

CLASSIFICATION PROJECT EVALUATION SUMMARY (PES) - PART 1

SERIAL # 79-6 Report Symbol U-447

1. PROJECT TITLE Dairy Production Assistance			2. PROJECT NUMBER 621-0129	3. MISSION/AID/W OFFICE USAID/Tanzania 360.
5. KEY PROJECT IMPLEMENTATION DATES			4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) Final	
A. First PRO-AG or Equivalent FY 75	B. Final Obligation Expected FY 79	C. Final Input Delivery FY 79	6. ESTIMATED PROJECT FUNDING A. Total \$1,600,000 B. U.S. \$1,200,000	
7. PERIOD COVERED BY EVALUATION From (month/yr.) November 1975 To (month/yr.) December 1978			7. PERIOD COVERED BY EVALUATION Date of Evaluation Review May 1979	
8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR				

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., program, SPAR, PIO, which will present detailed request.)

B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
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Recommendations

- That AID/Washington more closely coordinate centrally funded field projects with the field Missions involved, delineating all backstopping, authorization, documentation, and evaluation responsibilities in a clear-cut manner.
- That AID withhold funding for future dairy development projects until TanGov commitment to develop firm, clear-cut policy for development of dairy farm (TanGov/Parastatal) management, manpower, physical infrastructure maintenance and expansion capability - to include small holder dairy assistance - is demonstrated:
 - Institutionalize a firm policy for in-service and on-the-job training, career promotional, wage increase, etc., opportunities for all dairy farm staff.
 - Make greater utilization of expatriate technicians/managers for training of Tanzanian staff.
 - Eliminate high dairy farm turnover rates.
 - Establish a firm, clear-cut policy, to include parastatals, for provision of dairy development assistance to small holders.
 - Budget adequate funds to maintain staff and physical infrastructure now in place, as well as for

H. L. Steverson
Director

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify)
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify)
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. Continue Project Without Change
- B. Change Project Design and/or Change Implementation Plan
- C. Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

[Signature]
Robert E. Wilson, Evaluation Officer

[Signature]
Bert Behrens, Project Manager

12. Mission/AID/W Office Director Approval

[Signature]
Signature
Howard L. Steverson
Typed Name
Date
August 1, 1979

for future expansion.

3. That all future projects, dairy development or otherwise, are developed and designed in a manner such that the primary objective is to leave in place a Tanzanian functioning capacity to manage, fund, maintain and operate the institutions and/or facilities developed, improved or established through the project.

M. Fuchs-Carsch

a. In particular, that USAID/Tanzania in collaboration with the TanGov and HPI design all future dairy projects in a manner such that development of Tanzanian dairy management and technical capability is given highest priority and small farmer assistance activities are designed to meet the ability of the village farmers and conditions of their culture.

4. That in the event future cattle transfers to Tanzania are authorized under an AID project(s), shipment dates are set and met with the condition that sufficient time is allowed to procure and pre-condition quality, disease free cattle prior to shipment.

M. Fuchs-Carsch
B. Behrens

13 Summary

The purpose of this evaluation is to review the progress of the now completed Dairy Production Project (621-0129) toward achievement of project objectives stated in the grant agreement. This project was implemented under an Operations Program Grant (OPG) awarded to Heifer Project International (HPI) in 1974. The project terminated in December of 1978.

It must be noted from the start that evaluation of this project proved exceedingly difficult for a number of reasons: First, the project was somewhat unique in that it was designed and funded under an OPG, a grant specifically set up for Private Voluntary Organizations to perform in the field - ostensibly under field Mission control - but was designed, developed and authorized by AID/W with little or no Mission involvement. As a result, Mission requirements regarding project monitoring, evaluation and documentation have never been clear. Second, over the course of its scheduled three year life (1974-76) the project was extended several times, expanded to include Zanzibar and Mafia islands, and somewhere along the line expanded to include a \$300,000 training component. Accordingly, since all documentation was developed and authorized in AID/W, the many amendments made to modify the project were either never received by the Mission or received and improperly filed. As a result, proper Mission records and files on this project simply do not exist. Third, interviews with HPI technicians in-country revealed that they were not aware of the fact that submission of quarterly reports to the Mission was a requirement of the grant agreement. Thus, none were submitted. This, of course, made proper monitoring and record keeping nearly impossible. Fourth, over the past year and a half the AID Mission has undergone almost a 100% turnover in direct hire staff. This has resulted in rather severe institutional memory and continuity gaps, and in the process, with little or no records to fall back on, this project was literally nearly lost in the shuffle. Finally, HPI recently sent two individuals out to Tanzania to evaluate this project, but to evaluate it under, and as part of, a DPG grant - a centrally funded grant of which the Mission was not even aware. This once again demonstrates a severe lack of communication between AID/W and the Mission on a centrally funded project, and also the lack of clear-cut guidelines on Mission-AID/Washington responsibility in monitoring and evaluating these projects.

Despite the confusing nature and somewhat haphazard evolution of this project, however, nearly 1,200 head of cattle were transferred from the U.S. to three government farms in Tanzania, Zanzibar and Mafia over a five year period and observations and assessments can, and were, made based on the objectives set forth in the grant agreement, as to progress made and targets achieved.

The goal of this project was to provide high quality Holstein and Jersey heifers and their transportation, and technicians and evaluation staff in support of the Government of Tanzania's effort to improve its livestock industry. The specific objectives were twofold: (1) to build a genetic base on which the Tanzanian dairy industry can expand and (2) to increase small holder farmer dairy production.

During the course of the evaluation it was revealed that significant progress had been made towards achievement of the first purpose but little towards achievement of the second.

When the first heifers started arriving in Tanzania in 1974 and 1975, the TanGov dairy farm they were transferred to, Kitulo in Mbeya Region, was overwhelmed. The infrastructure and manpower required to take proper care of these exotic animals was simply not in place. Facilities were inadequate for proper milking, shelter, calving and treatment of diseases; drugs and veterinary services were limited; fencing was inadequate; pastureland was undeveloped; markets for the milk were not identified; and skilled technicians and managers were in critical short supply. As a result, the mortality rate for adult cows as well for the newborn calves rose unacceptably high and milk production lagged far behind the breed's genetic potential.

After the very unfortunate and shakey start, however, and over the extended life of the project, considerable progress has been made in developing the infrastructure required to take proper care of the animals, in increasing milk production, and in building the genetic base on which an expansion of Tanzania's dairy industry depends.

A large part of the improved infrastructure now in place at all three farms must be attributed to the massive assistance that was (and is being) provided Tanzania by several donor countries and the World Bank. The donor countries, primarily Scandanavian, have provided funds for a wide range of activities: construction of facilities, improvement of pastureland, fence building, water development, purchase of equipment, vehicles and drugs, and road construction. The World Bank has provided loans for the same. In addition, and perhaps most importantly, the donors have, and continue to provide, technicians who assist in managing and operating the farms. Indeed, at all three farm locations where HPI cattle were transferred, there is still a heavy reliance on expatriate technicians and managerial assistance just to keep the farms going. Therefore, although a great deal of progress has been made in the area of dairy physical infrastructure development, a great deal more should have been, and needs to be, done to develop the Tanzanian managerial and technical capability required to maintain and expand this infrastructure. Much greater effort should have gone into this area so that when the project terminated there was left in place at least a limited functioning capacity to manage, fund, maintain and operate the institutions and facilities developed, improved or established through the project.

However, it is realized the problems in Tanzania are many: In most cases, Tanzanian counterparts are assigned to the expatriate technicians but lack the training, job security, motivation and incentives required to take over after the technicians leave. A large part of the problem is the system itself as training opportunities are very limited, turnover rates are high, wages are low and promotional possibilities minimal. Therefore, until the system begins to reward its technicians/managers sufficiently, both psychologically and materially, little true management and technical capability will be developed at these farms.

The second thrust of this project, to increase small farmer dairy production, was never given serious consideration. In large this was due to TanGov policy constraints but also due to the fact that the primary objective of the national dairy farms is to expand and increase their operations to the point where all regions of the country are adequately supplied with milk, thus eliminating the great financial burden of import dependency. Therefore, there is very little priority or room for small holder involvement. Moreover, at present the three dairy farms are really in no position to provide villages and farmers the training required to take proper care of a high-bred cattle they themselves are having difficulty properly breeding; nor do the villages have the wherewithall-facilities and trained manpower - to do so.

It is reported that somewhere between 10-50 HPI derived animals are transferred from the government dairy farms each year. Most go to other national ranches or to special projects, however some reportedly have been provided to villages and progressive farmers. The three farms, however, due to current TanGov policy, are not allowed to carry out small holder assistance activity as a part of their regular operations. Nor are they in a position to do so. They must follow TanGov procedures which to date are as follows: Surplus bull calves must be sold to the Ministry of Agriculture, after which they are channeled to other government farms, villages, etc. Heifer calves or cows, if they are to be transferred at all, the decision comes down from headquarters in Dar es Salaam. The farms simply receive orders instructing them to transfer a certain number of cattle to a specified location by a given date. They have no say in the matter. Therefore, indirectly some cattle may be getting down to the village level and this project may have helped increase small farmer dairy production to a limited extent in this way but there are no records or means to document this, and assisting small farmers is definitely not a regular or controlled part of the dairy farms operation.

In conclusion, it is the evaluation teams assessment and recommendation that in the event future TanGov requests are made for cattle to carry out similar projects, several conditions would have to be met before such requests could be given serious consideration.

The conditions/recommendations are as follows:

1. That AID withhold funding for future dairy production projects until TanGov commitment to develop firm, clear-cut policy for development of dairy farm management, manpower, infrastructure maintenance and expansion capability - to include small holder dairy assistance - is demonstrated.

a. Institutionalize a firm policy for in-service and on-the-job training, career promotional, wage increase, etc., opportunities for all staff.

b. Utilize expatriate technicians for the training of Tanzanian staff.

c. Eliminate high dairy farm turnover rates.

d. Establish a firm, clear-cut policy to include parastatals for provision of dairy development assistance to small holders (villages/progressive farmers).

e. Budget adequate funds to maintain staff and physical infrastructure now in place, as well as for future expansion.

2. That USAID/Tanzania in collaboration with the TanGov and HPI design all future dairy projects in a manner such that (1) development of Tanzania's management and technical capability is of highest priority and (2) small farmer assistance activities are designed to meet the ability of the village farmers and the conditions of their culture.

On the second point, it must be kept in mind that animal breeding is a highly specialized activity in most Western countries, and animals such as Holstein and Jerseys are very dependent on special conditions such as a high quality diet, medicine, inoculations and sanitary facilities. Therefore, if small holders are to be successful in the raising of these exotic breeds, some facsimile of the conditions to which they are accustomed has to be produced.

14 Evaluation Methodology

This evaluation constitutes the final evaluation of the Dairy Production project. The primary reasons for this evaluation were: (1) to assess accurately the experience gained and problems encountered with the project, and (2) to offer substantial recommendations which can be applied to future dairy development efforts.

The evaluation is based on two weeks spent in the field divided between the three government dairy farms where HPI cattle are being bred; discussions and interviews with HPI contract team members, Tanzanian dairy farm staff members, TanGov officials and USAID personnel; and reports and documents.

15 External Factors

Changes in host government priorities have had an impact on this project. During the design, development and initial implementation of the project TanGov priorities were near equally divided between small holder dairy development and national dairy development. As the project progressed, however, greater priority was placed on national development, resulting in a restraining of the development of a capability on the national dairy farms to assist small holders in dairy production development.

16. Inputs

The reader is referred to Annex I, II and III for a detailed summary of actual animal cattle inputs.

Cattle:

Approximately 950 holstein cows were transferred to the Kitulo Farm in Mbeya Region over the five year period 1974-78, 140 jersey cows to the Bambi Farm on Zanzibar in 1977 and 80 jersey cows to the farm on Mafia Island in 1978.

With the exception of the last consignment of cows, 140 sent to Kitulo in 1978, the majority were high quality animals and arrived in good health. Reportedly, due to rather arbitrary shipment deadlines set by AID and the TanGov to get the agreed upon number of cattle in-country prior to project termination, the last shipment to Kitulo consisted of lesser quality, uneven in size and variable-aged animals. HPI's contention is they were not given sufficient time to properly procure, pre-condition and treat the animals prior to shipment. In the event future cattle shipments are authorized under subsequent projects, this must not be allowed to happen again. (See recommendation four)

As was mentioned in the summary, the first shipments of cattle were made to the farms before they were adequately prepared, infrastructure-wise or manpowerwise, to handle them. Much greater study and preparation should have gone into the project prior to the actual transfer of cattle, and smaller numbers sent. (See recommendation three)

Technicians:

In accordance with the project design, HPI was to provide one Veterinarian for assisting to establish disease control programs, diagnostic labs and technical backstopping. One Vet was recruited, served a two year tour at Kitulo and reportedly was able to establish a limited disease control program. A second Vet was recruited, arrived early 1977, but left after only six months, contending that the Tanzanians were sufficiently capable in this area. The position was then eliminated.

Diagnostic labs were not established at any of the farms as Regional labs are reportedly better equipped and capable of providing this service to the farms.

Over the five year life of this project, HPI successfully maintained four technicians at the three farms: two at Kitulo and one on Zanzibar and Mafia. On completion of the project, December 1978, and at the explicit request of the TanGov, HPI reports that it intends to continue its provision of technical assistance at all three farms for at least another two year period. The contract under which this will be carried out is a special arrangement between HPI and the TanGov. The USAID is not involved.

Commodities:

All commodities and supplies procured under this project, including a shipment of frozen semen, arrived in good condition.

The Veterinary Library designed as part of the project has not yet been established. However, HPI reports that a large number of books have been purchased and will be shipped in the near future. The Library will be established at the Kitulo Farm.

17. Outputs

1. Improve dairy herd genetic base:

Considerable progress has been made towards developing the physical infrastructure required to properly care for the project animals received. In the longer term, if manpower shortfalls are likewise improved, it is expected that the farms will be better managed, the animals better cared for, milk production will rise, mortality rates will fall and a solid base will have been created from which to expand.

2. Expanded and selective dairy cattle breeding program at the sites: This has been achieved. Cattle have been transferred to three government farms, at which on-going breeding programs are in operation.

3. Increased Tanzanian Government Management Capability at:
 - (a) Selected dairy ranches
Some progress made, however, there is still a heavy reliance on expatriate managerial and technical assistance to properly run the farms.
 - (b) Ujamaa Village Dairy Units.
Under this project, the government dairy farms were, and are, prohibited from getting involved in village dairy development. This effort is handled solely through the Ministry of Agriculture.
4. Dairy Production Units established at 50 Ujamaa Villages:
(Response to #3, b, also applies here)

18/19. Purpose and Goal

(Summary Statement covers purpose and goal in detail)

20. Beneficiaries

The immediate direct beneficiaries are the TanGov and villagers in the areas surrounding the farms who will benefit from dairy herd expansion and some indirect village upgrading through farm operation exposure, greater employment opportunities, greater milk production and improved road networks. Indirectly, villages and some progressive farmers will eventually benefit as small numbers of these high-bred cattle and their offspring, particularly bulls, make their way through the TanGov system down to the village level. In the longer term there is potential for the entire population to benefit from greater milk supplies, particularly children, as overall dairy production is expanded.

21. Unplanned Effects

During the past year, there has been an unfortunate development under the project involving cattle sent to both Zanzibar and Mafia Islands. After being in-country for nearly one year, a large number (70-80%) of the heifers ready for calving at both locations began to abort. Several diseases are suspected, brucellosis, riftvalley fever and leptostoriosis, but the actual cause has not yet been determined - and perhaps more importantly, whether the disease was picked up in Africa or carried over from the States. In the future greater care must be taken to assure that all animals are thoroughly pre-conditioned, and given a clean bill of health prior their transfer overseas.

In an effort to resolve the abortion problem, HPI, USAID and the TanGov have collaborated to contract on a short-term basis an American Vet who will assist the TanGov diagnose and treat the diseased cattle, develop better preventive and disease control programs on the farms and make recommendations for developing and designing more effective dairy development projects in the future.

22. Lessons Learned

Perhaps first and foremost, it was learned that the development and authorization of a centrally funded project which is to be implemented in the field must be very closely coordinated between AID/W and the Mission in the field. There must be clear-cut AID/W-USAID delineation of responsibilities on monitoring, backstopping, documentation and evaluation for such projects, with the Mission, to the extent possible, actively participating in its development and authorization. At the very least, the Mission must at all times be kept informed on project development and authorization and should have some approval authority prior project implementation.'

Second, it was learned that there is no substitute to proper and careful design and preparation for the development of good projects and effective implementation. Large numbers of cattle should not have been transferred to Tanzania until the farms were ready to handle them, and this should have been determined during the design stage. Also, unpre-conditioned or unhealthy cattle should not have been sent. Once again a matter of poor design in setting and having to meet unreasonable project deadlines.

In line with the second lesson learned is the fact that in nearly all of our projects, the primary objective must be to develop the Tanzanian capability required to take over after the project is completed. In this particular project, if greater effort and preparation had gone into design, the project would have placed greater emphasis on management, manpower and physical infrastructure development prior to the transfer of cattle. Also, TanGov policy, or lack of it, towards assisting small holders would have been better understood and dealt with in this effort.

... It is still that they recorded Foot and Mouth disease on the way, though this is not well recorded, and the survival rate of the first offspring and cattle themselves would indicate that the disease did not have as severe an effect on the herd as, for instance, it did on the 1975 shipment.

54 are recorded as having been present at Kitulo. Of these, 2 were sent to Musoma to the President's village. No subsequent information has yet been received on their eventual production or condition. Of the 52 cows remaining recorded at Kitulo, seven were lost to unknown causes: the highest killer, bloat, took 4 lives, 1 lung abscess, 1 high altitude disease victim, 1 peritonitis, 2 pericarditis, 2 liver failure, 1 drowning, 1 dystocia, 1 butchered due to mastitis, and 1 of general weakness, for a total of 22 deaths. Of these, only one has died thus far in 1979, of liver fascioliasis. There remain at Kitulo 30 living 1974 Shipment cattle, of which 20 were lactating at the end of 1978, and 10 were dry. See the lactation sheets for individual records of the cattle. Also see the 1978 Kitulo Annual Report for comparisons.

Of the 1974 Shipment offspring recorded up to December 31, 1978, a total of 140 calves were born; 64 heifers, 58 bulls, 16 stillbirths, 2 abortions and it is sure that there are several unrecorded births because of the living cattle 124 births are recorded.

Note on offspring of Kitulo's HPI Holstein Friesians:

No comprehensive tally has been made to date of the present whereabouts of all HPI offspring, their survival rates, growth rates, or overall production figures on those offspring who have calved. It is certain that some offspring have come into production at Kitulo, and the many are also distributed to village projects and missions in the area and around the country. Much work remains to develop a system for recording and evaluating of Kitulo offspring, both on the farm and those distributed to the villages. Where development and production have been the most intensive occupations of the farm staff, records have been more development and production oriented than oriented to the success of the offspring. Farm duties and lack of transportation have prevented the HPI technicians from doing the follow up until now, especially the village follow-up. Several bulls have also been sent to other DARCO farms and elsewhere, and soon Kitulo blood will be quite extended throughout the country.

1975 Shipment HPI

140 open heifers arrived. These contacted FMD soon after arrival and, although there were only 3 lost to FMD, the long term effects took a considerably heavy toll which can be seen below.

All 140 are recorded at Kitulo. Of the 140 sent, 68 are surviving as of the end of April. The most deaths occurred due to a condition called Altitude or Brisket disease: 32 died from this condition, 12 from bloat, 8 from drowning, 3 stolen and butchered, 3 of FMD, 2 of dystocia, 2 of liver abscesses, 1 of Anthroicide Drug poisoning, 1 of Anaplasmosis, 1 of liver cirrhosis, 1 of pseudorabies, 1 of peritonitis, 1 of lung abscesses, and 4 of unknown causes. Of these, only 1 has died thus far in 1979, of drowning. At the end of 1978, there were 47 of the shipment lactating, 17 dry, and 5 precalf.

Of the offspring recorded of the 1975 Shipment, as of Dec. 31st, 1978, there were 171 births resulting in: 69 heifers, 77 bulls, 18 still-

... large value and... are not with a proven cause, perhaps due to stress factors, poisonous weeds, or reactions to vaccines. No evidence was shown for breeding diseases. Note also the notes under the 1974 background.

August Shipment 1976 HFI

100 open heifers were sent. These animals arrived in a good state of health. All 100 are recorded at Kitulo. Of the 100 heifers sent, 79 are alive at Kitulo on this date. Lactation data is available as well as a comparison in the 1978 Kitulo Annual Report. The most frequent cause of death was due to bloat; 7 died of this, 4 of Brisket disease, 3 were slaughtered (mastitis, chronic lameness), 2 of peritonitis, 2 of lung abscesses, 1 of liver fascioliasis, 1 of pseudorabies, and 1 of an unknown cause. As of December 31, 1978 46 were lactating, 26 were dry, and 7 were precalf.

Of 129 recorded offspring as of December 31st, 1978, 50 were heifers, 46 were bulls, 14 were stillborn, and 9 were aborted. See the 1975 notes for a brief comment on the progeny records.

November 1976 Shipment HFI

131 open heifers were sent, of various sizes and stages of health. All 131 are on record at Kitulo. Of these, 32 have died, and 99 are alive to this date. As of December 31, 1978 out of 103 from this shipment surviving, 78 were lactating, 21 were dry, and 4 were precalf. Lactation summaries and comparisons are available. Of those who have died, the main causes have been Altitude disease and Bloat. Of the other losses, 4 were due to drowning, 3 due to pseudorabies, 3 due to liver failure, 2 to liver abscesses, 2 to pneumonia, 1 of abdominal tumors, 1 of pericarditis, 1 of calving paralysis, 1 of dystocia, 1 of lung abscesses, and 1 slaughtered due to Altitude disease.

Of the 115 births as of the end of December 1978, 35 were heifers, 58 were bulls, 30 were stillborn, and there were 2 abortions. The high incidence of stillbirths in this shipment compared to other shipments has not yet been attributed to any specific cause, but the same factors previously mentioned may easily explain some of the deaths.

1977 June Shipment HFI

All animals were sent to Tanzania, but 5 seriously wounded in transit were left at Mwambi Farm in Ebeya. These were left at Mwambi for nearly a year, before being transferred along with the January and April shipments of 1978, and the survivors of the Brisket disease who had been transported down to Mwambi. (See the 1977 Kitulo Annual Report which describes the survival of the heifers that were sent to the lower altitudes. The numbers of the heifers were not recorded when they arrived at Kitulo, and as longer lists and extra cards were sent along with the cattle it caused some confusion as to which animals were sent, and which remained in the USA. The process of eliminat

PART ONE:

GENERAL

1. 1978 has been a year of good progress and some significant developments have occurred during the year that will make the future even more exciting. This should not mean, however, that the expansion and development operation of this size could go without problems. The problems that we managed to tackle were solved and others were not, and these will require our attention next year or in the years to come. With these problems, any how, we were growing up with the operation.

2. Our most concern in the development targets for dairy production during the year was aimed to increase the size of the dairy cow population and improve the yield per cow also improving pasture production.

3. The milk production record during the year gives a total of 835,889 litres compared with 576,881 litres in the previous year, a total increase of 31% over last year production.

4. During the year 269 calves were born and reared in Unit I compared to 193 calves in the previous year, an increase of 29.4% over last year calf crop. There was a good demand of bull calves and these were distributed easily to the villages and other institutions mainly through the Ministry of Agriculture.

5. A tremendous demand for in-calf heifers and breeding bulls, particularly from Ujamaa Villages and some progressive individual farmers was noted this year. A total, 46 breeding animals of which 30 were bulls and 16 in calf heifers were disposed off. Unfortunately we could not satisfy the demand which was far greater than the supply.

6. Despite the shortage of building material, staff housing building progressed, an up to date dairy consisting of milking shed - double sixteen herringbone, feed-room, calf pens, necessary holding pens and yards were completed at Unit II and put into operation in December. The unit was expanding quite steadily after starting with 44 milking cows. The cow numbers were moving towards the goal of 200. Also to this unit the office and implement shed continued to good progress reaching 40% at the close end of the year. There remains a big building programme to be carried out next year, but shortage of material was seriously interfering with progress.

7. The farm continued to base future dairy development on the expansion of holstein -friesians to build a genetic base on which the dairy industry will depend for herd expansion of milk production. Another consignment of 459 holstein -Friesian heifers were received during the year from H.P.I. of U.S.A., this being the last of the 1000 heifers to Kitulo in the Dairy Production Assistance project phase two.

8. In July a new sub dairy Unit 2-B was constructed and gradually built up, milking an average of 113 cows. At this unit with a labour force of 14 included 2 full time women who shared all the work ranging from milking to silage making.

the year under review after the Road Settlement Unit was given a contract to rehabilitate 43 Km. of this road. It should be noted, however, that this road is not only to service an investment of the Kitulo Dairy projects, but will benefit many other National projects on the plateau. Generally speaking, the whole people on the plateau are directly dependant on this road for economic and social services from Mbeya. It is worth while to note here also that the Government has put more emphasis to the Kitulo plateau to be more of a National Development for Dairy Industry. To this point, this road will continue to need improvement and good maintenance for good communications.

11. This year, there was an increased incidence of two pasture insects, the first and most noticeable are porina and the other are grass grubs. This type of pasture infestation resulted in reduction of pasture production. Steps are being taken to arrest the situation.

12. 700 hectares under improved pastures provided more dry matter, starch and protein equivalent for all the dairy stock. Silage in three stakes, two in dairy Unit I and one in Dairy Unit II totalling 550 tons was made from Oats and grass for supplementary feed during July - November. This was fed mainly to lactating cows. The average, yields of about 35,000 kgs of fresh material per hecter was a obtained.

A laboratory test for 12 grass samples taken during the year revealed:-

Sample No.	14	-	15.	3%	CP	of	D.M.
"	"		16	-	16.	5%	" " "
"	"		15	-	17.	3%	" " "
"	"		18	-	18.	0%	" " "
"	"		17	-	21.	4%	" " "
"	"		13	-	22.	4%	" " "
"	"		12	-	23.	1%	" " "
"	"		19	-	23.	3%	" " "
"	"		11	-	24.	7%	" " "
"	"		1 B.-		25.	9%	" " "
"	"		2 B.-		27.	4%	" " "
"	"		3 B.-		29.	9%	" " "

In general, the grazing situation was holding on reasonably well, particularly in the established pastures, but Unit I-B felt the pasture shortage more severely for part of the dry season. The major parts of the ranch grazing potential were vastly destroyed by fire which resulted in scarcity of grazing land in the latter half of the year.

13. Despite the shortage of fencing material notably fencing wire, both plain and barbed and fencing posts at times, fencing had gone a head at an encouraging rate of progress particularly in Unit I-B where 15 paddocks were created and sub divided. A good repair work was carried out in many paddocks. There remains quite a lot of fencing programme to be carried.

14. With the expansion of cattle herd population, major building constructions, a lot of water was needed this year. Although there was enormous quantities of water in almost every stream, the basic problem was with the type of pump and engine which have always

big problem.

During the year, many reports have come up with proposals and surveys to increase the present minimum water flow to go into the gravity water supply system. Mr. D.L. Morris water Development Advisor from LIDA has done quite some studies on gravity water supply of the projects. Also Mr. Peter Selsbo, Water Engineer, R.L.D., Mbeya has done intensive studies on water, he agrees with Mr. Morris and all believe that we could increase the present pumping minimum water flows by gravity.

Mr. Holger Sorensen, Water Engineer who has also done quite some intensive study on the Kitulo water supply reports:-

" After one year experience working with the water system here at Kitulo it is my opinion that Unit I-A, I-B, and the lower part of Unit II should be supplied immediately with water by gravity to give a more stable water supply. During this year it has happened that the Units have often been without water because of pump or engine breakdowns and because spare parts are difficult to obtain. Often repairs are not immediately possible.

If Kitulo wants to continue supplying water by means of pumping, a new type of pump should be used: a centrifugal single stage pump with a high water capacity. Spare parts for this pump should include extra impellers and bearings because quartz from the soil which is suspended in the water wears out these parts within half a year's use.

Besides this there should be storage capacity of water for 6 days use, to allow both time for repairs, and prevent the need for pumping if water is especially dirty. This means that the DANIDA tank should be finished as soon as possible. Another reason for finishing the DANIDA tank is that it could be used as a pressure break for a gravity system."

WEATHER

The year saw more rain, total recorded 1406.5 mm against 1215.7 in the previous year.

The figures for rainfall, temperatures and other meteorological data are tabulated as under:-

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January	261.5	15.6	18.0	4.0	2.7	17.4	6.5
Febr.	190.0	12.4	18.5	5.5	3.6	17.8	6.5
March	375.4	15.6	18.0	6.0	1.6	17.0	7.2
April	139.0	14.3	18.5	5.0	4.7	18.0	6.1
May	6.7	13.7	18.5	3.0	5.5	17.7	5.9
June	13.0	12.6	18.1	3.0	4.8	17.5	4.7
July	15.5	11.7	18.0	2.5	6.7	17.7	4.2
August	9.0	12.6	18.0	2.0	7.8	17.7	3.2
Sept.	4.1	13.3	19.7	1.0	7.3	18.3	2.6
Oct.	40.6	13.5	20.7	1.0	5.3	19.5	2.3
Nov.	158.7	14.3	19.5	1.0	3.7	18.6	3.2
Dec.	194.6	15.1	19.5	3.5	1.0	19.7	4.8
Total	2476.5	174.7	225.0	37.0	54.7	210.9	57.2
Average	117.2	14.5	18.7	3.0	4.5	17.5	4.7

PAGE TWO

STAFF AND ADMINISTRATIONS:

15. The staff situation was strengthened during the year by the new arrivals at the post. This included specialists in Pasture Agronomy, Veterinary and Dairy technicians. We were fortunate to have almost men of several different types, who we hope will further the progress of Kitulo development, if all will work as a team with a common goal.

16. Mr. A.G. Barwell completed his 24 years contract as Pasture development officer in July and returned to New Zealand. This man in his several capacities gave of his best, he was replaced by Mr. F.K. Mawa, Pasture Agronomist, after his completion of his post-graduate Diploma and Master of Agriculture Science in New Zealand. Mr. Mawa took over the Pasture Agronomy section on 11 July in secondment.

17. The Veterinary staff was reinforced in October by the arrival of Dr. M.N.J. Minja, Veterinary Officer on his first appointment after his completion of his B.V. science degree in Russia.

18. Mr. S. W. d., Dairy Technician from HFE -USA joined the staff at Unit I-A as Unit Manager in January, displacing Mr. E. Kinsley to take over as Unit Manager of Unit I-B.

19. Our farm managerial staff at Unit II was depleted by the resignation of Mr. R. Biddock, Unit Manager, who resigned to seek a new job at Tsimba. Mr. Biddock was replaced from New Zealand in October by Mr. S. W. d. as Unit Manager.

replace Mr. F. Sumbul who was transferred to Mwanengwi.

22. Mr. Peter Sumbul, District Volunteer joined the staff as Water Engineer in February. To his credit he has greatly helped to improve the water supply situation during the year, not only to stock, but also to domestic supplies.

23. Mr. Joshua Willy, Dairy Unit Manager at I-B was transferred to Inisbo dairy farm and was replaced by Mr. Bidadile, Unit Manager in September.

24. TRAINING:

Mr. P.S.A. Auko Assistant Farm Manager proceeded to New Zealand in February for his post-graduate diploma and Master of Agriculture Science degree Course.

25. VISITORS:

The project continued to have the frequency of visitors individuals and groups of School and College Students. During the year the project had also the pleasure of the visit from the Prime Minister Ndugu Edward Sokoine who was accompanied by the Minister of state in the Prime Ministers office, ndg. J. Makweta Party and other government Officials. During the year, the project had also two visits from the Minister of Agriculture and some visits from LIDA and DAFCO Officials. (356 in 1978 against 261 in 1977).

PART THREE:

ANIMAL PRODUCTION:

26. DAIRY UNIT I-A:

Dairy unit I-A has seen much progress this year in many respects. Despite many problems that we are overcoming, we are getting nearer to the goal we all have here at Kitulo.

The first six months were very wet, which caused us some problems. The major problem was the road which caused many problems in transportation around the unit. The road also put stress on the cattle walking to and from the dairy.

27. There were frequent problems from January to April in getting enough cans to ship the milk to the Mbeya plant. Another problem related to this was the fact that the milk we were producing at night went sour by the time some times got to Mbeya, but these problems were solved when TDL took over the operations in processing the milk from NCCO. They brought their engineer up to fix the milk cooler, and they also brought in many new milk cans to help alleviate the problems we were having.

28. Many Kilometers of new fencing were put into use this year. Basically many fences that were inadequate to keep the cattle in were rebuilt with completely new fences. These operations were hampered with the lack of posts and wires.

some of the weight of this dairy.

The month of July brought around a division of cattle. In Unit I-B the milking stalls were installed by the end of July 1975. In December Unit I-B started operations, taking 30 more milking cows, leaving this unit with around 80.

30. Calves did fairly well, but there were some problems with scours and pneumonia which claimed a few lives.

31. Water was a problem at some stages of the month due to pump failure or other reasons but for the most part was adequate.

32. Many projects were done to this unit this year. The dairy had its first coat of paint which greatly helped the atmosphere and cleanliness of the dairy. The milk tank was moved from the back room to the main milk room with the additional good luck of exchanging tanks with Iwambi farm. A calf shed was constructed to shelter the calves in the wet season. The road had major work done on it and is now in very good shape. Gravell was filled around all the troughs as the mud was getting too deep for the troughs to be of any use. A new Cocker was made for hot water after the old one started leaking. Other repairs took place as required. A bonus was initiated, which helped in a tremendous way to encourage good work, and ease supervision.

33. DAIRY UNIT I-B:

1978 was again a year of major construction on Unit I-B. During 1978 the division of Unit I's milking facilities into two separate barns was a major order of business. The Unit I-B barn begun by Mr. Dick Newton in October 1977 was finished enough to start receiving milking cows by June 1978. The main tasks involved were the cement work and building of milking stalls and corrals. Difficult obstacles to development were the nearly impassable road, a serious breakdown in the water supply to the dairy, and frequent shortages of supplies and building materials. Fortunately work was able to continue non-stop, and by changing the design to a walk-through milking parlor with adjacent corrals, material and time was saved, besides improving the eventual movement of the cattle. Although not having finished installing hot water, cooling, electrical, and manure holding facilities as well as supplying water to the paddocks, more adequate supply to the dairy and fence subdivisions of the paddocks, it was decided to begin milking as early as possible to lessen the congestion in the Unit I-A milking parlor. The date for beginning was set on 10 July after the SabaSaba celebration. By that time the road had been smoothed and temporary living quarters for six families had been erected on site.

34. The following labor force was chosen to begin at the new Unit. It is made up of several workers from Unit I-A two workers who helped construct the dairy, and the two women to be milking cows for D.FCO.

S. 1.1, dairy I-B, 1978

F. Chifolo, Milker

A. Massa, Milker

L. ... Milker

G. ... Milker

... Milker

... Herdsman

... Nightwatchman

Besides these, the Unit also received much help from Central Services during the year including the seasons, tractor drivers, and fence crew, to name a few.

35. July 10 the first 70 cows arrived. This number eventually grew to 132 before levelling off to 125 when the Unit II barn began to be used. There was a marked difference in the milk production between Units I-A and I-B which is not only explained by the general pasture shortage experienced on the Unit, or the underdeveloped drinking water facilities.

36. This difference is better explained by the make up of the herd. Until December very few newly calved cows came into the herd, and the average stage of lactation which began at 6 months increased to 9 months before new cows started to bring it down again. Also there is a high proportion of first calf heifers in the herd since we started, average about 90%. These factors all taken into account, it is not surprising that the average production per cow per day for the first six months was only 11.03 litres. There were a total of 19559 cow days which produced a total of 257,73.0 litres of milk. 48,409 kilograms of concentrate were fed on 132 of the 183 days which cows were milked at Unit I-B, or an average of 3.4 kg. on the days it was available but a 2.5 kg. average overall. There was an obvious correlation between production and concentrates fed especially during the dry season. Other factors affecting the production fluctuations were availability of water, and time involved in herd treatments which restricted grazing, and degree of solar insolation.

37. Although the herd was late in lactation in July only 10% were confirmed pregnant. A stepped-up breeding program between July and December resulted in 132 breedings up to the first of December which have resulted in at least 47 pregnancies or a low 36 conception rate. This low figure may reflect various factors: the low level of nutrition during this period, the large number of cows late to be served after calving, and probably due to imperfection and inexperience of the technicians which we hope we have corrected. It may be noted that since beginning A.I. on the dairy herd in 1954 the breeding status has never been very good, but some of this is to be expected until skills of the technicians are perfected by experience.

38. The Unit has suffered much from the long drought and frost resulting in very little feed for the livestock. Lack of watering facilities made the rivers and gulleys the main source of water, compounded by frequent interruptions in supply for the dam. Only since the rains came in October have the pastures begun to recover and milk production with them. Enlarging the system of fences has made it more possible to rotate the grazing areas. The large grass fires have actually caused more feed to be available to the milk cows and these are being used more than ever before. It has been discovered that grass grub and prinia also plague parts of

39. DAIRY II
 The new dairy and staff quarters were almost completed in the second half of the year and the shortage of building material is.

40. This dairy although partly finished was operational by December starting with 44 milking cows. At the end of the month the number had risen to 54 and produced 4592.5 litres of milk with an average 8.5 litres per cow per day. This average is considered reasonable in that the Unit got many of the cows Kitulo bred heifers as compared to unit I which had retained most of the exotic holstein-frisians.

41. Livestock held during the year as categorised below:-

HERD CAPACITY/LIVESTOCK RETURN: The herd Capacity through out the year was as follows:-

	DRY COWS	HEIFERS 18-30 MONTHS.	HEIFERS WEANING TO 18 MONTHS	BREEDING BULLS	STEERS "	DEATHS "	CLOSING STOCK
JAN.	60	105	125	1	2	4	324
FEB.	76	142	117	1	2	NIL	334
MARCH	87	109	115	1	2	2	314
APRIL	109	89	187	2	2	4	349
MAY	115	68	200	2	1	2	386
JUNE	120	142	200	2	1	5	266
JULY							241
AUG.	119	32	NIL	2	1	NIL	154
SEPT.	100	30	159	2	1	1	300
OCT.	133	25	158	2	1	1	315
NOV.	136	18	156	2	1	5	315
DEC.	127	49	NIL	2	1	6	232

42. DAIRY UNIT III:

Due to the rapid increase of livestock especially those imported from the HPI - USA and a number of calves being born and weaned from the dairy units, a third unit had to be unofficially created to cater for the young and breeding stock. It is always good, any way, to be a head of time. This unit was centred in paddocks 43 and mainly grazed paddock No 37 to 54.

This herd included the domestic Kitulo bred heifers whose greater part of its progeny will be utilised for heifers for sale and few will possibly be reserved as dairy replacements.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Bulls								2	15	5			33
Heifer calves									13	6			24
Total								2	28	10			57

44. A total number 9 animals were sold during the year. They are categorised as below:-

	Janua- ry	Februa- ry	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Heifers						5				3			9
Bulls						1				1			1
Total						5				3			9

45. During year a total number of 4 animals were slaughtered. They are tabulated and categorised as below:-

	Janua- ry	Februa- ry	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cull cows		3	1										4
Steers													
Heifers													
Bulls													
Total		3	1										4

46. Closing stock for the whole year.

January	120	July	299
February	116	August	420
March	117	September	424
April	110	October	564
May	136	November	570
June	222	December	701

47. Herd size at the end of the year.

<u>Cows</u>		
With calves	-	17
Dry	-	15

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breeding 36
 w/not breeding 10
 Unsexed

Lactation Summaries

The presentation of this report includes the lactation summaries of the imported heifers and the locally bred heifers (Kitulo born heifers).

49. 945 holstein-friesian heifers imported through auspices of HPI (USA) Between 1974 and October 1978, have arrived at Kitulo in groups ranging in age 9- 10 months. Comparison study of the production records of these cows including the Kitulo born heifers are summarized.

50. 1974 Shipment - Dutch Friesians.

Lactation summaries give the individual and herd averages of the total yields based on 305 days but in some cases the lactations went beyond 305 days because the cows were not conceived to A.I. for various reasons as outlined under unit I-B and some were milked less than 305 days.

51. LACTATION SUMMARY DUTCH FRIESIAN
1974 SHIPMENT

COW #	KIT.#	1st.LACT.		2nd.LACT.		3rd.LACT.		4th.LACT.	
		DAYS	YIELD (Litres)	DAYS	YIELD	DAYS	YIELD	DAYS	YIELD
201	2K 205	341	3515	321	2290	427	4865		
202	IK 66	-	-	-	-	417	5331	347	5084
204	2K 250	315	3159	400	5423	335	4137	320	6390
205	IK 58	317	2329	480	5240	365	5735		
206	IK 45	350	3636	420	3211	429	6254		
207	IK 4	LOST	CARD	360	3450	514	5921		
209	IK 113	340	3318	456	5392	-	-		
212	IK 33	342	4244	375	4197	480	7044		
215	IK 24	-	-	365	2796	368	4953		
216	IK 54	349	3406	-	-	365	4192	345	4254
217	IK 132	330	3400	330	3178	-	-		
218	IK 67	321	2341	337	3456	353	3941		
219	IK 11	365	2555	425	3472	335	4010		
220	2K 224	559	4504	462	4724	-	-		
221	IK 97	-	-	369	3680	426	5139		

125	IK 84								
126	2K 103	381	3475	450	3450	-	-		
127	IK 25	350	4200			370	3545		
128	IK 105	-	-	326	2925	410	4220		
129	IK 50	-	-	305	2715	-	-		
132	IK 62	-	-	313	4280	345	4561		
133	2K 263	-	-	457	2437	-	-		
135	IK 92	LOST	CARD	450	5135	396	5150		
137	IK 106	485	3890	305	3863	-	-		
138	IK 12	319	3287	355	3586	977	4478		
139	IK 116	LOST	CARD	400	5100	399	6797		
140	IK 110	-	-	-	-	324	3000		
141	2K 126	LOST	CARD	-	-	329	4161		
142	IK 32	-	-	446	6203	-	-		
144	2K 10	306	1710	485	3765	-	-		
145	IK 61	NURSED	CALVES	365	3964	350	4068		
149	IK 39	720	5665	383	5171	-	-		
152	IK 21	331	3299	330	3751	-	-	351	5338
154	IK 36	320	3144	330	4124	445	6631		
Number of cows		20		25		23		4	
Total Days		7564.0		11270.0		8925		1363.0	
Average Days		378.2		388.62		388.04		340.0	
Total Yield			68951.0		116547.0		112024.0		21066.0
Averages			3447.55		4016.06		4870.61		5266.5
Prod/cow/day			9.12		10.34		12.55		15.46

52. DUTCH FRIESIAN TO 305 DAYS 1974 SHIPMENT

OLD #	KIT.#	1st. LACT.		2nd. LACT.		3rd. LACT.		4th. LACT.	
102	IK 66	262	1294	218	1983				
110	IK 3	207	1437	254	1805	233	1772		
115	IK 24	304	2103	-	-	-	-	174	1621
117	IK 132	-	-	-	-	260	3745		
116	IK 54	-	-	275	2887				
121	IK 97	249	1636	-	-	-	-		
122	IK 95	178	509	120	1390	210	3100		
127	IK 15	-	-	275	3354	-	-		

131	2K 248	290	1408	-	-	270	2226
132	IK 108	-	-	-	-	-	-
133	2K 253	290	1408	-	-	270	2226
137	IK 108	-	-	-	-	-	-
140	IK 110	259	2215	257	2285	-	-
141	2K 126	Lost	Card	127	713	-	-
142	IK 32	277	3363	-	-	215	3000
152	IK 21	-	-	-	-	285	3681
Number of cows		11		8		8	1
Total Days		2634.0		1640.0		1699.0	174
Average Days		239.45		205.0		212.38	174.0
Total Yield			18760.0		16157.0		19642.0
Averages			1705.45		2019.63		2455.25
Prod/cow/day			7.12		9.85		11.56
							1621
							1621
							9.32

53. 1975 SHIPMENT 90 - 305 DAYS

4	IK 10	295	3310	-	-
-	IK 122	276	2801	-	-
23	IK 85	-	-	116	1315
26	2K 231	-	-	186	2026
27	IK 103	304	3420	-	-
33	2K 206	196	2424	-	-
35	IK 29	304	2228	-	-
46	IK 137	184	2584		
57	IK 112	304	3429		
58	IK 56	-	-	233	3382
63	IK 22	192	2798	265	2942
67	IK 160	285	3517		
68	2K 103	136	2377		
73	IK 80	289	2959		
74	IK 57	-	-	175	2585
79	2K 228	151	2185	133	1223
82	IK 27	300	4063	-	-
84	-	200	2197	-	-
87	IK 109	-	-	164	2493
93	2K 131	273	2231	-	-

103	IK 20								
104	IK 24	279	2730						
125	IK 19			187	729				
141	IK 76	275	4024						
150	IK 3	244	2509						
Number of cows		18		10					
Total Days		4487.0		1897.0					
Average Days		249.28		189.7					
Total Yield			47027.0		22842.0				
Averages			2612.61		2284.2				
Prd/cow/day			10.48		12.04				

54. 1375 SHIPMENT - 305 + DAYS

OLD #	KIT. #	1st. LACT.		2nd. LACT.		3rd. LACT.		4th. LACT.	
		DAYS	YIELD	DAYS	YIELD	DAYS	YIELD	DAYS	YIELD
1	IK 43	450	5660						
5	IK 13	361	2774						
8	IK 144	528	5972						
11	2K 140	335	2042						
12	IK 48	473	5657						
14	IK 9	355	4485						
15	IK 124	400	4396						
19	IK 17	504	5072						
20	IK 127	334	2963						
21	IK 16	351	2393						
23	IK 85	365	3096						
24	IK 31	334	2925						
26	2K 231	335	2538						
29	IK 78	395	6512						
31	IK 131	409	3727						
34	IK 141	466	3576						
38	IK 86	577	7036						
45	IK 76	346	3550						
49	IK 7	343	3743						
54	IK 111	395	3338						

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62	IK 263	332	322						
69	IK 25								
71	IK 72	457	5722						
72	IK 24	420	4120						
76	IK 57	419	4390						
75	IK 30	400	6570						
76	IK 87	334	2325						
77	IK 71	470	6586						
83	IK 60	557	6177						
85	IK 151	591	4753						
87	IK 109	408	5793						
89	IK 89	365	3418						
91	IK 52	420	4472						
94	IK 35	335	3254						
101	IK 75	305	2774						
103	IK 20	315	3062						
106	IK 74	306	3013						
109	IK 150	555	6969						
113	IK 73	505	5629						
116	IK 129	347	3825						
117	IK 18	536	6465						
120	IK 53	592	5970						
124	IK 120	606	7176						
125	IK 133	489	4818						
129	IK 46	497	4916						
133	IK 79	470	4819						
141	IK 70	-	-	341	4755				
145	IK 81	393	5555						
146	IK 30	396	3436						
147	IK 136	493	5026						
148	IK 68	331	2747						
154	IK 19	351	4428						
155	IK 63	573	5604						
156	IK 101	457	4225						
163	IK 145	333	4005						
165	IK 34	469	4665						
169	IK 40	607	6447						

Total Days	25121.0	941.0		
Total Yield	257039.0	4755.0		
Average	4525.08	4755.0		
Prod/ccw/day	10.83	13.94		

55. 1976 SHIPMENT - 305 + DAYS

Lact #	KIT. #	1st. LACT.		2nd. LACT.		3rd. LACT.		4th. LACT.	
		DAYS	YIELD	DAYS	YIELD	DAYS	YIELD	DAYS	YIELD
192	2K 94	364	3297						
197	IK 140	318	3084						
199	IK 28	365	3000						
207	IK 91	393	5471						
204	2K 153	325	3605						
214	IK 130	427	4283						
214	IK 44	306	2648						
221	IK 155	345	4023						
229	2K 90	385	6458						
241	2K 200	344	2832						
242	2K 147	331	4019						
244	IK 123	344							
247	2K 108	379	3793						
251	2K 258	358	2638						
254	2K 130	382	4128						
258	IK 155	362	3889						
264	IK 5	315	3235						
266	IK 69	308	2963						
270	IK 119	428	4746						
271	IK 157	370	3749						
273	2K 109	391	3154						
277	IK 23	320	3505						
277	IK 126	391	2526						
281	2K 144	358	3262						
282	2K 264	402	5021						
283	2K 92	329	3133						

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300	2K 143	322	3231						
305	2K 143	392	4431						
351	2K 146	308	3171						
350	2K 142	342	2824						
370	2K 200	366	3764						
371	2K 146	307	2820						
372	2K 156	389	4069						
373	2K 151	325	2899						
374	2K 169	409	4183						
375	2K 178	436	3474						
376	2K 180	313	3372						
377	2K 143	305	2905						
378	2K 184	337	2957						
379	2K 145	316	2695						
Total cows		43							
Total days		14863.0							
Total yield		345.73							
Total yield lbs			149474.7						
Total yield			3476.14						
Total yield			10.05						

1976 SHIPMENT - 90 TO 305 DAYS

COW #	AGE #	1st. LACT.		2nd. LACT.		3rd. LACT.		4th. LACT.	
		DAYS	YIELD	DAYS	YIELD	DAYS	YIELD	DAYS	YIELD
240	2K 106	247	2218						
241	2K 121	177	445	176	1770				
242	2K 82	264	2140						
243	2K 100	184	2133						
244	2K 154	230	2005						
245	2K 102	277	3375						
246	2K 117	244	1773						
247	2K 135	175	1700						
248	2K 114	255	2055						
249	2K 147	178	1721						
250	2K 159	286	2439						
251	2K 173	295	2633						

250	2K 51	210	2727						
257	2K 253	189	2732						
267	2K 152	251	2119						
272	2K 167	273	2306						
275	2K 125	283	2341						
279	2K 156	261	2594						
280	2K 25	213	2568						
287	2K 157	12	443						
289	2K 151	302	3402						
296	2K 43	130	2193						
296	2K 207	130	73						
298	2K 125	240	2333						
299	2K 71	167	2310						
300	2K 120	273	2773	120	2070				
304	2K 147	206	2277						
305	2K 134	252	2390						
306	2K 14	204	2370						
308	2K 201	81	120						
308	2K 127	221	2417						
308	2K 142	17	120						
308	2K 121	273	2016						
308	2K 171	181	2110						
308	2K 150	270	2312						
308	2K 161	273	2555						
308	2K 134	233	2017						
308	2K 203	120	891						
308	2K 220	168	1808						
308	2K 217	213	2034						
308	2K 177	260	4150						
308	2K 190	131	1043						
308	2K 152	287	2778						
308	2K 155	225	1773						
308	2K 101	210	2012						

Total Yields	10255.0	3065.0
Averages	1262.5	1262.5
Prod/cow/day	9.32	13.06

57. 1977 SHIPMENT - 90 - 305 DAYS

OLD #	KIT. #	1st. LACT.		2nd. LACT.		3rd. LACT.	
		DAYS	YIELD	DAYS	YIELD	DAYS	YIELD
T151	2K 70	275	1025				
T200	2K 47	115	700				
Number of cows		2					
Total Days		390					
Average Days		195					
Total Yields		2525					
Averages		1262.5					
Prod/cow/day		6.47					

58. KITULO BORN - 305 + DAYS.

OLD #	KIT. #	1st. LACT.		2nd. LACT.		3rd. LACT.		4th. LACT.	
		DAYS	YIELD	DAYS	YIELD	DAYS	YIELD	DAYS	YIELD
	IK 28	412	4617						
	IK 54	377	2288						
	IK 47	362	3579						
	IK 55	386	1861	-	-	-	-	316	3692
	IK 33	-	-	-	-	334	3012	-	-
	IK 62	333	4200	395	3561	-	-		
	2K 54	378	2548	322	1098	-	-		
	EK 96	374	1794	-	-	-	-		
	2K 97	-	-	-	-	330	1261	-	-
	2K 234	-	-	455	2339				
	2K 242	306	3417	-	-				
	EK 241	-	-	305	1588				
Number of cows		8		4		2		1	
Total Days		2930		1434		672		316	
Average Days		366.25		358.5		336.0		316	

ID	1st. LACT.		2nd. LACT.		3rd. LACT.		4th. LACT.	
	DAYS	YIELD	DAYS	YIELD	DAYS	YIELD	DAYS	YIELD
IK 107	292	1919	225	1460	304	2403		
IK 93	302	1754	128	1893	-	-		
IK 94	-	-	226	1608	Lost Lactation		247	3432
IK 90	284	1868	270	2053	301	3999		
IK 95	214	577	220	1515	152	1109		
IK 47	-	-	303	2680	221	1609		
IK 8	290	2370	-	-	-	-		
IK 5	-	-	263	2293	163	1248		
IK 162	no record		95	568	-	-		
IK 33	264	1421	235	1571	-	-	98	823
IK 62	-	-	-	-	100	556		
IK 98	301	2195	242	2211	269	1440		
IK 143	123	848	-	-				
2K 58	119	936						
2K 90	247	1922						
2K 107		2114		1190	232	2042		
2K 96	-	-	251	1724	299	1817	213	1760
2K 97	283	2080	219	1627	-	-		
2K 234	290	2152	-	-	181	1311	178	1336
2K 252	122	407	-	-	-	-		
2K 242	-	-	135	616	164	1540		
2K 241	-	-	-	-	-	-	127	481
Number of cows	13		13		11		5	
Total Days	2938		2812		2366		863	
Average Days	226		216.31		215.09		172.6	
Total Yields		22564		23009		19114.00		7832.00
Averages		1735.69		1769.92		1737.64		1566.4
Prod/cow/day		7.68		8.16		8.08		9.08

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APPENDIX I-A: MILK PRODUCTION AND MARKETING - 1978

A		SALES			UNIT I B			SALES		
SUB TOTAL PRODUCTION	AV/DAY/COW	MBEYA PLANT	STAFF	KNOWN: LOSES	COWS IN MILK	SUB TOTAL PRODUCTION	AV/DAY/COW	MBEYA PLANT	STAFF SALES	KNOWN LOSES
58087.0	10.95	52566.5	1924.0	60.0						
53791.0	11.10	52730.0	1161.0	34.0						
50982.0	10.05	57527.5	2623.5	443.0						
56021.5	10.0	56140.0	1542.5	43.0						
71191.5	10.8	63691.0	1674.0	22.5						
61021.5	11.4	60896.0	1793.5	2079.5						
61880.5	11.8	51615.0	1794.5	37.0	90	21909.5	10.53	21764.5	135.5	20.5
48253.5	11.3	37012.5	1744.5	10.0	99	20642.5	9.1	28449.5	173.5	42.0
38027.0	10.2	31630.0	1450.5	20.0	107	23164.5	7.10	22997.5	164.0	23.0
26970.5	9.7	20539.0	1345.0	-	112	23060.5	6.5	22062.5	190.0	-
34240.5	10.0	26462.0	1421.5	4.0	127	26733.5	6.97	26366.0	327.5	40.0
35703.0	11.3	27544.0	1267.5	71.0	120	34739.5	6.72	34364.5	374.0	
57206.5	10.72	552901.5	19742.0	2824.0	671	150270.0	49.0	156804.5	1372.5	115.5

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CONTINUED

APPENDIX I-A: MILK PRODUCTION AND MARKETING - 1978

FIS		SALES			TOTAL PRODUCTION	FED TO CALVES	SEPARATED INTO CREAM	CREAM	SKIM TO		DISCREANCY		
SUB TOTAL PRODUCTION	AM/DAY/TON	MBEYA PLANT	STAFF SALES	KNOWN LOSES					CALVES	SCHOOL	UNIT I-A	UNIT I-P	UNIT I-P
					66661.5	10430.0	1681.0	112.0	970.0	500.0	14.5		
					63791.0	9240.0	1035.0	69.0	624.0		3.0		
					68969.0	7312.0	1027.0	68.0	578.0		36.0		
					66024.5	7300.0	915.0	60.0	480.0		76.5		
					74191.5	7765.0	1026.0	61.0	374.0		24.0		
					81053.5	7916.0	330.0	23.0	98.0		38.5		
					83750.0	7520.0	870.0	50.0	614.0		36.0		
					74508.0	5466.0	1014.0	99.0	1416.0		28.5	17.0	
					61226.5	4044.0	870.0	50.0	406.0		27.5	-	
					59731.0	5264.0	1510.0	99.0	744.0	699.0	12.5		
					60882.0	5376.0	870.0	50.0	817.0		15.0		
45000.0	8.5	4520.5	67.0	5.0	75035.0	5514.0	1260.0	124.0	816.0		17.0		
45000.0	8.5	4520.5	67.0	5.0	835889.0	73776.0	13000.0	800.0	8007.0	1300.0	319.0	17.0	

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APPENDIX I-B: BIRTHS, ABORTIONS AND STILLBIRTHS: 1978
(DAIRY CATTLE)

B I R T H S										ABORTIONS	STILLBIRTHS
UNIT II			UNIT III								
F	M	Total	F	M	Total	Total Female	Total Male	Total Births			
4	11	15	-	-	-	4	11	15	-	-	5
6	7	13	1	1	2	7	6	13	-	-	5
7	16	23	1	2	3	8	18	26	3	-	11
11	11	22	-	1	1	11	11	22	1	-	3
18	10	28	1	1	2	19	11	30	1	-	5
8	18	26	-	1	1	8	19	27	1	-	1
11	13	24	3	1	4	14	14	28	1	-	1
2	7	9	-	2	2	2	7	11	-	-	-
6	6	12	-	2	2	6	8	14	-	-	2
3	5	8	13	15	28	16	20	36	1	-	1
7	4	11	4	6	10	11	10	21	1	-	3
13	8	21	1	1	2	14	9	23	-	-	5
75	115	212	24	33	57	120	149	269	9	-	15

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APPENDIX IC: A COMPARISON OF MILK PRODUCTION - KITULO

1975		1976		1977		1978	
Yield (liters)	Cows In Milk	Yield	Cows	Yield	Cows	Yield	Cows
15,813		27,883	101	41,312	136	60,687	197
16,885		27,506	118	45,862	139	63,791	204
18,577		27,794	102	52,345	121	68,969	215
20,111		21,826	87	45,250	136	66,024.5	221
27,612		23,976	88	44,856.5	145	74,191.5	223
37,531	80	28,107	114	44,319.5	144	81,053.5	236
41,624	98	30,237	104	46,539.5	132	83,790	263
43,288	114	25,384	99	45,743.0	152	74,500	230
40,110	121	21,647	105	42,513.5	164	61,226.5	228
42,136	128	19,305	97	47,761.5	174	59,731	227
21,875	124	25,023	111	52,775.5	168	60,882	243
17,830		35,020	144	67,553.5	187	75,035	284
20,113		313,868	1,270	570,831	1,800	1,35,889	2771

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Mortality Rates and Causes for Cattle Deaths at Kijulo (Rural) (1975-1980)

	(58) 1975	(140) 1976	(100) 1977	(131) 1978	(61) 1979	(66) 1980	(70) 1981	(162) 1982	(162) 1983	TOTAL
Deaths	21	71	21	28	6	5	7	14	12	185
Altitude Malaria	1	12	4	4	2	-	1	1	1	46
Diarrhea	4	18	7	6	2	-	2	2	-	35
Wound	1	7	-	3	-	-	1	-	1	13
Eye Abscess	1	1	2	1	1	-	-	-	-	6
Emphysema	-	-	-	2	1	1	-	5	5	14
Heart Failure	1	-	-	2	1	-	-	-	-	4
Brucella	1	2	-	1	-	-	-	-	-	4
Pericarditis	2	-	-	1	-	-	-	-	-	3
Pneumonia	1	1	2	-	-	-	-	-	-	4
Acidosis	-	3	-	-	-	2	-	-	-	5
Septicemia	1	-	-	-	-	-	-	-	-	1
Postmortem Parasites	-	3	-	-	-	-	-	-	-	3
Large Ab. Poisoning	-	1	-	-	-	-	-	-	-	1
Adenocarcinoma	-	1	-	-	-	-	-	-	-	1
Unidentifiable	-	1	1	3	-	-	-	-	-	5
Liver Abscesses	-	2	-	2	-	-	-	-	1	5
Liver Cirrhosis	-	1	-	-	-	-	-	-	-	1
Liver Fascioliasis	-	-	1	-	-	-	-	-	-	1
Not Posted	7	4	1	-	-	2	1	-	-	14
Abnormal tumors	-	-	-	1	-	-	-	-	-	1
Graying Paralysis	-	-	-	1	-	-	-	-	-	1
Shipping Fever	-	-	-	-	-	-	-	5	1	6
Abdominal rupture	-	-	-	-	-	1	-	-	-	1
Gastroenteritis	-	-	-	-	-	-	1	1	-	2
Pulmonary hematoma	-	-	-	-	-	-	1	-	-	1
Long worms	-	-	-	-	-	-	-	-	1	1
Slaughtered	1	-	1	1	1	-	-	-	-	6

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