

Величина расхода энергии на теплопродукцию заметно колеблется, в пределах от 40 до 80% энергии усвоенных питательных веществ.

Поэтому анализ данных, при которых наблюдается наименьший расход энергии рациона на основные физиологические функции организма, является актуальным.

Данные о суточном балансе энергии подопытных животных приведены в таблице 3.

Таблица 3 - Баланс энергии

Показатели	Группа		
	I	II	III
Валовая энергия, МДж	21,15	21,27	21,31
Энергия кала, МДж	4,86	4,36	4,66
Переваримая энергия, МДж	16,27	16,91	16,65
Коэффициент переваримости, %	76,93	79,50	78,13
Энергия мочи, МДж	0,75	0,86	0,79
Обменная энергия, МДж	15,52	16,05	15,86
Коэффициент обменности, %	73,38	75,46	74,42
Теплопродукция, МДж	13,22	12,65	12,96
Теплопродукция в % к обменной энергии	85,2	78,8	81,7
Энергия продукции, МДж	2,3	3,45	2,9
% от контроля	100,0	147,8	126,0
Эффективность использования обменной энергии, %	14,8	21,2	18,3

Из данной таблицы видно, что расход обменной энергии на теплопродукцию был ниже во второй группе на 6,4%, в третьей - на 3,5% в сравнении с контролем. Следует отметить, что во второй группе, которая получала 3% ЦТМД, энергия продукции была выше на 47,8%, чем в первой группе. Более высокая степень отложения энергии в этой группе установлена за счёт синтеза белка в мышечной ткани.

Эффективность использования обменной энергии в опытных группах была выше, что сказалось на увеличении среднесуточных приростов молодняка свиней. Коэффициент полезного действия (отношение энергии продукции к валовой энергии) составил в первой группе 10,9, во второй – 16,0 и в третьей – 13,6.

Заключение. Таким образом, скормливание в рационах молодняка свиней на доращивании цеолиттрепеловой молочной добавки в дозе 3% и 4% от сухого вещества рациона позволило повысить среднесуточные приросты во второй группе на 24,2 и в третьей - на 15,7% в сравнении с контрольной группой.

У поросят на доращивании, получавших 3% цеолиттрепеловой молочной добавки от сухого вещества рациона отложено в теле азота на 15,7, в группе, которая получала 4% ЦТМД - на 9,6% больше, чем в контроле.

Эффективность использования обменной энергии у молодняка свиней, получавших цеолиттрепеловую молочную добавку в количестве 3% от сухого вещества рациона, во второй группе была выше на 6,4 и в третьей группе при скормливании 4% ЦТМД на 3,5% эффективнее шло использование обменной энергии, чем в контроле.

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ПРОБЛЕМАТИКА ЖИВОТНОВОДСТВА В ЗАМБИИ

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Animal Husbandry and its problems in Zambia Hatskevich Alena

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1. Briefly about Zambia

Full name: Republic of Zambia.
Population: 12.2 million (UN, 2008).
Capital: Lusaka.

Area: 752,614 km² (290,586 sq miles).

Major language: English (official), Bemba, Lozi, Nyanja, Tonga.

Major religions: Christianity, indigenous beliefs, Hinduism, Islam.

Life expectancy: 42 years (men), 42 years (women) (UN, 2007).

Monetary unit: 1 Kwacha = 100 ngwee.

Main exports: Copper, minerals, tobacco.

GNI per capita: US \$800 (World Bank, 2007).

Zambia covers an area of 752,614 km², with a terrain which is mostly plateau savanna and climate which is dry and temperate. Zambia is a land locked country with a population, which is predominantly Christian, is currently estimated to be about 12.2 million with an annual growth rate of about 2.9 percent. While only 60% of the population live in rural areas, most parts of the country have very low population densities. The country is rich in agricultural and mineral resources that are largely underutilized. Some 58 percent of Zambia's total land of 39 million hectares is classified as having medium to high potential for agricultural production, but less than half of potential arable land remain largely untapped. Zambia has some of the largest copper and cobalt deposits in the world. Moreover it is endowed with other minerals such as zinc, lead, coal, emeralds, gold, silver, and uranium.

2. The Economic and Agricultural situation in Zambia

During the early and late 1990's Zambia's economic poor performance can be traced mainly due to the decline in the mining sector, which contracted at an average annual rate of 8.7, and poor performance in the agricultural sector, which contracted by 0.2 percent a year. Industry was stagnant (manufacturing grew 0.9 percent, utilities grew 1 percent, and construction contracted 4.8 percent) and services grew 2.7 percent a year.

A colonial legacy mismanagement debt and disease are said to have contributed to the country's tribulations.

The situation has been aggravated by frequent occurrences of drought, failure to diversify the economy away from copper, and HIV/AIDS pandemic. With no growth in industry, the service sector was the only significant sectoral source of growth offsetting the huge contraction in the mining and agricultural output.

The industries include copper mining and processing, construction, foodstuffs, beverages, chemicals, textiles, fertilizers.

Copper exports, which accounted for almost 80 percent of total exports in 2007, are still playing a major role in sustaining Zambia's growth (World Bank, 2008).

Agriculture is an increasingly important sector in the Zambian economy since the mineral sector, which was the backbone of the economy from post-independence times (1964) till the late 1980's, has declined. The agriculture sector generates about 18% to 20% of the country's GDP and provides a livelihood for more than 60% of the population. The livestock sector contributes 35% to the agricultural GDP excluding the benefits from use of animal draft power and manure. The sector comprises of about 85% small-scale farmers (about 850,000 rural households) who utilize about 75% of the cultivated land and 15% commercial farmers who utilize 25% of the land.

Most Zambians are subsistence (small-scale) farmers. In the year 2000, agriculture accounted for 85 percent of total employment (formal and informal). Maize (corn) serves as the principal food staple in central, southern and eastern Zambia and supplies about 60% of national calories, while cassava (tapioca) is important in northern and western Zambia (FAO, 2002). Small-scale farmers produce almost all cassava in Zambia. Other important agricultural crops include sorghum, rice, groundnuts, sunflower seeds, vegetables, horticultural products, tobacco, cotton, sugarcane, coffee, and soybeans.

Agriculture in Zambia is predominantly rain-fed and rainfall is one of the major determinants of the sector performance in any given year. The irrigable potential is conservatively estimated at 430,000 hectares, of which no more than 100,000 hectares is developed, mostly on commercial farms for sugar, wheat and plantation crops. Among the Southern African countries, Zambia is the endowed country with surface and ground water supplies.

The livestock sector is poorly developed due to the spread of the tse-tse flies and a weak veterinary services. It provides meat, milk, eggs, hides and skins, manure and draught power, generates employment opportunities and income among rural people. Fishing is also developed in Zambia.

The socioeconomic importance of these animals cannot be over-emphasized. Through animal draft power and manure, cattle contribute directly to increased crop production. Failure to access cattle manure in the sandy flood plains of Western Province is synonymous with crop failure as animal manure in these sands is essential for crop growth. Crop production in Southern province over the last 12 years has drastically reduced due to inadequate draft animal power. High mortalities of cattle due to tick borne diseases have left many families in Southern Province without draft animals and unable to cultivate adequate areas of land with consequent acute food insecurity.

Animals are banks on the hoof for rural people. They are converted to cash in times of emergencies especially now with introduction of Liberalization Policy in 1992 which removed free educational and free health services among other things. The last 15 years have been years of repeated droughts due to changing weather patterns. Sale of cattle, goats, pigs and chickens generate income to buy grain and sometimes these animals are exchanged for grain thereby alleviating food insecurity. Farm animals are an integral part of sustainable development of rural Zambian people. One of the indicators of acute food insecurity and poverty in a Zambian village by a casual visitor is the absence of chickens and other livestock around the village. Chickens are the first choice of animals to be sold in times of food hunger. Households that do not own any animals are usually considered the poorest in the rural communities and those with large numbers of animals are rich members of the community.

Lack of animals is associated with abject poverty and food insecurity. When food and prosperity returns to the village, presence of village scavenging chickens and other livestock are evident.

3. Animal Husbandry in Zambia

Livestock husbandry is characterized by three sectors namely: the state, the commercial and the small-scale sectors.

The state sector includes large ranches operated by the government through parastatal organizations with an intended, but unrealisable objective of increasing beef production, but because of inefficiency the output is low. They are characterized by large inputs through government subsidies. It is not discussed in this paper though reference to it has been made where necessary.

Commercial farms are large undertakings, both beef ranches and dairy farms. They require big capital investment but also have large economic returns. Unlike state ranches, commercial ranches are highly efficient.

Small-scale cattle farms are family holdings characterized by low input and low output. Cattle play an important role in rural households by providing employment, contributing draught and manure for crop production. It is also the main food and cash source for most people in the cattle keeping areas (CHILONDA, et al. 2000).

The main commercial livestock areas are Southern province, Central province, Lusaka province, Copperbelt province and the Eastern province. Distribution of livestock in different provinces in Zambia and numbers of cattle, goats and sheep are given in Table 1 and 2.

Table 1 - Distribution of livestock ('000) in the different provinces in Zambia

Provinces	Cattle	Goats	Sheep
Central	363	195	3
Copperbelt	57	6	3
Eastern	251	125	6
Luapula	11	19	8
Lusaka	75	16	1
Northern	11	15	10
North-Western	58	10	10
Southern	1100	224	11
Western	500	4	-

Source: AREGHEORE (1994)

Table 2 - Livestock numbers - thousand head

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cattle	2,701	2,747	2,905	2,621	2,600	2,600	2,600	2,600	2,600
Goats	710	890	1069	1249	1270	1270	1270	1270	1270
Sheep	80	99	120	140	150	150	150	150	150
Asses	1.7	1.6	1.7	1.8	1.8	1.8	1.8	1.8	1.8

Source: FAO (2005)

3.1. Cattle Production

Cattle production is important but productivity is low, due in part to the poor nutritive value of natural pastures. However, DAKA (2002) reported that the livestock sector is increasingly becoming an important component of Zambia's economy and its contribution to the National Gross Product in 1996 and 1997 was estimated at 6.4 and 6.5% respectively. This accounts for about 35% of total agricultural production. In 1997, the livestock sector accounted for 33% of agricultural exports. About 23% of the per capita supply of protein comes from animal products. Beef is preferred and cattle contribute at least 61% of the meat and milk.

Traditional and commercial activities, contributes about 35% to the national agricultural output. Zambia exported beef to neighbouring countries. Exports of animal products were US \$1.4 million in 1995, US \$4.4 million in 1999 and US \$3.1 million in 2001. Traditional activities account for 83%, 64% and 97% of cattle, sheep and goat production respectively.

Per capita consumption of meat is only 2.4 kg per annum, about half the average for Africa. Cattle production in certain regions is limited by trypanosomiasis, carried by the tse- tse fly. Beef is preferred and cattle contribute at least 61% of the meat and milk.

Types of indigenous breeds for beef production are Angoni, Barotse and Tonga, which are bred with exotic types of zebu, like Boran, Brahman and Sahiwal and European breeds including Hereford, Sussex, South Devon, Charollais and Simmental; for milk production mainly Holsteins, Friesians and their crosses.

Commercial dairy producers provide about 66% of the fresh milk intake of the Dairy Produce Board (DPB) and in 1981 delivered 8 million litres of fresh milk. Friesian cows have an average yield of 25 litres per day; Friesian x indigenous crosses give 10 litres. This makes the combined national production from the commercial and parastatal sectors about 22.5 million litres.

Milk production on smallholdings, generally located near urban centres and away from the railway line, was established in the early 1970's under milk production schemes. The sector has the majority of

dairy cattle in Zambia yet contributes no more than half the national milk production. Given its potential, it should be possible to increase the output of milk from this sector and help satisfy national needs.

Milk in the traditional sector is produced from local cattle, mostly of the Sanga and zebu types crossed with Tonga, Barotse and Angoni. Milk yields per animal range from three to five litres per day. The milk produced is consumed domestically and is estimated at about 31.5 million litres per annum (PHIRI, 1992).

3.2. Sheep Production

Sheep are produced in the commercial and traditional sectors (MWENYA, 1992). The traditional sector, which owns 64% of Zambia's sheep, mainly of the indigenous fat-tailed and thin-tailed types places less emphasis on income and more on nutrition and subsistence. Traditional sheep production is concentrated in the Southern, Eastern and Luapula Provinces, accounting for 63% of the traditional sheep population.

Sheep in the commercial sector are exotic: Blackhead Persian, Dorset Horn, Dorper and Suffolk. Flocks are concentrated in Lusaka and Central Provinces, near the main consumption centres.

Fat-tailed indigenous sheep have a smooth hairy coat which ranges from brown to black; thin-tailed types have smooth hairy coats too with similar colour patterns to those of the fat-tailed. Indigenous sheep may be acquired from the village flocks.

The Dorper is the commonest breed, because it has a long breeding season, high milk yield and a good carcass quality.

Most mutton consumed in urban areas is supplied by the commercial sector. Annual per capita mutton consumption is estimated at 0.7 kg of which the rural areas account for 80%. The market supply of meat from sheep is less than one per cent of the total meat supply. There is therefore a need to improve sheep production to increase availability of mutton. Better breeding, nutrition, management, disease control and marketing can all contribute to this (MWENYA, 1992).

Suffolk rams are used in two- and three-breed crosses as the terminal sire to improve lamb growth rate and carcass weight. Commercial farmers claim that slaughter weights for Suffolk x Dorper crosses are 30% higher than those for pure Dorper. There is no evaluation and selection taking place on these farms to accompany crossbreeding.

Sheep farming is regarded as a domain for commercial farmers and as such the promotion of sheep farming at smallholder level receives very little attention. Indigenous sheep could greatly contribute to the well being of smallholder farmers and as such, there is an urgent need to fully characterize this genetic resource.

3.3. Goat Production

Goats which are important in the marginal areas are widely distributed throughout the country, but over 60% are in river valley areas and semi-arid regions which are characterized by poor crop production and cattle do not thrive because of trypanosomiasis and feed scarcity (DAPH, 1993; AHMADU et al, 2000). Goats' adaptability, prolificacy and modest nutrient requirements make them well adapted to poor marginal lands (AHMADU et al., 2000). Most smallholders keep local breeds. There is also the Boer goat.

Zambian goats are believed to originate from the present day Zimbabwe (the Matebele and Shona kingdoms). The numbers in the national flock are not well known. There are many indigenous types (MWENYA, 2001) which are further described by the locality within which they are found. There are three types of goats breeding in the Southern part of the country:

- The South East African Dwarf Goat, or Gwembe Valley goat: its population was estimated as 340,000 (AREGHEORE et al., 1992).

- In most of the southern half of the country and the northern parts of the Zambezi escarpment and Luangwa valley, a larger breed is found generally referred to as the Valley goat.

- On the plateau areas there is an intermediate type referred to as the plateau goat which appears to be widely distributed in the country. Colours vary from black, brown and roan with or without white markings. The goats are short with fine and glossy coats.

3.4. Piggery and chickens

Piggery is now at a high rate of commercial farming in Zambia. As reported 2006-2009 piggery section has Duroc is the most common which is bred throughout subsistence and commercial farming producing the second highest from beef production.

Chickens are the number one consumption compared to any birds. It is a subsistence and commercial farming and this gives 80% of households with eggs and meat.

4. The main problems in Animal Production in Zambia

The main problems in animal production in Zambia are:

diseases;

poor improved pasture, causing poor nutrition;

lack of finances and technologies.

4.1. Diseases

Foot-and-mouth disease (FMD) is a highly contagious and sometimes fatal viral disease of cloven-hoofed animals, including domestic animals such as cattle, water buffalo, sheep, goats and pigs, as well as antelope, bison and other wild bovines. It is caused by foot-and-mouth disease virus.

Contagious bovine pleuropneumonia (CBPP) is one of the economically most important diseases in Africa, being widespread from west, central and east part of continent.

Anthrax is endemic in Western and North-western Provinces of Zambia. The disease occurs throughout the year and impacts negatively on the economy of the livestock industry and public health in Zambia.

Tick-borne diseases occurring in Zambia are assuming more importance as they continue to be a major economic problem not only in Zambia, but in many parts of Eastern, Southern and Central Africa. The history, current status and attitudes regarding the control of these diseases, taking into account their complexity, are reviewed. The establishment of the well-designed Central Veterinary Research Institute (CVRI) and Japanese International Cooperation Agency (JICA) sponsored veterinary school, both have a potential for high quality research, with access to a wealth of specimens a veritable goldmine of research material. It is thus hoped that this review will stimulate the desire to maximize the value of the tick and tick-borne disease research in both Zambia and the international research community.

5. Recommendations

There is a number of recommendations which I will just mention a few in the mean time:

To prohibit the transportation of animals from rural areas to urban areas.

To provide a research on breeding and proper nutrition, for example, by the Czech government in co-operation with Zambian government.

To improve animal husbandry practices.

To increase livestock production by eradication and control of diseases (including vaccination, undertaking disease awareness campaigns, etc.).

Improvement of meat potential utilization.

Promotion of improved feeding practices and pastures which are grown mostly for fattening and milk production (fodder legumes, fodder trees and shrubs, hay, straw, animal feeds, industrial feeds, etc.).

The government must work more with the organisations and private sector to improve breeding.

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МОНИТОРИНГ ГЕНОФОНДА СЫЧЕВСКОГО СКОТА ПРИ ЕГО СОВЕРШЕНСТВОВАНИИ С ИСПОЛЬЗОВАНИЕМ МАРКЕРНЫХ ГЕНОВ ГРУПП КРОВИ

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Группы крови EAB-локуса использовали в качестве генетических маркеров для мониторинга генофонда сычевского скота при выведении нового молочного типа «Вазузский» с использованием красно-пестрой голштинской породы. По генетической структуре животные нового типа имеют сходство с красно-пестрой голштинской и отличаются от исходной сычевской породы. По молочной продуктивности превосходят сычевских аналогов и соответствуют требованиям стандарта типа.

Blood groups of EAB-Locus were used as genetic marker in the monitoring of gene pool of sychevskaya race cattle by selection of the new dairy type «Vazuskiy» using red-motley Holstein race. Genetic structure of this new type of cattle has similarity with red-motley Holstein race and distinguished from the initial sychevskaya race. They excel sychevskaya race in dairy productivity and satisfy the requirements of this race standard.

Введение. Сычевская порода крупного рогатого скота комбинированного направления продуктивности выведена в хозяйствах Смоленской области в 1950 году и составляет в структуре разводимых пород 32,5%. Животные хорошо приспособлены к местным условиям и отзывчивы на улучшение кормления и содержания, характеризуются хорошими молочными и мясными качествами. Вместе с тем коровы недостаточно приспособлены к промышленной технологии производства молока. Поэтому с 1985 года в агроформированиях региона проводится планомерная селекционная работа по созданию нового молочного типа сычевского скота с использованием лучших мировых и отечественных генетических ресурсов голштинской породы красно-пестрой масти и его совершенствованию. Новый тип