

GOVERNMENT AND IRRIGATION IN BURMA: A COMPARATIVE SURVEY

JANICE STARGARDT

THE REMAINS OF IRRIGATION SYSTEMS IN CENTRAL Burma predate the earliest records of government. Within the period of recorded history, however, the concern of government with irrigation has been, on the whole, both sustained and emphatic. This study attempts to trace the history of governmental policies on irrigation from the earliest material available up to contemporary policies of extension and renewal, and to place them in the perspective of the general historical evolution of Burma. It is, therefore, comparative only in an internal sense in contrasting the governmental attitudes and irrigation works of one era of Burmese development with those of another.

The geography of Burma must have played a major determining role in the early development of irrigation techniques. Burma's river and mountain systems follow a north-south orientation and focus on the Irrawaddy and Salween rivers whose many tributaries interlace the mountain folds of the east, north, and west. The lands of the Irrawaddy valley proper may be distinguished from each other as the Lower Irrawaddy Valley¹ and Delta² and the Dry Belt. Though Burma generally receives very high annual rainfall³ and is a well-watered land, the last area referred to, "The Dry Belt," receives less than 26" annual mean rainfall.⁴ Moreover, this rain falls in a comparatively short period so that much would be lost through run off, if no measures to retain it were taken. It was presumably to compensate for this short rainy season and to exploit the strongly favourable river system that irrigation techniques were developed at a very early time in the heart of the Dry Belt. The Irrawaddy River itself and its great tributary, the Chindwin, have carved out many channels and courses which are dry, low or full, depending on the different seasons of the year. It would have been, initially, a comparatively simple matter, therefore, to dig channels connecting one course to another, especially in places where the pressure of water was particularly strong, and a channel flow ensured.

¹ Lower Irrawaddy Valley and Delta.

² The dry belt of Central Burma, stretching from Thayetmyo and Yamethin in the south to Ye-U in the north.

³ Annual average rainfall varying between 79" at Myitkyina and 212" at Tavoy.

⁴ Annual average rainfall varying between 23.91" at Pakokku and 38.02" at Yamethin.

The earliest traces of irrigation systems so far uncovered, were found in sites where the natural conditions were overwhelmingly favorable and the short rainy season made the need equally pressing: just south of the confluence of the Irrawaddy and the Chindwin, in the region around Pagan; in the Kyaukse district due south of the point where the Irrawaddy today bends sharply westwards. The Kyaukse district is close under the eastern hills and benefits from the drainage from that heavy rainfall area. The Meiktila district benefits from the run-off of both the eastern hills and the Pegu Yomas, while in the Minbu district, the Irrawaddy runs close under the Arakan Yomas or Western Hills which compress its force and also provide substantial drainage. These are the sites of the earliest known systems of lakes and channels.

In studying the earliest works, there are, so far, no available records to show who took the decisions to construct them and when. In the absence of written records, there are other sources of information. There are the various techniques of archeology, to which others have devoted some attention⁵ and there are the oral traditions of legend. It is to these last that attention will first be turned here, as they have some bearing on the relation between government and irrigation.

Pagan originated as a cluster of nineteen villages, long before the rise of central authority. There were the Four Islands which were island villages in the Irrawaddy, the Five Villages, and the Ten Villages. It is likely that these groupings reflected geographic unity such as that of neighboring islands or that of villages served by, and serving, the initial irrigation net. Whether from the inception of irrigation, or only later, this unity assumed also a political character. There was a Lord of the Four Islands, a Lord of the Five Villages, and a Lord of the Ten Villages.⁶

Htin Aung, in his "Folk Elements in Burmese Buddhism,"⁷ refers to these lords because they were included in the list of "Thirty-Seven Nats"⁸ or lords, as recounted by the attendants of the Shwergon Pagoda. Aung

⁵ See, Stewart, "Burmese Irrigation: A sidelight On Burmese History," in *Journal of the Burma Research Society* 1921, and "Old Burmese Irrigation Works," cited by G. E. Harvey, *History of Burma from the earliest times to 10 March 1824, the Beginning of the English Conquest*. London, Cass and Co., 1967, p. 320.

⁶ Maung Htin Aung, *Folk Elements in Burmese Buddhism*, London, Oxford University Press, 1962, p. 98 describes these lords as "all king's deputies who built up the new kingdom." It is, perhaps, more likely that they were Lords, local in origin, who accepted the King's over-riding authority and therefore provided for the transition to a unified state. Their inclusion among the Thirty-Seven Lords would then be understood as a special mark of royal approval, which was often the case in this cult.

⁷ *Ibid.*

⁸ *Ibid.*

describes them as "all king's deputies who built up the new Kingdom"⁹ at the time of the emergence of Pagan as a seat of central authority over a wide region.

It is likely, however, that these offices were much older than that period — the tenth century — and of indigenous not royal origin. Likewise, the role of the Lords as the focus of local, animistic cults concerning irrigation, crops, and authority would probably have had much older origins than the worship of the "Thirty-Seven Nats" which Anawratha reluctantly authorized towards the close of his reign, in the eleventh century.¹⁰ This hypothesis is certainly supported by what is known to have been the case elsewhere. In the neighboring Kyaukse district, the Lord of the Nine Towns was worshipped as the local god of the irrigation works embracing the "nine districts." According to Aung, the cult persisted to the contemporary period. It would appear very likely that the original significance of the worship of the three Lords of the Pagan district was of this kind; that it acquired an additional, political level when later Lords accepted the central authority of the King of Pagan and that the two levels merged in the manner so common to Burmese legends.

From these legends, one may see the intimate connection between government and irrigation works from the earliest times in Burma. Furthermore, it is clear that the duties of government in irrigation partook of the religious or mystic significance that surrounded much of the work of early authority in Southeast Asia generally. Indeed, irrigation seems to have occupied a position of central significance in the mystical nexus which linked authority to agricultural renewal. At Angkor the initiation of a new irrigation work was the most sacred duty of each new King upon his consecration. In Pagan, where the Kings did not claim the pre-eminence of the god-king of Hindu ritual, but served as Kings under the law of Theravada Buddhism, they still accorded a high importance to irrigation.

The second great King of the Pagan dynasty was Kyansittha (1084-1112). Several inscriptions celebrating his origins, achievements, and desires for the future, survive. They are the Myazedi inscriptions at Myinkab, the great inscription of the Shwezigon Pagoda at Pagan, and the

⁹ *Ibid.*, p. 98.

¹⁰ Anawratha allowed statues of the "Thirty-Seven Nats" (or Lords) to be placed in the court of Shwezigon Pagoda, his great temple to the new Buddhism. The statues were grouped in attitudes of worship around the Buddha, symbolically represented in the form of a stupa. He made his grounds for this compromise explicit by saying, "Men will not come for the new faith. Let them come and worship their old gods and they will gradually be won over to Buddha's law."

Myakan inscription at Myanpagan, Pagan.¹¹ They give a legendary history of Kyansittha's origins, his earlier lives and exploits, and record the outstanding events of his reign: the endowment of monasteries, the repair of the great Buddhist shrine at Bodh Gaya, in Bengal and its re-endowment, and an embassy he sent to a Chola prince. In all these inscriptions, the King is referred to by the title Sri Tribhuwanadityadhammaraja. Alone, in a fragment of an inscription¹² dealing with his achievements in irrigation, did the King assume the superlative title of Sri Tribhuwanadityadhammarajadirajaparamiswarabala cakkrawar, meaning "Supreme King of Kings, overlord, mighty universal monarch."

The inscription reads:

.....to the end that all beings may obtain happiness, bliss (and) plenty, (and) be free from famine of ((agriculture)) (in) every place that lacks water, lacks arable land, lacks ((intensive)) cultivation our Lord the King of the law dams the water, digs a tank (and thus) creates arable land (and) ((intensive)) cultivation.

At the time when King Sri Tribhuwanadityadhammarajadirajaparamiswarabalacakkrawar, the exalted, who rides upon a male white elephant, who was foretold by the Lord Buddha, the omniscient (one), the Bodhisatva* had dug this tank, he gave (it) the name of Mahanirbhan Lak Chuy Khi Kiy (to be) for the benefit of all mankind, the congregation of beings (and) all — May all you good men understand.¹³

To confirm the special emphasis given this aspect of the King's achievements, the second paragraph is written in Pali, not Burmese. Legend attributed the entire irrigation system to Anawratha, the first great King of the Pagan dynasty. As we have seen, it is much older than this. The Pagan dynasty was, however, most active in restoring existing works and extending the system.

The Meiktila lake was repaired by Anawratha. It stored water to irrigate approximately 15,000 acres. The Kyaukse lake, also repaired during his reign, irrigated an area of 5,000 acres while the nearby Yamethin lake irrigated a further 5,000 acres. Kyansittha's grandson and heir Alaungsithu constructed the Nanda and Maungmagan lakes, in the Mandalay district, (1112-1167). The next king of this line, Minshinzaw, constructed two further lakes in the same district, Aungbinle and Tamokso. A later king of the Pagan dynasty, Narapatisithu, was responsible

¹¹ These inscriptions are available in *Epigraphica Birmanica*, Pts. 1 & 2, Vols. I, II and III, Rangoon, 1921. Edited and translated by Blagden and Duroiselle.

For study of these inscriptions, see the present writer's "The Powers and Duties of Kingship in Kyansittha's Reign, 1084-1112; from Contemporary Inscriptions." Paper No. 70, I.A.H.A. Conference, Kuala Lumpur, 1968.

¹² The Myakan inscription at Myanpagan, *Epigraphica Birmanica*, No. III, C27-D6, p. 142.

* Probably refers to Kyansittha — the man who will become Buddha.

¹³ *Ibid.*; any departures from the Blagden and Duroiselle translation are indicated in the text by the insertion of double brackets.

for the Kyaukse weir and for initiating work on the largest system of all, the Mu canals, which were designed to provide irrigation for 300,000 acres in all, if in full operation.¹⁴

The canal area was known in the Burmese chronicles as Yehlwen-gahkayaing — “The Five Sluices.” It was the traditional center of grain production in the pre-colonial period. A large part of the abundant grain which was acquired from two harvests each year, was transported to the royal granaries and there formed a guarantee of the continuing prosperity of the kingdom even in the event of famine or war.

The rapid expansion of irrigation works under the Pagan dynasty was part of a general economic expansion at that time. Not only from agriculture but also from commerce did the consolidated political power of the first Burmese empire draw increased revenues. Pagan itself was on one of the inland trade routes from India to China. As well, Pagan had considerable influence over the maritime trade between Ceylon and the Malay peninsula. Both Kyansittha and his heir, Alaungsithu, made major sea journeys as far afield as Bengal, Ceylon, and Malaya. The peninsular territory of Tenasserim occupied a central position for this trade. Settled largely by Mons and formerly an independent kingdom, it had been conquered by Anawratha and was ruled by a governor under the first Burmese empire. Some indication of the strategic importance of the territory is given by the fact that the Pagan government kept it under direct surveillance. Alaungsithu took the exceptional step of personally leading an expedition to put down a local revolt there. The traditional Burmese definitions classified waters as three types: the “tame” or inland waters; the “salt waters” — that is, the tidal waters of the delta region; and “open waters” of the sea. Much of the prosperity of the first Burmese empire came from successful exploitation of the “tame waters” for irrigation and of the “open waters” for maritime trade. To these sources of wealth must be added the important inland trade routes through central and northern Burma.

During the thirteenth century, the power and wealth of Pagan gradually suffered diminution owing to both external and internal factors. This decline became marked after 1234, the beginning of the reign of Kyaswar. There was a drop in royal revenues, reflected in counter-measures such as the confiscation of monastic lands, to provide alternate sources of income. If, as seems likely, the cause of declining revenues was in fact a weakening of the trade cycle between India and China, then clearly land values and agricultural produce alone could not provide an adequate substitute source of wealth. Increasingly oppressive

¹⁴ There is some doubt whether this system was ever fully effective. See G. E. Harvey, *History of Burma, op. cit.*, p. 319. However, there seems little reason to estimate its actual effectiveness at as low a figure as he does.

rule within the empire was matched by mounting external dangers from two sources. The Tai tribes on Burma's northern and eastern borders had gained rapidly in strength and organization¹⁵ and the armies of Kublai Khan, in their sweeping campaigns to consolidate Mongol rule over all of China, thrust southwards to demand the suzerain rights of the Khan over the kingdoms of Southeast Asia.

In the last quarter of the century, the central authority of Pagan was eroded through the vicissitudes of warfare between Burmese and Mongol armies in the northern border areas of Burma and Yunnan. Side conflicts erupted between Tai and Burmese forces in the north-east and in the south, a Mon rebellion broke out in Tenasserim. In 1283, the Mongol army inflicted a major defeat on the Burmese forces. A long interlude followed in which the advantages of this victory were not pressed home by the Mongols, but the Burmese central government was not able to rally its strength. Ten years later, Mongol armies returned to Central Burma, sacked the city of Pagan, killing much of its remaining population and carrying off much treasure.

With the destruction of Pagan in 1293, the unified rule of the first Burmese empire was also destroyed and in its place there emerged a number of rival centers of power. Upper Burma was a province of China. The Mongols also claimed Central Burma as a province but made no effective provision for its rule. In the internal disarray of the Burmese government, the group to display most initiative were the Shans who managed to consolidate considerable power in the Kyaukse district at the expense of the legitimate heir to the vestiges of the royal power of Pagan.

In the course of the political vicissitudes of the latter part of the thirteenth century, the irrigation system suffered. Irrigation depends for its success upon strong and sustained administration and settled conditions. The momentum gained by irrigation construction works in the early part of the first empire could not be sustained in the later period. The system fell victim to the process of political disintegration of which a brief sketch has just been given. The only significant extension in this period was undertaken by one of the Shan chieftains who had been made Lord of Myinsaing in the Kyaukse district. He developed the Thindwe works in 1300.

It is true also of later extensions to the irrigation system that they coincide with periods of relatively strong government and, conversely, that in the interludes of internecine struggle the system was neglected. By the middle of the fourteenth century, the struggle among warring groups entered a period of relative stability around three acknowledged centers of power: Ava, Arakan, and Pegu. It was during this time that the next significant

¹⁵ The Kingdom of Sukhotai was founded at this time.

extensions were made to the irrigation system at Zidaw by Minkyiswasawke, King of Ava from 1368-1401.

In the fifteenth century, the southern Kingdom of Pegu enjoyed one of its most brilliant periods, especially under Queen Shin Saw Bu and her successor, the former monk, Dhammazedi. The wealth of the Kingdom derived, in the main, from the greater share of the maritime trade which the Mons were able to acquire at this time. Irrigation played no significant role in the economy of the southern Kingdom. In Central Burma, the short-lived reunification of the country under Tabinshweti in the sixteenth century meant that extensions to the irrigation system were again undertaken. The Ngakyi works were carried out during this period, 1546-1552. Concern with irrigation never disappeared, even under the most unsettled conditions. It re-emerged quickly whenever conditions permitted it. As late as the mid-nineteenth century, when the power of the Kings was already seriously eroded by the struggle against the British, King Mindon ordered the construction of two further irrigation works, at Pinda and Htongyi, and the repair of the Nyaungyan-Minhlá lakes in the Meiktila district.

Much current repair work must have been carried out throughout the pre-colonial period. The construction materials were on the whole light. Extensive use was made of palm trees and jungle wood which had a very limited period of usefulness.¹⁶ Only when the repairs were a major undertaking in their own right did they receive special emphasis in the records of the Kingdom, as when Alaungpaya carried out major repairs to the Mu canal system, 1752-1760. In the Kyaukse district, the labor for maintaining the irrigation works was ensured by a system of villages.

Harvey described the situation at the beginning of British rule:

The area irrigated was rather more than 100,000 acres at the end of native rule. It was administered directly under the Crown by two governors, one for the Zawgyi and one for the Panlaung. At each weir was a sebin village whose inhabitants had to keep constant watch on the weir and were exempt from all other duties and from thathameda*. They formed a hereditary profession and were employed on the construction of weirs, the repair of breaches, etc. Some are still employed.¹⁷

The principles upon which traditional construction rested were largely those of practical observation and trial and error. When repeated attempts at construction were unsuccessful, the project would be abandoned as inauspicious. This was the case in Narapatisithu's ill-fated extensions to the Minhu system in the twelfth century. These works

¹⁶ See, Harvey, *op. cit.*, p. 319.

* Household tax.

¹⁷ Harvey, *op. cit.*, pp. 318, 319 and also G. H. Luce, "Old Kyaukse and the coming of the Burmans," *Journal of the Burma Research Society*, XLII, i, June 1959 pp. 75-112.

were abandoned and not touched again until the British reconstructed the system early in the twentieth century.

Harvey, who was not prone to praise Burmese technology, made the following assessment of traditional irrigation techniques:

...the fact remains that Burmese irrigation works are a monument to the skill and energy of the race. The best stonework is good, and the alignment is extraordinarily fine. The cultivator has a good eye for levels; he has seen the land under rain year by year, and can tell to a nicety which way water will run off. English irrigation officers have seldom been able to better the main alignment of any Burmese canal system. They have straightened channels and cut off bends which were unavoidable to builders who did not use falls, but they could not have bettered the sites as a whole, and they now admit that the Burmese site of the Mu canal would have given a better alignment than the one now utilized.¹⁸

During the colonial period, 1886-1941, Burmese agriculture underwent a significant change. Under the Kings, the irrigated regions of Central Burma had been the granaries of the nation, but during the colonial period the Delta lands were opened up for intensive rice cultivation. The consequences of this development on population distribution, new sources of credit, turnover in land ownership, rice production, and export levels were to be profound. The added up to a major shift in relative economic and political importance from the traditional center of the nation in the central Irrawaddy valley where most of the old capitals were to be found and where the irrigated districts were situated, to the fertile plains of the delta region and the coastal trading port which became the new capital.

After the opening of the Suez Canal in 1869, market outlets in Europe for Burmese rice expanded. This lent corresponding impetus to the exploitation of the Delta lands and the accumulation of a rising surplus of grain production for export. From a little over 400,000 tons of rice exported in 1865-1866, levels rose to 3,500,000 tons annual export by the close of the colonial period.¹⁹ Most of this spectacular expansion in production was achieved through the reorientation of the industry to the southern areas.

In the north, owing to the drier climate, a wider variety of crops were grown. In addition to rice, cotton, millet, and sesamum had been cultivated there in pre-colonial times. Under colonial rule, agriculture was further diversified with the introduction of sugar cane, peanuts (groundnuts), certain types of beans, and pigeons peas.²⁰ Peanut cropping covered 781,000 acres in 1940-1941.²¹ These crops were grown in

¹⁸ *Ibid.*, p. 320.

¹⁹ "Burma Rice," Burma Pamphlet No. 4, Longmans Green, 1944.

²⁰ J. Russell Andrus, *Burmese Economic Life*. Stanford University Press, California, 1947, p. 17.

²¹ "Season and Crop Report," Government of Burma, Rangoon, 1940-1941, cited by Andrus, *op. cit.*, p. 17.

the Dry Belt, mostly where irrigation was not available. The irrigation system was, however, adjusted and extended during the colonial period with a corresponding expansion in acreage under rice.

*Growth of Acreage Under Rice in Upper Burma*²²

1890	1,357,000 acres
1895	1,500,000
1900	1,972,000
1905	2,057,000
1910	2,142,000
1915	2,119,000
1920	1,751,000
1925	2,240,000
1930	2,459,000
1935	2,307,346

The following table gives a detailed list of irrigated areas, acreage and the extensions during the last decade of colonial rule:

*Irrigated Land in Upper and Central Burma*²³

Division	1931-2	1938-9	1940-1
Shwebo	256,476	364,428	365,081
Kyaukse	171,968	156,045	159,231
Yamethin	159,074	158,759	177,471
Minbu	124,878	142,638	145,762
Meiktila	121,801	111,496	128,480
Mandalay	96,817	104,952	105,293
Magwe	60,215	37,245	65,069
Myingyan	23,268	20,648	26,181
Lower Chindwin	22,927	18,341	18,112
Pakokku	17,307	13,697	12,671
	<hr/> 1,446,511	<hr/> 1,470,333	<hr/> 1,562,336

The modernization of the Burmese bureaucracy took place during the colonial period. Most closely associated with irrigation were the Department of Agriculture, the Public Works Department, and in particular the Irrigation Branch. The Department of Agriculture in the last decade of colonial administration worked within a very limited budget. From 1935-1939 its allocation averaged Rs. 871,466. In 1939-1940, this was substantially increased to Rs. 1,227,577.²⁴ The countryside was zoned into eight circles, each with a central experimental farm and a number of demonstration farms. By the close of the decade, the Burmese held most

²² Figures abstracted from *Burma Handbook*, Government of Burma, Simla, 1943 by Andrus, *op. cit.*, p. 43.

²³ Figures taken from *Annual Reports*, Public Works Department, and *Season and Crop Reports*, Department of Agriculture, Government of Burma for those years by Andrus, *op. cit.*, p. 57.

²⁴ Andrus, *op. cit.*, p. 61.

positions in the department and one of their number was appointed Director of Agriculture during the Japanese period. Otherwise, the department was left to function virtually unaltered. This was not the case in the Irrigation Branch, where little effort appears to have been made during the Japanese period to maintain the effort of the preceding years. There was a rather widespread deterioration of the canal system during the four years, 1941-1945, from which, however, much of the large Shwebo (Mu) network emerged still in working order.

Modern Burmese governments have continued to lay great emphasis upon agricultural development, upon the importance of an active participation of government in agriculture and upon the renewal and extension of irrigation technology. In the most recent period the figures for the total irrigated area are:

Total Irrigated Area

1964-1965	1,940,000 acres
1965-1966	1,860,000 "

These show that the total acreage of the irrigated area at the end of the colonial period has been maintained and extended. The total area under crops in 1965-1966 was 21,680,000 acres of which the irrigated area formed 8.6%. In addition to these figures there are still, as traditionally, many small private canals, wells, and tanks, which provide irrigation for substantially larger areas again. The role of government in modern irrigation is, however, the decisive factor, just as it was in Burma under the Kings.

Substantial sums have been or are being invested in further extensions to the irrigation system. The largest project among current investments is the Kyetmauktaung Dam in Myingyan District. This should provide water for 28,000 acres in the heart of the Dry Belt. Its total cost was Kyats 57,000,000 of which Kyats 36,500,000 was provided under Soviet aid. When in full operation, this dam will allow considerable extension to the system of double-cropping already initiated in the Dry Belt during the colonial period. At that time, the main second crops (after rice) were sesame, beans, groundnuts, cotton, and millet, the water mostly provided from small private tanks. The new extensions to second-cropping will embrace wheat, pulses (peas, beans) maize, cotton, and groundnuts.

Altogether, twenty-three major irrigation projects had been completed by 1966.

This represents a significant aspect of the government's policy for agriculture generally, namely, to overcome the difficulties of the transitional period by substantial and long-term governmental investment. By selecting those areas most likely to generate development such as credit

facilities, marketing, and irrigation, the government hopes to re-establish an integrated Burmese rural economy without recourse to foreign capital or expertise.²⁵

In 1948, the Burmese parliament enacted legislation nationalizing large estates. The immediate effect of this act was to restrict the influence of the Indian, British, and Chinese money interests on the Burmese economy. The foundations laid by the first Pyidawtha (eight-year plan) have been consolidated by subsequent administrations, to reinforce and stabilize the role of the small Burmese farmer in the rural economy.

Under the colonial administration, nearly half of the land of the southern region was owned by non-agriculturists, *i.e.*, mostly Indian and other money lenders.

Although numerous large estates grew up, owned by Burmans as well as Chettyars, there was little large-scale agriculture in Burma. The typical unit of cultivation was fifteen to thirty acres — let to a tenant. Thus the large landlord dealt with a large number of tenants, each of whom worked independently of the others.

... Rents were increased by landlords whose interest in the land was almost purely economic, and who did not partake fully of the life of the countryside. The result was that tenants did not stay for long in any one village. The constant migration from village to village broke down the Burmese social system, with its restraining influence on the potentially lawless, and was probably the outstanding cause for Burma's phenomenally high rate of murders In other words, approximately half the tenants changed holdings every year, and an unknown proportion of them changed villages as well.²⁶

In contemporary Burma, the Abolition of the Tenancy Act has not only broken up large holdings, it has reversed the pronounced trend towards the alienation of the Burmese peasantry from the land and greatly increased the number of small farmers. The number now stands at 400,000. With time these measures should also affect social stability and productivity.

In 1967, Kyats 300,000,000 were advanced to farming households, on the basis of twenty-five different types of crop, as part of the Monsoon Agricultural Loan program.²⁷ Each farmer was entitled to a sum of Kyats 500, on the recommendation of his Village Land Committee. On repaying 75% of the earlier loan, farmers become eligible for a renewal of credit. In this way, government is playing a major part in providing direct assistance to solve the perennial problem of agricul-

²⁵ For a study of the fragmentation of the Burmese economy during the colonial period and a discussion of its consequences in the shape of social alienation, see J. R. Andrus, "Three Economic Systems Clash in Burma," in *Review of Economic Studies*, London, February, 1936.

²⁶ Andrus, *Burmese Economic Life*, *op. cit.*, pp. 71, 72.

²⁷ *Far Eastern Economic Review Yearbook*, 1968, p. 127.

tural credit and to avoid the dangers of chronic indebtedness among rural populations to local money lenders.

The modern program of agricultural renewal is not without its problems. Burma has faced a falling trend in export earnings during the current decade, as the following table shows.

*Burma's Export*²⁸

(Kyats million)

	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67
Rice & products	852.1	784.1	760.9	645.1	562.7	291.6
Other Agric. prods.	217.8	245.6	159.0	213.9	126.9	98.7
Teak	125.0	157.3	149.4	146.9	163.0	81.6
Hardwood	7.1	7.1	1.7	1.1	—	0.9
Metals & Ores	42.6	48.4	52.4	60.5	49.0	22.1
Others	22.2	20.2	14.3	14.0	19.9	5.9
	1,266.8	1,262.7	1,137.7	1,081.5	921.5	500.8

Repayment difficulties have been experienced by farmers in the Monsoon Agricultural Loan Scheme and general agricultural productivity has not greatly increased. Against this must be set the government's success in reducing imports, avoiding the burdens of an extravagant foreign borrowing program and the re-establishment of agriculture upon the basis of indigenous ownership. The spectacular rice export levels of the late colonial period have not been matched but the conditions of the Burmese peasantry, under which those levels were achieved, have been ameliorated. Domestic consumption of rice has risen and accounts for some of the drop in amounts available for export. At the same time, agricultural production has been greatly diversified.

In the field of irrigation there are two current projects of major extent: the Mu River valley project, which is under survey and the Sittang Valley Scheme, under construction. The former will renew and extend the most ambitious of the ancient irrigation works, the Mu canals, which were constructed under Narapatisithu in the twelfth century to provide water for 300,000 acres. The current program will irrigate 700,000 acres in the Shwebo, Monywa and Sagaing districts of the Dry Belt. The largest undertaking of all to date is the Sittang Valley scheme which is designed to provide both flood control and irrigation facilities. The irrigation network will serve a total of 2,400,000 acres in Yamethin, Toungoo, Pegu, and Hanthawaddy districts.

²⁸ Central Statistical and Economic Department, Revolutionary Government of Burma, Rangoon, 1967.

*Burma's Agricultural Production*²⁹

	PROVISIONAL ESTIMATES										
	(000's)	1963-64		1964-65		1965-66		1966-67		1967-68	
		Acres	Tons	Acres	Tons	Acres	Tons	Acres	Tons	Acres	Tons
Paddy	12,475	7,660	12,624	8,378	12,391	7,928	12,328	6,532	12,787	7,592	
Wheat	218	53	298	71	409	95	372	66	337	72	
Groundnut	1,490	332	1,332	338	1,315	283	1,132	273	1,417	389	
Sesamum	1,610	53	1,960	99	1,998	57	1,910	56	1,924	82	
Cotton	674	53	616	67	567	45	486	42	470	63	
Jute	54	12	53	12	72	15	69	13	84	18	
Pulses	1,854	339	1,609	275	1,707	312	1,763	240	1,771	339	
Sugar-cane	98	1,097	120	1,067	143	1,425	155	1,559	131	1,697	
Tobacco, Virginia	9	13	13	17	17	29	20	15	37	36	
Tobacco, Burmese	133	41	116	40	101	23	109	23	107	25	
Rubber	207	13	213	14	216	12	216	11	219	13	
Maize	357	72	221	53	207	61	223	88	301	—	
Chillies	134	18	144	20	154	17	107	15	161	23	
Onions	39	78	45	83	46	50	54	77	54	86	
Potatoes	41	49	37	45	37	34	29	21	29	32	
Coffee	9	1	8	2	9	1	8	1	9	2	
Tea	102	28	115	34	115	36	117	37	118	37	
Coconut	26	40,004	32	49,106	33	65,762	33	65,247	38	70,744	

²⁹ Budget Report of the Revolutionary Government of Burma, Rangoon, 1967-68.

These undertakings represent major investments of capital and technical expertise with significant ancillary affects on the development of the rural economy for the future. As such, they provide a sensitive gauge of Government's policy directions for long term, agricultural re-development, as well as an impressive return to the dynamic policies of irrigation and development which have traditionally been the intimate concern of government in Burma.