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AND DEVELOPMENT IN SOUTHERN AFRICA

The political economy of malaria epidemics in Swaziland

by

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The impact of industrialization on the economic and social development of African societies located on the periphery of South African industrial development has been the focus of a number of recent historically situated studies. These studies have shown how demands for cheap industrial labour, combined with the interests of white settlers produced restrictive land and agricultural policies which undermined the productivity of African cultivators and led to the impoverishment and disruption of African societies. One of the most profound effects of this development on the lives of Africans was its impact on patterns of sickness and health. The disastrous medical consequences produced by labour recruitment, land alienation, and village consolidation have been vividly described by Leroy Vail in his pioneering study of disease and ecological change in northeastern Zambia during the colonial period. A number of other studies have noted the relationship between migrant labour and the spread of infectious diseases such as influenza, tuberculosis, and syphilis in rural areas connected to the mining industry.

A disease of equal importance in this context is malaria. Yet the relationship between the changing incidence of malaria and the dual processes of industrialization and rural under-development in the lowland areas of southern Africa is only partially understood. While a number of studies have linked
upsurges in both the morbidity and mortality associated with malaria to specific developmental changes, such as shifts in settlement patterns, house types, farming practices, communication patterns, the organization of labour, water use patterns and insecticide use, few have attempted to relate these changes to the wider political economy in which they occur. Thus the linkages between the political economic forces which generate specific social and economic transformations and the epidemiology of malaria has not been clearly defined. It is with these wider linkages in mind that the present paper examines the political economy of malaria epidemics in Swaziland during the colonial and post-colonial eras.

Swaziland is located in southern Africa on the border between South Africa and Mozambique. It is a small country occupying approximately 6700 miles with a population of about 700,000 people. The country is divided into four ecological regions distinguished by elevation, climate, soil quality and vegetation. These variations have played an important role in shaping the social and economic development of Swaziland and the epidemiology of Malaria.6

The westernmost region, the highveld, is situated above 1000 meters and except in a few valley bottoms averages 1500 meters or more. Eastward, successive north-south trending belts comprise the middleveld at a mean altitude of 700 meters, the lowveld with an average elevation of 400 meters, and the Lebombo range with summits of 600 and 900 meters.

Differences in altitude affect rainfall and temperature
MAP OF THE KINGDOM OF SWAZILAND

TRANSAAL

HIGHVELD

Mbabane

Manzini

Malkerns

Hlatikulu

Mahamba

LOWVELD

LEBOMBO RANGE

MOZAMBIQUE

0 10 20 30 40 50 Kilometers
levels in Swaziland. Rainfall, which occurs primarily during the spring, summer and autumn months from October through March, is highest in the upper regions of the country and lowest in the lowveld, with a general increase in rainfall per annum of seventy-five millimeters for every one hundred meters of altitude. While rainfall is normally adequate for agricultural production in the higher regions of the country, the lowveld is marginal with a maize drought risk, i.e. the probability that the area will receive less than 635 millimeters of rain, of between sixty and eighty per cent. In contrast to rainfall levels, annual mean temperature varies inversely with altitude, decreasing from seventy-two degrees farenheit in the lowveld to sixty-one degrees in the highveld at heights around 1600 meters.

Finally the four regions are distinguished by variations in soil type, terrain, and vegetation. The highveld is predominantly rocky with slopes too steep for cultivation. Moreover, the leached condition of the soil mitigates against intensive crop production without reconditioning. The natural grazing is sour, and thus not of sufficient nutritive value during the winter to maintain cattle in good condition without supplementary feeding. The middleveld, with its undulating countryside has soils which are mainly deep friable loams providing ample scope for mixed farming. Tall Grassveld dominates the grazing of this region and is moderately sour. The lowveld, while lacking in rainfall, has good soils and sweetveld grazing which makes it excellent ranching country.
Finally the Lebombo range has soils built of acid to intermediate volcanic lavas, of good depth and of medium texture and is thus well suited for mixed farming.

The above variations in ecology have helped to shape the distribution of human and cattle populations in Swaziland. At the time of the first European settlement in Swaziland in the middle of the last century, the bulk of the Swazi population was concentrated in the middleveld and Lebombo regions of the country. Good soils, moderate temperatures, reliable rainfall, and adequate grazing made the regions more attractive to the Swazi than either the high or lowveld regions, which remained relatively unoccupied. In addition, the areas chosen for settlement in the middleveld were backed to the west by a deeply dissected escarpment, ideal for defense against the depredations of neighboring peoples. From their homesteads in the middleveld and Lebombo range the Swazi were able to take advantage of both the grazing and hunting resources offered by the lowveld.

The colonial period saw a gradual movement of Swazi into both the high and lowveld. This movement was necessitated by land shortages resulting from both increases in the Swazi human and cattle populations and restrictions on Swazi access to land following the alienation of land to European settlers who also preferred the middleveld and Lebombo areas for settlement. Following World War II movement into the lowveld accelerated as a result of the development of large scale irrigation projects in the area.
The Epidemiology of Malaria in Swaziland

Malaria has been a major health problem in Swaziland for as long as historical records have been kept, and so it would seem, for as long as the Swazi themselves remember. However, because Swaziland has a sub-tropical climate, malaria has tended to be a seasonal occurrence associated with the warmer and wetter summer and autumn months of November through April, when conditions are ripe for the breeding of the anopheles gambiae mosquito, which is the primary vector for the transmission of malaria in Swaziland. During the cooler drier months from May through October, transmission normally ceases except in certain riverain areas of the lowveld.

Prior to the commencement of extensive anti-vector spraying campaigns in 1949, malaria was normally limited to the lowveld and lower reaches of the middleveld. In the lowveld a large number of cases, occurred every year. However, the number of severe cases among older children and adults appears to have been limited by the endemic nature of the disease in this area and by a partial immunity which lowveld residents had acquired through repeated infection. The number of middleveld cases was usually much lower than the number of lowveld cases during normal years. However, the severity of cases in the middleveld was often greater. This is because malaria infections were a less frequent occurrence among middleveld residents and consequently their acquired immunity to infection was minimal. Cases in the highveld were rare during normal years, most reported cases having been acquired elsewhere.
Variations from this normal pattern occurred on a number of occasions during the colonial era prior to the commencement of anti-vector spraying campaigns. In certain years the incidence of malaria was extremely low with very few cases occurring anywhere in the country. Such years often coincided with years of exceptionally low rainfall and a corresponding reduction in breeding conditions for the Anopheles gambiae mosquito. Thus 1912, 1916, 1921, 1922, 1924, 1926, 1931, 1934, 1943 and 1945 are described in administrative and medical reports as years in which the incidence of malaria was extremely low and in which rainfall was well below normal throughout the country.

At the other extreme, certain years are noted as having been marked by very severe regional epidemics of malaria. During these years the number of cases in the lowveld increased tremendously, and many more severe cases and deaths especially among young children were reported. In addition, a great number of cases occurred in the middleveld and a significant number in the highveld as well. Major epidemics are reported for 1913, 1915, 1917, 1919 (though the coincidental arrival of Spanish Influenza in 1919 makes it difficult to judge the accuracy of malaria reports for this year), 1923, 1932, 1937, 1939, 1942, and 1946. For 1946, the first epidemic year in which extensive malarial surveys were carried out, it was estimated that there were nearly 50,000 cases of malaria in Swaziland. Over 10,000 cases were treated in hospitals, and infection rates among young children reached 100% in certain
Throughout the colonial period and up to the present time, major malaria epidemics have been attributed to heavy rainfalls and a resulting increase in vector breeding. Thus, as recently as 1974, a World Health Organization study, which calculated the average rainfall for the normally rainy months of November through March for the years 1966-1973 and correlated this with the number of malaria cases recorded during these years, concluded that there was a high positive correlation ($r=0.90$) between rainfall levels and the incidence of malaria, a correlation which was reported to be statistically significant at the 1 per cent level. The author concluded from this that it was possible to forecast epidemics on the basis of rainfall figures.10

The absence of accurate statistics on the number of cases by year for years preceding 1946 makes it difficult to confirm or reject the report's findings statistically. Yet even a casual examination of rainfall data in relation to case reports and the informal observations of medical and administrative personnel leads one to question the historical validity of this correlation (see Table 1). Thus if one calculates the summer rainfall for the years 1917-18, 1924-25, and 1942-43, years that are associated with either normal or low levels of malaria, and compare these figures with those for the epidemic years of 1916-17, 1922-23, 1931-32 and 1941-42 it can be seen that more rain fell in the former years than in the latter. The lack of correspondence between rainfall
TABLE 1
ANNUAL SUMMER RAINS (NOV.-APRIL) IN LOWVELD (MANZINI) AND REGIONAL MALARIA EPIDEMICS
AND HOMESTEAD STATION

<table>
<thead>
<tr>
<th>Year</th>
<th>Malaria Epidemic</th>
<th>Mean Rainfall</th>
<th>Lowveld</th>
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<tr>
<td>1916-1917</td>
<td>Epidemic</td>
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<td>1917-1918</td>
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<td>1931-1932</td>
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and malaria levels is particularly apparent in relation to the malaria epidemic of 1932. This epidemic was one of the worst in memory. Yet rainfall from November to March 1931-32 as well as rainfall from October to September 1931-32 was below the mean for these two periods in all four geological regions of the country. October to September rainfall figures for the lowveld in 1931-32 were in fact below the drought hazard level. The correlation between levels of rainfall and numbers of malaria cases thus appears to be of questionable validity when examined over a longer historical period.

This is not to say that rainfall does not play a significant role in determining the incidence of malaria in a given year, for it certainly does affect the breeding of anopheles mosquitoes and thus the possibility of transmission. It is not, however, the only factor involved, a conclusion which has been clearly documented by malaria studies elsewhere.

Of equal importance is the number of persons harboring malarial parasites in the host population. The presence of a large number of anopheles mosquitoes in a given region is unlikely to produce a single case of malaria without the presence of such carriers within the human host population. For parasite carriers are needed to infect the mosquito population, although transmission may occur as a result of infected mosquitoes being introduced into an area in which no carriers are present. It follows that the incidence of
malaria among a human host population may be increased by the introduction of a number of infected persons, with or without symptoms, from outside the population, since the increase in carriers raises the likelihood that existing mosquitoes will be infected and that the transmission of parasites to previously uninfected members of the host population will occur. As Prothero and others have indicated, the introduction of parasite carriers from outside a given host population may occur as a result of cattle herding practices, labour migrancy, the introduction of human resettlement schemes and a variety of other circumstances which encourage the movement of human populations. The incidence of malaria may also increase following the introduction of non-resistant human hosts into an area in which malaria is prevalent. Finally, the severity of a malaria epidemic and the mortality rate associated with it may be affected by a number of factors which reduce the ability of the host population to cope with infection.

Thus, increases in the incidence and severity of malaria within a given human population may result from factors other than increases in rainfall and vector breeding. Swaziland data, in fact, suggests that the major malaria epidemics of the colonial era, prior to the commencement of vector spraying campaigns, were as much the product of changes in the condition of human host populations as they were the product of increases in vector breeding. These changes in the nature of the human host population, in turn, were associated with transformations
in Swaziland's political economy during the colonial period and specifically with the underdevelopment of rural areas, the proletarianization of Swazi labour, and the subordination of Swazi economic interests to those of South African and local European settler capital.

The Political Economy of Swaziland 1890-1946

The political economy of Swaziland during the first half of this century was marked by the underdevelopment of African lands and a growing dependence on wage labour leading to the semi-proletarianization of large numbers of Swazi cultivator-herdsmen. King Mbandzeni's granting of land concessions to European mineral seekers, farmers, and land speculators during the 1880s and the subsequent recognition of these concessions by the British colonial administration following their assumption of political authority over Swaziland in 1904 has been cited as the primary factor in this pattern of economic development. For these actions ceded two-thirds of Swazi lands, including some of the best grazing and farm lands, to European owners, and forced the Swazi into reserves which rapidly became overstocked and eroded.12

While the 1907 Land Partition, which legalized the colonial division of Swaziland by recognizing the European concessions, undoubtedly played a major role in undermining Swazi self-sufficiency, patterns of underdevelopment and dependence preceded the partition, which was not enforced until 1914 and did not become a major factor in Swaziland's development until the 1920s. They were in fact established
by the end of the first decade of this century.

Prior to 1896 the Swazi, with an economy based on both the production of food crops and the herding of cattle, supplemented by spoils acquired through periodic raiding activities, appear to have been largely self-sufficient in food production and to have provided early European travellers and settlers with grain supplies. The rinderpest epidemic of 1896-7, however, decimated the Swazi herds and seriously disrupted their rural economy. The near elimination of cattle products along with the forced reduction in raiding activities under Boer and then British administrations placed increased demands on Swazi agriculture as the Swazi became heavily dependent on grain supplies. Swazi cultivators found it difficult to make an adjustment to these changed circumstances and during the decade following the rinderpest epidemic were seldom able to produce enough grain to meet their own needs. Administrative reports up to WWI note frequent crop failures and, in general, provide a picture of a people out of step with their environment, an experience common to a number of African peoples incorporated into an expanding colonial economy.

As a consequence of these changes, the Swazi became increasingly dependent on grain purchased from European traders. The absence of cattle with which to trade for grain forced many Swazi men to seek wage employment, as did the imposition of a poll tax of £2 per adult male plus ten shillings per wife by the South African Government in 1895.
Swazi men also sought wage employment in order to acquire cash for bridewealth payments. Following the South African War, the Queen Regent Lobotisbeni actively encouraged Swazi men to seek work on the Transvaal mines in order to accumulate funds to pay for a delegation sent to England in 1907 to argue the Swazi case against British recognition of European concession claims, and later in 1909 and again from 1913 to 1915 to purchase back land from the concessionaires. Finally, the practice of licensing grain traders as labour recruiters further stimulated Swazi participation in wage employment, for the traders extended credits to the Swazi, which led to indebtedness for which the trader recruiters offered wage labour as a solution.  

In light of limited wage labour opportunities in Swaziland prior to WWI, most Swazi men sought employment outside Swaziland on the gold mines at Barberton and then later on the Rand or on white-owned farms in the Transvaal. Following a pattern established during the years of Swazi independence, men often engaged in military campaigns following the planting of crops and were away until the harvest time, Swazi men engaged in an oscillating labour pattern which took them away from their homesteads for six-month periods between September and May. By 1911, over 5000 men a year, or approximately twenty-five per cent of the adult male population, were engaged in this migrant labour pattern.  

Thus, during the first decade of this century a pattern of dependence on wage labour to meet food and cash requirements
was established among the Swazi. While some wage income was invested into agricultural production in the form of new hoes and the introduction of plows, there was little incentive to do so. There were no markets for surplus grain sales within Swaziland, and the cost of transport made Swazi produce uncompetitive with that grown closer to South African labour centres. Given this fact, Swazi men, being unaccustomed to household agricultural labour, which was largely the work of women, evidently preferred to engage in wage labour in order to acquire cash.\textsuperscript{16}

The enforcement of the 1907 Land Proclamation, beginning in 1914, contributed to the patterns of rural underdevelopment and dependence on wage labour established during the previous two decades. However, because many Swazi household heads chose to negotiate tenant farmer agreements with the concession holders rather than to move their kraals into the Native Areas,\textsuperscript{19} and because the partition had left enough good land in most areas of the country for the Swazi population to maintain itself for several years, the economic consequences of the partition were not immediately felt.\textsuperscript{20} By the 1920s, however, restrictions on land usage in combination with rapid increases in the human and cattle populations of the reserves were taking their toll on Swazi agriculture. The African population increased by an estimated 46\% between 1911 and 1936, while the cattle population nearly quadrupled.\textsuperscript{21} The overstocking and overutilization of Native Area lands led to their rapid deterioration further decreasing Swazi ability to
feed themselves and increasing their dependence on wage labour. The failure of the British Administration to invest in rural development until after World War II only contributed to this pattern. Consequently, by the early 1930s, it was estimated that the Swazi were only able to grow enough food to meet 20% of their food requirements domestically. So that even in good years, many Swazi homesteads had to supplement their subsistence production with European-grown maize produced locally or imported from South Africa and purchased with cash acquired from either the sale of cattle or of labour. 22

Unfortunately, markets for the sale of both labour and cattle, as well as for the purchase of maize, whether grown locally or imported from South Africa, were regulated in large measure by the interests of South African and local European settler capital. These interests frequently worked to the disadvantage of Swazi cultivators, reducing their ability to purchase maize and increasing their vulnerability to droughts, famine and disease, and particularly, within the context of the present discussion, to malaria. The relationship between the subordination of Swazi economic interests to those of settler and South African capital and the production of famine and malaria can be seen in the history of the malaria epidemics of 1932 and 1946.

Famine and the Malaria Epidemic of 1932

The malaria epidemic of 1932 was preceded by a major drought which destroyed much of the Swazi maize and sorghum crops during the autumn (March to May) of 1931. 23 While
the drought left many Swazi almost totally dependent on the purchase of maize from traders and European farmers, colonial officials in Swaziland initially were not alarmed, since plentiful supplies were available for import from the Union at reasonable prices. By the end of 1931, however, famine conditions had developed in many parts of Swaziland. These conditions resulted in large measure from the subordination of Swazi food requirements to European economic interests within the context of the world-wide depression of the early thirties.

Swazi demand for purchased maize did not increase significantly until June and July of 1931. However, the price charged for maize in certain parts of the country began to rise sharply as early as May. Chief Pahla from the Ubombo district complained to the Assistant District Commissioner that although mealies could be purchased in the Union at about 7/- per bag and could be landed at Stegi at 12/- per bag, local traders and farmers were asking 20 to 25/- per bag. Inquiries into this discrepancy revealed that the European farmers in the area, who had a surplus of grain to sell but who had also suffered losses, were selling their own maize at a high price in order to compensate for their limited supply and were not importing cheaper Union maize.

By mid-winter the supply of maize had increased considerably following the Administration's importation of large amounts of South African maize. The price of maize accordingly went back down to fifteen to seventeen shillings per bag.
However, settler interests once again pushed the price of maize up in August as a duty of 4/- per bag of maize and 3/6 per bag of maize meal was imposed upon Union-grown maize in order to protect local European growers in Swaziland from being undercut by the importation of cheap Union maize. This duty, coming at a time when the Swazi were facing famine conditions, hampered the ability of the Swazi to feed themselves. Moreover, it violated the South African Customs Agreement of 1919 which allowed for the free exchange of produce between South Africa and Swaziland, and revealed the dominance of settler economic interests in Swaziland. The duty was reduced to 1/- per bag of maize and 1/6 per bag of meal at the end of October 1931, however, by then increases in current demand for maize combined with the fear of yet another bad crop in 1932 had pushed prices up beyond the levels reached with the initial imposition of the duty. Worse yet, the annual import quota on maize from South Africa ran out in November, sending the price for available maize to over 25/- per bag by December.

The impact of the crop failure of 1931 and the resulting rise in maize prices might not have been so severe had it not been accompanied by a rapid decline in Swazi sources of income. As noted above, Swazi income came primarily from two sources: the sale of cattle and labour. Both sources were severely restricted by the worldwide depression of the early 1930s.

Like other peoples in southern Africa, the Swazi were
attached to their cattle for both social and economic reasons. They were not, however, opposed to disposing of one or two head of scrub stock from time to time in order to acquire cash to meet their financial obligations or simply to feed themselves. Between 1914 and 1920 European ranching companies in Swaziland made extensive purchases of Swazi cattle. Yet, during the early 1930s, and in fact from 1920 until WWII, there was little market for Swazi grown beef within Swaziland, there being no large employers of labour who did not produce their own stock and only small urban centres which were provisioned largely from European stocks of cattle. The Swazi, therefore, depended on South African markets to dispose of their surplus cattle, selling them either to grain and cattle speculators who resold them for a profit in Johannesburg or Durban, or to European farmers in Swaziland who acquired Swazi cattle, fattened them, and then sold them on the South African markets.²⁷

South African meat markets were relatively open to the importation of Swaziland cattle as well as to cattle from other neighboring territories up till the end of WWI, except where outbreaks of disease, particularly East Coast Fever, occurred in the territories forcing veterinary restrictions to be imposed limiting the importation of cattle from these territories.

The depression of the early 1920s and the consequent reduction in the demand for beef both internally within South Africa and on the world export market caused White
cattle raisers in South Africa to begin agitating for the imposition of an embargo on the importation of cattle from neighboring territories, since these importations competed with their own cattle on South African meat markets and drove down the price of cattle. While the South African Veterinary Department rejected the idea of a total embargo, it did begin to institute a series of measures which served to restrict importations and reduce competition. The first of these measures imposed a minimum weight restriction which prohibited the importation of cattle weighing less than 800 lbs. Since the weighing was done at the markets and cattle were often driven a part of the route to market on the hoof, during which time they lost an average of 100 lbs., the effective minimum weight was more like 900 lbs. Subsequent regulations imposed monthly quotas to prevent competition on South African markets at times of peak selling by South African cattle raisers. There is also evidence, largely from European farmers in Swaziland, that the South African Veterinary Department employed health restrictions in an arbitrary fashion to limit the importation of Swazi cattle by restricting them to special quarantine markets.

While these restrictions limited the sale of European raised cattle in Swaziland, they all but eliminated the market for Swazi cattle, which because of overstocking seldom reached the minimum weight restriction without special feeding which most Swazi could ill afford. Moreover, while
a number of larger European cattle raisers in Swaziland were able to obtain an exemption from East Coast Fever restrictions by providing fenced pens and other safeguards against contamination, no Swazi were exempted. For the most part, therefore, the only market available to the Swazi other than the rather limited butcher market within the country was European stock ranchers who would buy Swazi cattle for fattening. This latter option disappeared, however, during the depression of the early thirties, for prices on the South African markets were so low that it did not pay European ranchers to invest in the feeding of underweight Swazi cattle, especially in 1931 when drought conditions greatly restricted grazing. A market for scrub cattle destined for export as frozen beef opened up in Durban in 1930, providing an alternative market for Swazi cattle. However, as the ADC Ubombo told a meeting of district chiefs, the prices being offered were so low that it would pay better if more were slaughtered for the use of people in the kraals. Moreover, whatever market existed closed at the end of 1931.31

In short, the depression, combined with the restricted market for Swazi cattle created by South African interests, knocked the bottom out of the market for Swazi cattle. Whereas the average sale price for Swazi cattle had been 45 per head in 1929 and 1930, with large animals fetching as much as 10, the Swazi could get no more than 2 for a large animal, and some Swazi claimed to have been offered no more than 10/- for a fully grown beast in December of 1931. By
the end of the year some Swazi were forced to deal with traders on a barter basis, exchanging cattle for maize at rates of one bag of maize per beast.\textsuperscript{32} This ratio of bags of maize per head of cattle when compared to the average ratios for the previous four years--8.4, 7.9, 5.9 and 6.1 bags per head--clearly reveals the effect of rising grain prices, combined with declining cattle prices, on Swazi purchasing power.\textsuperscript{33}

During the early months of 1931, Colonial officials encouraged Swazi men to seek employment on the mines in order to acquire the cash they needed to meet both their tax debt and their food requirements. Labour recruiters for the Native Recruiting Corporation saw the failed crops and growing Swazi hunger as an opportunity to increase their production of recruits. To take advantage of the situation, they offered to sell maize to anyone proceeding to the mines at a profit of only 2/6 per bag.\textsuperscript{34} In August, however, MRC agents in Swaziland received orders to stop recruiting Swazi men, as there was no work for them on the mines. At the same time, the number of passes issued by district officers to men wishing to seek work in the Union on their own was restricted because of the problems which large numbers of unemployed Africans were creating for South African officials at Union labour centres.\textsuperscript{35} Employment opportunities on European farms were no better as large numbers of Swazi men were reported traveling from farm to farm in search of work. Many of these job seekers came from the areas hardest hit
by the drought in the lower regions of the country and from areas in the south which were traditional sources of mine labour in Swaziland.36 The demand for farm labour increased somewhat by the end of 1931 as farmers planted crops for the following year. However, the wages offered were extremely low, being only one-half to two-thirds of what they had been in previous years. European farmers claimed that they could afford no more, although in reality they may simply have been taking advantage of the glut of available labour as large numbers of Swazi men sought employment anywhere it was offered.37

The growing inability of Swazi men to find employment or a market for their cattle in order to support their families may account for the increased numbers of Swazi women reported to have traveled to Union labour centres in search of employment during this period. Many of these women are reported to have found a living brewing beer or engaging in prostitution, though the extent of these two practices may well have been exaggerated by both South African officials, who were concerned with the large influx of unattached women, and by Swazi men, who were opposed to their women going out in search of employment. In response to these concerns, Administration officials in Swaziland began requiring women to have passes giving them permission from their husbands or guardians to travel outside the territory. South African Railway Motor Bus drivers were instructed to refuse transport to women who lacked such passes. As a result of this restriction, Swazi purchasing power was further reduced.38
The combination of rising food costs, declining cattle prices, a near absence of labour opportunities, and the inability of the Swazi to grow enough food to feed themselves both in general and as a result of the drought, created, by the end of 1931, famine conditions in many parts of Swaziland. The areas hardest hit were located in the lowveld and in the south of the country around Hlatikulu, where Chief Velakubi is reported to have told the ADC that the famine was the worst in memory. In the lowveld areas on the northeastern portion of the southern district along the banks of the Great Usutu River, crop failures were said to have reduced the inhabitants to a state of starvation. Even the European population of the Hlatikulu area, most of whom were poor white Afrikaner farmers, were reported to be on the verge of starvation. Emergency food supplies were provided for twenty-seven of the most destitute families. A report by the head of Swaziland police noted much privation among natives living in the lowveld and remarked on the increased numbers of Swazi who followed hunters of wild beast and depended on the handouts from camps for a food supply. 

Famine conditions grew worse as the drought continued through the summer months of December and January, seriously damaging the 1932 maize crop. Toward the end of February, however, rains began to fall, and in March heavy rains were experienced over most of the country. While the rains had come too late to save much of the Swazi harvest, they did create conditions for the breeding of mosquitoes. Malaria
cases began to appear in large numbers by the beginning of March, and by April cases were reported throughout the country, as indicated by the following extract from the Annual Medical Report for 1932:

The extent and severity of the malaria epidemic is beyond anything experienced in the living memory of the old inhabitants. The dry summer followed by hot weather and fairly heavy rains in the autumn and early part of the winter gave rise to conditions eminently suitable for the development of anopholes coastalis \[gambia\] with the result that from February till the middle of June malaria was very bad in the endemic and epidemic areas \[low and middleveld\] and spread to parts such as Mahamba, where it has hitherto been unknown. The inhabitants of these areas had not acquired the slightest degree of immunity; they suffered very severely and the mortality rate was high... The Mahamba Mission Hospital was flooded with patients suffering from malaria. 42

In general, the southern half of the country, which had been most severely affected by the famine, was also the area most critically affected by the malaria epidemic, the central and northern districts being less affected by both disasters. In the south, as well as elsewhere, cases
occurred in all four geographical regions of the country and not just in the lowveld, although in the lowveld the number of severe cases appears to have been greatly heightened, with many deaths occurring among young children. While the exact number of cases and deaths is impossible to determine, given the absence of either morbidity or mortality statistics in Swaziland at this time, malaria cases represented 30% of all hospital admissions in 1932 as compared to between 15 and 20% in normal years. To the south of Swaziland, among the Zulu, drought and famine conditions had also been severe in 1931, and it was estimated that there were 10,000 deaths due to malaria in 1932.

The Malaria Epidemic of 1946

The 1946 malaria epidemic, like that in 1932 and, in fact, like nearly every malaria epidemic during the colonial period prior to 1946, began with an extensive drought. Moreover, as in 1932, the subordination of Swazi economic interests to those of settler and South African capital undermined Swazi ability to acquire food supplies to replace their destroyed crops and led to a major food crisis.

The drought conditions leading up to the famine are vividly described in the following excerpt from the 1945 Annual Agriculture and Veterinary Report for Swaziland:

The year 1945 was characterized by one of the worst droughts ever remembered in South Africa.

...Although the planting of maize and other crops was probably greater than ever before,
the drought severely affected yields in all areas and even in May and June there was a marked shortage of maize and kaffir-corn [sorghum], the staple food crops of the native population. The demand for maize and kaffir-corn continued to increase month by month until, by the end of the year, the shortage of all foodstuffs was acute, and famine conditions were being experienced by the population in several areas of the territory.\[46\]

While the early shortage of maize in 1945 was largely the result of crop failures, it was exacerbated by the failure of grain traders to stockpile grain following the 1944 season. This omission resulted from the imposition of maize price control regulations in 1943, which set a ceiling on how much could be charged for maize and maize products. While in the long run this policy was a benefit to the consumer, it led in the short run to grain shortages, since it discouraged grain speculation on the part of traders who saw the permitted margin of profit as being too low.\[47\]

While the price control measures insured Swazi consumers of a fair market price, it could not insure a low price in face of the failure of the South African maize crop, something which had not happened in 1931. The average price for the year was around 26/6 per bag. Toward the end of 1945 and the beginning of 1946, however, the Union authorities
found it necessary to import grain from Argentina at a very high price. While Union authorities subsidized the sale of maize to Union customers in order to dampen the impact of rising food prices, this subsidy was not passed on to consumers in Swaziland, and Swaziland officials felt that the financial position of the territory did not warrant a local subsidy. Swazi consumers were thus compelled to pay a levy of 12/8 per coupon on the coupons issued for the importation of Union maize. Adding transport costs to this levy made the landed cost of a bag of maize at the retailer roughly 34/2 per bag. While the cost of European-grown maize in Swaziland was considerably less than this, it was claimed that there was no practical way of distinguishing between Swaziland-produced maize and Union maize, and the price of Swaziland maize was fixed at the same price, an increase of nearly 8/- per bag. This policy obviously benefited European farmers in Swaziland at the expense of Swazi consumers.48

Yet the high prices were only part of the problem, for even with the importation of grain from the Union, food shortages continued to exist, and many families had to go without maize supplies for varied periods of time. Thus the Principal Medical Officer noted that "...it has become usual to see long queues of natives outside trading stores waiting patiently for what mealie meal they may get and often having to return home long distances disappointed."49

In terms of income, once again 1945 saw the imposition
of restrictions on the export of cattle to South African markets which limited Swazi ability to earn cash from the sale of cattle. The establishment of government cattle sales in Swaziland in 1942 combined with the increased wartime demand for export beef improved the cattle market in Swaziland. However, the extended drought conditions in 1945, combined with the nature of Swaziland's dependence on South African markets, severely limited Swazi cattle sales by the end of the year, when the demand for cash to purchase grain was highest. While the total number of cattle sold at the government sales was only slightly lower than that of the previous year, there was a sizable drop in the number of cattle purchased toward the end of the year, accompanied by a drop in the average price offered from £10.2 per head to £5.15. The drop was caused in part by the declining condition of Swazi cattle brought on by the drought. However, it was also the result of a decline in demand for export cattle from Swaziland created by the imposition of very small export quotas by the South African Beef Marketing Control Board. These quotas had the explicit purpose of limiting competition on South African beef markets, which were being flooded by South African cattle raisers who were off-loading their cattle before the drought and rapidly declining condition of their cattle reduced their sale value below costs. Thus, few Swazi cattle were purchased during the last two months of 1945 and the first four months of 1946. The near absence of sales during the early months of 1946 is reflected in the fifty
per cent drop in annual cattle sales for that year.  

The market for Swazi labour was somewhat better than that for cattle. Recruitment for the mines, while somewhat down from pre-war levels, did not suffer the drastic drop experienced in 1931. In fact, recruitment levels remained fairly constant from 1936 till 1974, averaging around 7,000 men a year. It must be noted, however, that the Swazi population increased by approximately 20 per cent between 1936 and 1946. While employment opportunities within Swaziland increased somewhat during this period, they did not grow sufficiently to compensate for this rise in population. Thus the total of men recruited for the mines plus those employed domestically rose approximately 14% during this same period. This does not include the nearly 3,000 Swazi recruited for the military during the war, since these men were returned home during the latter half of 1945. The unemployment picture was, therefore, somewhat worse than recruitment levels would suggest, though by no means as bad as in 1931. Still, the drought conditions and food shortages stimulated substantial increase in the number of Swazis looking for work toward the end of the year and beginning of 1946 and resulted in the congregation of destitute job seekers around the urban centres of Manzini and Mbabane. The Annual District Report of 1946 noted that, “In the past, native authorities have been seen to upkeep the destitute natives but in the areas adjoining Mbabane a definite class of destitute natives is coming into existence and paupers
from this class of persons are increasing in number."\textsuperscript{52}

The famine conditions created by the inability of Swazi cultivators to obtain sufficient food supplies is well documented. Dr. Mastbaum, the first malaria officer in Swaziland, reported conditions in Native Areas 28, 31 and 35, (located primarily in the lowveld), which he visited in November 1945, were alarming. "I was informed that in some areas the stock of mealie meal and other cereals is completely exhausted and it is impossible for the people to buy any at the local stores. In some places the natives are digging up roots which they cook and this with some meagre rations is the only food available to them."\textsuperscript{53} A nutritional survey of school aged children carried out in September 1945 indicated significant levels of malnutrition, particularly in the southern part of the country.\textsuperscript{54} A second, more thorough, survey of school-aged children conducted in November of 1945 revealed a similar picture. The survey found that 33.3\% of the children surveyed "showed signs of malnutrition" and 5.3\% showed signs of severe malnutrition.\textsuperscript{55} It should be noted that given the requirement that students attending primary and secondary schools pay school fees, the sample of children surveyed, made up primarily of school children, probably represents children of better off Swazi families and that a survey of all children in the same age group would have revealed even higher levels of malnutrition.

The absence of similar surveys in the preceding years make it impossible to know for sure whether the conditions
described in 1945 represent a major decline in nutritional levels. The 1945 surveys are nonetheless consistent with the general picture of malnutrition described in the medical and administrative reports for the year. A further indication of the adverse conditions created by the food shortages of 1945 is found in the record of Swazi men recruited for mine labour and then rejected for health reasons in Johannesburg. The percentage of workers rejected increased toward the end of 1945 and through the first six months of 1946. More significantly, the percentage of those rejected for poor physique showed a marked rise representing nearly 50% of all those rejected between November 1945 and June 1946, as opposed to only 20% of those rejected between July 1945 and December 1946.56

The drought and famine conditions of 1945 combined with the extensive breeding of malarial vectors which began to occur in the perennial streams of the lowveld in November and increased sharply during December and January following the onset of heavy rains prompted the malaria officer Kastbaum to predict a severe malaria epidemic in 1946.57 The prediction was all too accurate, as indicated by the annual report for that year.

Following the onset of abnormally heavy rains, which succeeded the prolonged drought of 1945, the territory was visited in the first-half of 1946 by one of the most severe and wide-
spread malaria epidemics in its history. The populations of the middleveld and highveld were more seriously affected than that of the lowveld. Malaria admissions to the hospital exceeded the maximum reached during previous epidemics by 94% and 26 Europeans acquired primary infections in the Mbabane township, which is normally malaria free. It is estimated that some 50,000 cases occurred in the middleveld and bush during the course of the epidemic which reached its peak in April. 58

Over 10,000 cases were treated in hospitals. Parasite rates for children between 1 and 10 years ranged from 60 to 80% among children in the lowveld, reaching nearly 100% in some areas of the eastern lowveld, and from 20-40% in the middleveld. Both sets of figures roughly double similar rates during the non-transmission season of 1945, as well as those for the normal transmission season of 1947. 59

Drought, Famine and the Epidemiology of Malaria

In attempting to explain the malaria epidemics of 1932 and 1946, colonial medical authorities paid little attention to the role played by the drought and famine conditions which occurred in 1931 and 1945 and even less to the political economic factors which helped turn drought to famine, preferring to explain the epidemics primarily in terms of excessive
rainfall, even when, as in the case of the 1932 epidemic, the rainfall for the year was below normal. Yet studies elsewhere in Africa and India have suggested that drought and famine are predisposing factors in the occurrence of regional malaria epidemics. Moreover, a survey of rainfall figures and agricultural reports for the first half of this century indicate that nearly every major malaria epidemic was preceded by a year of below normal rainfall generally and by drought conditions in the lowveld.

The question which we must now address is what exactly is the relationship between drought and famine on the one hand and malaria epidemics on the other. At the outset it must be noted that the absence of accurate morbidity or mortality statistics for various areas within Swaziland during major malaria epidemics or statistical data on nutritional standards prior to these epidemics and the reliance on more subjective types of descriptive data makes it impossible to answer this question definitively. Nonetheless, the available data does suggest several possible connections between drought and famine, on the one hand, and major malaria epidemics on the other.

Looking first at the lowveld, studies in India have suggested that periods of drought predispose a population which normally enjoys a certain level of immunity to malaria, acquired as a result of recurrent infection, to increased levels of disease. This is because the drought conditions reduce vector breeding and cause a break in transmission.
This in turn lowers the ability of the population to suppress parasites in their blood and results in an increase in the number of persons debilitated by infection when transmission is recommenced. The increase is particularly severe when drought is followed by heavy rains. This process may have played some role in the 1932 epidemic in Swaziland, which was preceded by two years of low transmission. It is unlikely, however, to have played much of a role in the 1946 epidemic, which was preceded by only a single season of low transmission. Surveys carried out among lowveld residents during the non-transmission season of 1945 revealed that both spleen and parasite rates were between 50 and 60% in children between one and ten years of age. These high levels indicate that the drought conditions of 1945 had not reduced the immunity levels of peoples in the lowveld to any significant degree.

A more important factor in the lowveld areas may have been the negative impact which crop failures, combined with an inability to purchase sufficient quantities of maize and other foods, had on nutritional levels. While studies on the relationship between malnutrition and malaria infection have had contradictory results, it does seem clear that falciparum malaria by itself lowers the nutritional levels of infected persons and especially persons who have little acquired immunity to the disease, and thus in the lowveld areas of Swaziland, children from one to ten years of age. It follows that a malaria infection on top of pre-existing nutritional deficiencies (such as were created by the famine
conditions of 1931 and 1945) can create a critical synergistic reaction which may in many cases be fatal. The group most susceptible to such a condition would have been young children, which may explain the high mortality rate experienced by children of this age during the epidemics of 1932 and 1946. In addition, reduced nutritional levels among nursing mothers combined with physical disability caused by malaria infection may have prevented the adequate feeding of infants and contributed to mortality among infected members of this age group. Finally, R. Harris, in a study of falciparum malaria in the Niger Delta region of Nigeria, has suggested that "...a deficiency of first class protein may lessen the ability of the individual to resist high levels of parasitemia, and therefore the untoward effects of clinical malaria." If this is so, then the depressed nutritional state of peoples in the lowveld may have increased the overall incidence of clinical cases as well as the severity of cases.

Turning to the higher regions of the country, it is unlikely that an interruption in transmission in 1931 and 1945 could account for the increased incidence of malaria in 1932 and 1946, since the population of these regions enjoyed little acquired immunity to malaria in any case. A more important drought-related factor may have been the migration of Swazi men from hyperendemic areas of the lowveld to the middle and highveld regions in search of employment. Assuming that a percentage of such workers would have been parasite carriers (the survey carried out in the lowveld during the
non-transmission season of 1945 indicated that approximately 20-30% of adults over age 15 would have been carriers. Their movement into the middle and highveld regions of the country in search of work on European farms and other enterprises would have increased the reservoirs of such carriers and thus the possibility for transmission in the higher regions of the country. Of course the timing of such movement is critical. The migration of parasite carriers from the lowveld could only be relevant if their movement coincided with the onset of the malarial season. This was in fact the case. WRC recruiting reports indicate that, in normal years, the winter months following the harvesting of crops in April and May were generally poor months for recruiting. Plentiful food supplies combined with a reluctance to proceed to the mines during the colder winter months and sufficient cash available from previous contracts tended to keep most Swazi migrants at home. Recruitment picked up again around October but did not reach its peak until after Christmas. This was because Swazi men were responsible for the spring plowing and so often had to wait for the first rains of October. If the rains were at all delayed, recruitment was delayed. Moreover, having delayed going to the mines till the end of November, many Swazi evidently chose to wait until after Christmas before going forward to the mines. January through March were thus the peak months for recruitment, with November and December being the second highest. This pattern, clearly
documented by the NRC labour reports, appears to apply to other forms of labour migrancy among the Swazi during the colonial period. While there are few available records of Swazi employment on European-run farms and businesses prior to the early 1950s, the NRC records provide some indication of the periodicity of Swazi employment in businesses which the NRC viewed as "competition."

The monthly reports of NRC labour recruiters regularly report on alternative opportunities for wage employment within their recruiting district and on how these opportunities affected their own ability to recruit mine labour. These reports suggest that the periods of peak recruitment for the mines largely coincided with periods of heightened demand for farm labour both within and outside Swaziland. While there was little demand for Swazi labour during the winter months, European farmers needed labour for planting toward the end of the calendar year. Later in the growing season, in February and March, labour was needed for weeding, and in April and May for harvesting.

During the famine year of 1931, as we have seen, this seasonal pattern in the demand for farm labour was accentuated by the drought and the absence of any demand for farm labour up until the end of 1931, even though, as noted, many Swazi were said to be wandering from farm to farm in search of employment prior to this date. Employment opportunities opened up toward the end of the year as the European farmers prepared their fields for the next season. And while the
wages offered were very low, the supply of labour was abnormally high on account of the severe food shortages being experienced by the Swazi and by the absence of alternative forms of employment in the mines which had shut down recruitment. In addition, as we have seen, there was virtually no market for Swazi cattle. In short, while it is impossible to provide precise figures, there appears to have been a substantial movement of Swazi workers from famine affected areas, and especially from the lowveld, into the higher areas of the country during the summer and early autumn of 1931-32. These workers were, therefore, present in the higher areas of the country at the onset of the malaria season of 1932 and may well have increased the pool of parasite carriers in these areas and thus the potential for transmission of disease. In this context, it is worth noting that a map defining the risk of malaria infection in various regions of Swaziland, constructed by the chief medical officer for Swaziland in 1939 on the basis of information collected over the previous five years, characterized the middleveld region in general as "moderate" with regards to the probability of infection. The middleveld European farming areas around Malkerns, however, were characterized as "serious," the same designation applied to the lowveld region. The higher prevalence of malaria around Malkerns may reflect its proximity to the Great Usutu River, which is said to have facilitated the movement of malarial vectors into the middleveld from the lowveld.
However, other middleveld areas located equally close to the Great Usutu and in fact closer to the lowveld are designated as moderate areas. The higher prevalence in the Malkerns area may, therefore, be related to the presence of European farms and the seasonal employment of large numbers of Swazi workers from the lower regions of the country.70

As we have seen, a similar movement of men and women into the higher regions of the country occurred toward the end of 1945 and was accompanied by the beginning of squatter communities around the main towns of Manzini and Mbabane. These concentrations of men and women living in inadequate housing and sanitation conditions would have facilitated the breeding of anophgalese mosquitoes at the same time that it increased the pool of parasite carriers, an ideal combination for the onset of malaria epidemics and one which was repeated during the 1960s in irrigation schemes located in the lowveld. In the latter case, however, the carriers were not Swazi but Mozambique labourers.71

An additional factor in the outbreak of malaria in Mbabane in 1946 may have been the operation of buses between Manzini and Mbabane. These buses could have transported infected mosquitoes as well as human carriers.72

Finally, as in the lowveld, the severity of malaria cases, especially among young children, may have been increased by the overlay of malaria infections on existing malnutrition resulting from the famine. Thus, as noted above, the epidemic of 1932 was most severe in the areas
to the south which were hardest hit by the famine.

The history of malaria epidemics in Colonial Swaziland indicates that the semi-proletarianization of Swazi cultivator/herdsmen and the subordination of Swazi economic interests to those of South African and local European settler capital reduced the ability of many Swazi to feed themselves and made them vulnerable to climatic disasters, turning drought into famine. Famine, in turn, when followed by heavy rains and vector breeding, led to major upsurges in the incidence and severity of malaria in Swaziland. While this pattern is apparent in the histories of the major epidemics of 1932 and 1946, the epidemics of 1923, 1939 and 1942 also followed periods of drought, the loss of crops, declining economic conditions, rising food prices, and famine. Thus the pattern described for the epidemics of 1932 and 1946 may represent a more general phenomenon. In this context, it is worth noting the conclusion of a study carried out in India in 1911 by S. R. Christopher. The study attempted to define the conditions which were likely to give rise to regional malaria epidemics in Punjab. Christopher tested the correlation coefficients for different factors including rainfall in the year of the epidemics, a rainfall coefficient, defined as the rainfall in the year of the epidemic divided by the rainfall in the preceding year, and the prices of food supplies. He found the following correlations between these factors and "fever."
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The study suggests that the combination of drought in the year preceding the epidemic combined with high food prices and rainfall in the year of the epidemic had the highest positive correlation with the onset of regional epidemics in the Punjab region of India. It thus supports the conclusions of the present study which suggest that it was not simply rainfall or even a rainfall coefficient (see the years 1917-18, 1919-20 and 1924-25) but the combination of drought followed by heavy rains combined with declining purchasing power which set the stage for major malaria epidemics in colonial Swaziland.
The commencement of an anti-vector control program designed to eradicate malaria in Swaziland during the 1950s dramatically altered the epidemiology of the disease. The first nucleus of a malaria control unit came into existence in 1945 and residual spraying with DDT began on a limited basis in 1949. Spraying was expanded to cover the hyperendemic areas of the country, primarily in the lowveld, during the 1950s. The program was an initial success and except for a moderate outbreak which occurred in 1953 following a major drought in 1952, the number of reported cases dropped steadily throughout the decade. After only three years of spraying the parasite rates in children living in sprayed areas dropped from 65% to 2%. From 1956 spraying was gradually withdrawn from those areas in which no malaria cases had been reported for two years and by 1958 only a fifteen mile protective barrier along Swaziland's eastern border was being treated. Entomological investigations during 1958 and 1959 showed that the *A. gambiae* population had almost totally shifted its living and feeding patterns, resting out of doors and feeding off animals instead of man as an adaptive response to hut spraying. While recognizing the need to continue surveillance work and the potential threat of malaria being reintroduced via migrants from Mozambique, where no control measures had been started, Swaziland
medical authorities confidently stated that malaria was all but eradicated in Swaziland in 1958 and ceased spraying activities for fear that continued spraying might produce DDT resistant strains of mosquitoes. Both the claim and the cessation of spraying proved to be premature. A disturbing flare up of indigenous cases occurred in 1960 and larger outbreaks occurred in 1967 and 1972. The number of recorded cases rose steadily during the late seventies near pre-eradication levels in 1978 when 1473 cases were reported and it was estimated that roughly five per cent of the lowveld population was infected.

The resurgence of malaria in Swaziland is by no means a unique phenomenon. Malaria has made a major comeback in many areas of Africa, Asia and Latin America where it was once thought to have been eliminated. In many areas this resurgence has been linked to the so called "green revolution" and to the extensive use of pesticides designed to increase crop production. This heavy pesticide use has produced DDT and BHC resistant strains of mosquitoes and thereby made possible the recommencement of malaria transmission.

At the present time there is no evidence that resistant strains of A. gambiae mosquitoes have evolved in Swaziland, yet it does appear that as elsewhere, large scale agricultural development has played a role in the resurgence of malaria in Swaziland and that this resurgence, like pre-eradication epidemics, has been related to changes in Swaziland's political economy.
The commencement of anti-vector spraying in Swaziland coincided with the penetration of Swaziland by large scale agricultural capital and the development of irrigation schemes for the production of sugar in the lowveld. As in Natal, where malaria control coincided with and was underwritten by the development of the sugar industry in the 1930s, the parallel development of malaria control programs with the development of the lowveld in Swaziland was not fortuitous.

Malaria control measures had been recommended by Swaziland medical authorities since the 1930s. However, the administration judged such programs to be too expensive. As long as the Swazi were viewed primarily as exporters of labor, and the labor supply was not adversely affected by occasional outbreaks of malaria, the benefits of eradication did not outweigh the costs. In the wake of World War II, however, Colonial Development Schemes proposed for Swaziland’s soil rich but rain poor lowveld made malaria eradication a pressing issue. Thus in 1944, R.W. Thorton, Agricultural Advisor to the High Commissioner commenting on the proposed development of the lowveld warned against the danger of malaria.

Those who advocate settlement in the lowveld stress the grand opportunity of creating irrigation settlements where large numbers of families can be established in close proximity. I have no doubt... that such settlements may be possible but there is little doubt that the malaria trouble will then be aggravated owing to the multitude
of small pools which will furnish breeding grounds for mosquitoes. Naturally these breeding grounds can be treated but that means establishing a proper medical service to supervise and see that remedial measures are carried out.

In short, the creation of agricultural schemes in the lowveld depended upon the eradication of malaria. Consequently, the construction of canals for the Colonial Development Corporation irrigation scheme in the northern lowveld could not begin until the mid-fifties and the production of sugar did not get underway until 1958, the year in which the eradication of malaria was said to have been nearly accomplished. A second major irrigation scheme, Ubombo Ranches Limited, owned by the British owned firm of Lonrho, commenced operations in the southern lowveld around Big Bend at approximately the same time.

Ironically, the development of sugar production in the lowveld created conditions which encouraged a resurgence of malaria in the areas in which sugar was grown. It thus undermined the effectiveness of the malaria control measures which it had been largely responsible for initiating.

Irrigation agriculture, by its very nature, can create conditions suitable for the breeding of mosquitoes. While well maintained canals in which a steady flow of water is maintained are incompatible with the breeding of *A. gambiae*, which breeds in small standing pools of water, runover, seepage and improper maintenance produced the necessary environment in the lowveld -objects, especially during
periods of heavy rainfall. In addition, the extremely poor condition of the housing provided for sugar workers and the near absence of sanitation measures during the early sixties produced additional ideal breeding sites for *A. gambiae* around the workers quarters. Since the malaria control program focused on hut spraying and included no provision for larval control these environments produced an abundant supply of potential vectors, although it appears from entomological studies that the most efficient malaria vector, *A. gambiae*, species "A" had been eliminated by residual spraying leaving only species "B" and"C" which are less effective, though potential, vectors. Finally, the major rivers from which the irrigation schemes drew their water flowed from Swaziland into Mozambique, where as mentioned no control measures were being carried out. This provided opportunities for the introduction of additional vectors, some of which were species "A", which passed along the river valleys into Swaziland.

While most of the *A. gambiae* population had adapted to hut spraying by resting out of doors and feeding off of animals, the absence of livestock in the irrigation schemes encouraged a return to man. From a vector viewpoint, therefore, the sugar estates provided abundant opportunities for the transmission of malaria.

Yet, as noted above, an available vector population, while a necessary cause of malaria outbreaks, is not a sufficient cause. One also needs parasite carriers to
infect the mosquito population and begin the transmission cycle. By 1959, a decade of control measures had reduced the parasite load of the Swazi population to nearly zero. Of the 15682 persons tested in that year, only 173, or 1.1 per cent were found to carry parasites in their blood. This compares to 23% in 1950. At the same time the number of reported cases had dropped from 1300 in 1950 to 18, and most of these were imported cases. Clearly, malaria parasites had all but been eliminated from the Swazi population. Where then did the parasite carriers come from? The answer is Mozambique. The employment of large numbers of Mozambique laborers on Swazi sugar estates during the 1960s provided the necessary population of parasite carriers for the transmission of malaria within the areas in which the sugar estates were located during years of heavy rainfall and vector breeding.

The number of Mozambique workers employed on the Sugar estates rose steadily during the 1960s despite repeated warnings by malaria control officers that these workers represented a threat to the health of Swazi workers and their families as well as to the general population of the areas surrounding the sugar estates. It is important to look at the reasons behind this rising employment of Mozambican labour in order to understand the connection between the resurgence of malaria and the political economy of Swaziland.
From the mid-fifties through the early 1960s the rapid penetration of foreign capital into Swaziland and the development of the mining, forestry and agricultural industries in combination with the continued demand for labor by the South African mining industry, created a demand for Swazi labor which outstripped local supplies. As a consequence of this glut in demand Swazi wage earners were able to "play the market" and be selective in their choice of employment. More often than not Swazi men avoided employment on the agricultural schemes of the lowveld. While the wages paid by the sugar industry were comparable to those of other agricultural industries within Swaziland, averaging 2/4 per day in 1960, the working and living conditions were much poorer on the sugar estates than elsewhere. The Labor Inspector Report for 1957 includes the following evaluation of conditions in the Ubombo Ranches Estate.

Of the major projects visited thus far Ubombo Ranches appear to be the most backward in outlook and planning in the labour field. Unless the company is prepared to offer a higher standard of housing, considerably better rations and develop a more modern outlook for the welfare of its labour force, it is likely to find itself unable to attract labour in the present competitive field.
It was these conditions—inadequate housing, the absence of proper sanitation facilities, insufficient rations including no provision for family rations, irregularities in payment practices, and excessive work hours—which industry representatives attributed to the high initial capital outlays required for starting up and the need to reduce labour costs, that figured prominently in the reasons given by Swazi workers for the major strike which occurred in the Big Bend area in March of 1963.\(^2\)

The industry's difficulty in recruiting Swazi labour during the early sixties, especially during peak periods in Swazi domestic agriculture, led them to employ large numbers of Swazi women and children to perform unskilled tasks such as weeding, and to recruit men from Mozambique to cut cane and perform other heavy labour.\(^3\)

The fact that the number of Mozambican workers in the sugar industry continued to grow during the second half of the sixties, despite a cool down in the Swazi economy and declining employment opportunities which forced more Swazi men to accept employment on the estates, may well reflect the growing militancy of Swazi labour during this period. This militancy reflected in the 1963 Big Bend strike and attributable to the declining mobility of Swazi labour, encouraged the sugar industry to continue employing Mozambican workers who were viewed as being less militant than Swazi workers.
This use of Mozambican labour as a foil to the demands of Swazi workers became a political issue by the end of the sixties and led to restrictions being applied to the employment of foreign labor by the sugar industry.\textsuperscript{95}

Restrictions against the use of Mozambican labour were seen as a major step in the fight against malaria by Swaziland medical authorities. The head of the Malaria Control Unit referred to the restrictions as "the beginning of the end of Malaria in Swaziland in 1970." However, outbreaks continued to occur throughout the seventies and a general rising trend began in 1975.

While the exact causes of this upward trend are difficult to define, part of the explanation may rest with the continued movement of both legal and illegal migrants from Mozambique into the lowveld area of Swaziland. Thus the 1976 Swaziland Census recorded 1056 residents born in Mozambique, which presumably represents only the legal portion of this influx. More important, however, may be the fact that the repeated outbreaks of the sixties, associated with the heavy use of foreign labor, created a reservoir of indigenous carriers within Swaziland. Thus WHO malariologist R.M. Shrestha concluded in 1978, "The intensive transmission that has taken place in the last two years has not only caused high morbidity and even mortality among the semi-immune population, but has also left a lot of reservoirs for sustaining high levels of transmission in the years to come."
These pools, moreover, **developed** over wide areas of the lowveld as a result of the migrant nature of Swazi labor. so that more recent malaria outbreaks have not been restricted to the areas of the irrigation schemes but have occurred throughout the lowveld.

Shrestha also attributed the rising trend in malaria to inadequate control measures during the seventies.

While reviewing the spraying program carried out this year it is observed that the areas were not defined, advanced spraying programmes were not prepared, adequate manpower and transport were not provided, proper training of temporary spraymen was not done, and necessary sprays were not available. All of these led to poor spraying so that it could not be completed before the spraying season. Field visits revealed that even positive kraals were found unsprayed. Under these circumstances it is very difficult to expect any impact of spraying activities carried out during the past years.

The report is additionally critical of case finding and treatment procedures.

The reasons behind these failings of the malaria control unit are not discussed in the report and are beyond the scope of this paper. Let it suffice to say that the Swaziland Ministry of Health from the beginning of the Colonial period up to the present has been seriously underfunded and has been forced to rely heavily on outside sources to fund control.
This outside funding has not always been available. Consequently health officials have had to make choices about where its limited resources will be directed. The recent outbreak of cholera has forced the ministry to direct a large portion of its resources and manpower to cholera control measures and away from the control of other diseases which are seen as less life threatening. The long term costs of this perhaps inevitable decision however, may be high.

As Shrestha concluded in 1978,

If priority is not immediately given to take necessary action for preventing the possible future outbreak, it may bring about a tremendous set back in the over-all socio-economic development of the country as it is clear from the fact that the present malaria flare-up has hit mostly the people in the areas of vital economic projects e.g. agricultural development like sugar, rice and cotton and other development projects like roads, railways and mines where a large number of labourers both from within and outside the country are aggregating.

The potential impact of malaria on lowveld industries and particularly on the sugar industry which in 1980 contributed 50% of Swaziland's foreign exchange, would appear to necessitate a recommittment to malaria control, while the sugar industry's role in the resurgence of malaria suggests that the industry itself needs to shoulder some of the financial burden that this
effort will require. Moreover, given the complex relationship between malaria and changes in Swaziland's political economy over the last eighty years any program designed to cope with the country's malaria problem must go beyond a purely bio-medical response and examine the epidemiology of malaria within the wider context of Swaziland's political economy. While the pattern of malaria flare-ups since the commencement of anti-vector control measures has not replicated those of the pre-control days in either the number of cases or the geographical distribution of cases, most cases occurring in the lowveld region, the possibility of wider regional epidemics in the future cannot be ruled out. The more limited extent of current outbreaks is due in part to the partial effectiveness of control measures, but also to the existence of employment opportunities in the lowveld which restrict the movement of Swazi workers, and thus potential parasite carriers, into the higher regions of the country during periods of economic crisis within the homestead economy. It must be remembered, however, that the health of the sugar industry and its ability to absorb a population which is still heavily dependent on wage labor is dependent on international market forces which control the price of sugar. Any major downturn in world sugar prices could severely affect Swaziland's sugar industry and employment opportunities in the lowveld. This in turn could re-establish earlier patterns of population movement which contributed to regional epidemics. It would thus seem that malaria control measures need to go hand in
hand with efforts to diversify economic development within Swaziland and especially within the lowveld, as well as with attempts to increase food production within homestead economies, thereby reducing dependence on wage labour. Without this type of broad based economic approach to malaria control, drought conditions such as have occurred in Southern Africa over the last two years, combined with a down turn in sugar production and ineffective malaria control measures could lead to a wide scale regional epidemic of malaria in Swaziland in the future.
Notes

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5 The list of such studies is too extensive to site here. Persons interested in the relationship between development and malaria are encouraged to consult the World Health

6 The following geographical description of Swaziland is based largely on that of G. Murdock in his study of *Soils and Land Capacity in Swaziland*, Ministry of Agriculture (Mbabane, 1969).


8 O. Mastbaum, "Report on the Malaria Survey in Swaziland," Mbabane, 1946, RCS 831, Swaziland National Archives (SNA)


10 V. Ramakrishna, "Malaria in Swaziland" AFR/MAL/142, WHO, Brazzaville, 1974.


17de Vletter, "Labour Migration in Swaziland", 50.


19"Reports on Concurrent Occupation from 1914-1920," located in the Swaziland National Archives suggest that while a large number of Swazi kraals were moved from concession lands during this period, many household heads preferred to enter labour tenancy contracts with the concession owners.

20Sir. A. Pim, "Report of the Commission Appointed by the Secretary of State for Dominion Affairs to Inquire into the Position of Swaziland from the Financial and Economic Points
Of View," 1932 SNA. The Pim Report indicated that enough good land was provided throughout the country, with the exception of the Makiana area, to provide the Swazi with adequate land for a period of about ten years.

21Jones, Report on the 1966 Swaziland Population Census, 8

22Pim Report, 1932; Kuper, Uniform of Colour, p. 4; Annual District Report, Hlatikulu District, 1931 RCS 22/32 SNA.

These forces did not affect all Swazi homesteads to the same degree. Class differentiation and social stratification were clearly present in Swazi society prior to European settlement and certain royal and commoner lineages with close ties to the kingship enjoyed superior access to land and labour which enabled them to maintain high levels of household productivity during this period. The resulting disparity in productivity is reflected in the sale of surplus grain at high prices by certain Swazi said to represent the Paramount Chief during the famine of 1931. (A. C. Ubombo to Govt. Secretary, Mbabane, 6 Aug. 1931, RCS 701 SNA).

23Annual District Reports, 1931, RCS 22/32 SNA.

24Meeting of Chiefs with Assistant Commissioner Ubombo District, 24 March 1931, RCS 135/31 SNA.

25Meeting of Chiefs with Asst. Comm. Ubombo, 29 May 1931, RCS 135/31 SNA.

26Annual District Reports, Mbabane and Ubombo, 1931 22/32 SNA; Meeting of Chiefs with Asst. Comm. Mankiana, 19 Oct. 1931;


Correspondence: G. W. Williams, Acting Secretary for Agriculture for the Union of South Africa to Resident Commissioner, Mbabane, 12 Sept. 1923, RCS 472/23; Report of the Central Committee of Stegi Farmers Association, 4 Aug. 1923, RCS 472/23; Resolution, Southern Swaziland Farmers Association, 20 June 1923, RCS 472/23, SNA.

Williams to Resident Commissioner Mbabane, 12 Sept. 1923, RCS 472/23.

Customs Conference 1935, RCS 116/35; Government Secretary Mbabane to Acting Administrative Secretary, Cape Town, 16 Jan. 1935, see note 28.


Meeting of Chiefs with Asst. Comm. Bremersdorp, 18 Dec. 1931;

33 These figures are based on the average annual prices reported in Annual District Reports. They are only a rough approximation of price ratios since the prices for both maize and cattle fluctuated considerably during any given year. The price of cattle tended to decline toward the end of the year while the price for maize tended to rise so that in any given year the ratio of bags of maize per head of cattle was normally lowest toward the end of the year when the Swazi were most dependent on purchased maize.


38 Asst. Comm. Hlatikulu to Govt. Secretary Mbabane, 22 Jan. 1931; Meeting of Missionary Association with resident Commissioner Bremersdorp 16 Oct. 1931, File 1470 SNA.

A scheme proposed in 1945 to export Swaziland beef outside of South Africa in order to compensate for reductions in South African quotas was abandoned following the report of an economist from the University of Witwatersrand which stated that such a scheme was not practical given the uncertainty of the world market and the danger that such a scheme would antagonize the Union cutting the territory off from its natural market (Annual Veterinary and Agricultural Report, 1945 File 793B).
de Vletter, "Labour Migration in Swaziland," 52.

Annual District Report, Mbabane, 1946 File 1155.

Mastbaum to Deputy Director of Medical Services, Mbabane, 16 Nov. 1945, File 741.


Native Recruiting Corporation, "Returns showing the number of contracted Natives rejected for underground work at the W.N.L.A. compound and the causes therefore, "December 1945-December 1948, located at The Employment Bureau of Africa (TEBA) Headquarters, Siteki.

Mastbaum to Director of Medical Services, Mbabane, 16 Nov. 1945 File 741.


There are two exceptions to this pattern. The first is the epidemic of 1919, which was preceded by a year of heavy rainfall and generally good crops. However, as noted above, the con-
currence of the influenza pandemic of that year with the onset of the malaria season contributed to the malaria epidemic of 1919 by both confounding diagnoses and contributing to the mortality rate. The second exception is the epidemic of 1937. Again, 1936 was a year of moderate rainfall throughout the country and the crops were above average. However, 1935 was marked by a major drought which destroyed crops throughout the country. Moreover, as in 1931 and 1945, restrictions on the export of cattle to South Africa, this time on veterinary grounds, knocked the bottom out of the cattle market, preventing the Swazi from bartering their cattle for maize. Given these conditions and what has been described above, one would have expected that a severe malaria epidemic might have occurred in 1936. On the surface, however, 1936 appears to have been only a moderate year for malaria.

The Annual Medical Report notes that the outbreak of malaria was "not at all severe." Yet, other sources refute this conclusion and suggest that the reported low level of malaria cases in 1936 only reflects the absence of many cases in the higher areas of the country where the medical officers traveled. Meetings with chiefs in the lowveld report a severe outbreak of malaria during the summer of 1935-36. Moreover, census takers operating in the lowveld reported that the year was an extremely bad one for fever and that large numbers of children died within a few months prior to their visit. The occurrence of a severe epidemic of malaria in lowveld areas during the autumn of 1936 helps to explain
the epidemic which occurred throughout the country in 1937 and to connect that major epidemic with the drought of 1935. The 1936 epidemic was not only severe in the lowveld, but also long lasting. The late appearance of winter frosts meant that malaria transmission continued through the winter. This continued transmission created a large reservoir of parasites within the human population for the following malarial season of 1937, when heavy rainfall throughout the country led to extensive vector breeding. The combination of a large pool of parasite carriers with extensive mosquito breeding set the stage for the major epidemic in 1937.


67This pattern emerges from the Monthly Reports of NRC recruiters from 1945 through 1960, TEBA Headquarters, Sišteki.

68Annual Medical and Sanitary Report, 1939 RCS 31/40.

69Botha de Meillon, "Malaria in Swaziland," South African Institute for Medical Research, Johannesburg, 9 August 1941, 4, RCS 211/41.

70It is also probable that people living in drought-striken areas visited their better off kinsmen in the higher regions of the country in search of food at this time. This response was evidently common during the pre-colonial era (Personal Communication from Jonathan Crush).

71The conditions which contributed to the outbreak of malaria following the commencement of anti-vector spraying will be discussed in a subsequent publication.

72Botha de Meillon, "Malaria in Swaziland", 4.

73S. R. Christopher, "Malaria in the Punjab," *Science Memoire Office of the Medical and Sanitary Department, Govt.*
These three years clearly illustrate how the occurrence of regional epidemics depended on a combination of several factors, the absence of any one of which could act to reduce the level of malaria in the country. In 1917-18 the occurrence of drought conditions and the loss of crops was followed by excessive rains. However, a strong cattle market allowed the Swazi to offset the loss of their crops. Moreover, the rains in 1918 were so excessive that they inhibited the breeding of the *anopheles gambiae* mosquito, which breeds in shallow hoof prints, pot holes and ditches. In years of heavy rain such as occurred in 1918 these breeding places are repeatedly swept clean disturbing the breeding sites and reducing the mosquito population. Excessive rains also appear to have accounted for the limited outbreak which occurred in 1925 despite the occurrence of famine conditions in the months preceding the outbreak of malaria. The epidemic of 1920 like that of 1918 was limited by the ability of the Swazi to sell their cattle. Moreover there was no depression in employment opportunities as occurred in 1931 and to a lesser extent in 1945. The Swazi were therefore able to cope with the loss of their crops more successfully and were less vulnerable to malaria.

76 Director of Medical Services to Government Secretary, Mbabane 6 Oct. 1959, "Malaria Control", File 3231 L, SNA.


78 See for example, G. Chapin and R. Wasserstrom, "Agricultural Production and Malaria Resurgence in Central American and India," NATURE, 5829 (1981); 181.

79 Personal Communication, Peter Matthews, Director, Malaria Control Unit, Manzini.

80 Culver, "Malaria Control in Natal and Zululand"

81 D. Drew, Principal Medical Officer, Swaziland to Government Secretary, Mbabane, "Proposals for the Control of Malaria in Swaziland." 26 July 1938, RCS 428/38, SNA; PMO to Government Secretary, 20 September 1940, RCS 428/38.

82 Government Secretary, Mbabane to The Administrative Secretary to the High Commissioner, 20 July 1940, RCS 428/38.

83 R.W. Thorton, Agricultural Advisor to the High Commissioner, "Land Settlement in Swaziland" Mbabane, 1944, RCS 301.


Delfini, "Report on Malaria in Swaziland, 1969, p. 4


"Foreign Workers in Swaziland" 30 June 1965, File 3034 B;
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Director of Medical Services to Government Secretary, Mbabane, 6 Oct. 1959, "Malaria Control," File 3231 L, SNA. DMS to GS, 2 May 1960, "Outbreaks of Malaria" File 3231 L. DMO to Secretary, Swaziland Farmers Association, 11 September, 1961, File 3231 L.

Alan Booth, "The Development of the Swazi Labour Market," SOUTH AFRICAN LABOUR BULLETIN, 7, 6 (1982); 48-51.

"Labour Conditions in Swaziland," 19 Nov. 1957, Ubombo Ranches LTD. File 3049W.


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The Central Statistics Office, REPORT ON THE 1976 SWAZILAND POPULATION CENSUS(Mbabane, 1979); 52.

99 Swaziland Government, Department of Public Works, "Malaria Control Map of Swaziland, Case Distribution, 1975/76, 1977/78.

100 Shrestha, "Malaria in Swaziland, p. 4

101 Shrestha, "Malaria in Swaziland," p. 6-7
These papers constitute the preliminary findings of the Second Carnegie Inquiry into Poverty and Development in Southern Africa, and were prepared for presentation at a Conference at the University of Cape Town from 13-19 April, 1984.

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