



Characterization of the farming and livestock production systems and the potential to enhance livestock productivity through improved feeding in Tsibet, EndaMehoni District, Ethiopia

T. Hagos¹, T. Tesfay², S. Wayu², T. Atsbha², T. Yikaalo², T. Zeberh², T. Teshale²,
M. Ebrahim³ and J. Wamatu⁴

¹TARI, Mekelle Agricultural Research Center

²TARI, Alamata Agricultural Research Center

³AfricaRISING Tigray Coordinator

⁴International Center for Agricultural Research in Dry Areas
(ICARDA)

Produced by

International Center for Research in Dry Areas

Published by

International Livestock Research Institute

November 2014

www.africa-rising.net



The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three regional projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads the program's monitoring, evaluation and impact assessment. <http://africa-rising.net/>



This document is licensed for use under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 Unported License

This document was made possible with support from the American people delivered through the United States Agency for International Development (USAID) as part of the US Government's Feed the Future Initiative. The contents are the responsibility of the producing organization and do not necessarily reflect the opinion of USAID or the U.S. Government.

Contents

Introduction.....	1
Methodology	2
Study site	2
Sampling method	2
Selection of Kebeles	2
Selection of participants.....	2
Survey structure and format	2
Data analysis.....	2
Major results	3
Overview of the farming systems.....	3
Livestock production system	4
Feeds and feed resources.....	5
Problems, issues and opportunities	7
Conclusions.....	9

Introduction

Tigray region is characterized by a cold and frosty climate. The landscape is hilly with steep slopes. The soils are degraded and crop production is low. Livestock, particularly sheep production, are the mainstay of farmers' livelihoods. Livestock production is constrained by ecological, technical and economic limitations which result in severe feed shortages.

The Feed Assessment Tool (FEAST) is a systematic and rapid method to assess local feed resource availability and use at site-level. It helps in the design of intervention strategies aiming to optimize feed supply and utilization through technical and organizational interventions.

FEAST was used to characterize the livestock production system and in particular feed-related aspects of smallholder farmers of Tsibet *kebele* is located in Endamehoni District in southern Tigray.

The objective of the current survey was to assess the feed resource availability and utilization using a feed assessment tool (FEAST) within the context of the overall farming and livestock production systems to determine the potential of site-specific feed interventions in selected areas within the sub-alpine highlands.

Methodology

Study site

The survey was conducted in Tsibet *Kebele*. Tsibet is located in Endamehoni District in the southern Tigray zone of the Tigray regional state. The *kebele* lies 683km north of Addis Ababa, approximately 116 km from Mekele (the regional capital city). Tsibet has an altitude of 2950-3050 m above sea level with a minimum average temperature of 4^oC and maximum average temperature of 12^oC. The mean annual rainfall is 750 mm. The *kebele* has a total land area of 4016 ha, of which 1039 ha are arable. It has 1267 households of which 304 are female-headed and 963 are male headed. The average family size is 6 persons.

Sampling method

Selection of Kebeles

Tsibet is one of the two *kebeles* in Tigray selected for the Africa RISING project intervention. The criterion was based on accessibility and proximity to the administrative town of the District. Tsibet is the less accessible *kebele* of the two and it lies 9km from the main road and 20 km from the administrative town.

Selection of participants

The criteria for selection of participants included gender, age and wealth classes based on landholding (small, medium, large).

Survey structure and format

Two tools were used for the survey, a focus group discussion using the participatory rural appraisal approach and individual interviews. A total of 20 farmers (7 women and 13 men) were selected for the focus group discussion. From the three landholding categories (small, medium and large farm size), 9 respondents (3 respondents from each categories) were selected for individual interviews. The surveys were conducted on 26 – 27th December, 2013.

Data analysis

The FEAST excel macro program (www.ilri.org/feast) was used for data analysis. Narrative responses collected from the group discussions were examined and reported.

Major results

Overview of the farming systems

The farmers in Tsibet *kebele* are entirely smallholders with a subsistence mode of production. The average farm size is very small, about 65 % of the households have a land size of less than 0.5 ha. The landless farmers are 10 % (Table1).

Table 1: Average land size owned by various categories of farmers in Tsibet

Category of farmers	Range of land size(ha)	Ranges of land size in “timad”	% of households that fall into the category
Landless	0	0	10
Small	Up to 0.25	Up to 1	15
Medium	0.26-0.5	1.1 up to 2	50
Large	0.6-0.75	2.1 up to 3	25

Tsibet has only one cropping season, the *meher* season (May - December). There is a short season, *belg*, from February to June which has become highly unreliable over the years. Irrigation (stream, well dig and check dam) is available to 20% of the households. The major crops grown are barley, wheat and faba beans covering approximately 0.20 ha, 0.12 ha and 0.04 ha respectively in each household (Figure 1).

There is shortage of land for cultivation and fallowing is done to control soil erosion. Agricultural activities in the *kebele* do not usually require more than family labour. Farmers with large landholdings who may need extra labour get it through the traditional labour sharing arrangements (*wonfel, jige*) or hire it at a cost of Birr 65 (\$3.4) and Birr 40 (\$2.1) at the time of weeding and harvesting respectively. Lunch and a local drink are provided.

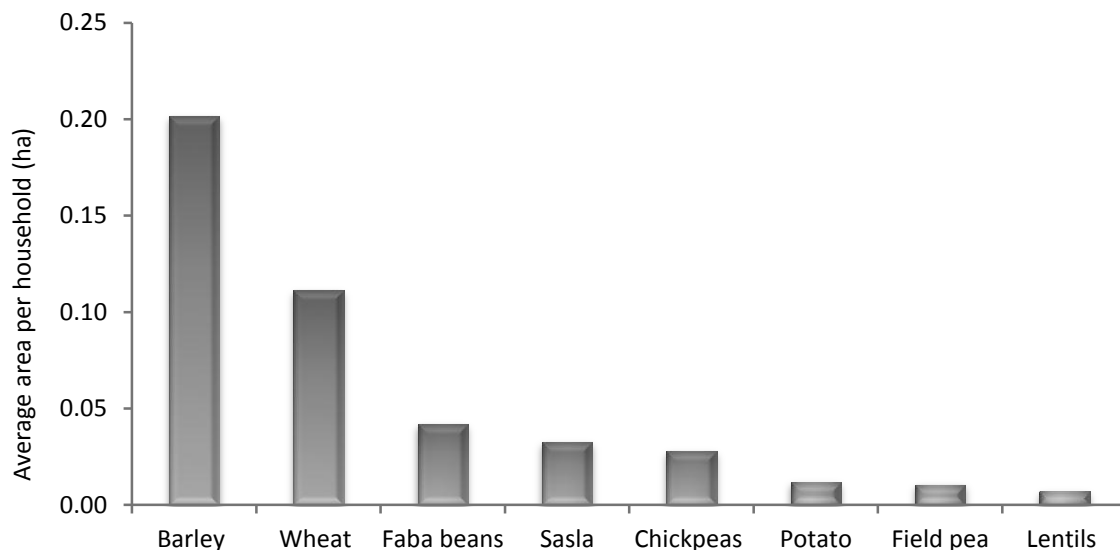


Figure 1: Major crops grown in Tsibet

Farmers in the area have various sources of income sources (Figure 2). The main sources are sale of food crops, cash crops (*ensosla* and horticulture) and eucalyptus trees that contribute up to 80% in total.

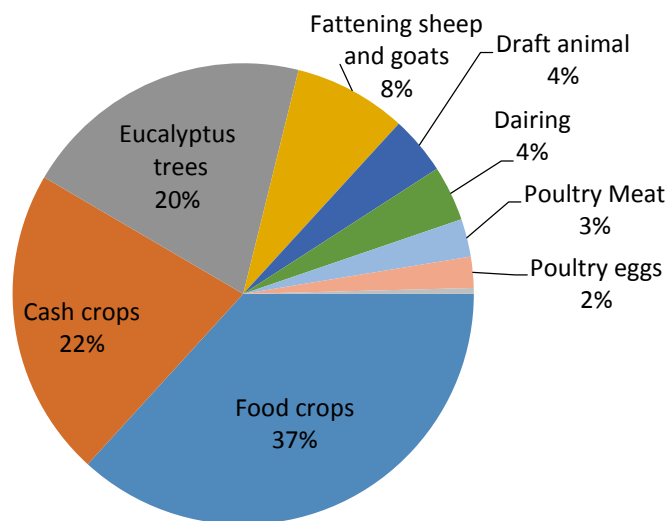


Figure 2: Contribution (%) of livelihood activities to household income in Tsibet

The credit institutions in Tsibet are Dedebit Microfinance and GRAD (Graduation Resilience to Achieve Sustainable Development) at the district level, Multipurpose Cooperative and Saving & Credit Association at the *kebele* level. The requirements and procedures for acquiring the credit is not attractive to farmers as the credit institutions offer loans only to groups (minimum 3 persons) as opposed to individual loans. Agricultural inputs are supplied by the District of Agriculture and Rural Development at a subsidized cost. These include fertilizers, improved seed, vaccines, forage seed for alfalfa, phalaris and sesbania, improved breeds of poultry, drip irrigation equipment, water pumps and motor pumps.

Livestock production system

Majority of the households in Tsibet own sheep, local dairy cows, draft cattle, local poultry and donkeys (Table 2). Figure 3 shows the average livestock species (in TLU) per household. Donkeys, draft cattle which are later fattened and local dairy cattle are predominant.

Table 2: Livestock species owned by households in Tsibet

Livestock species	% of household that own the species	Average number of animal per household
Local dairy cows	75	2
Improved dairy cow	1	1
Draught cattle	80	2
Sheep	90	25
Goats	5	4
Local poultry	95	6
Improved poultry	2	3
Horses	1	2
Donkeys	95	2

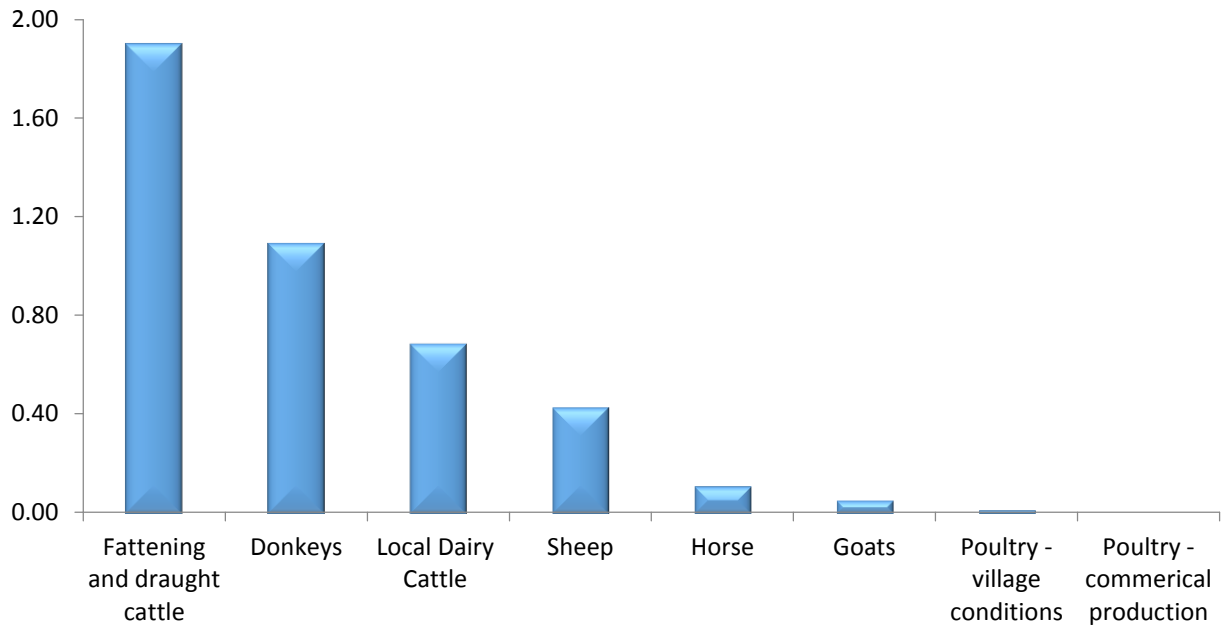


Figure 3: Average livestock species holdings per household in Tropical Livestock Units (TLU) in Tsibet

Animals are housed in barns adjacent to the family houses. The barns do not protect the animals from rain and wind. The main animal health services are vaccination, deworming and spraying. Animal health services in the *kebele* are available one day per week at district level. Transportation of diseased animal to the district town takes 2 hours on foot. The cost of vaccination, deworming and spraying of cattle is Birr 2 (\$ 0.1), Birr 1.5 (\$0.08) and Birr 2(\$0.1) per head of cattle. There is no AI service in the *kebele*. Farmers use bull service, which is free of charge.

Feeds and feed resources

The feed resources in Tsibet *kebele* include natural pasture (grazing), cereal and legume crop residues, hay, naturally occurring green fodder (mainly weeds). Overall feed availability is low because farmers own very small plots of land, thus yields of cereal and pulse crops are very low. Grazing land is highly degraded and only a few farmers produce cultivated fodder, usually not more than 10 plants. Farmers do not treat crop residues in any way except chopping. They have no knowledge of mixing crop residues with any supplements to improve their nutritional value.

The relative contributions of the different feed sources to the total dry matter (DM), metabolizable energy (ME) and crude protein (CP) contents of the total diet are shown in Figure 4. Farmers rely heavily on grazing and naturally occurring fodder that is available after the rains from September-December (Figure 5). During the rest of the months of the year, farmers rely on crop residues which are in short supply as seen in their low (6%) contribution to DM (Figure 4).

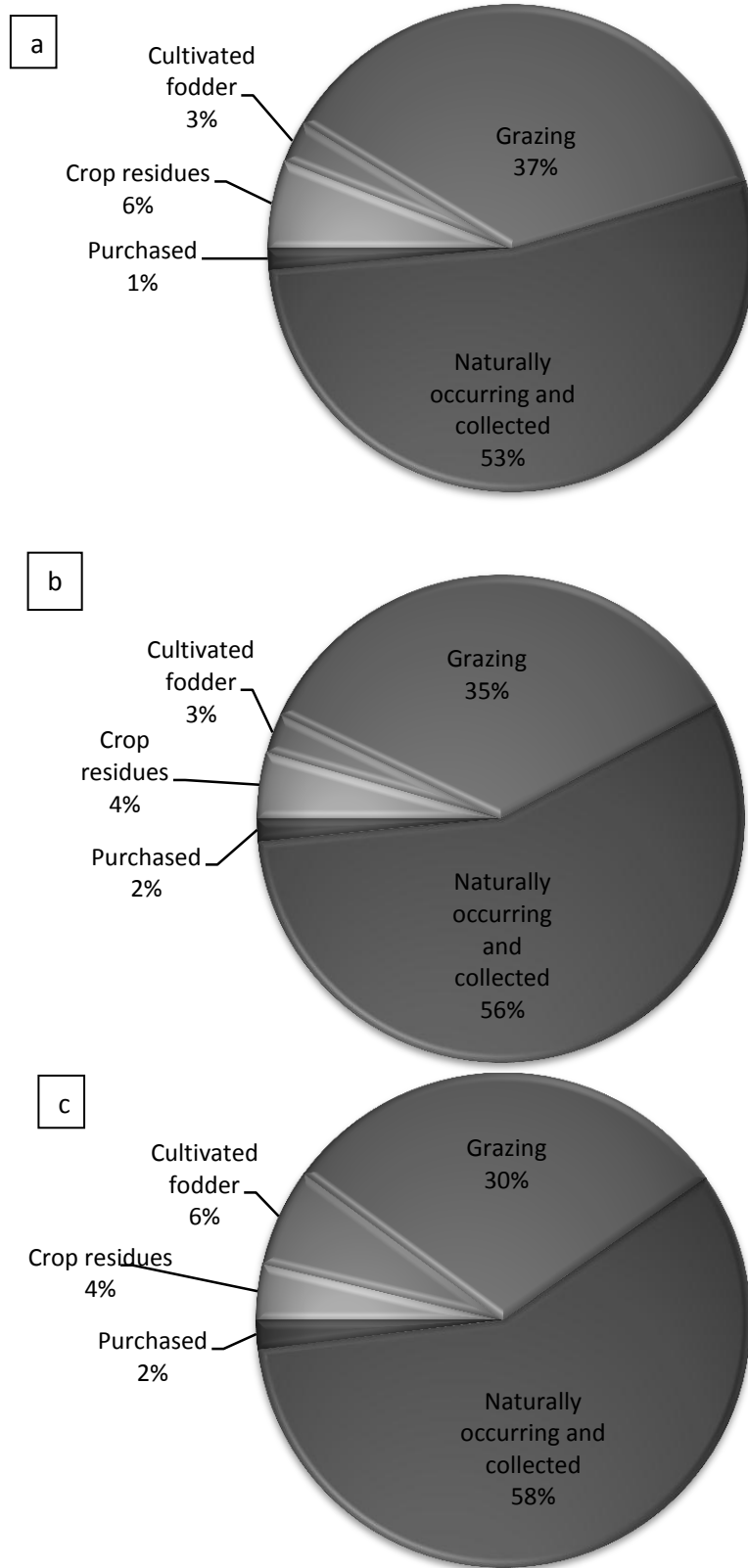


Figure 4: The contribution of various feedstuffs to DM (a), ME (b) and CP (c) to livestock diets in Tsbet

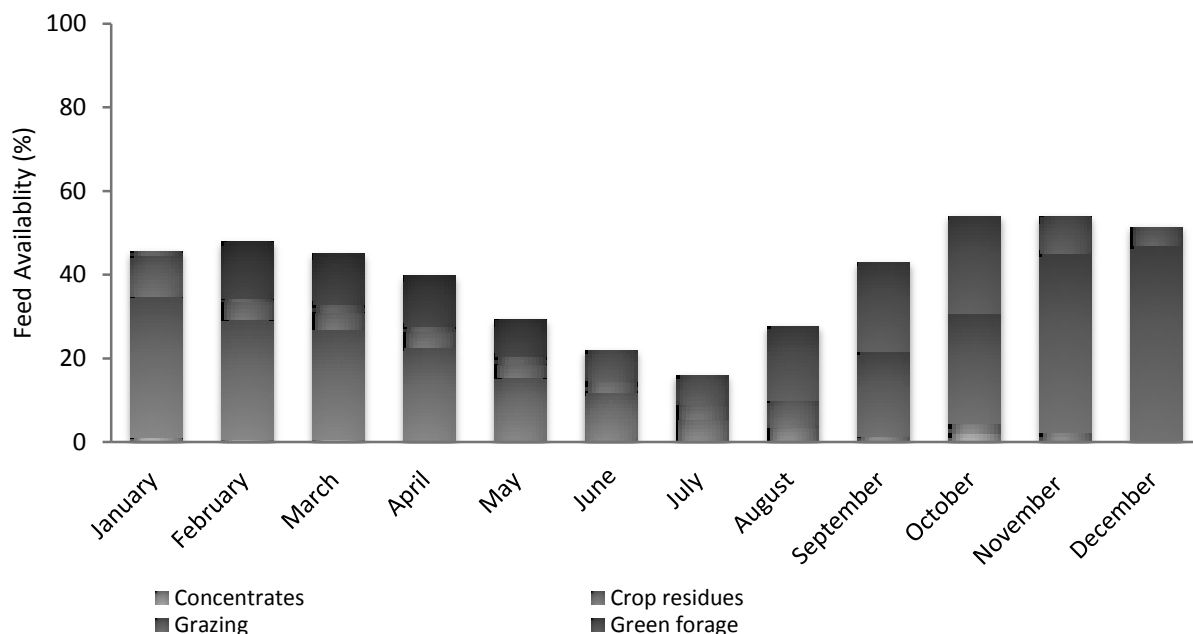


Figure 5: The composition of the livestock diet throughout the year in relation to the rainfall pattern in Tsibet

Problems, issues and opportunities

Livestock production is constrained by a multitude of factors. The major problems and their priority ranking according to farmers are presented in Table 3. Feed shortage, leeches and low performance breed were identified by farmers as the most important problems. Poor animal husbandry and marketing problems were the second and the third most important problem in the *kebele* respectively.

The very rough and hilly topography with high soil degradation, frosty and sub-moist climate and land shortage limit feed availability from grazing, development of planted forages and availability of crop residues. Crop production and livestock are banned in the mountains and hills due to soil conservation projects. There are limited high yielding forage species adapted to the sub-alpine highlands.

Disease, traditional breeding and management practices limit livestock productivity and hence income, resulting in poor incentives for farmers to adopt improved technologies. Attitude and knowledge of the farmers towards small ruminant production does not encourage improvement because farmers consider them scavengers. Coping mechanisms of farmers and their perceived solutions to their livestock problems are presented in Table 4. Potential interventions to the livestock situation in Tsibet are shown in Table 5.

Table 3: Livestock production problems as ranked by farmers in Tsibet

Problem	Score of the problem	Order of the problem importance
Feed shortage	3	1
Leeches	3	1
Low performance breed	3	1
Poor animal husbandry	1	2
Market problem	0	3

Table 4: Coping mechanisms to problems and proposed solutions proposed by farmers in Tsibet

Major problem	Farmers coping mechanisms	Suggested solutions	Opportunities and limitation
Feed shortage	<ul style="list-style-type: none"> Collecting and conserving green forages & crop residue Feed purchasing and planting of forages 	<ul style="list-style-type: none"> Planting forages in backyards Introducing cut and carry system Destocking 	Even though land shortage is the Key problem, they have good experience of zero grazing. Faba beans and field peas are well known crops next to barley and wheat and residues from these crops can be used to improve the nutritional values of other crop residues.
Leech	<ul style="list-style-type: none"> Drinking animals using water trough Controlling animals during drinking times Dehydrate animals to remove the leach by denying them water 	<ul style="list-style-type: none"> Construction of water troughs Controlling animals during drinking times 	Farmers are willing to cooperate in the construction of water troughs as they realize the detrimental effects of leeches
Market problem	<ul style="list-style-type: none"> Selling at high market price time Travel to neighbor market places, Alaje and EndaMehoni 	<ul style="list-style-type: none"> Introducing road infrastructure Establishment of near market place 	Feeder road which connects to the main road is under construction. Knowledge on fattening is limited both in small ruminant and large ruminants. Farmers have a large number of animals with small sizes of lands which cause low production potential, so awareness creation about destocking and fattening importance should be an intervention.
Low performance breed	<ul style="list-style-type: none"> Cross breeding with improved breeds Selection of local bull breeds 	<ul style="list-style-type: none"> Establishment of AI service at <i>kebele</i> level Introducing improved bulls Introducing breeds adaptable to the agro ecology 	Zero grazing feeding system can be used to control uncontrolled breeding (to use only selected breed or bull).
Poor animal husbandry	<ul style="list-style-type: none"> Supplementation using salt Cleaning animal barns Built animal barn with iron roofs and mad wall 	<ul style="list-style-type: none"> Improving feeding strategies Improve animal health 	Farmers are aware of the importance of animal health, thus health technicians should be availed at <i>kebele</i> level to assist farmers.

Table 5: Potential interventions for top priority problems in Tsibet

Problems identified by farmers	Possible intervention
Feed shortage	<ul style="list-style-type: none"> • Planting forages at irrigation and backyard • Supplementing green forages to crop residue and mixing cereal residues with legume residues • Introducing cut and carry system • Destocking and fattening
Leech	<ul style="list-style-type: none"> • Construction of water troughs is the only way of solving the problem.
Low performance breed	<ul style="list-style-type: none"> • Establishment of AI service at PA level • Introducing improved bulls and Introducing adaptable breed for the agro ecology

Conclusions

Despite the constraints of land shortage both for grazing and crop production, rough and hilly topography and farmers' subsistence mode of production, the interest of farmers and their experience in zero grazing is a good opportunity to build upon. Improved forage crops and improved bulls to reduce uncontrolled breeding can be introduced. The construction of water troughs through community participation (labour contribution) to control the problem of leeches needs to be emphasized as it causes high losses of production and death of animals.