence the area in time. Neither did they attend to irrigation. Therefore, in spite of the severe set back the young seedlings had received, the land was taken over again and all operations were carried out by the department.

The results showed a very substantial increase of yield in tractor worked

3) Johnpulle, A. L. 1945

area. The yield was well over 2.2 times that obtained in the rest of the area. However, the yield increase in the mechanically ploughed area cannot be directly attributed to the mechanized land preparation because the tract-level uniformity in the variety of seed sown; in the kind, quantity, and time of the application of fertilizers; and in the depth of water which is considered to be crucial in determining the yield was maintained in the mechanically ploughed area whereas it was not so in the rest of the area. This trial also showed greater cost advantages of tractor ploughing. In this area where buffaloes are used the average cost from mudding to sowing was Rs. 30.00 as opposed to Rs. 13.75 per acre for tractor working from ploughing to sowing.

The authorities were very impressed by these results and they were optimistic. On the strength of the results obtained, this experimental study stated that "it will be seen that there is a strong case for the immediate introduction of large scale machinery for agricultural operations on organized lines. If this is done it would be possible to make the island self-supporting in the matter of foodstuffs within a comparatively short period" (Johnpulle, 1945, p. 25).

Having being encouraged by the results of the preliminary experiments like this the government directed the paddy land mechanization in two ways.

1. By direct intervention in the initial stage (1952/56).
2. By providing support to the private ownership.

Direct Intervention

As it was mentioned already the settlers' failure to cope with the labour requirement in peak periods generated the need for hired labour in new settlements. Many of the adjacent villages which would have been the sources of hired labour also failed to provide hired labour because according to the settlement policy the small farmers and landless people in those villages were also given large allotments in new settlement schemes. Therefore, an increasing volume of request from settlers and politicians for tractor ploughing services were noticeable in the late 1940 s⁴⁾.

In response to the increasing demand, mechanization of paddy cultivation was started with about 150 tractors left by departing British military authorities after the World War II. The Department of Agriculture, having acquired this tractor fleet, established 5 tractor hire stations in various areas in the dry zone in 1949-1951. These hire stations provided tractor ploughing and threshing services to the dry zonal farmers at remarkable low rates. The charge for ploughing and harrowing was Rs. 24.00 per acre which has been estimated as one third of the buffalo ploughing cost. For threshing, the tractor charge was estimated as Rs. 0.17 per bushel against Rs. 0.77 for buffalo⁵⁾.

In 1953, Sri Lanka received 112 tractors and implements as a gift from Australia. Using these tractors the Food Production Department established

4) Burch, D. 1974

5) Burch, D. 1974

a tractor hire station at Anuradhapura, one of the major towns in the dry zone. It also began to provide tractor ploughing and threshing services at low rates. During the same period (1952-1953), the Co-operative Agricultural Production & Sales Societies, and their unions imported 241 tractors from Britain in order to provide hire services. The majority of these tractors were allocated to the dry zone. These hire stations charged lower rates than the Agriculture Department's hire stations.

However these tractor hire stations proved to be unsuccessful. Although the size of tractor fleet enlarged rapidly, operators and management staff would not be trained at the same rate. An inadequate supply of spare parts was a severe problem. The most important setback, however, was the financial loss. The income was hardly adequate to cover the running cost. Concerning the tractor hire stations owned by co-operative unions, the official hire rates were only approximately one third of the real cost of tractor ploughing in this early period, the remainder being attributed to the subsidy implicit in these losses. In 1957, a supplementary estimate was submitted to Parliament for Rs. 3,867,910 to reimburse the tractor purchase costs and make good the losses. The stations maintained by the Food Production Department too showed losses. In 1956, its cost of hire services amounted to Rs. 1,054,010 against an income from hiring of only Rs. 245,420⁶⁾.

Owing to financial loss and management difficulties, the majority of the co-operative societies tended to close down their tractor hire stations and hand over the tractors to the Department of Agriculture and to the Food Production Department during 1954-56. In 1956 the Food Production Department's tractor hire station too found difficulties in covering its costs. Consequently its tractors were also handed over to the Department of Agriculture in 1956. Even after this initial unsuccessful experiment with tractor pools, some hiring operations (through the Department of Agriculture's tractor stations), continued at hire charges lower than the cost in the late 1950s and 1960s. Their losses, reported to be Rs. 1.5 million per annum in the 1960s, were covered by public money.

Although the tractor hire stations were unsuccessful in operation, they successfully initiated the popularization of tractors among the farmers around the tractor stations. Their lower charges induced farmers to shift from traditional animal draught ploughing and threshing to tractor ploughing and threshing. The initial shift was the beginning of the deterioration of the traditional buffalo power and the popularization of the modern tractor power.

Support for Private Ownership

When the mechanization through the state owned and co-operative owned tractor ownership failed, private ownership began to rise in the mid-1950s. While the tractor hire stations gradually declined in number and capacity, private ownership rapidly emerged to meet the rising demand for tractor services. Some rich land owners, traders, businessmen and some government

6) Burch, D. 1974

servants tended to purchase tractors. In this way, in the mid-1950s, private tractor ownership had begun to rise. Of the 855 tractors available for hire services at the end of 1956, 475 were in private hands⁷.

Private hire charges were slightly above the Department of Agriculture's rates, but the absence of bureaucratic procedures and the early availability of hire services appears to have compensated for this difference⁸. Therefore, hiring services from private owners became popular. The government too, due to the continuous financial loss of its hire stations, tended to shift its policy in favour of private ownership since the mid-1960s. Government support for the private sector is summarized by Farrington and Abyrathne (1982) in the following way.

1. A preferential rate of import duty, at 1 % for tractors and spare parts until 1967, when it became 10 % on tractors and implements and 5 % on spare parts.
2. Throughout the 1950s and 1960s preferential allocation of foreign exchange was made for tractor import when the import of other capital goods was severely limited.
3. Hidden subsidies were also provided by a number of credit schemes for purchase of tractors from mid 1960 s. Their features included concessional rates of interest and the lowering of criteria for acceptance of borrowers below those commercially applicable.
4. The cost of diesel by which the vast majority of tractors was fuelled, was heavily subsidized until late 1980. This cost was relative to both the internal prices of petrol and the cost of importing diesel. Though the amount of subsidy cannot be estimated precisely, it can be at least 50 % of the retail price.
5. Income tax subsidy, The Lump Sum Depreciation Allowance whereby the full value of all capital items, including tractors, can be used to increase agricultural production, is deductible for tax purposes from gross income in the year of purchase, was continued up to March 1981.

Apart from the provision of subsidies in various forms, the government established various institutes to promote the paddy land mechanization. Since the beginning of the introduction of mechanical power for the paddy farming sector, the farmers had no alternative but to use the imported machines even though in certain cases such machines did not suit local conditions. Moreover, machines were too costly for the average farmer in Sri Lanka to purchase and operate. In order to solve these two problems, the government established the Research and Development Division under the Department of Agriculture in 1968; and the Farm Machinery Research Centre at Maha Illukpallama has undertaken the responsibility to design and to develop machinery to suit the local conditions and also to adapt imported machinery. Sri Lankan farmers' lack of experience in handling farm machines has been quite evident. Inefficient operations and bad maintenance practices by many farmers

⁷ Neal, M.E.B. 1957

⁸) Neal, M.E.B. 1957

not only reduce the life of the machine but also increase the cost of operation". Having felt the need to train farmers and operators, the government established the Farm Mechanization Training Centre at Anuradhapura in 1971 with the collaboration of the Federal Republic of Germany, and 4122 farmers have been trained as of July 1984 at this institution on the various aspects of farm mechanization⁹⁾. The emphasis for the farmers' training has been in the operation and maintenance of machinery for agriculture viz. tractors and power tillers, plant protection equipment and water pumps for irrigation.

While the government policy encourages this mechanization, some of its policies exert negative impacts on traditional animal draught power. In contrast to the traditional villages, in the planned new settlement schemes, there is no space for buffalo rearing¹⁰⁾. In traditional villages, the nearby scrublands and the tank bed provide land to feed animals, but the settlement planners did not allocate land for grazing in new settlement schemes. When double cropping is practiced paddy fields cannot be utilized for grazing even in the dry season as it is used in traditional villages. Furthermore, according to the trespassing law, the owners of the animals are liable to pay compensation for any damage caused to the crops, by trespassing animals. When most of the farms are not protected with fences, it is extremely difficult for animal owners to keep their animals away from farmlands. Therefore this law discourages buffalo rearing.

The government's supports, directly or indirectly, has kept the price and the running cost of tractors at a lower level than it otherwise would have been. Therefore, tractor ownership has become a very profitable investment¹¹⁾. As a result, the size of the tractor fleet has remarkably increased under private ownership.

However, since there was no tractor manufacturing industry, the tractor supply has always been constrained by the allocation of foreign exchange for tractor importation. Foreign exchange for tractor importation, up to the 1977 import liberalization, had been determined by the following two main factors.

1. Government's ability to earn foreign aids and loans.
2. Development strategy of the political party which is in power

The major political party, United National Party (UNP), and Sri Lanka Freedom Party (SLFP) have come into power alternatively since the national independence which occurred in 1948. Apart from the general elections in 1952 and 1982 which brought the UNP into the power for second term, every other election has marked a change between UNP- and SLFP-led governments.

Both parties, literally, appear to favour mechanization. The 10-year plan from 1959-68, which was prepared by the SLFP-led government, aimed "to double the output of rice within the plan period, partly through considerable

9) Pillai, P. V. 1984

10) Pillai, P. V. 1984

11) Farmer, B. H. 1957

12) Harris, B. 1977

investment in agricultural machinery and implements¹³⁾” (10-year Plan 1959-68). The Agricultural Development Proposals for 1966-70, which was prepared by the UNP-led government also adopted the mechanization policy. It stated that “in certain parts of the island, particularly in the larger producing areas there is an acute shortage of labour for cultivation. This shortage of man power is a reason for the urgent import of agricultural tractors, to at least mechanize the cultivation of paddy in these districts’¹⁴⁾” (Agricultural Development Proposals 1966-70, p. 162). Though both parties appear to support the mechanization policy, foreign exchange shortage and lack of access to foreign aid exerted pressure upon SLFP-led government to adopt a development policy which relied on indigenous resources such as labour, irrigation water and improved varieties rather than on foreign exchange. It is worthwhile to mention here that under the SLFP-led government in 1971 the Minister of Agriculture and Land proposed to support the breeding and distribution of water buffalo in an effort to reduce foreign exchange allocations for tractors¹⁵⁾. It has been quite clear that the foreign exchange crisis was particularly severe during the periods of SLFP-led governments. Up to the mid-1950s the UNP-led government had been able to draw the foreign exchange deposits accumulated during the World War II until it was eventually exhausted when the SLFP acquired power in the 1956 general election. SLFP brought with it rumours of nationalization of major foreign owned enterprises, particularly of oil companies, banks and tea estates, which reduces the availability of foreign aids. Also, SLFP-led government did not make much efforts to obtain foreign aid, whereas UNP-led governments often made efforts to obtain foreign aid and to please the World Bank and the International Monetary Fund in order to obtain credit on easy terms. For instance the UNP-led government (1965-70) agreed to pay compensation for the foreign oil companies, which were nationalized by the former SLEP-led government, in order to please the foreign aid agencies¹⁶⁾. In this way, during the periods of UNP-led governments (1965-70) and 1977 onward Sri Lanka managed to obtain adequate foreign loans and aid. For example, aid to Sri Lanka averaged \$ 115.96 million per annum during the SLFP led government (1970-76) against the \$ 394.46 million per annum in the first three years of the 1977 UNP-led government¹⁷⁾.

Apart from the policy differences and the foreign exchange availability, the UNP-led government’s inclination to adopt the recommendations putforward by the international agencies such as World Bank and International Monetary Fund which favour mechanization also seems to have pushed the UNP-led government towards mechanization. For example, the World Bank reviewing Sri Lanka’s development policy, recommended a doubling of the level of investment in tractors¹⁸⁾; and it initiated the “Aid Ceylon Group” in 1965-66 in

13) Ministry of Planning 1959

14) Ministry of Agriculture 1965

15) Farrington, J. and F. Abeyrathne 1982

16) Burch, D. 1974

17) Farrington, J. and F. Abeyrathne 1982

18) IBRD 1966

order to make available foreign aids to purchase tractors. Also, during the UNP-led governments (1965-70) 28 % of the total foreign exchange component of the 1966-70 Agriculture Development Proposals was set aside for the import of tractors and spares¹⁹⁾.

To state in brief, SLFP is, in general inclined to rely on indigenous resources, which do not consume foreign exchange, whereas UNP relies on imported technologies and resources. While the UNP heavily relies on the private sector, SLFP is rather inclined to state-owned or state-controlled enterprises. During the period of SLFP-led government, a number of important private enterprises were nationalized. In contrast to SLFP, UNP always encouraged the private sector and foreign investments. Therefore, the western developed countries and international agencies favour UNP but disfavour SLFP. Whenever UNP is in the power, Sri Lanka receives much foreign aid and foreign loans. But it is not so when SLFP is in power. For these reasons, as it is graphically illustrated in Figure 1, tractor importation increased during the periods of UNP-led governments more than under the SLFP led governments.

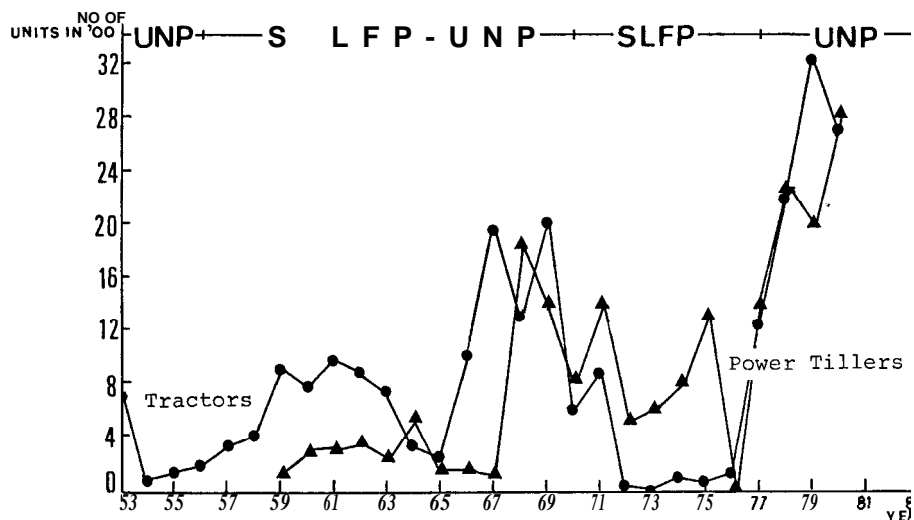


Fig. 1 Changes in Tractor Import Levels in Relation to Political Changes (1953-1981)

Source: State Trading (Tractor) Corporation, and Private Importing Agents.

After the 1977 general election which brought the UNP into power, the private sector became free to import tractors without foreign exchange restrictions, due to the import liberalization. But owing to the withdrawal of some concessions on tractor importation, retail tractor prices have substanti-

19) Carr, M. N. 1975

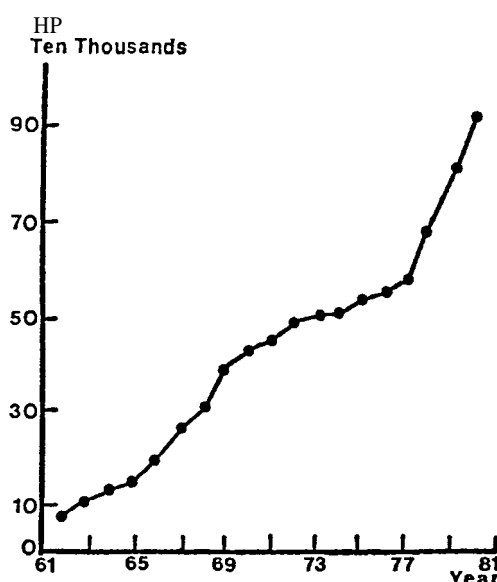


Fig. 2 Growth of Tractor Fleet in Sri Lanka

Note: Tractor=45 HP

Power Tiller=7 HP

Source: New Registration Records, Statistics Division, Commissioner of Motor Traffic, Colombo.

ally increased. In spite of that, relying on the greater profitability of tractor ownership observed in the 1970 s, the rural rich class have tended to purchase tractors. As a result, the national tractor fleet has remarkably risen since 1977 (Figure 2). Up to the 1977 import liberalization, the sole authority of tractor importation had been held by the government sponsored (semigovernment) company called State Trading (tractor) Corporation which was established in 1971 under SLFP-led government. Before that a number of private companies were engaged in tractor importation. Since the very beginning, tractors of 35-45HP have been more popular than power tillers based on the following reasons.

- a. For the new irrigation schemes in the dry zone, large scale tractors were more suitable because a greater horse power was needed for jungle clearing and initial land levelling.
- b. During the early period of mechanization government's intention was to provide tractor ploughing and threshing services to small farmers on contract basis through the state-owned or co-operative owned tractor hire stations. Therefore, in view of the greater operational capacity of the large tractors, they were found to be more appropriate.
- c. Later, when the tractor ownership transferred to private hands, as a result of the prevailing narrow scope for farm works (small size of farms and the seasonality of farm works) tractor owners tended to he-

avily rely on non-farm works. For non-farm works, i. e. haulage and passenger transportation etc., tractors attached with trailers are much more appropriate than power tillers.

However, in some districts due to the increased number of tractors, tractor owners experienced difficulties in getting adequate custom work to keep the tractors profitably. Besides, the size of paddy allotments given to the settlers in irrigated settlements in the dry zone has reduced from 5 acres in the 1940 s, and 3 acres in the 1950s to 2 acres in recent years. As a result, the number of customers required per tractor to cover the cost has increased. Consequently much time and effort has to be devoted to find enough customers to organize the custom works properly. Therefore, keeping a power tiller for one's own use appeared to be profitable and convenient. So, some large farmers gradually tended to shift from tractors to power tillers.

Power tillers began to gain the government's support in the early 1970 s. The Draft Agricultural Development Proposals 1971-77 and the report of the Tractor Committee²⁰⁾ both emphasized the need to provide tractors (especially power tillers) as an inducement to youths to return to agriculture. The State Trading (tractor) Corporation also adopted a power tiller-biased policy. For instance, it proposed importing 1,000 tractors and 1,500 power tillers per year in 1971. At the same time the government initiated a local power tiller manufacturing project. First, locally manufactured power tillers called "Land Master" came into the market in the early 1970 s. However, a subsequent import of power tillers funded by the Asian Development Bank was sufficient to satisfy the current local demand, so that much of the current basis for local manufacture was removed and the initiative was lost. However, power tiller importation has continued. Since the 1977 import liberalization, a substantial influx of lorries and passenger vehicles has undoubtedly curtailed a certain share of the tractor owners' non-farm income because tractors were used as a substitute for lorries and passenger vehicles²¹⁾. The increased number of tractors has led to competition among tractor owners for custom works. Consequently, the monopoly that tractor owners maintained hitherto over the tractor hire charges has been weakened. All these events together may have imposed a negative impact on the profitability of tractor ownership. Potential investors in farm machines are, therefore, tending not to rely heavily on custom works and to instead purchase farm machines with low fixed capital. This might be a reason for the recent trend of increasing popularity of power tillers.

SUMMARY AND CONCLUSION

At the initial stage, government deliberately induced small farmers to use tractors for land preparation and threshing by providing cheap tractor services on a contract basis through the heavily subsidised state and co-operative

²⁰⁾ Ministry of Foreign and Internal Trade 1971

²¹⁾ Plumbe, A. H. and H. M. Byrne 1981

owned tractor hire stations. Later, when these hire stations failed to stay in operation due to heavy financial losses coupled with management difficulties, government devised measures to encourage the private ownership which was emerging at that time. But such an attempt was not made to promote the indigenous farm power resources (buffaloes) and implements which have been neglected. Meanwhile, mechanization steered by the private ownership has rapidly spread.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. Tsunemasa Kawaguchi, Associate Professor and Dr. Satoshi Kai, Assistant Lecturer of the seminar of econometric analysis in agriculture, Faculty of Agriculture, Kyushu University for their constructive comments on the first draft of this paper.

REFERENCES

- Burch, D. 1974 **Agricultural Tractor Pools in Ceylon 1952-56**. Seminar Paper, 7.11.74 (Unpublished), Institute of Development Studies, Sussex
- Carr, M. N. 1975 **Pattern of Tractorization in the Major Rice Growing Areas of Sri Lanka**. D. Phil. Thesis, IDS, University of Sussex, Sussex
- Farmer, B. H. 1957 **Pioneer Peasant Colonization in Ceylon**. Cambridge University Press, England
- Farrington, J. and F. Abeyratne 1982 **Farm Power in Sri Lanka**. Reading University, Reading
- Harris, B. 1977 Tractors, Profits and Debts in Hambanthota District. In "Green Revolution" ed. by B. Farmer, Macmillan, London, pp. 127-149.
- IBRD 1966 **The Foreign Exchange Problem of Ceylon**. Ministry of Planning and Foreign Affairs of Sri Lanka, Colombo
- Johnpulle, A. L. 1945 Tractor Cultivation of Paddy Fields in the Eastern Province **Tropical Agriculturist**, 101 : 22-26 Department of Agriculture of Sri Lanka, Peradeniya
- Ministry of Planning of Sri Lanka 1959 Ten Year **Plan**
- Ministry of Agriculture of Sri Lanka 1965 **Agricultural Development Proposals 1966-70**
- Ministry of Foreign and Internal Trade of Sri Lanka 1971 **Report of the Tractor Committee**.
- Neal, M.E.B. 1957 **Contract Agricultural Machinery and Tractor Pools**. FAO Technical Report No. 747, Rome
- Pillai, P. V. 1984 **Training Farmers on Machinery for Agriculture**. The paper presented at the National Symposium on Machinery for Agriculture in Colombo, August 24 th-26 th
- Plumbe, A. H. and H. M. Byrne 1981 **The Role of the Agricultural Tractor in Road Haulage in Sri Lanka**. Report No. LR 1007, Transport and Road Research Laboratory, Crowthorn, UK