A study of some aspects of dairy management practices of farmers in Morogoro rural district:

A case study of Surude and HIP beneficiaries in Turiani division

Safari, J.[1], Lekule, F.P.[1], Sarwatt, S.V.[1], Mollel, E.L.[1] & Makauki, A.F.[2]

[1]Department of Animal Science and Production, SUA, P.O. Box 3004
[2]Development Studies Institute, SUA, P.O. Box 3024

ABSTRACT

A study on some management practices of dairy cattle by smallholder farmers was done in Turiani division, Morogoro (R) district. The study objective justified adoption of a cross sectional research design. As the main instrument for data collection, a structured questionnaire was administered to total of 40 respondents who were beneficiaries of Heifer-In-Trust scheme under two non-governmental organisations (NGOs) namely The Foundation for Sustainable Rural Development (SURUDE) and Heifer Project International (HPI). It was observed that majority of the respondents (100 % for SURUDE and 95 % for HPI) had adopted zero grazing system, feeding their animals mainly on natural pasture. Generally, 60 % of the respondents were found to provide feed supplements such as hominy feed, sunflower seed cake (SSC) and minerals to their animals. However, the distribution was statistically ($P<0.05$) skewed towards SURUDE more than HPI for SSC (i.e. 75 Vs 40). Natural mating was the only breeding method practiced by both groups of farmers. Whereas 25 % of farmers under HPI reported to serve their cows more than twice per conception, the proportion for those under SURUDE was only 10 %. Long calving interval (CI) was also reported by both groups of farmers. A CI of 12 - 13 months was reported by only 15 % of farmers under HPI and none under SURUDE. Only 5 % of farmers under HPI reported a CI exceeding 24 months, which was reported by 20 % of farmers under SURUDE. The common disease control measures in the area were spraying with acaricide and deworming, but both were not regularly practised. Record keeping was another management practice, which differed between the two NGOs. It was concluded therefore that dairy management practices in Turiani were generally not well performed and they differed between beneficiaries of HPI and those of SURUDE.

Key words: Heifer-In-Trust, Zero-Grazing, Feed supplements, Natural mating

INTRODUCTION

Research in Tanzania has shown that in households where improved dairy cattle are kept, per capita milk consumption is more than twice the national average and that considerable amount of surplus milk is sold to supplement farm income (Mchau, 1991). Dairying has thus been found appropriate to rural farmers because most of them face financial and nutritional problems especially during off-season (Sarwatt & Lekule, 1998).

In Turiani division, Morogoro (R) district, Moiro (1993) has shown smallholder dairying to be a major contributing sub-sector in Tanzania's milk production. Similar findings were reported by Msechu (1988) and Kurwijila (1991) who pointed out that the sub-sector contributed significantly to the dairy plants and that the plants would promisingly depend mainly on smallholder dairying.

Introduction of dairy cattle to Turiani was done by two non-governmental organisations (NGOs), namely The Foundation for Sustainable Rural Development (SURUDE) and Heifer Project International (HPI). The organisations have been providing loans of improved animal crosses through heifer-in-trust (HIT) scheme. Currently, more than 100 households have benefited from services of the two organisations. Despite the introduction of exotic dairy cattle in attempt to increase milk production, the production performance of these animals has always been below the expected level. This necessitates the need for investigating some management practices such as feeding, breeding and disease control in smallholder dairy cattle enterprises.

The objective of the present study was therefore to assess different dairy management practices in Turiani focussing on SURUDE and HPI beneficiaries.

METHODOLOGY OF THE STUDY

The study area.

The present study was carried out in Turiani division, which is about 100 km North of Morogoro municipality along Kilosa-Handeni road. The division with an area of 2,454 km^2 is in Morogoro (R) district, which lies between latitudes $5^o\ 5^'$ and $7^o\ 4^'$ South and between longitudes $37^o10^'$ and $31^o31^'$ East.

Research design, sampling technique and data collection

A cross sectional research design (Casley & Kumar, 1988) which allows collection of information at one point in time was adopted. A purposive sampling technique was employed so as to get a sample of 40 farmers, 20 being SURUDE and other 20 HPI beneficiaries. To each of the selected farmers, a structured questionnaire focusing mainly on feeding, record keeping, disease control and breeding was administered so as to obtain primary data.

Data analysis and presentation.

The collected data were coded, entered and analysed using statistical analysis system (SAS) computer software. Descriptive statistics mainly frequencies and percentages were computed. Cross tabulation involving Chi-square test (at 5%) was used to assess association between the organisations and management practices. The information was then presented in form of tables, specifically cross-tabulations. Cross tabulation is both a powerful way of communicating information and the commonest form of data presentation (Casley & Kumar, 1998).

RESULTS AND DISCUSSION

Background characteristics

Table 1 presents background characteristics of the respondents. It was generally observed that in terms of active gender class in dairying the proportion of female respondents exceeded that of male respondents for both SURUDE and HPI (i.e. 60 vs. 40 % and 55 vs. 45 % respectively). The table also shows that majority of the respondents aged between 36 and 45 years and were married. The highest level of education for most of the respondents was primary education for both change agencies. In terms of income level, the proportion of respondents earning above 60,000/= was far higher for SURUDE than for HPI (70% Vs 15%). This distribution shows a statistically significant (P<0.05) association between income level and the change agency.

Table 1 Distribution of respondents by their background characteristics

Characteristic	SURUDE		HPI	
	Number	(%)	Number	(%)
Active sex in dairying				
Male	8	40	9	45
Female	12	60	11	55
Age(years)				
25-35	4	20	3	15
36-45	12	60	10	50
Above 45	3	15	7	35
Marital status				
Married	19	95	18	90
Widowed	1	5	2	10
Highest education level				
Primary education		75	12	60
Secondary education	4	20	6	30
Post secondary education	1	5	2	10
Income level				
Low (below 30,000/=)	2	10	9	45
Medium (30,000-60,000/=)	4	20	7	35
High (above 60,000/=)	14	70	3	15

Feeding management

It was observed that 100 % and 95 % of the respondents under SURUDE and HPI respectively were practising zero grazing. Similar observations were reported by Lekule et al. (1998). The authors reported that majority of dairy farmers in Turiani had adopted zero grazing system. It was further revealed in the present study that farmers under the two change agencies fed similar forages to their animals. The most common grasses were identified to be Rottboellia cochinchinensis (itch grass), locally known as "Mbayaya," Panicum maximum, Pennisetum purpureum and Tripsacum laxum. Neonotonia wightii, Clitoria ternatea and Macroptilium atropurpureum were some of the most common leguminous herbs. Some multipurpose tree species had also been adopted, which include Leucaena leucocephala, Sesbania sesban, Morus alba and Gliricidia sepium.

Farmers under both change agencies were found to supplement their animals with hominy feed, minerals and sunflower seed cake (SSC). However, the proportion of farmers practising supplementation was higher for SURUDE than for HPI in all cases (Table 2). Chi-square ($\div^2$) test has indicated a statistically significant (P<0.05) association between supplementation of SSC and change agency, the distribution being skewed towards SURUDE more that HPI. This is because sunflower cultivation was introduced by SURUDE and hence it was adopted by the agency's beneficiaries more than other farmers. Supplementation of hominy feed and minerals was not statistically (P>0.05) associated with change agency suggesting that farmers of both categories were facing similar constraints as far as availability of the ingredients is concerned. The main constraints mentioned were unaffordable prices and short supply of maize at certain periods (January-June).

It was disappointing to note that only 5 % and 10 % of the respondents under SURUDE and HPI respectively were practising feed conservation while 20 % and 5 % of the same had established pasture plots, separated from the main crop field. Shortage of land around the residential area was found to be one of the key factors limiting establishment of pasture plots. Similar results were previously reported by Makauki et al. (1999).

Table 2 Distribution of respondents by type of feed supplement offered

Feed type	SURUDE		HPI	
	Number	(%)	Number	(%)
Hominy feed	13	65	11	55
Mineral supplementation	10	50	7	35
Sunflower seed cake	15	75	8	40

Record keeping

Different types of records kept by farmers in Turiani are shown in Table 3. All the respondents kept at least one type of records. Majority of the farmers (100 % under SURUDE and 85 % under HPI) kept health records. The reason why health records were kept more than other record types is that, veterinarians were involved directly in writing

down particulars of the cases attended. Laisser (1997) reported similar results. The author reported that in the Southern highlands of Tanzania extension officers filled in smallholder dairy farmers' cards, which were kept for review in subsequent visits.

Whereas a higher proportion of HPI respondents (60 %) kept weight and breeding records, the proportion of SURUDE respondents who kept milk records exceeded that of their counterparts (45 % vs. 30 %). Feeding records were kept by a small proportion (10 % for SURUDE and none for HPI). It can generally be argued that adoption of record keeping by smallholder farmers in Turiani is not satisfactory.

Table 3 Distribution of respondents by type of records kept

Record type	SURUDE		HPI	
	Number	(%)	Number	(%)
Milk records	9	45	6	30
Weight records	5	25	12	60
Breeding records	7	35	12	60
Feeding records	2	10	0	0
Health records	17	85	20	100

Disease control measures

Most common diseases reported in Turiani were East Coast Fever (ECF), metabolic diseases, trypanosomiasis, anaplasmosis and salmonellosis. Problems of ECF and trypanosomiasis reflect lack of proper routine dipping and regular vaccination (for trypanosomiasis) while those of metabolic diseases shows the outcome of limited mineral supplementation. Incidences of salmonellosis might be due to poor sanitation, which is a major source of contamination in feed and drinking water.

Table 4 shows disease control measures that were practised by farmers in the study area. The main control measures mentioned by the respondents were application of spray dips (spraying with acaricide) and deworming. It was found that only 10 % of SURUDE respondents were spraying their animals against tick-borne diseases while as much as 55 % were practising the same for the case of HPI. This shows that 90 % and 45 % of the respondents under SURUDE and HPI respectively sprayed their cattle once after every two or more weeks. Farmers under HPI showed a serious concern of acaricide application because their animals were back crosses of dairy cattle, which are more susceptible to tick borne diseases than those kept by SURUDE farmers. Vaccination was also performed but it greatly depended on individual efforts in general herd management, availability of drugs and financial capacity. Thus, there was no respondent who admitted to do regular vaccination against such diseases as trypanosomiasis.

As far as deworming is concerned, the proportion of respondents under SURUDE who were deworming their animals after every 3-6 months exceeded that of HPI (35 % vs. 15

%). The rest of the respondents were deworming after every seven or more months. The long spraying and deworming intervals observed in the present study portray a weak disease control strategy by farmers under the two NGOs.

Table 4 Distribution of respondents by disease control measures practised

Control measure	SURUDE		HPI	
	Number	(%)	Number	(%)
Spraying				
Once per week	2	10	11	55
Once per two weeks	8	40	6	30
Once per three weeks	10	50	3	15
Deworming interval (months)				
3-6	7	35	3	15
7-12	5	25	9	45
Above 12	8	40	8	40

Breeding management

Breeding method

Farmers under the two organisations adopted natural mating in breeding practices. Like in many other parts of Tanzania, AI was not done in Turiani due to lack of facilities and problems related to transport. Further, the method is expensive relative to natural mating. Farmers under both organisations faced a problem of limited number of bulls, which might in the long run cause inbreeding, thus, resulting in inbreeding depression.

Conception rate

Farmers were requested to tell the number of services per conception. Table 5 thus presents the number of services per conception for the two categories of farmers

Table 5 Distribution of respondents by number of services per conception

Services per conception	SURUDE		HPI	
	Number	(%)	Number	(%)
1-1.5	14	70	14	70
2	4	20	1	5
3 or more	2	10	5	25

It was observed that 90 % and 75 % of the respondents under SURUDE and HPI respectively had their cows conceiving after an average of one or two services while the rest of the respondents admitted that their cows were conceiving after an average of three or more services. For SURUDE, none of the respondents mentioned more than 3 services per conception but 10 % and 5 % of HPI respondents admitted and 4 and 6 services per conception, respectively. Kurwijila (1991) reported a practical goal of service per conception to be under 1.8. Thus, values that exceed 2 imply inefficient reproductive performance. The implication is that the performance of cows kept by more than 75 % of farmers in Turiani in terms of conception rate is quite good

Poor heat detection, poor record keeping and lack of access to bulls for timely mating are some of the factors causing poor conception rates in cows. In Turiani, farmers under the two organisations reported difficulties in accessing bulls, as there were only three bulls that provided service to over 120 cows under HPI. Feeding practices have also been reported to influence conception rate as they influence weight gain. Howard et al. (1992) reported 1.5 and 2.3 services per conception for cows gaining and those losing weight, respectively.

Age at first mating

Information based on age at first mating (AFM) was not adequately provided because most of the farmers were provided with the animals without enough records. However, the organisations' extension officers reported a range of 18 to 25 months as AFM for most cows. It is widely recommended to breed dairy heifers at 15-18 months.

Calving interval (CI)

It was observed in the present study that CI ranged from 12 months to more than 24 months (Table 6).

Table 6 Distribution of respondents by CI of their cows

Calving interval (months)	SURUDE		HPI	
	Number	(%)	Number	(%)
12 - 13	0	0	3	15
14 - 18	13	65	7	35
19 - 24	1	5	5	25
Above 24	4	20	1	5
No record	2	10	4	20

Majority of the respondents (90% for SURUDE and 65% for HPI) reported CIs exceeding 13 months while the recommended goal of reproductive management is for each cow to calve every 12 to 13 months (Grusenmeyer et al., 1992). CI is mainly influenced by management factors, because its heritability and repeatability are very low

(Alim, 1960). Heat detection, which is the first step in getting cows bred, is a major factor determining the length of CI. Long calving intervals are usually a result of delayed breeding whose primary cause is failure of heat detection (Nebel & Lee, 1992). Bull scarcity, which was evident in Turiani, is hence among other factors contributing to long CI.

Housing management

Status of the houses based on cleanliness and necessary components of the houses was assessed through observation and enquiry. Distribution of the respondents by housing management is shown in Table 7.

Table 7 Distribution of respondents by housing management

Component	SURUDE		HPI	
	Number	(%)	Number	(%)
Feed trough	20	100	20	100
Water trough	8	40	1	5
Crush	8	40	2	10
Barn cleaning frequency				
once per day	9	45	6	30
once in 2-3 days	11	55	14	70

It was learnt in the present study that farmers used locally available materials to construct the houses. All cowsheds were observed to have roofs, majority of which were thatched. The houses were well ventilated and all had feed troughs but only 40 % of the respondents under SURUDE had water troughs and crushes in their sheds. The proportion for those under HPI was smaller (i.e. 5 % and 10 % for water troughs and crushes respectively). c2-test has indicated a statistically significant (P<0.05) association between availability of the two structures and change agency, showing SURUDE's success in training HIT beneficiaries on the construction of their animals' houses. Generally, there is limited water supply in Turiani thus creating serious problems to dairy farmers especially during dry season. Water has been reported to be the cheapest among the nutrients necessary for farm animals but surprisingly it is commonly deficient on many farms leading to low productivity and general unthriftness (Kinsey, 1983).

It was also revealed in the present study that most of the houses were not kept clean. Only 45 % and 30 % of the respondents under SURUDE and HPI respectively cleaned their houses once every day while the rest admitted to do the same once in every 2 or 3 days depending to the amount of accumulated dung. The cleanliness reported here refers to removing cow dung since real moping was not in practice. An informal discussion with extension officers revealed that cleanliness was usually poor during critical period of farming (cropping season) which was identified to range from December to June.

CONCLUSIONS

Dairy management practices of farmers in Turiani are generally poor. This is largely the cause of low animal productivity which in turn, leads to failure of most farmers to provide the necessary health and nutritional care required for the improved animals. Health, nutritional and breeding problems were identified as the most important constraints in dairy production in the division. Other constraints include poor record keeping and shortage of land.

Effective dairy management by farmers would improve livestock productivity as well as nutritional and financial status of Turiani's dairy farmers. For improved dairying in the area, there is a need to heighten the awareness of individuals on the immediate and long-term effects of their feeding practices. Regular farmer training on such aspects as the importance of record keeping and other management practices through seminars or workshops is thus recommended especially for HPI beneficiaries. Extended adoption of sunflower is also recommended as it has a direct financial relief to farmers through supply of seed cake for dairy cattle. Farmers under HPI are especially encouraged, as they had not yet adopted the crop. SURUDE and HPI are advised to find more bulls for timely mating so as to avoid risks of inbreeding and problems associated with poor conception rate and long calving intervals.

REFERENCES.

Alim, K.A .(1960) Reproductive rates and milk yield of Kenana cattle in Sudan. J.Agric.Sci. 55: 183-188.

Casley, D.J & Kumar, K. (1988). The collection analyses and use of monitoring and evaluation data. The Int. Bank for Reconstr. and Dev. Washington, D.C.pp 37-38

Grusenmeyer, D.; Hillers, J & Williams, G. (1992). Evaluating dairy herd reproductive status using Dhi records. Washington pp 16.

Howard, W. T.; Hutjens, M. F.; Reneau & Hartwig, J.N. (1992). Dairy management: The reproduction clinic Philadelphia, pp 71.

Kinsey (1983). Integrated small holder dairy farming manual. Perfect printers Ltd Arusha.

Kurwijila, R.L. (1991). Basic dairy husbandry and management practices in tropical environment. Aas, NLH, Norway. Vol. 2: pp 89.

Laisser, K.L. (1997). Record keeping among small holder dairy producers in the southern highlands of Tanzania. MSc Diss., SUA pp.135.

Lekule, F.P; Sarwatt, S.V & Petersen, P.H. (1998) The SURUDE Heifer-In-Trust scheme a preliminary assessment. Proc. TSAP Conf. Vol. 25: 13-19.

Makauki, A.F (2000) Factors affecting the adoption of agroforestry farming system in Turiani Division, Morogoro rural district. MMSc Diss., SUA. pp 93

Makauki, A.F., Lekule, F.P. & Kawa, I.H. (1999) Awareness of farmers in multiipurpose tree planting in Turiani division, Morogoro (R) district. A Case study of Kidudwe, Kunkhe and Lungo villages. Proc. TSAP Conf. 26: 142-152.

Mchau, K.W. (1991) The impact of upgrading the Tanzanian Shorthorn Zebu on smallholder dairy Production in Mbeya region. MSc Diss., SUA.

Moiro, J.N. (1993). Prospects and potential of keeping cattle in Turiani. Special proj., SUA. pp 40

Msechu, J.K. (1988) Contribution of milk from the traditional livestock sector. TSAP Sci. Conf., Vol. 15.

Nebel, R.L. & Lee, K.L. (1992). Evaluation of reproductive performance using Dhi Records. Virginia. pp 3

Sarwatt, S.V & Lekule, F.P.(1998) The role and experiences of SURUDE in poverty alleviation in rural areas. Paper presented at workshop on "Governmental and NGO's builing alliances in poverty alleviation" 19th–20th Jan., VETA, Morogoro.