LEAGUE OF ARAB STATES
ARAB ORGANISATION FOR AGRICULTURAL DEVELOPMENT

RATIONAL DEVELOPMENT OF LIVESTOCK SECTOR

IN

DEMOCRATIC REPUBLIC OF SOMALIA

KHARTOUM, SEPTEMBER, 1978

FORWARD

Honorable Chairman and Members of the
Council of Arab Organisation for
Agricultural Development

In response to the request submitted by the Government of Democratic Republic of Somalia, the council decided in its seventh session that a study on " Rational Development of Livestock Sector in Democratic Republic of Somalia" would be carried out as a part of 1978 programme. A team of experts was, thus, recruited by the Organisation (AOAD) in consultation with the Ministry of Livestock, Forestry and Range (MLFR), Mogadishu. The experts assigned to the study were :-

1. Dr. Abdel Kader R. Abou Akkada, Director Livestock Production and Health Division, AOAD Team Leader

2. Dr. Mahmoud Abdullahi H. Ali, Director General MLFR (Counter Part To Team Leader)

3. Dr. Ahmed Abdel Aziz, Head, Livestock Production Department, AOAD

4. Dr. Mohammed El Radwan, Professor of Range Management, Faculty of Agriculture, Cairo, Egypt

5. Dr. Adam M. Shemmein, Head, Department of Pathology and Diagnosis, Central Veterinary Research Institute, Ministry of Agriculture, Food and National Resources, Khartoum.

6. Dr. Sakr. A. Sakr, Associate Professor of Economic, Institute of National Planning, Cairo, Egypt.

7. Dr. Kathim. A. Khali, Senior Beef Production Specialist, AOAD.

The team also secured the assistance of :-

1. Dr. Mohammed Ali Hussein, Director, Livestock Production Department, MLFR

2. Dr. Ismail Alim Nooh, Director Department of Research, Planning and Extension, MLFR

3. Dr. Hassan Khalaf, Director, Department of Range and Environment, National Range Agency, Mogadishu

4. Dr. Ibrahim Osman, Dairy Production Specialist, MLFR.

5. Dr. Mohammed Farah, Animal Health Specialist, MLFR

6. Mr. Yousif Dool, Agronomist , MLFR

The team assembled in Mogadishu on 4th and 5th July 1978 and was given a detailed briefing by the Director General MLFR on government policies and priorities in livestock sector. The team, then made " on ground " visits to:- 1) Livestock Government farms and Projects, Mogadishu, Hargeisa, Barbara and Kismayo 2) Meat Processing Plants, Kismayo and Mogadishu 3) Cold Storage Facilities, Mogadishu and Hargeisa 4) Slaughter houses 5) Livestock Development Agency (LDA) 6) National Range Agency (NRA) 7) Local Livestock Markets 8) Holding grounds, Kismayo and Hargaisa. Following comprehensive discussions with the Directors of MLFR, LDA, Meat Factories, Slaughter houses, milk Factory, Regional Veterinary Services, Ministry of Industry, NRA, State Planning Commission and Dean of Faculty of Veterinary Science and Animal Husbandry ; a follow up of investigations and appraisal of previous studies and proposals, was conducted. These investigations emphasized the necessity of drawing up programmes for the development of various aspects of livestock sector in Somalia.

The existing situation of livestock sector in Somalia including ; national herd, administrative structure, meat production and

Processing, Milk Production, Animal Feeds, range management Schemes, Animal Health Service and Livestock Marketing ; has been reviewed in the present study. A critical evaluation of the progress and accomplishments of the current and on-going projects related to livestock health and production, has also been included in the study. Education, research and training institutions in Somalia were assessed in view of the future development of livestock sector.

The present study has identified various constraints and bottlenecks that handicap the development of livestock sector and the efficient implementation of livestock project. Definite programmes were therefore drawn up for the development of meat and milk production ; animal health service, rangeland and feed resources. National programmes of animal breeding and artificial insemination , were formulated. Proposals for improving the marketing conditions of the export of live animals, meat and meat products, were set up in the present study. Great emphasis was given to the programme of various levels of training as it represents the backbone of any future development in livestock industry. Proposals for achieving these programme were also discussed. Because of the great need to facts on livestock which could be utilized in future livestock planning, programmes for orienting the existing governmental farms and projects to research and extension, were drawn up in the present study.

It is believed that the present study will assist the Government in determining the priorities of future livestock development projects. It also offers a guide line for the Government in assessing the technical and economic viability of government livestock projects. The study would assist in identifying the training requirements which could be requested by the government through the technical aid programmes of the regional and international organisations.

In closing, I should like to extend my tanks to the Government of Democratic Republic of Somalia

and H. E. the Minister of Livestock, Forestry and Range for the appreciable care they have given to the team and for facilitating the progress of the study.

I sincerely hope that the implementation of the present study would maximise both the foreign earning and benefits gained by the large livestock owing populations.

Dr. Mohamed Mohib Zaki
Director General

Khartoum, September, 1978

ACKNOWLEDGEMENT

I should express my deep gratitude to Dr. Mohammed Mohib Zaki, Director General, AOAD for granting the team of experts the opportunity to conduct the present study.

The study was carried out in coordination with the Ministry of Livestock Forestry and Range (MLFR), Mogadishu. I therefore extend my thanks to Dr. Mahmoud Abdullahi. H. Ali, Director General; Dr. Mohammed Ali Hussein, Director, Department of Livestock Production ; Dr. Ismail Alim Nooh, Director, Department of Planning, Research and extension and Dr. Hassan Khalaf, Director, Range and Environment, NRA, for their sincere assistance and cooperation throughout all phases of the study.

My thanks are due to : 1) Dr. Mahmoud Ahmed Ali, Director, LDA 2) Mr. Hussein Alaba, Acting Director, State Planning Commission 3) Dr. Mahmoud Ghany Mohammed, Dean, Faculty of Veterinary Science and Animall Husbandry 4) Mr. Ahmed Aboukar, Director, Milk Factory, Mogadishu 5) Dr. Yousif Ahmed Harary. Acting Director, NRA ; for their help and constructive discussions

My thanks are due to all members of the team and their Somali counterparts for their remarkable efforts which greatly led to the prefection of this study.

Dr. Abdel Kader R. Abou Akkada
Team Leader

CONTENTS

ABSTRACT

1. Most of Somalia's land areas is suitable only for extensive livestock production and the majority of the people are traditional pastroralists. Those pastoralists constitute two-thirds of the population and have long experience in handling livestock under the conditions of Somalia. Livestock and livestock products are the major components of Somalia exports whose share is around two-thirds of total exports ; thus the livestock sector plays a major role in the national economy of Somalia .

2. The livestock sector is handled by a number of administrative organisations. The Ministry of livestock, Forestry and Range is responsible almost for all relevant activities. However, livestock processing falls within the Ministry of Industry. Hides and Skins agencies operate within the Ministry of Commerce. The development of fodder crops is the responsibility of Ministry of Agriculture. Range management is now handled by the National Range Agency (NRA) which is an autonomous agency to design and implement national range development strategy. Livestock Development Agency (LDA) directly collaborates with the Ministry of livestock, Forestry and Range (MLFR) and is responsible for all marketing operations of livestock. It is proposed that MLFR should be qualified to function as the overall coordinator of all agencies and Departments operating in the livestock sectors. Programmes should be set up for strengthening the professional staff in the technical departments of MLFR.

3. The national herd of Somalia consists of 3,764,078 ; 9,438,068 ; 15,294,215 and 5,298, 149 heads of cattle, sheep, goats and camels respectively. The distribution of these numbers depends on the climatic conditions. The wetter south has the bulk of cattle and the dry central regions together with the north accommodate the majority of sheep and goats. It has been always thaught that the annual offtake of the cattle is 9-10% ; sheep and goats 30% and camels 5%. Right planning and development

strategy can greatly increase the annual offtake. Two of the most profitable areas for development are improvement of the rangelands and the efficient utilization of the immense amounts of roughage and other by-products available in Somalia.

4. Somalia possesses great potentials for meat production. Meat production is based mainly on extensive system of grazing Few feedlot projects are now being established. Fattening operations should be encouraged as a mean of improving the quality and quantity of the beef of Somalia. In the south where the water resources are reasonable and there is good prospects of irrigated farms, cattle fattening projects based on irrigated fodder production supplemented with the agricultural by-products, will be the most feasible strategy for meat production Somalia.

5. Meat industry is in a critical situation as meat factories and slaughter houses are not operating at its full capacity. The slaughter by-products are not fully utilized. Development of meat industry can be achieved by establishing modern slaughter houses in which the by-products are fully used. A modern slaughter house in Mogadishu can help in accommodating the large numbers of animals slaughtered in this area. The slaughter house could be oriented to training technicians for other areas. The strategy of production of Kismayo meat factory should be altered to suit the consumer in Arab Gulf countries. A plan for modernising the factory should be given the highest consideration in order to achieve economic production. The present study included a detailed proposal for the establishment of a national meat board to be responsible for all matters concerning the production and processing of meat in Somalia.

6. The majority of cattle in Somalia are managed within fully nomadic or semi-nomadic systems. Management in the economic, or technical sense is not practiced. Technical data on the Somali cattle population by breed, age-sex structure, rate of survival, reproduction and production have been collected and are included in the present study. An integrated plan for the improvement of

milk production of Somali cattle has been also outlined. It is suggested that a net-work of milk collecting units should be established. In irrigated land intensive milk production should be encouraged.

7. Rangeland as a source of animal feeds in Somalia has been discussed in the present report. Particular emphasis has been placed on the present range conditions, Rangeland problems and current range rehabilitation programmes. Detailed programmes for the maximal utilization for the agro-industrial by-products as animals feeds have been also outlined.

8. Intensive care of animal health and establishment of a number of projects for the development and rehabilitation of veterinary services, are obvious in Somalia. However, the veterinary services lack the trained experienced professional staff, adequate transport and communication systems, veterinary extension service, sufficient drugs and spraying facilities, and sufficient control and quarantine measures. The present study has therefore included and comprehensive programmes for the effective health services in Somalia .

9. It appears that the implementation rate of the existing projects of livestock production is not as it was hoped. It has been recognised that the critical constraint of development projects is the shortage of skilled manpower. Crash training programmes of all aspects of livestock production have been catered for in the present report. Proposals for orienting the existing governmental farms and projects towards extension and research activities have been also outlined in the present study.

10. The traditional livestock marketing system in Somalia is well established and involves a complex pattern of collection, transportation and distribution functions. The present report has dealt with the description and analysis of the existing livestock marketing in Somalia. Short and long term plans for the improvement of the performance of livestock marketing, have been laid

out in this report. The short-term plans included the proposal for the establishment of large numbers of improved markets, development of infrastructures and rural roads, provision of adequate transport such as two livestock carriers and re-organisation of the livestock development Agency. The establishment of pastoral cooperatives is an appropriate form of long term plans for improving marketing conditions in Somalia.

PART I : INTRODUCTION

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The livestock industry provides approximately 70-75% of the Somalia's exports in the form of live animals, meat products and hides and skins. Livestock is probably the most readily exploitable economic resource in the country. Its potential as a factor of production should therefore, be given a higher priority in the development strategy. However, previous and present development programmes laid a great deal of emphasis on animal health aspects and individual self-contained projects. Generally, livestock development efforts in Somalia are becoming increasingly constrained by the lack of survey planning data and management data. They did not come to grip with the real key of the problem namely investigations into better and integrated systems of livestock breeding, nutrition and management together with forage production and rangeland management which are crucial for the optimum improvement to the industry as a whole. This integrated approach would maximise both foreign earnings and benefit the large livestock owning population. The object of the present study was therefore, to examine the immediate problems which concern the entire livestock sector and to draw up plans for the development of the livestock industry. Detailed description of prevailing conditions of livestock husbandry practices, institution, research and training have been included in this study. Programme co-ordination with overlapping ministries such as livestock, Range and Forestry, Agriculture, Commerce, Industry and Town municipalities, is also discussed.

The present study has been carried out at the request of the Government of Democratic Republic of Somalia and under the Arab Organisation for Agricultural Development (AOAD). 1978 programmes. A seven-experts-team was thus recruited by AOAD in consultation with the Government of Somalia. The experts assigned to the study covered the disciplines of livestock feeds and feeding, dairy cattle, breeding, meat production and processing, animal health,

range management, agricultural engineering and economics. The study was carried out in July and August 1978 in full cooperation with seven Somali counterparts from the Ministry of livestock, Range and Forestry, Mogadishu. It is sincerely hoped that the implementation of the plans drawn up in this study, will lead to a rapid and successful development of livestock sector.

PART II : SALIENT FEATURES OF LIVESTOCK SECTOR

(1) Background

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(1) BACKGROUND

1.1. Climatic Conditions :-

Somalia has a total land area of about 637,000 km2. The country is bounded by Kenya in the South and South West, Ethiopia in the West and Djibouti in the North-West. The southern Region of Somalia is influenced by the two major rivers. The Shebelli and the Juba, both rising in catchment areas within Ethiopia.

The climatic zones are identified in Somalia, as follows :

a) A sub-desert and desert zone in the coastal parts of the area known as the Horn of Africa.

b) An arid wooded savana zone which covers the majority of the country.

c) A mild sub-arid wooded savana which covers only small areas of the Northern mountain ranges.

There are two distinct seasons for rainfall in Somalia. The seasons of more reliable rainfall extends through April, May and June and is referred to locally as the "GU". The second seasons extends through October, November and early December and is known locally as the Der". Light showers can be expected along a narrow coastal belt in the Hagai season from June through August. Average annual rainfall shows wide variation over the country from less than 50 mm in the true desert zone to more than 600 mm in parts of the inter-river areas.

There are variation in the temperature in Somalia. Temperature in the sub-desert and desert zone reach critical levels over the period June, July and August when average temperature exceed 35C. In the arid wooded savana zone the mean monthly temperature rage is relatively narrow with a minimum of 24-25 C in July and a maximum of 28-29 C in March and April. Temperatures are

somewhat lower in the coastal areas and Southern Somalia has a slightly higher temperature. In the mild sub-arid zone of the Northern Mountain ranges, the mean monthly temperatures range from a low of 18 C in January to 24 C in May.

In general, relative humidities decline with increasing distance from the sea. In Mogadishu, the relative humidity ranges from 70-75%. Annual evaporation exceeds average annual rainfall by significant amounts, in all parts of Somalia and soil moisture deficits are bound to occur for mush of the year. All vegetative growing is consequently of a very seasonal nature. The length of the growing season and the severity of the yearly deficit are the major factors influencing the productivity of the natural rangelands. The high evaporation rates have also an important bearing on the availability of drinking water for the livestock.

1.2. GENERAL ECONOMIC BACKGROUND

1.2.1. Gross National Product and Income per Capita

Although there is no official data on national economic accounts to help in appraising the developments of economic performance at the aggregate level, there exist some very broad estimates for some of these measures. One of those estimates put the Somali gross national product at about U.S. $ 200 Million in 1971. This estimate gives per capita income of about U.S.$ 70.(1) It has also been estimated that between 1960 - 1970, the per capita income remained static, or even declined slightly.

Based on the available data and informed guesses, UNCTAD secrtariat has recently published some figures in this respect. These estimates indicate that the growth of per capita real product has shown considerable improvement in recent years (1970 - 1974) as compared to the position in the decade 1960-1970, when a negative

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(1) IBRD, Appraisal of the Trans-Juba Livestock Project, 1974, P. 2

real per capita growth rate was recorded , as can be seen from the following table :-

Table 1.1.

Annual average Growth Rates of total and per capita real gross Domestic Product at Market Price

	1960-1970	1970-1974
Total real product	1.7	5.4
per capita real product	- 0.4	3.2

Source :- UNCTAD Secrtariat, UNCTAD IV, Least developed among developing counteries, statistical annex, Report No. TD/191/Supp.1. 26 March 1976.

Around 80% of Somali gross national product is in the form of traded production, while the remaining 20% is in the form of traditional agriculture. At the same time, the industrial sector accounts for around 16% to 24% of the total gross national product, while the modern agricultural sector represents one quarter of the total.(1) It should be noted, however that these income measures are of little significance in an economy where traditional, non-monetized, sector co-exist with the modern sectors.

The composition of GDP by major groups of economic activities during 1960-1973 has been as follows :-

(1) TECHNITAL S.P.S. Juba River Valley Development Study 1976. Vol. 1. P. 15.

Table (1.2) Gross Domestic Product by Major Activities

In constant Prices

1960 - 1974

Year	GDP at 1970 at factor prices	Agric-ulture	Industrial activity		Construc-tion	Transport, commerce & others
	US$ m	%	%	%	%	%
1960	182	45	12	(4)	5	38
1970	215.4	38	14	(7)	5	43
1973	254.4	32	15	(9)	5	48

Source : UNCTAD Secrtariat, op, cit.

As for more recent developments, the latest annual report (1976) of the Central Bank of Somalia shows that, based on the available economic indicators, 1976 was another difficult year (in addition to the drought years of 1974 & 1975) for Somalia's economy(1). Further production declines were recorded in that year for both agriculture and industry. This does not mean however that all the economic sectors faired badly, since investment activities were brisk in that year, and employment has shown an increase, especially in the public sector.

1.2.2. EMPLOYMENT AND WAGES

Here, tod, the lack of consistent and reliable data on the distribution of employment between regions and between economic

(1) Central Bank of Somalia, Annual report and of accounts, 1976 P. 6.

sectors makes the analysis of the employment situation in Somalia very difficult and Incomplete. Available evidence shows that moderate employment gains were achieved during the period 1971 and 1975[1]. These gains, however, were not enough since it absorbed only a little more than a half of the natural increase in the non-agricultural labor force. And while information with regard to employment in the private sector agriculture is not available, the natural increase in the labor force of the nomadic and semi-nomadic sector (which accounts of about 65% of the labor force in the economy was absorbed in the form of disguised under-employment and not so much of open unemployment.

By 1975, the employment situation in urban centres had deteriorated for two main reasons. The first was the substantial migration of rural population to the urban centres, particularly Mogadishu and Hargeisa, as a result of the 1974 and 1975 drought. The second reason was due to the growing disparities between urban and rural wage levels.

The Government has taken several steps to tackle the problem of open unemployment. Apart from the considerable planned outlay f for the development of agriculture, industry, and other sectors, which will obviously generate additional employment, some other special measures incude the agricultural Crash program of 1973, which was and is intended to transfer the unemployed people away from towns to rural areas and train them in agriculture and related fields so that they coult settle as farmers of as skilled works. In addition the settlement schemes launched in 1975 to settle some of the nomads, who were made destitute due to the drought in 1974-1975 into the agriculture and fisheries sectors.

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(1) International labor office, economic Transformation in a socialist framework, An employment and basic needs Development strategy for Somalia, Addis Ababa, Nov. 1976 P. 10 hereafter JASPA Report*.

These resettlement projects, whilst not actually creating employment opportunities, they do contribute to the overall employment situation in that by placing the drought affected people in settlements, an explosion in unemployment is prevented. Last of all, the problem of educated unemployed has been tackled by guaranteeings jobs in the public sector to all university, secondary schools, and technical institute graduates.

The problem of providing productive employment opportunities in the future will, however, require a much greater attention for several reasons. Firstly, there will be the natural rate of growth of the population, and the resultant increase in the labor force. Secondly, there is the limited possibility of absorption of manpower in the modern sector. Last of all, enormous resources will be needed to absorb an increasing number into agriculture and fisheries, if the policy of the government is to avoid rapid population growth in the pastoral sector. The magnitude of the task will be obvious from the following table :-

Table (1.3) The possible absorption by sector of Somalia's Additional population 1979 - 1983

Sector	Assumed (a) proportion of total population %	Assumed (b) annual growth rate	Assumed (c) 1978 population in 000	Population increase in 1979-83 without reallocation in 000	Population increase in 1973-1983 after reallocation in000
(1)	(1)	(3)	(4)	(5)	(6)
Nomad & Semi nomad	65	1.7	2,388	210	-
Agriculture	15	2.2	559	64	244
Fisheries	1	2.2	37	4	34
Urban industry & services	19	4.9	765	207	207
TOTAL	100	2.4	3,749	485	485

NOTES :-

a) This proportion refers to 1976, See JASPA Report op, cit, p.19

b) These growth rates are based on various pilot census surveys conducted by the Government of Somalia.

c) These figures were obtained by applying the annual growth rate in column 3 to Somalia's obtained in the census of 1975.

d) We assumed that the increase in the nomadic population (210 thousands in the coming 5 years) will be reallocated as follows, 180 in agriculture and 30 in fisheries.

The implication of the above table is that, on the average agriculture has to support annually 49,000 additional people, and fisheries has to support annually 7,000 additional people, if the additional nomadic population is to be absorved elsewhere. In addition to this 41,000 additional people will have to be absorbed annually in the urban sector. This represents a great challenge, and the ultimate solution lies only in as rapid a development of the agricultural and fisheries sectors as possible, together with the rapid development in the pastoral sector, for the scope of absorption of a large number of people in the industrial sector is rather limited.

It should be noted, however, that the problems of unemployment refered to above, are confined mainly to the unskilled, with skilled workers, particularly those in the administration and professional classes in short supply. Projects currently being developed are facing difficulties in procuring their required manpower of skilled workers and it appears that the trained manpower will still remain the most important constraint to development.

As for wages and salary levels these have been relatively stable for the period Dec. 1973 up to May 1977. In Dec. 1973, the Government granted wage and salary increases that ranged between 5% & 10% for public servants and workers employed in the

public sector. At the same time, the Government urged the private sector to make comparable adjustments. The Government granted another increase in wages and salary in May 1977 that ranged between 10% and 25%.

It is to be noted that there exists some differential between rural and urban wages, where the former is substantially lower than the latter. This differential can be manipulated, in appraising sectoral planning decisions or in making project investment decisions, to reflect the Country's endowments of natural resources, or to shift investment to less productive regions in order to alleviate regional inequalities, or to effect rural development. This type of wage rate is usually called the shadow wage rate, because it reflects the net social marginal product of the worker to the country as a whole , and which may be different from the market wage rate. To the extent that development funds are transferable between sectors and regions, these differential shadow wage rates between urban and rural areas should help raise rural incomes relative to urban incomes.

1.2.3. Domestic Consumption and Nutrition :-

In Aug. 1977, the Central statistical Department of the State Planning Commission published the results of the Multipurpose Household Pilot Survey, the first of which occured in Nov. 1975, and the second in June-July 1976. The results of the second round of this survey reveals that 46% of the households surveyed spent less than So. Sh. 50 per week, 20% spent between So. Sh. 50 and 100 per week, while the rest of the sample (33.8%) met a weekly expenditure of So.Sh. 100 and more (1).

The results of this survey reveals also that about 66.2% of the expenditure of each household was spent on food, 13% on clothing and footwear, 2.8% on fuel and light, and the rest (18%) on miscellaneous items.

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(1) Central Statistical Department, State Planning Commission. Aug. 1977. p.p. 8-9

In addition to this pilot survey, another one was conducted in the Bondre district of Mogadishu in 1976 to update the composition of the basket as well as the weights used for the construction of Mogadishu price index(1).

These surveys were conducted in preparation for the multipurpose household survey to be carried out in the Country at the National level. Detailed analysis of consumption patterns as well as accurate projection of domestic and imported consumers foods are not possible, however, without this national survey.

As regard to food consumption, the limited available survey evidence(2) indicates that although national consumption average appear adequate, there are relatively severe dietary problems and nutritional deficiences occur is a result of the considerable distributional inequalities in consumption levels, in addition to the large seasonal fulctuation coinciding with the seasons of drought and grain shortages occuring periodically.

In view of such periodic dietary deficiencies and grain shortages, one can deduce that livestock development should occur only in those areas where available soil and water resources can not be viably used for food production. This set of priorities is necessary in the short run in order to economise the use of the scarce irrigation water resources. In the long run, however, there may be no such restriction on the development of livestock due to the possibility of introducing a fodder crop into the rotation system, a programme for the utilization of the agro-industrial by-products now available, or due to the improvements in marketing which could allow for an increase in the exports of livestocks to pay for the required imports of cereals.

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(1) Central Statistical Department, State Planning Commission, Multi-purpose Household Pilot Survey, Bondre District, Dec. 1976

(2) FAO Manual on food and Nutrition policy Nutritional studies No. 22 Rome 1969.

1.2.4. AGRICULTURE

Although most of Somalia is classified as arid or semi-arid, there are large areas of potentially productive land suitable for agriculture or livestock development. Of some 2 million hectares considered suitable for cultivation, only about 720,000 hectares are now being cultivated. The following table gives the estimated potential, and the estimated present utilization.

Table (1.4) : Estimated potential and present land use

Estimated Potential	Million Hectar	% of Total
Suitable for cultivation	8.0	12.5
Suitable for stock production	35.0	54.9
Other areas	20.8	32.6
Total Land Area	63.8	100.0
Estimated Present Utilization :		
Dry land farming	.583	1.0
Occasional irrigation	.087	.14
Controlled irrigation	.050	.08
Under indigenous forests and bush	8.8	13.8
	9.520	15.02

Source : Somalia Statistical Abstract, and Ministry of Agriculture.

These estimates, however, must be taken with caution as no indication is given of the type of crop or technology envisaged ; no estimate is available of the likely capital or recurrent cost ; and no analysis has been made of potential markets. Further, most of the unused but potentially cultivable land will almost certainly be inferior to that at present under cultivation. Finally it seems

highly probable that substantial area of the land identified as suitable for cultivation already form part of an integrated migratory livestock system which would collapse if access rights were withdrawn.

On the other hand, estimates of actual crop production are more firmly based than those of area. Irrigated crops in Somalia include banana (the second most important export item and the only export crop of significance), sugar cane (the most important commercial crop grown for domestic consumption), cotton and oilseeds (sesame and groundnuts). Dryland crops include maize, millets and sorghum. These most important staples in the Country are predominantely subsistence crops and any small surpluses are sold on local markets. The production of such crops has sharply declined in the 1976-1977, by 22% relative to the previous crop year.(1)

As a result of this, the Agricultural Development Corporation was forced to import 544.000 guintals of maize in 1976, which is contrary to the agricultural policy of Somalia.

The importance of agricultural development in the near future can be seen from the fact that settled agriculture provides a source of livelhood to about 15-20 per cent of the population, and in the next five years (1979-1983) it may be called upon to absorb more than half of the increase in population, or 49.000 additional people annually. Somali measures to absorb this huge influx into agriculture and to feed the extra people depend on raising self sufficiency on the domestic market for foodstuffs and for raw materials such as cotton, and on capturing foreign markets in the long run for potential exportable surpluses which could within limits, take the form of sugar, cotton, grape fruits, bananas, rice or maize.

In addition to the previous required measures, it is also important to create a productive base for agro-industry an

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(1) Central Bank of Somalia, Annual Report, 1976 p. 11.

Another sign of the inadequate attention given to the livestock sector is with regard to credit : it received less than 5% of the available credit up to 1975, and its share increased in 1976 to only 8% of total available credit.(1)

It should be noted that the great boom in livestock marketing from the 1950's to the 1970's did not represent a sustained growth in the productivity of the sector, which is the real measure of development, even though it has led to a partial monetisation of the traditional subsistence economy, and to growth in consumption of modern sector goods. This short coming is the result of the recent changes that contributed to the underdevelopment of the livestock sector and to the state of crisis in which it now is. Thus the boom in marketing was not more than a windfull gain to traders and to the state in response to new marketing opportunities abroad.

Among the main factors responsible for recent changes and developments one can mention the inability of the nomads to invest their profits in the production machinary other than by building wells, for the lack of an institutional framework within which they could make investments in the range or in the land and reap its returns solely.

Another factor is the overgrazing and range deterioration which has been going on for a long time, and which occured as a result of several reasons such as the proliferation of unplanned water supplies which led to an increase in unplanned a settlements and thus to permanent grazing pressure around them. This ecological imbalance was heightened by the success of veterinary care which led to the increase in the breeding stock and a consequent increase in grazing pressure. The change in the composition of herds, away from camels and goats towards cattle and sheep, under the influence of greatly increased market opportunities for the latter type has also led to range deterioration since the latter types are principally

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(1) Central Bank of Somalia, Annual report 1976 P. 50-52
*2. JASPA Report PP. 76-83.

grazing animals and are liable to cause more environmental damage than the former types. The shifting of some of the best grazing areas to agriculture has also led to range deterioration. This is due to the fact that such areas were normally usee only in the dry seasons, and was thus the key to the use of a much wider area of less good grazing during the rest of the year. Thus shifting has led in fact to put out of use a much larger area of range land.

A third factor that can be mentioned in this context is the increased partial settlement into agriculture, which has usually been accompanied by a more sedentary form of pastoralism based on cattle. Such settlement usually increases the risk to the pastoralist/farmer who thereby loses the mobility which is his first line of defense against variable and uncertain rainfall, and the certainly of periodic drought.

This review of the role of the livestock sector in the Somali economy and the problems it now facrs, shows clearly the urgent need to give it a more concerted and planned attention. Rational development of the sector requires drawing plans for the development of its various components and other related activities, and making the organizational changes required for the implementation of such plans, and above all, securing the various resources, especially skilled labor and financial resources, required to achieve such tasks. In the next section, the various aspects of the livestock sector will be reviewed and discussed. These aspects include the national herd, the administrative structure of the sector, major outputs, and required inputs. It also includes existing animal health services, training, education and research ; and livestock marketing The third part of this study will be concerned with outlining and discussing some proposed plans for the development of the livestock sector in the fields of meat production and processing, dairy production, feed and rangeland, animal health services, training, research, and marketing.

(2) PRESENT SITUATION OF LIVESTOCK SECTOR

(2) PRESENT SITUATION OF LIVESTOCK SECTOR

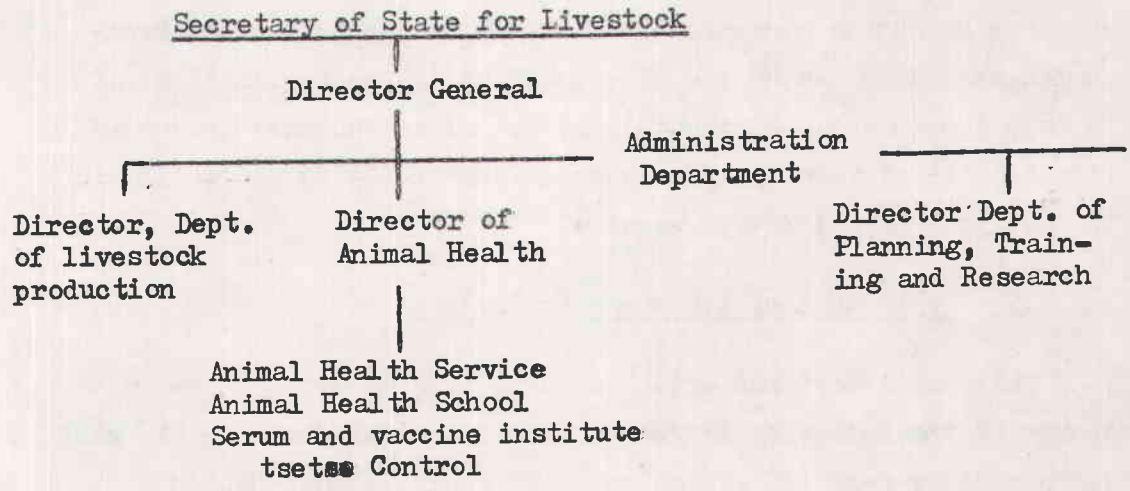
2.1. Administrative Structure

The livestock sector in Somalia is handled by a number of administrative organisations. The Ministry of Livestock, Forestry and range is reponsible almost for all relevant activities and now functions as the overall coordinator of the sector. However, the livestock processing falls within the Ministry of industry. Hides and skins agencies operate within the ministry of commerce. The development of fodder crops is the responsibility of ministry of agriculture. This chapter is mainly concerned with those agencies and sectors that are connected directly with the livestock industry and operate in coordination with the ministry of livestock. Forestry and range.

2.1.1. Ministry of Livestock, Forestry and Range

This ministry was formed in 1960 to give greater emphasis to livestock development and the launch programmes, aiming to the promotion of livestock industry. The ministry is comprised of four divisions, each with a director (fig. 2.1). The technical divisions are :- (1) Department of animal Health (2) Department of livestock production (3) Department of planning, training and Research.

Fig. (2.1) Ministry of Livestock, Forestry and Range



2.1.1.1. Department of Animal Health

In Somalia, the emphasis has been on animal health. The Animal Health Department is therefore, the largest sector of the Ministry and is responsible for the greater part of its activities. The Department is involved in the organisation and administration of animal health and disease control measures. The department operates the production and distribution of drugns for use by veterinary services. Through serum and vaccine institute and other laboratories the department is conducting diagnosis and investigations of diseases of livestock. The Department is also supervising the Animal Health School which organises the training of staff in animal health.

There are now approximately 18 professionally qualified Somali veterinains employed in Department of Animal Health and are involved mainly in :-

1) Ministry administration
2) Teaching in faculty of veterinary science and Animal Science school.
3) Vaccine and serum Institute
4) Meat inspection
5) Field service.

In a country consisting of 16 Regions and 72 districts, the staffing situation at professional level, is not adequate. Programmes should be set up for strengthening the professional staff in this department. Fortunately 27 veterinarious have graduated from faculty of veterinary science this year (1978) and will join the national animal health service.

2.1.1.2. Department of Livestock Production

This Department was established in 1974 in order to be in charge of the following livestock development projects :- (1) 21st October dairy farm (2) Warmahun Dairy Ranch (3) Ged Deblah

experimental farm (4) By-products feed lot pilot scheme (5) poultry breeding unit, Mogadishu (6) Aburii poultry farm (7) Artifical Insimination center at afgoi (8) Feedlot at Balad (a) scheme for mechanised harvesting of crop residues on commercial irrigated farms. Most of these development projects were handed over from livestock Development Agency (LDA).

Although, this department is responsible for a number of viable livestock projects, it is suffering badly from the lack of experienced and well trained staff. There are now seven (7) professionally qualified Somali experts. This staffing is very inadequate in the light of the important activities carried out in this department. No attempts have yet been made for the establishment of research and investigation into Animal management and nutrition which would be the basis for all livestock production work. Facilities for practical training in various aspects of livestock production is virtually non existent. Only recently the animal production training has become a part of the programme of the veterinary faculty and the animal health school. Even these programmes need to be strengthened by the provision of more experienced staff and equipments.

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2.1.1.3. Department of Planning, Training and Research

This department was established in 1971 with the objectives of the preparation and supervision of all livestock development planning in the Ministry of livestock. The department is therefore responsible for project identificant and analysis. Data collection, analysis of statistics and overall coordination of development progress are operated in this department. Training, extension and research activities are also important function of the Department. However, little or no research programmes have been persued in this department. Lack of research facilities and qualified research workers are the main reasons for the absence of research programmes in Department of Planning, Training and Research. Training in the fields of animal health, production and laboratory

technicians is carried out in the Animal Science School which now belong to department of Planning, Training and Research. There is a great need to support this standard of training. The Department is run by the director and only 6 qualified Somali staff. This diversity of activities conducted in the Department requires a greater number of professional staff. To fill more technical teaching and research appointments within the service, it will be necessary to continue sending staff overseas for further studies. The extension activities of the department should also be strengthened through injecting extension programmes in the corriculum of the graduates from the Animal Science school who could be the basis of the field extension service of the Ministry of Livestock.

2.1.2. Livestock Development Agency (LDA)

This agency directly collaborates with the Ministry of Livestock and is responsible for all the marketing operations. The main objectivities of LDA are :-

(1) Rational Development of Animal production for meeting the growing local demand for meat and meat products and increasing the export of meat, frozen, chilled and canned.

(2) Consolidation of the traditional marketings for livestock and livestock products as well as development of new markets.

(3) Improve the rate of offtake from the national herd both for export and local consumption.

(4) Develop facilities for finishing and fattening cattle for more carcass weight and better quality meat.

(5) Rationalizes the marketing system and explores ways and means of increasing the returns from export of livestock and livestock products.

Since 1960 the agency, has been trying to orient the export

of live animals, fix the minimum price for live weight per kg, determine the minimum export price provide assistance required for improving the annual offtake of the national herd. LDA's main activities are the marketing of cattle in the south and the sheep in the Northern regions. LDA possesses the rights of monopoly on the export of cattle and the supply of cattle to Kismayo meat factory, in Lower Juba region. Recently the Ministry of Livestock has granted LDA the monopoly in all cattle trade both in public and private sectors. Consequently LDA has already started a vigorous drive in purchasing cattle and several markets are being established all over the regions. (1)

Together with the Marketing activities, LDA are concerned with the improvement and development of livestock. The agency is supervising the Trans-Juba livestock project, which provides improved marketing systems for the purchase of livestock from nomadic pastoralists and established cattle fattening operation to supply Kismayo meat Factory with the live animals. The project also furnishes the Southern region with the technical service, grazing ranches, disease control programmes, a holding ground and the development of water supply.

LDA is also involved in other livestock development projects such as the cold storage plant and abatoir at Hargeisa, holding ground at Galcaday and Arror, (Northern region) and the EEC supported holding ground at Jelib. However, at this stage the LDA needs more encouragement and financial support in order to carry out all activities concerning the livestock trade. Funds are required for improving the working capital of the agency. Skilled manpower is needed to develop the technical staffing of LDA.

2.1.3. National Range Agency (NRA)

The National Range Agency (NRA) was established by law No. 32

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(1) Annual Report of livestock development agency (LDA), Mogadishu 1978*.

of August 16, 1976, as an autonomous Agency to design and implement a national Range Development Strategy. Formerly a department within the ministry of Livestock, Forestry and Range, NRA is now authorised to :-

1) Plan national range development
2) Establish grazing and drought reserves.
3) Promote techniques of fodder production
4) Carry out planned stock water development
5) Promote organisation for guiding and educating livestock owners.
6) Map the rangeland and classify rangeland areas.

RNA emergence as an outonomous body resulted from a crisis due to increasing long term pressure on Somalia grazing resources. Rising livestock population, coupled with inadequate water distribution and the deterioration of Somalia 28-35 million hectares of grazing land, have created a need for a rational strategy for the development of range. RNA's general manager carries out the development strategy through 15 regional offices. RNA is divided into four functional departments, each headed by a Director.

1) Research, training and extension Department
2) Range and Environment Department
3) Forestry Department
4) General Administration

RNA is now involved in the management of the Kuwait - supported project, namely the Northern Rangelands Development project. The project with a total funding of So. Sh. 133 millions, encourages a comprehensive range development program for Northern Regions of Somalia. The project, through RNA, would set up :- (1) Three grazing reserves of about 1,000 km2 (2) Two drought reserves of 2.000 km2 each (3) 20 fodder production units (4) Stock water development (5) Formal and non formal education (6) Expansion of veterinary service in Tugdeer, Sanaag and Nugaal Regions.

RNA is also seeking fund for the implementation of the Central Rangelands Development project identified by the World Bank in 1977. The project area comprises three administrative regions of Mudug, Galgudud and Hiraan which together total 149.000 km2 in area. This project, if implemented, would improve rangeland production and overcome the problems of grazing, management in the project area. Total project cost is estimated at So.Sh. 167 million (US.$ 26.6 Million). It is hoped that RNA succeeds in securing these funds, thus benefits most of the 490.000 people dependent on livestock in the area of the proposed projects.

2.2. National Herd of Somalia

A recent census of the numbers of Animals in Somalia has been conducted in 1975. Although the results have not been fully processed, the population of livestock by regions was made available through the assistance of state planning commission (Table 2.1). It is noted that the numbers of the census are greater than those previously reported (1,2). It is generally believed that because of the construction of reservoirs and watering points and improved animal health control, the numbers of animals are substantially increasing. It is notewortly to indicate that the numbers of the recent census have been derived from the actual counting of animals coming at the waterpoints.

It is also believed that the size of the national herd in Somalia depends greatly on the changes in the rainfall which are reflected on the conditions of grazing on the ranges which are practically the only source of survival of Somalia's livestock population.. Severe drought cause drastic drop in the size of the national herd.

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1. International Bank for Reconstruction and Development (IBRD) 1975 Somalia Recent Economic Development and Current Prospects. Report No. 702 - 50.
2. Hunting & Gunn. (1976). Livestock Sector, review and project identification. Democratic Republic of Somalia.

Data about the distribution of the livestock population in Somalia are rough estimates and little is known about the age and sex composition of the national herd. However, the recent census has indicated that the distribution of the livestock can be illustrated as shown in Table 2.1. It appears that the distribution of livestock depends on the climatic condition. The wetter South has the bulk of cattle and the dry central regions together with the North accommodate the Majority of Sheep and Goats. It is therefore, suggested that the strategy adopted for the development of livestock in the South must be different from that followed, in the North. The improvement of the range mangement, the water supply and the seasonal movement of animals seem to be the most pressing need for development of livestock in the North. In the South where the water resources are reasonable and there is tremendous prospects of irrigated farms, cattle fattening projects based on irrigated fodder production supplemented with the agricultural by-products, will be the most feasible strategy for the development and increasing the value of cattle in lower Juba area.

Due to the nomadic nature of the population, there is no accurate estimate of the annual offtake of the livestock in Somalia. The picture is further complicated because the movement of livestock to and from neighbouring countries is usually unrecorded. Often livestock originating in one country is marketed in another one (Kenya or Ethiopia). Because of the price differences of the animals in these countries. However, it has always been thought that the annual offtake of the cattle is 9-10%, sheep and goats 30% and camels 5%. Reports of IBRD (1975) indicated an annual offtake of 7-10% for cattle and 30-35% for sheep and goats. The offtake estimates of Hunting & Gunn (1976) were 5-8% for cattle and 16-20% for sheep and goats. However, these last estimates seem to be pessimestic and are based on inaccurate figures of slaughtering both for meat factories and municipal abatoirs. The annual offtake of the national herd may be influenced by weather and grazing conditions. A record of the highest offtake was noted in 1972 then

Table (2.1) : The Distribution of Livestock in Somalia

Animals	NORTH		CENTER		SOUTH		Total
	Numbers	%	Numbers	%	Numbers	%	Numbers
Cattle	290,463	7.80	1,115,603	29.98	2,340,012	62.22	3,746,078
Sheep	6,291,650	65.64	2,341,709	24.83	804,727	9.53	9,438,086
Goats	7,348,039	48.11	6,377,039	41.75	1,548,324	10.14	15,568,324
Camels	1,526,818	28.82	1,844,410	34.81	1,926.921	36.37	5,298,149

Source : State Planning Commission, Mogadishu 1978.

a reduction was observed during the drought seasons in 1974, and 1975.

Although an offtake of 9-10% for cattle and 30-35% for sheep appears to be reasonable, right planning and development strategy can easily double the numbers of livestock and thus the annual offtake can be tribled. In this respect the two most profitable areas for development are improvement of the rangelands and the efficient utilization of the immense amounts of roughage and other by-products available from the irrigated and dry-land crops (see 2.7).

It is noteworthy to indicate that the advancement of the utilization of the national Herd in Somalia cannot be achieved through concentrating on one or two factors within the production operation and neglecting others. This may lead to only relatively small increasese at best and disaster at worst. Unfortunately, previous and present development programmes in Somalia have laid a great deal of emphasis on animal health aspects and individual self-contained projects. Integrated programmes drawn up through comprehension studies, will, maximise the annual offtake and therefore benefit the large livestock owing populations.

The National herd obviously (Table 2.1) consists of cattle, sheep, goats and camels. There are four main types of cattle namely :- Boran, Jiddu, Charre (Duara) and Abgel. These types are generally kept as dual purpose animals. A detailed description of cattle and systems of management in Somalia will be included in Chapter 2-4 (Dairy Production).

Sheep and Goats are run together as a single flocks. They provide a subsistence flock for the nomad families, supporting the women and young children with milk and providing a reserve of animals for sale when cash in necessary for the family. In the North both sheep and Goats whereas in the South goats rather than sheep are found in small numbers only.

The sheep in Somalia are of the black heads, fat rumped type. The average weight of full-grown female sheep is 30-35 kg while the males weight 35-40 kg. The first lambing take place at the age of 26 - 28 months. The wes generally lamb 4-8 times with 8 months between each two lambing. The lactation period is 4-5 months with a production of 50 kg milk normally consumed by the lambs.

There are two types of goats in Somalia. :- 1) Nudugh Goats (abgal and Ogaden). (2) Bimal goats (gazze and Tunni). Goats are raised with camels in areas where the grazing is better and water is scarce whereas goats are run with sheep in regions with better conditions. The liveweight of a mature goat ranges from 25 - 40 kg. Goats generally produce their first kid at an age ranging from 16-24 months. The period between each two off springs is 6 - 12 months. The lactation period is 5-6 monthswith a milk production of 70 kg, the majority of which is consumed by the young.

Camels are the most popular source of wealth form for the nomads in Somalia. There are five main types of Camels :-

1. Cangial
2. Gazze
3. Elai
4. Mudugh
5. Benadir , is true Somalia. Camel and is more numerous.

The most abundant milk supply is produced by camel herds. The surplus milk is marketed locally. Large numbers of camels are slaughtered for meat ; the price of which is equal to that of beef. The milk yield of camels ranges from 3-12 kg/day for a period of 8-10 months. The adult camel weight is from 500-600 kg and the dressing percentage ranges from 45-60%.

2.3. Meat Production and Processing

2.3 .1. Meat Production

Somalia is a livestock and meat exporting country. Cattle, Sheep, Goats and Camels are raised for meat and milk production; to meet the demand of local consumption and for export (live-animals and processed meat).

Meat production depends mainly on the indiganous livestock (2.1. and 2.4), with nomadic and semi-nomadic systems being the methods of raising livestock on pasture grazing without any feed supplementation in the country. Nomads move by rotation from one end to the other. It is estimated that on the average a nomad and his stock travels about 500 km per year, but it reachs 1000 km or more. in the drought year. Under these conditions the performance of animals is poor. It is estimated that the cattle average daily gain (ADG) is low and ranges from 0.18 - 0.25 kg. (nomadic cattle). In general livestock loses weight during the dry seasons, but it reaches the maximum weight during the rainy season. On the other-hand the meat from these animals is of low quality due to increase of connective tissues and fiber diameters. Furthermore, these animals are marketed at the age ranging from 4-5 years. Meat from these animals is of low eating quality (tenderness, flavour and juiceness).

The Government has planned many projects in addition to the existing schemes, to improve pasture, range management, feedlots and holding grounds. The livestock Development Agency (LDA) is now making serious efforts to develop facilities for fattening and finishing cattle for more carcass weight and better meat quality.

2.3.1.1. Meat Production systems

There are several existing systems of meat production in somalia :-

A) Traditional Systems, consist of nomadic and semi-nomadic system of rearing livestock, which are dominating systems all over the country (2.3.1.).

b) Ranching Systems :- are used for fattening animals to make them suitable for sale through improved feeding and health standard to reach the high market price abroad. the ranches serve as demonstration centres for improved animal husbandry practices as well as production of superior types of animal through selective breeding. This would assist in the ultimate goal of attracting the nomads to settled livestock rearing and agricultural production.

Ranches are fenced with improved plantation of high nutritive value of grass and fodders. Animals are rotated with cattle first followed by sheep (in case of rearing cattle and sheep together).

C) Feedlot Systems :- These systems aim to :-

- Produce better quality animals in regard of excess weight and improved meat quality for the exported trade and obtain premium prices.

- Relieve the rangeland of a greater number of animals and thus aid in the rangeland regeneration and livestock management. This is of a particular importance during drought periods where an efficient marketing and fattening system will syphon off surplus animals which otherwise would have died on the range through starvation.

- Continue the supply of livestock during all seasons for the meat factories and holding grounds for export.

Feedlot Practices :- Animals coming from the nomads into the fattening centres are generally in backward store conditions, poorer than is usual for a feedlot. However ; animals in this conditions have an advantage in that they will have a higher efficiency of food utilization than animals that are already

semi-finished.

Somalia Zebu cattle (Tropical type), are more efficient in utilizing roughage, but have less appetite, than temperate (European) type animals Their daily gain therefore, cannot be expected to be high. It is only when they are fed on expensive high energy rations that they are able to reach good growth rates.

The limiting factor for the success of feedlot operations in Somalia is the availability of grain importing country, besides that grain prices are too high for profitable fattening. However Somalia has big potential for grain production.

2.3.1.2. Existing Schemes for meat Production in Somalia (Ranching, feedlots and holding grounds)

a). Km 7 By-Products and feedlots projects :

The project was established during UNDP project in 1972, the object being to run trials on the use of by-products available in Somalia and to determine the growth parameters of local stock, while permitting the training of staff at the veterinary school. The feedlot was constructed entirely of locally available materials in order to keep costs low and to provide an example which can be readily emulated.

The project consists of :-

- Feed mill with a capacity of 7 ton/day
- Feed laboratory analysis
- Feedlot units

The feedlot consists of two fenced enclousers which face a feed trough, with 79 heads of cattle of Daura cattle and crossbred of Doura X Frisian cattle.

Cattle with initial weight of 200 Kg are fattened for a period of a 6 months. An average daily gain of 1040 g, 1400 g,

is obtained for Daura and crossbred respectively. These results indicate the feasibility of fattening stock on the abundant by-products that will be available when the various irrigated projects are implemented in the country,

B) Balaa'd Feedlot Project

This project is an expantion for km7 project, located 35 km North of Mugdisho and 4 km from Balad Village, It was established in 1976 with an area of 800 ha, out of this 340 ha for forage production (maize, sorghum, alfa alfa and sudan grass) and 360 ha as grazing land, aiming to fatten 15000 heads of cattle per year for export purchases.

The project consists of :-

- Administration buildings
- 4 stores for feed, equipments and workshop
- Laboratory for feed analysis and veterinary services.
- 5 cattle pens with a capacity of 100 heads of cattle per pen.
- An additional 5 cattle pens which are still under construction.

The project is expected to start operation in 1978 with 500 heads of cattle through local funds, but funds are required for the full implementation of the project.

C) Trans - Juba Livestock Development Project (1)

The project foresees the creation of :-

1. Two ranching schemes (Farms) of 80.000 ha each at full development in year three, each would provide about 10000 cattle for the feedlot.

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(1) LDA Annual Report 1978, Mogadishu.

2. One irrigated fodder farm of 1200 ha, and feedlot with a capacity of 5200 heads of cattle.

3. Construction of five permenant markets, one new holding ground and development of water supplies and staging points over 1000 km of existing stock routes.

4. A disease control programme.

5. Technical services and training.

Cattle in the project will be collected from the nomads of the area. Cattle would enter the ranch at about 210 kg liveweight and would reach some 300 kg before being transferred to the irrigated fodder farm and feedlot. After one year on the grazing ranches, the immature cattle would show substantial growth and weight gain, as well as significant quality improvement ; they would then be ready for subsequent " Finishing" in the feedlots. About 25000 cattle would be fattened annually in full production from year six. Approximately 80% of these (20000) would come from the two grazing ranches and the balance of about 5000 would be selected from local markets. It is estimated that about 2000 cattle would enter and leave the feedlot every month in lots of about 500 per week. All cattle entering the feedlot (average weight 300 kg) would be fattened over 75 days to reach a weight of 370 kg to be ready for export.

The project went through serious problems. It was recosted to 24 million dollars nearly dollar to its original cost. The project has had to be redesigned in accordance with remaining financial resources. Work has been going on since 1977, and is supposed to be completed by Dec. 1979. This project is one of the livestock Development Agency (LDA) activities.

Holding Ground (HQ) at Gelib

This holding ground which was handed to (LDA) by the end of 1976 consists of :-

1. Out of 10120 km, only (32) grazing blocks of 1 sq. km were debushed and provided with water troughs.
2. Staff accommadation at the main base camp.
3. Quarantine stations (QS) on North of the (HQ) with cattle collection pens.
   - 16(sixteen) paddocks debushed each comprising 50 ha.
   - A dipping tank, vet. laboratory, yard, watering troughs and weighing platform.
4. A debushed strip all around the (HQ) and (QS) which runs accross by a ditch of about ½ m. depth and 2m width preventing elephants entering the (HQ).

LDA is now responsible to improve the entire infrastructure of the project. This holding ground has a capacity of 3000 heads of cattle for export.

E. Immature Cattle Holding, Marketing

The 1971-1973 programme had included a project for construction of two staging points on the Burgo-Berbera road. Subsequently this project was expanded to include two holding grounds, one near Burao. The implementation of this project is spillover into the five year programme. The project area would serve the traditional range lands located in the Borama, Gabilay, Hargeisa, Burao and Buholde Districts.

The project aims at stopping the export of immatures by improving market facilities, establishing two holding grounds and producing fodder to hold, fatten and market immature and steers. The project has also a target for the construction of two staging points on the way to the Berbera port. The more important aspects of the project are :-

slaughter houses distributed all over the country. They are :-

1. Mogadisho Slaughter house (MSH) :- This is the only example of the first kind of municipal slaughter houses. MSH consists of the following :-
   - Stables for keeping animals prior to slaughtering.
   - Two seperated slaughtering halls one for sheep and goats and the other for cattle and camels.

- Establishment of two small

A 1500 ha of pasture land will be set apart. This area will supply green fodder during the favourable period of the year and also provide approximately 1300 tons of hay during the dry period of about 150 days.

Beginning from the third year of the starting of the project, it is expected that nearly 6800 heads of sheep and goats can be sold every year.

Multi Purpose Cattle Ranch - Gelib

- Room for collecting heads, hides and skins.
- Administration office.
- Trucks for transporting carcasses to the markets.

Animals are slaughtered on the floor and hanged on hooks. All the slaughtering operations are done manually by knife.

There are no cooling and meat processing facilities in the MSH. Fresh carcasses are transported to market after inspection directly. The capacity of MSH is shown in table (2-2).

Table (2.2) Capacity of the Mogadisho Slaughter house

Type of Animals	Proposed Capacity per day one shift	Present working capacity per day one shift	Percent capacity utilization %
Cattle	300	100	33
Sheep & Goats	400	200	50
Camels	70	32	46

Source :- Manager of Mogadisho Slaughter house 1978.

The slaughter house is not fully utilized. The over all utilization is about 43% from the proposed capacity table (2-2).

Edible by-products such as liver, heart, kidney, head and stomach are recovered for local consumption. Hides and skins are collected and sold by weight to hides and skin Agency.

2. Small Slaughter houses :- Over 15 slaughter houses are manually operated in each municipal township. They are very simple constructions each of which consist of :-

- Three unroofed divisions, one for slaughtering sheep and

goats, another for slaughtering cattle and camels and a third for deboning heads and cleaning edible by-products.

- Roofed area for drying hides and skins.

Animals are slaughtered on the floor, then hung on hooks for further preparation. Adequate water is not available in all these slaughter houses. Good examples for these slaughter houses are :- Hargeida and Barbera slaughter houses. The Kismayo slaughter house is much simpler.

Taxation on slaughtered Animals

Dues are collected by the municipalities for slaughtering animals. The dues in So. Sh. are :-

	Dues	Transport dues	Total dues/head
Cattle	7.0	3.0	10.5
Sheep and goats	1.5	0.5	2.0
Camels	13.0	5.5	18.5

Total Slaughtered Animals in Somalia

Animals are slaughtered in the country in two ways :-

1. Controlled slaughtered animals :- Refer to animals slaughtered in municipal slaughter houses. Table (2-3) shows the number of total animals slaughtered in these Municipal slaughter houses in the country.

Table (2-3) Total Animals slaughtered in the Municipal Slaughter houses in Somalia

Head/Year	Cattle	Sheep & Goats	Camels
1973	63834	209316	30119
1974	71847	499197	37969
1975	76208	454265	56507
1976	88170	221674	38987
1977	96497	197659	28393
TOTAL	396356	1582111	191975
Ave/Year	79271	316422	38395

Source : Animals Health Department, Ministry of Livestock, Forestry and Range 1978

Inconsistency in the [illegible]

Table (2-5) Meat Recovery at Sopral 1975-76

No.	Item	1975-76	Per head of cattle	In % of total
1.	Number of cattle slaughtered	12,580	-	-
2.	Live weight in kg.	2,302,140	183	100
	2.1 Carcass wt in kg	993,820	79	43
	2.2. Weight of items which do not form part of carcass	1,418,960	104	57
3.	Carcass cut in kg	993,820	79	100
	3.1 Debonned crude meat in kg	661,952	52.62	66.60
	3.2. By products of carcass in kg	331,868	26.38	33.40
4.	Debonned crude meat in kg	661,952	52.62	100
	4.1 Recovery after cooking			
	4.1.1. Cooked meat for canning corned beef	320,215	25,46	48.38
	4.1.2. Carne gelatine	278,115	22.10	42.00
	4.1.3. Meat Extract	16,971	1.35	2.56
	4.2 Process loss	46,651	3.71	7.06
5.	Cooked ; eat for corned beef	320,215	25.46	100
	5.1. Production of canned corned beef in kg (this includes species and fillers)	3,352,259	26.64	104.64
	5.1.1. Number of tins produced			
	- 4.75 oz. tins	401,952	32.0	
	- 7.0 oz. tins	103,296	8.0	
	- 12.0 oz. tins	773,088	62.0	
	5.2 Production of carne gelatine in kg			
	5.2.1. Number of tins produced :			
	- 300 g	591,480	47.0	
	- 200 g	467,580	37.0	
	- 100 g	715,500	57.0	
	5.3 Meat extract in kg	16,971	1.35	

Source : A sectoral study on the prospects and problems of meat production industry in Somalia (UNIDO) Nov. 1976

Table (2-6) Total Production of Kismayo Meat Plant for 1971-1977

No.	Denomination of Indices	1971	1972	1973 (1)	1974	1975	1976	1977
1	Purchasing and processing of cattle (head)	38000	35000	28000	50300	46000	41000	33525
2	Live weight of cattle (ton)	9704	12747	6908	10870	11360	9882	7526
3	Weight per head (kg)	255	242	246	216	244	242	225
4	Meat output (ton)	4076	5560	3127	4766	4923	4455	3217
5	Tinned products output including :-							
	Stewed steek (thou)	11922	16584	5733	9934	13363	10648	6636
	Corned beef (tins)	360	207	44	1695	1069	508	237
	Frozen meat (tons)	-	-	1291	-	-	-	-
6	Meat in Jellettin (tins)	-	-	-	748	-	-	28
7	Sausages (tons)	2	0.7	0.2	0.3	0.1	-	-
8	Render Food (tallow)(ton)	77	153	73	94	125	77	17
9	Hides (ton)	379	557	336	531	420	366	256
10	Meat and bone meal (ton)	74	90	45	107	139	109	60

Source : Kismayo Meat Factory 1978

(1) 1973 was the worst year of drought not to be taken as the normal production year.

The stock of canned meat is subsidised by the government to be sold in Kismayo area for local consumption. The recipe and size of the can for stew beef have been changed to suit the Somalian taste.

E. Hargeisa Slaughter House (1)

This plant was originally proposed early in 1972 after the Libyan Government had shown interest in importing frozen meat from Somalia. Proposed capacity was 400 small stock and 22 cattle per day. The project was to be operated by the LDA and involved Libya supplying its own Boeing 707 Cargo plane. The existing facilities are situated on well drained site near the old slaughter house on the new Hargeisa/Berbera road and almost seven km from the airport. Construction of a perimeter wall, an office and buildings housing the cold storage plant were completed in 1974. The best existing facility is the cold storage plant which consists of a freezing tunnel is of 20 tons capacity and has an external door and also two interior doors to the two freezing stores. The two freezing stores are of 20 tons capacity. A new refrigeration truck with 50 m^3 capacity is also in site.

2.3.2.2. Average Live-weight per head purchase and methods of Purchasing cattle for both KMS & SMM. :-

Cattle (Boran breed) are purchased from the local markets. These cattle are from the local breeds reared by nomads and semi-nomads. Cattle performance vary from region to region and year to year depending on the feed available (pasture) in the region. SMM does not have facilities for fattening cattle. Whereas KMP has a holding ground located at Afmader 100 miles from Kismayo to reserve stock. The cattle number in reserve varies from montht to month. These cattle remain in the holding ground from 1-2 months. At present reserve stock maintenance is apparently a compulsion, a business of loss. Stock is purchased at low price but the cost

(2) LDA Report for 1978.

of transportion and maintenance coverts the gain on purchase price into loss.

Cattle of KMP is about 20% heavier than the cattle of the same breed at SMM (table (2-7)). At KMP there has been a continuing downward trend in the live-weight per head of cattle.

The two meat plants operate in their respective markets of cattle supply. Whereas SMM had been free to make its purchases at any price, LDA supplied cattle to the KMP. The same policy continued in the 1974. However further problems occured in late 1975 when KMP started buying its cattle requirements directly from the market. In 1975 KMP was made a subsidiary of LDA.

Purchase price comparison of live-weight cattle per kg for both plants are shown in the following data :

Year	Kismayo (1) So.Sh./Kg of liveweight	in % of 1972 price	Sopral (1) So.Sh./kg of liveweight	In % of 1972 price
1972	0.92	100	0.89	100
1973	1.62	174	1.50	166
1974	2.31	251	1.69	171
1975	2.31	251	1.71	181

From the above mentioned data, KMP has been buying cattle for more prices compaired with SMP. This reveals that the difference in price may be on account of the quality of cattle found in the 2 regions in which the plants are located KMP paid a higher price than the LDA for the cattle by 3.3% in 1972 and by 8% in 1973. But the difference in the purchase price shot up when the purchase was taken over by LDA. Apparently the margin started closing in 1975 because in that year purchase was reverted to the plant. On the other hand LDA could exercise this power in a way to ensure that both factories get their supplies at a rate equitable if not equal.

Source : A sectoral study on the prospects and problems of meat production industry in Somalia, UNDP 1976.

Table (2-7) Average live-weight per head of cattle slaughtered for meat production in the 2 plants

Years	Kismayo Ave. liveweight per head		Sopral	
	kg.	In % of 1969	Kg.	In % of 1971
1969	290	100	-	-
1970	273	94	-	-
1971	253	88	184	100
1972	244	83	198	108
1973	246	85	231	126
1974	216	75	187	101
1975	244	84	183	100
1976	242	83	183	100
1977	225	77	-	-

Source : Meat Plants.

2.3.2.3. Processing By-products of the Slaughtered Animals :-

Animals such as sheep, goats, cattle and camels are slaughtered to yield the following :-

- Carcasses
- By-products of two kinds.
-

1. Edible by-products :- Such as, liver, heart, jaw meat , brain, tongue, mesanteric fat, casing, kidney and stomach.

Edible by-products are sold in the local market for local consumption. Demand on these kinds of by-products has been growing after the increase in meat prices.

2. Inedible by-products :- Such as, head skulls, horns, hoofs, legs and feet blood, diaphragm, cattle, lungs, trachea, udder and reproductive organs and glands. Inedible by-products are for processing of blood, meat and bone meal etc. (hides & skins will be discussed under hides and skins).

The most significant point in availability is that the greatest bulk of by-products is produced at nearly some 15 municipal slaughter houses or at various nomad and semi-nomad slaughtering sites. Tables (1) (2-8) and (2-9) point out the availability of all the raw by-products produced in the country. These by-products are mostly consumed locally and the other portion are not recovered.

Tables (2-10), (2-11) and (2-12) show the over all availability of all types of raw by-products produced in the country

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1. The assumed ave. live-weight for calculating of the produced by-products are based on these assumptions :-
   - Heavy cattle (Bulls) are selected for export and the rest are bulls of light weight and cull cow.
   - Ave. live-weight for KMP cattle is declining year after year. on the other hand ave.live-weight for SMP is low table (2-7).
   - Slaughtered camels are usually old and heavy.

Table (2-8) Total By-Products produced from slaughtering Cattle and Camels in Somalia (in tons)

No.	Cattle	Camels	Total	Remarks
No. of animals slaughtered (heads)[1]	158542	76790	235332	Controlled & none controlled
Ave. liveweight (kg)	210	500	710	-
Total live-weight	33294	38395	71689	-
Head meat (jaw	333	384	717	Local market[2]
Brain	13.3	15.4	28.7	" "
Head skull (Roaches)	1052	1213	2265	Bone & meat meal
Horns	100	-	100	" " "
Tongue incl. Root	166	192	358	Local market
Hoofs	33.3	-	33.3	Bones & meat meal
Legs and feet	633	730	1363	" " "
Hide (3)	2664	3072	5736	Tannery
Tail	66.6	77	143.6	Local market
Blood	1165	1344	2509	Blood meal
Diaphgram	66.6	77	144.6	Bone & meat meal
Lard	433	499	932	Technical fat
Heart	133	154	287	Local market
Liver	433	499	932	" "
Lungs	233	269	502	Bone & meat meal
Traches/Gullet	200	230	430	" " "
Kidney	133	154	287	Local market
Udder /Reproductive organs	466	538	1004	Bone & meat meal
Glands	33.3	38.4	71.7	Export
Gall bladder with contents	33.3	38.4	71.7	"
Mesanteric fat	666	768	1434	Technical fat
Stomachs	1065	1229	2294	Local market
Gasings	999	1152	2151	Export
Stomach & casing contents	4761	5759	10520	Organic fertilizer

Source : Experiments on Zebu cattle, sheep and goats in Sudan.

(1) Controlled and non controlled slaughtered animal in Somalia

(3) Execluding Kismayo & Sopral meat plants ; Collected hides are sent to the tannery.

(2) Demand is high on these by-product for local consumption'.

Table (2-9) Total By-product produced from slaughtering Sheep and goats in Somalia (in tons)

Items	Sheep & Goats	Remarks
No. of Animal Slaughtered (heads(1)	696128	Controlled and none controlled
Ave. live weight (kg)	35	-
Total live weight	24365	-
Head	1584	Local market (2)
Feet	975	Bone & meat meal
Liver, lungs, Trachea, Heart	780	Local market
Mesenteric fat	487	Technical fat
Casings	682	Export
Stomachs	807	Local market
Glands and Reproductive organs	500	Export, bone & meat meal
Skins (3)	3126	Tannery
Blood	1026	Blood meal
Stomach and casing contents	3130	Organic fertilizer

Source : Same as in table (2-8)

(1) (2) (3) : Same as in table (2-8)

Table (2-10) Total By-product produced from slaughtering cattle in Mogadisho Municipal Slaughter House (also camels) Kismayo and Sopral meat plants' (In tons)

Items	Mogadisho Sl.Ho.		Kismayo	Sopral
	Cattle	Camels		
No. of Animals slaughtered (heads)	36000	11520	40638	30930
Ave. live weight	210	500	248	194
Total live weight	7560	5760	10078	6000
Head meat (Jaw)	75.6	57.6	100.8	60
Brain	3	2.3	4	2.4
Head skull (Roaches)	239	182	318	190
Horn	23	-	30	18
Tongue incl. Root	38	29	50	30
Hoofs	7.6	-	101	6
Legs and feet	144	113	191	114
Hide	603	461	806	480
Tail	15.2	11.6	20.2	12
Blood	265	202	353	210
Diaphragm	15.2	11.6	20.2	12
Lard	98.3	75	131	78
Heart	30	23	40.4	24
Liver	98.3	76	131	78
Lungs	53	41	70.5	42
Trachea/Gullet	45.4	35	60.5	36
Kidney	30	23.2	40	24
Udder/Reproductive organ	106	81	141.1	84
Glends	7.6	5.8	10.1	6
Gall Bladder with contents	7.6	5.8	10.1	6
Mesentric fat	151.2	115.2	201.6	160
Stomachs	242	188	322.5	192
Casings	227	173	302	180
Stomach and casing contents	1081	834	1441	858

Source : Same as in table (2-8).

Table (2-11) Total By-Products produced from Slaughtering Sheep and Goats at Mogadisho Municipal Slaughter House (In Tons)

Items	Sheep & Goats
No. of Animals slaughtered (heads)	72000
Ave. Live-weight	35
Total live-weight	2520
Head	164
Feet	101
Liver, Lungs, Trachea, Heart	80.6
Mesanteric fat	50.4
Casings	70.6
Stomachs	83.2
Glands of reproductive organs	40.3
Skins	342.4
Blood	113.4
Stomach of casing contents	328.4

Source : Same as i table (2-8)

Table (2-14) Annual approximate availability of hides & skins in Somalia

Items	Kismayo Meat Plant (number)	Sopral meat Plant (number)	Total no.inSomalia (controlled & non-controlled slaughtering both Kismayo & Sopral plant
Cattle Hides	405 38	309 30	190 110
Camel Hides	-	-	76 790
Sheep & Goats Skins	-	-	696 128

Source : Tables (2-8), (2-2) and (2-10)

Hides and skins are collected after salting and drying by hides and skins Agency from the slaughter houses and from nomadic and semi-nomadic areas.

Hides and skins are of 4 grades :-

Grade	Buying price So.Sh/Kg	Percent from the total hides & skins in the area (1)
Grade 1	5.0	20
Grade 2	3.5	35
Grade 3	2.5	35
Grade 4	1.8	10

(1) Kismayo Tannery :

The hides and skins recovered are of law quality due to improper branding of animal and skin parasites. Government policy on hides and skins was identified (1) as having three major gools :-

- To raise the export value of the existing hides and skins production

(1) Dr. Hendrichson, Hides, Skins, leather and foot wear economy in Somalia, Ministry of Planning and co-ordination, Mogadisho 1972.

- To reduce foreign exchange losses through import of raw and processed leather products.
- To expand local agro-industrial production and thus provide additional industrial employment opportunities.

Hides and skins Agency was created as a result of the 1972 Hendrikson's study to meat the three major goals.

2.3.2.5. Leather and Foot-wear Industry (1) :-

There are 4 modern tanneries in the country. The biggest one is hides and skins Development Centre in Mogadisho which has the capacity to tan 75000 hides annually. The 2nd tannery (Kismayo tannery) has the capacity to tan 150000 hides annually. The other two are private sector (Missions in Mogadisho and DREI in Brava) each has the capacity of 30000 hides per year. There are also 2 pickling plants in the Northern Regions which process skins.

A mechanized shoe-making unit is attached to each of the above tanneries. In 1976, the hides and skins Development Centre has produced 29365 pairs of sandals, 13990 pairs of shoes and various other leather products like belts, handbags etc.

The missions shoe-making unit, which is also equipped to produce boots, besides shoes and sandals, has achevied a similar increase in 1976. It produced in 1976 a total of 80000 pairs of footwears consisting of shoes, sandals and boots. In addition to this, the Mission tannery has processed 29000 hides for the manufacture of the above foot wears.

2.3.2.6 Consumer preferences and per-capita consumption of meat :-

Somalian consumers prefer sheep & goats followed by camel and then cattle meat. Fresh meat is the most preferable kind of meat in Somalia. Animals are slaughtered and directly transfered to the market.

(1) Annual Report and Statement of accounts 1976 Central Bank of Somalia Mogadisho.

2.4. Dairy Production and Processing :-

The object of this survey is to put together a rather comprehensive outline for the situation of the dairy cattle industry in Somalia, investigate different aspects of dairy cattle production, and to give possible recommendations. There are few subjects on which information were readily at hand. However, all data made available were collected and some sampling was also undertaken at the 21st October Dairy Farm at Afgoi. Information were modified through frequent discussions with technical staff at the Ministry of Livestock.

2.4.1. General Features

Most of Somalia's land area is suitable only for extensive livestock production. The cattle population in Somalia was estimated as 3,746,078 heads. About 62% of the cattle population are found in the Southern part of Somalia, South and west of Mogadisho (Table 2.15).

Table (2-15) Cattle Population by Regions

Region	Number of Cattle	% of Total
North	290.463	8.0%
Central	1,115.603	29.6%
South	2,340,012	62.4%
Total	3,746.078	100.0%

Source : Livestock Development Agency, 1975.

The FAO Agricultural Commodity projections for the period 1970 - 1980 indicated milk production from all sources in Somalia to be as high as 988125 tons per year. Estimated annual per capita consumption of 108.40 litters was also reported. Given that the

Somalia human population is around 3492000[1], total milk consumption of Somalia would be about 378553 tons per year. This would leave a surplus of 609592 tons of milk[2].

It is proposed that even if 10% of this quantity could be collected, processed and exported, earings of foreign currency would amount to So. Sh. 400 millions[3]

The big obstacle facing the achievement of such goal is that milk has never been considered as a commercial commodity in Somalia. The majority of stock are managed with fully nomadic or semi-nomadic systems in which about 65% of the human population are engaged[4]. Dairy farming in the technical sense is not practiced except, to a limited extent, in the Government-owned farms. Size of house holding is usually small. In a sample of 4604 house holds in North , 91.6 sample of the nomads were found to have no cattle and the average house hold size of the remaining families ranged from 1 to 20 per house hold, while in Bardere, South Somalia, 73% out of 847 householdings owned 20 heads of less[5]. In middle Shabelli region, 821 households were sampled and the average husehd size was 8 heads[6]. Little is known about age-sex structure and production characters of the national herd.

Marketing and processing of milk are so limited and are in negligible quantities. To satisfy the demand for milk in urban areas, dairy products have been imported at annual average of 230 tons of evaporated and condensed milk, 550 tons of dried milk, 85 tons of butter, and 90 tons of cheese for the period 1972-1975[7]

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(1) State Planning Commission, Mogadisho.
(2) Milk production from cattle was estimated as 91000 tons in 1970. FAO Production Yearbook, Vol. 24.1970
(3) Prefeasibility study on the establishment of milk processing plants in Somalia, UNIDO, 1976
(4) JASPA, Report 1977 p. 19
(5) Central Statistical Department, Pilot surveys 1973-1974.
(6) Middle Shabelle pilot survey 1976.
(7) Ministry of Industry. Development Programme 1979-1981.

a minimum liveweight of 250 kg. on the average. Choice of bulls for breeding is based mainly an appearance and, to a little extent, on background pedigree. Cows are milked according to the requirements of the family. In the vacinity of urban markets, milk is also sold.

A small minority of stock are outside the nomadic systems. Those are kept in urban areas basically for milk production. Very little information are available on the management practices within this sytem which appeared to be rather similar to the nomadic systems, with the exception that the bulk of feeding requirements is satisfied from fodder purchased and transported from surrounding areas. This costly procedure results in high milk prices and less milk for sucking calves.

2.4.7. Development Programmes :-

It is the Government policy to develop the livestock sector. The 1974-1978 and the 1979-1981 development programmes include a number of investments in health, production, marketing processing and range improvement. Among the objectives stated for the 1974-1978 programmes, qualitative changes in livestock production, improvement of the rate of offtake from the national herd, improving the potentialities for milk and meat production through selection through selection and crossbreeding, have special priorities.

The first three development programmes, 1963-1967, 1968-1970, and 1971-1973 concentrated on the problems of animal health and the organization of livestock marketing rather than on production problems. It was realized, however, that intensification of animal health services alone could not bring about the necessary improvements in the quality of the livestock and livestock products. A comprehensive programme was, therefore, proposed. The programme included the establishment of intensive animal production system assisted by an AI network to introduce and enhance genetic improvement, filling the gaps in the livestock structure, and modifying

the existing firms and projects. However, only an amount of So.Sh. 162 millions representing 4.5% of the total investments in the 1974-1978 development programme was allocated to the livestock sector (refer to section 1.3 for further discussion of the financial aspects of the programme). A detailed description of the projects proposed in both the 1974-1978 and the 1979-1981 development programmes follow in sections 2.4.6. and 2.4.7.

2.4.6. Major Dairy Projects

(a) The 21st October Dairy Farm

The primary aims of the farm, which was established in 1960, were to carry out a crossbreeding programme using Duara cattle and Friesian bulls mainly to obtain an adapted dairy type, to be the site of an AI-Center for the country, and to guarantee a good supply of milk to the Milk Factory in Mogadishu. The farms is located near Afgoi to the east of the Merca road at a 30 km distance from Mogadishu. The central area of the farm is 583 ha of which 281 under irrigation along side the Shebelli river, some distance from the center. There are also about 400 ha of potential-irrigatable land between the farm and the Merca road. At present there are about 800 heads kept in open sheds. The anticipated expansion of the the farm is 1200 - 1500 ha, with a total carrying capacity of 2000 heads(1). A cattle fattening center was also proposed to use the fodder produced in the farm and in Uarmahun ranch. Capital cost of the project during 1974 is So. Sh. 2.188 millions and operating cost is So.Sh. 1.508 million (1).

The breeding programme has not achieved its targets, and the amount of milk produced is still far below the level that makes the farm of major importance in supplying the Milk Factory.

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(1) Five Year Development programme 1974-1978

Sh. 27.06 millions with a foreign component of So. Sh. 24.24 million, were estimated, and operating costs/annum were So. Sh. 83.748 millions. At full operation, sales revenue will amount to So. Sh. 98.4 millions and gross profit will be So. Sh. 14.65 millions. A total of 336 persons are required for the project among whom, 82 will be engaged in management and administration. 174 skilled laborers, 50 sem-skilled laborers, and 30 unskilled laborers (1).

The site of the project has not been yet defined. A prefeasibility study was carried out in 1976, but a survey and identification study is still needed.

2.4.8. Constraints

Most of the milk is produced by nomadic and semi-nomadic sectors. These traditional sectors have tried to meet the demand for milk using their own resources and methods which would lead to an increase in cattle numbers but to little increase in production. The slow rate of transition from nomadic systems to commercial scheme reflects the conservative attitute of the pastoralistic sector to milk sale. Unfortunately, this sector has not received technical advice, guidance and investments necessary for solving existing problems, and to carry out, thereafter, integrated development plans.

Three major factors would contribute to the overall low level of milk output from cattle :-

- Improper utilization of pasture resources.
- Low herd productivity.
- Inadequate infrastructure and services.

No substatial improvement has been done in the first two issues. Constraints on development which are of ecological, institutional

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(1) The 1979-1981 Development Plan. Industrial Sector.

and technical nature could be summerized as follows :-(1)

a) Ecological Constraints :-

- Droughts
- Lack, or poor distribution, of deep wells.
- Endemic and livestock diseases.
- Unsuitable stocking, over grazing, insufficient fodder production, and lack of supplementary feeding.
- Accumulation of cattle for social prestige and as an insurance against droughts, diseases and other difficult conditions.

These conditions may upset the balance among the animals, water, and land resources.

b) Institutional Constraints :-

- Lack of basic information needed for the planning and evaluation of dairy cattle improvement programmes.
- Lack of well defined breeding, strategy and development programmes.
- Lack of professionals and skilled personnel.
- Inability of operating crop/livestock projects.
- Lack of educational , training and extension services.

These constraints would decrease the capacity for effective and timely implementation and operation of planned projects.

c) Technical Constraints (2)

- Low fertility rates (60%)
- High average age at first calving (4-5 years)
- Low number of calves producedin the whole reproductive live of a cow (2-3 calves).

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(1) Financial and Marketing Constraints are discussed in chapter 3.
(2) For sources of estimates given in this section, See table (2-16)

- High rates of mortality, particularly in animals less than one year of age (35-40%)
- Low mature weight of animals (300-350 kg for males, and 250 - 285 for females).
- Low total milk yield per cow (300-350 liters)
- Very limited culling among cows.
- Retention of cows until they are too old which results in high percentages of old cows in the herds.
- Relatively high rate of growth in the cattle population[1]

These constraints would result in low productivity and offtake.

Recommendation on measures aiming at relativing the present constraints will be discussed in (Chapter 5) of this report.

2.5 Poultry Production

The role of poultry production in Somalia is a far less significant than that of other domestic stocks such as cattle, sheep, goats or camels. Poultry are kept in small numbers around the traditional farms. Living under a " back-yard" system, poultry kept by nomads, normally find their living by picking up scattered grains, seeds and waste. There is no particular system of management for poultry living in private farms or in the villages. The production is therefore low as compared to that of poultry kept under modern systems of management, breeding and nutrition. It is estimated that a hen kept by nomads has an average production of 40 eggs/year with eggs averaging less than 40 gm (2).

The government of Somalia has recently realised the importance of poultry as a source of good quality protein for improving the standard of diets of people especially those living in main towns.

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(1) The improvement of nomadic and transhumance animal production systems (AGA/MLSC/74/3), FAO 1974.

(2) Hunting & Gunn Technical Service. Somali Democratic Republic Livestock Sector. Review and Project Identification Vol. I (1976)

The government has, therefore, planned in the five year development programme (1974-78) to develop a more modern poultry industry by establishing seven modern farms near the towns of Mogadishu, Hargeisa, Kismayo, Burao, Beletwen, Galkayo and Bosaso. In order to improve the quality of poultry and to demonstrate methods of keeping and raising chicken and layer, improved breeds will be introduced to these seven farms. Each of these farms is planned to be stocked with 2,000 layers. It is hoped that each modern poultry farm and hatcher will produce about 200,000 eggs per year of which 135,000 will be sold, while 65,000 will be incubated for further reproduction of poultry in the farm.

One of the modern farms included in the five year Development Programme had been started in October 1975 at km. 13 near Mogadishu in order to supply the capital with table eggs. The farm started with a capacity of 20,000 layers and has been expanded to accommodate 50,000 white Leghorn hens. This farm is equipped with two brooders 8000 chicken each, two egg incubators and two hatchers. The hatchers and incubators are located in the buildings of Animal Science School, Mogadishu because of the irregularity of electricity in the farm area. The average production of the farm in 1975/1976 was 60,000 eggs/year at a rate of 195-200 eggs/Leghorn hen. However, a drop in the production (40,000 eggs/year) was noted in 1977/1978 because of the diseases and due to the effect of inbreeding in the stock. A new batch of one - day old chickens (20,000 white leghorn) has been imported in order to replace the olds stock. The chickens are now about 2 months old and seem to be in a fairly good condition. Mogadishu farm is run by one poultry specialist and eight assistants. The rations are prepared in the feed mill in the By-product Unit, Km 7. Crushed maize, sesame cake, wheat bran, blood meal, bone meal and minerals are the main components of the poultry rations in the By-product Unit. The Mogadishu Poultry farm gets the water from a well leading to two resevoirs. The farm should be supplemented with an additional well and more buildings for housing the skilled non skilled staff of the farm

(93 persons). The farm should also provided with another building for chicken brooding to avoid erowding of the chickens which is presently noted in the farm.

A second modern farm of those included in the Five Year Development Programme, has been established near Hargeisa. The buildings are about to be completed and no equipments have been provided. The date at which the farm will be in operation, is not exactly known. However, lack of funds seems to be the reason for any possible delay. It is intended that this will be also involved in the distribution of chicks individuals and cooperatives in order to stimulate modern poultry production in the region.

It is believed that the entire situation of poultry of production in Somalia should be reviewed in the lights of :- 1) the availability of grains and possible future expansion of area cultivated with maize and sorghum 2) The maximum utilization of the meat and fish-by-products presently produced in the country 3) The availability of experienced manpower capable of running commercial poultry farms 4) The disease problems facing the intensive poultry production 5) The performance of various imported breeds of poultry under the conditions prevailing in Somalia. In view of these circumstances, the poultry farm near Mogadishu should be used as a pilot unit, to study the problems involved, the economics of poultry production and to train personnel, before the development of other units. It may also be recommended that Mogadishu and Hargeisa poultry farms should concentrate on the production of improved breeding stock for distribution under a domestic poultry extension scheme. The Government of Somalia should also seek the assistance of an international organization such as FAO, AOAD (Arab Organisation for Agricultural Development) or Arab Fund for conducting a technical and economic feasibility for the establishment of a commercial poultry unit to fit into one of the irrigated crop projects presently implemented in Somalia. This Commercial poultry farm could cater for egg (layers) and meat (briolers) production.

2.6. Rangelands as Source of Animal Feeds :

2.6.1. Introduction

Somalia can best be described as a rangeland country as almost all of its total area of 638,000 km^2 is presently used for grazing. Land use categories in the country[1] include about 68.7% of forest and rangeland, 12.5 arable land and 18.8% of wasteland. However, presently cropped land amounts to only 1% of total area, the balance used for grazing. About 55% of the land of Somalia can be considered prime range and nearly 40% as potential rangeland[2] on account of topography and meager rainfall. These rangelands upport over 37 million heads of camel, sheep and goats and a wide range of wildlife. From 50-70% of the human population in the country derive their livelihood principally from livestock production[1] mostly in rangelands.

Thus the rangeland value to Somalia can hardly be overestimated. Centuries of unplanned range use have outcropped many range ailments that need prompt measures to be immediately taken in order to restore range productivity. Such measures however, have to consider the triangular set up of man, animal and range which coherently tie up in a complex of biological, social and economic interrelations.

2.6.2. Range Vegetation Types

Climatic, edaphic as well as topographic factors interact at various levels to produce different types of ranges in Somalia. Rainfall over most of the central range lands varies between 150 -200 mm annually. In these ranges soil type has a more prominent effect than rainfall on vegetation from the coast to the western borders of the country[3]

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(1) International Bank for Reconstruction and Development 1975. Somalia Recent Economic Developments and Current Prospects. Report No. 702 SO.

(2) Norris, J.J.(1976) Rangelands & their importance FAO/UN-Som/72/003

(3) Report by the Government of Somalia in Support of a loan Application to Finance a Central Rangelands Development Project, Directorate of planning and Co-ordination, Mogadisho, Somalia, 1977

Gypsum soils in the Sanaag, Nugal and Togdeer regions where rainfall is 100-150 mm have a characteristic vegetation of sparse trees and shrubs and grass. The woody component includes Cadaba sp, Maerua crassifolia, Salvadora persica, Acacia tortills and Ficus benchalensis. The grasses include Chrysopogon aucheri, Sporobolus ruspolinus and Aristida sp. The gypsum soil vegetation generally provides seasonal grazing only.

The sub-desert and desert ranges in northeastern Somalia (Bari region and parts of Nugal valley) receive rainfall generally less than 150 mm. Most of this area is desert shrub on limestone hills and mountain slopes with vallies of deep red soil. Vegetation is composed of shrubs of Boswellia, Commiphore, Grewia and Acacia. Grasses include Sporobolus, Aristida, C. aucheri and Enneapogon. In the area known as the African Hoon exists a sparse vegetation of salt desert shrubs including Sueda, salsola and KOCHIA, as well as some Sporobolus.

In these desert ranges most of the forage comes from browse which makes it suitable for sheep, goat and camel.

The Acacia bussei open woodland is spread where rainfall is between 200-300 mm. Tree size and woodland density is dependent upon topography. The dominant grass associate is Chrysopogon Aucheri which still covers large tracts of land. Other grasses may be found as Sporobolus & Eragrostis sp. The A. bussei zone is very important grazing land for sheep, and goat.

The "Haud" vegetation of reddish loamy sand soils extending over wide areas south of the A. bussei open woodlands down to the Ogaden region. It also occupies parts of regions of Mudug and Galgadud toward the Western borders. Haud range is very rich and diverse and of goat grazing potential inspite of some over use where water is available. Vegetation includes several woody shrubs and trees of Acacia bussei, A. nubica, A. bussei, A. tortilis, Boscia senegalensis, Commiphora sp, Maeura Crassifolia, Grewia

tenax, Cordia charaf,. Herk include Chrysopogon aucheri, Paspalum sp, Sporobolus sp, Panicum Kelliri, Aristida sp. Cenchrus ciliaris.

The Haud range is suitable for all types of livestock but generally camel, goat and sheep are grazed.

B) Vegetation of Central Rangelands

Ranges of Mudug, Galgadud and Hiraan vary with soil type. To the west there is a strip along the frontiers representing Haud vegetation. To the North-east of Mudug a similar vegetation is found on sandy vallies and includes trees and shrubs of Delonix elata, Acacia tortilies, A. mellifera, Terminalia orbicularis and Dobera glabra.

Large areas of the Mudug plain are gypsecus soils of more or less similar vegetation to the gypeous soils of the North, except with Acacia species being the more dominant shrub. The latter include A. miser A tortilis, A. mellifera A. bussei

The eolian sand dunes on the coast of the Indian ocean are covered with an almost completely herbaceous vegetation of annual grasses, forbs and sedges. These include species of Eragrostis, Sporobolus, Cenchrus, Dactyloctenium, Heliotropium and Blepharis. The dune ranges are suitable for sheep and cattle grazing.

In land from the above coastal sand dunes there are areas to the south of loose a sand over limestone where a shrub-grass vegetation is present. Shrubs of Acacia and commiphora and Dichrostachya are frequent. Vegetation clearing to practice dryland farming is frequent in this soil, which often leads to sand blowing due to lack of vegetative cover. The main soil type in Mudug inland areas is, however, the orange sand overlying limestone soils. This type support a vegetation that may be well described as a mixed Acacia bushland with occassional trees. Species list include Acacia , edgeworthii, A. Misera, Commiphera sp. and the grasses, Chrysopogon aucheri , Aristida sp. and Indigotera. These areas are suitable

and increased soil erosion.

2. Unplanned distribution of watering points.
3. Increased clearing of fertile bottom lands and vallies for cropping of dryland crops especially in areas of marginal rainfall.
4. Shrub encroachment of good rangelands due to overgrazing.
5. Tree felling for charcoal especially around settlement.
6. Lack of integration between agricultural and grazing activities.
7. Almost complete absense of fodder grown for conservation as hay and silage for supplementary feeding of range livestock.

Detailed report on the nature of these problems will be discussed in sector 2.6.5. - 2.6.10.

2.6.5. Range Forage Production and Utilization

2.6.5.1. Present Range Productivity

Accurate estimates of forage production from the Somali rangelands are essential for adjusting the carrying capacity to a non-harmful level. Though forage estimates taken in one season or from less than extensive sampling may not be as helpful as desired, at least they act as guide lines to general management of broad ecological or bioclimatic zones. But within each zone forage production estimates have to sample a large number of range sites and year combinations in order to reach proper stocking for each range type. This is true because of variation in rainfall within bioclimatic zones and also because of variation in soil fertility, previous management, range conditions, and the moisture regime as effected by topography.

Estimates of productivity of rangelands in the Shebelli and Juba Valleys and the inter-river area were obtained by FAO in 1964/65 (FAO 1967). These estimates were based on samples taken at the end of the first rainy season (Gu) and it considered that secondary growth during the second rainy season would be equivalent

to a " use factor"[1]. The obtained estimates (Table 2-18) show some relationship to rainfall, but probably an important factor in this area is the annual flooding of some range land in the river plains which accounts for variation in forage production.

Forage production estimates for the whole of Somalia were obtained by the Hinderikson (1973) planning Group. For the Southern parts of the country they relied upon above mentioned FAO work.

Forage productivity was then related to rainfall in broad climatic and ecological groups (Table 2-19). The estimate of total annual forage produced amounts to 13.22 million tonnes of dry grass herbage. This estimate, however, does not include browse from shrubs and trees. No attempt has been taken to estimate the amounts of browse but on basis of casual observation it probably runs up to 30-40% of grass herbage. Browse apparently makes a sizable portion of goat feed and probably a much larger contribution to the camels feed. As mentioned earlier observations in Somalia showed that browse was the most important single class of forage in the rumens of livestock.

2.6.5.2. <u>The Forage Balance</u> :-

It is useful to investigate the balance of forage i.e., supply against needs of livestock comprising the national herd in the country. Livestock numbers in 1975 were converted to standard animal units. One animal unit is equivalent in its requirements to a mature cow weighing 250 kg. The cattle herd was assumed to be composed of 40% mature animals (one A.U), 40% - 1-4 years growing animals . (67. A U) and 30% calves (.33 A.U). Thus an average animal in the herd would have an equivalent requirement as 0.7 animal unit. Calculations are given in table 2-20 for the Northern Central and Southern regions as groups of administrative districts.

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(1) Use factor refers to the amount of annual growth (forage) that should be left in order to maintain the vegetation.

Table (2-20) Somali Livestock Population as Animal Units (1) (Thousands), and estimated total Dry Forage Required (000 tonnes/Year)

Type	REGION			
	Northern	Central	Southern	Total
Cattle	203	781	1637	2621
Sheep/Goat	1364	872	237	2473
Camel	1832	2213	2312	6357
	3399	3866	4186	11451
Total Forage required, 000 tonnes/Dry/ Matter	7818	8892	9628	26338

(1) Based on 1975 livestock census and the following Animal Unit Equivalents :- Cattle 0.7 A.U., Sheep/Goat 0.1 AU, Camel 1.2 A.U.

The dry feed requirements of one animal unit was estimated as 2.5% of live body weight per day or a total of 2.3 tons of dry herbage per annum. This was adopted as a more conservative estimate for local stock, although Nelson[1] estimated the requirements as 3.6 tons dry matter per year which appears to over estimate animal requirements. Data in table 2.20 show that total dry herbage requirement for the livestock in the country amounts to 26.3 million tons per year which is considerably more than forage supplies. The national deficit in productivity approximates 13 million tons of dry matter per year. The Hunting Group's Study[2] also pointed out deficit in feed supply equivalent to 3.53 million tonnes, of total Digestible Nutrients (TDM). The addition of an estimated 100,0000 tonnes of TDN value from potentially available agricultural products slightly reduces the above feed deficit. However, if one considers the amount of browse forage available from rangelands a different picture is obtained. It is assumed that 60% of camel and goat feed is browse. Since camels and goats in the national herd add to 7.89 million A.U then forage from grazing will only be consumed by 11.45 - 4.78 = 6.72 million A.U. The requirements of these animals would be 15.4 million tonnes of forage annually which exceeds estimated forage production by only 2.2 million tonnes. This again shows that the size of the national herd is either too close to what it should be according to range productivity, or probably somewhat larger than present range capacity. Examination of carrying capacity of important range areas in the next section reveals more information on this point.

2.6.5.3. Present Range Stocking Rate :-

Available data for determining the present stocking rate (Animal Units per km^2) as compared to the carrying capacity estimated on basis of forage production are presented in table 2.21 These data reveal the following. The regions of Togdeer, Sanag

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(1) Nelson, M.T (1958) Range Management in Somalia U.S.A.I.D.

(2) Hunting Report.

and Nugal are stocked at less than their estimated capacity, whereas central and southern areas are overloaded with more than range present capacity. However the estimates of carying capacity included in table 2.21 do not involve browse forage. Neverthelss the stocking rate for the central and southern regions appears to be considerably greater than possible range capacity taking all possible factors into consideration.

2.6.6 Nutritive Value of Range Plants

Little work has been done to assess the nutritive value of key species in Somali ranges. Available analyses made by Bettini (1941) are given in table 2.22 for representative grasses, herbaceuos legumes, shrubs and trees.

Green forage from immature grass is of good nutritive value, although mush of its nutrients are lost as the grass matures and dries out to a standing hay which comprises the bulk of grazeable forage during the dry season. Herbaceous legumes generally contain more protein than the grass and also maintain somewhat higher protein content upon drying. The presence of these legumes in the range flora provides the animal with a nutritionally more balanced feed especially in the dry season. This is an important aspect of range feeding of cattle and sheep which are less able to utilize protein rich browse. Browse from platable trees and shrubs especially the leguminous species is rich in protein and other nutrients. This browse provides nutritive components (protein and carotene) almost lacking in grazeable forage during dry season.

Since browse is important in goat and camel feed, these animals would be nutritionally better fed than sheep and cattle where browse is more available. It should also be noted that when protein is low in the feed animal's apetite and feed intake are reduced resulting in loss of body weight.

Table (2-21) Estimated Carrying Capacity and Present Stocking Rate for Somalia Rangelands.

Region	Productive range (2) 000 km²	Total U.A. (4) per region	Estimated carrying capacity A. U. km²	Present stocking rate A. U. km²
Southern (1)	200	5001	15.7	25.0
Central (2)	100	2384	16.9	23.8
Northern (3)	140	1391	11.9	9.9
	517	11451	5.7	22.1

(1) Southern Administrative region including Bay.

(2) Mudug and Galogadud

(3) Togdeer, Sanag and Nugal

(4) Based on 1975 census and animal units conversion factors of camel 1.2, cattle 0.7, Sheep/goat 0.1 A.U.

5. Support the formation of grazing associations as representative of nomadic graziers.

6. Institute non-formal training, expand the training capacity of the Range Management course at the Agricultural College University of Somalia.

A second project has been proposed for the development of the central rangelands. The funding has been secured and work will iniate in 1979. The objectives of this project are generally similar to Northern rangeland project. Its principal elements would be :-

1. Establishment of communal grazing reserves.
2. Development of new watering points.
3. Establishment of tree plantations.
4. Formation of trial cooperative ranches.
5. Setting up national range facilities.
6. Strengthening veterinary services.
7. Technical training of range staff and pastoralists.

2.7. Animal Feeds in Somalia

As previously reported (2, 6) practically all of the land area of Somalia is grazed or browsed by livestock during the major part of each year. It is also noted that the productivity of this land, as rangeland, depends greatly on the rainfall regime. Because of Somalia's extremely variable rainfall pattern, annual or seasonal range production is unpredictable. The utilization of other feed resources, can therefore ; be regarded as complimentary to that of range grazing. This chapter will include the survey of the materials of potential use as animal feeds in Somalia. Estimates will be based on records of Agricultural Development Corporation (1977) and reports of central Bank of Somalia (1977).

2.7.1. Concentrates

2.7.1.1. Wheat Bran

A roller-flour mill dependent entirely on wheat imports has been established at Mogadishu. The mill is now working up to 93% of its capacity. The present and projected production of wheat bran from Mogadishu mill presented in table 2.24. The wheat cultivated area in Somalia is about 3,000 ha with an estimated production of 1500 tons of grains (1.2). The potential production of wheat bran is expected to be 350 tons per year. The total expected production of wheat bran would be of the order 4,390 tons/year

Table 2.24 : Production of Wheat Bran in Mogadishu Flour Mill

	PRODUCTION (TONS)	
	per day	per year
1. Wheat grinding capacity (tons)	60	18,000
2. Capacity utilized in 1976 (200 days)	58	11,200
3. Wheat bran recovered in 1976	13	2,587
4. Bran recovery of crushed wheat (kg/ton)	224	224
5. Bran recovery at full capacity (300 days)	13.44	4,034
6. Ex-factory sale price (So. Sh/kg)	0.43	0.43

Source :- Ministry of Industry, Mogadishu. 1978

2.7.1.2. Sorghum and Maize Bran

Somalia has six maize and sorghum mills in the public sector and 11 in the private sector. Three are new mills with a total capacity

1) Agricultural Statistics, Ministry of Agriculture, Mogadishu (1976)
2) Economic Transformation in a socialist Framework. International labour office (JASPA). An employment and basic needs oriented development strategy for Somalia (1977).

around 60,000 tons of maize annually. The remaining 14 mills have a total milling capacity of 100,000 tons/year. The recovery of maize or sorghum bran is (Ministry of Industry 1977) 0.5% and 2.5% of the processed grains in the new and old mills respectively.

The cultivated area is approximately 400,000 ha for sorghum and 170,000 ha for maize (JASPA Report 1977). ACCORDING TO ADC (Agricultural Development Co-operation 1977) 300,000 tons of Sorghum and maize are purchased annually. From the annual purchased grains 300 tons of bran will be recovered from the new mills (60,000 tons X 0.5%) and 2500 tons will be produced in old mills. The potential maize and sorghum bran is expected be approximately 3000 tons/year. The amount will go up to about 5500 tons/year and the milling capacity is enough to deal with the purchases of ADC.

2.7.1.3. Oil Cakes

The main oil seed crops in Somalia are sesame, cotton and groundnut. There are 70,000 ha cultivated with sesame and the annual production of sesame seed was approximately 30,000 tons (0.4 rons seeds/ha) is 1975 (Agricultural Statistics). It is believed that by 1982 the area cultivated with cotton will be of the order of 10,000 ha yielding around 6,000 tons of cottonseed per year. The area cultivated with groundnut is 10,000 ha and the annual seed production can be in the order of 8,000 tons.

The edible oil industry which produces cake is composed of

a) one mill in the public sector with a capacity to process 6000 tons/year,

b) Small sized oil expelling units in the private sector the number of which is not known.

The mills in the public sector could not work at its full capacity in 1977 and was operating for 110 days 1227 tons of sesame yielding 610 tons of sesame cake (Ministry of Industry).

It is believed that only 6000 tons of sesame will be crushed

in the public sector yielding 3600 tons of sesame cake (cake is 60% of the seed) in 1978. The balance (24,000 tons) will be available to small mills and camel driven plants in the private sector. The sesame cake in the private sector should be in the order of 15,000 tons. The total potential production as sesame cake in Somalia is expected to be 18,800 tons in 1978. It is believed that 50-60% of this annual production (10,000 tons/year) will be available for use in the animal feed industry.

In the near future it is likely that 6000 tons of cotton seed will be available from the area cultivated cotton ; thus about 3000 tons of cottenseed cake may be available for animal feed industry.

Groundnut seeds are not processed in Somalia and therefore no groundnut cake is produced. If the groundnut is not processed, an amount of 4,000 tons of groundnut cake will be available from an annual production of 8,000 tons of groundnut seeds (Agricultural Statistics 1975).

According to the above indicated estimates, the potential production of oil seed cake which will be available for animal feed industry in Somalia in the near future could be as follows :-

a) 10,000 tons of sesame cake
b) 3,000 tons of cottonseed cake
c) 4,000 tons of groundnut cake

2.7.2. Agro-Industrial By-Products :-

2.7.2.1. Banana Fruiting stems

The estimated cultivated area is 10,000 ha (JASPA Report 1977) it has been shown that the fruiting stems can be used for feeding livestock when they are frestly cut(1). The production of fruiting stems is about 20 ton/ha. The potential production of Somalia is about 200,000 tons per year i.e. 160,000 ton of dry matter.

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(1) Hunting & Gunn Technical Service (1976). Somalia Democratic Republic livestock Sector Review and Project Identification.

Experiments in some African countries indicated that cattle can consume 15 kg of fruiting stem daily.

2.7.2.2. Sorghum and Maize Stover

The cultivated area is 400,000 ha for sorghum and 170,000 ha for maize (JASPA Report 1977). The availability of stover is estimated as one ton per hectare. The potential production of maize and sorghum is in the order of about 600,000 tons/year. Experiments in many countries indicated that maize and sorghum is an excellent roughage for both beef and dairy animals.

2.7.2.3. Rice and Wheat Straw

The estimated cultivated area is 2800 ha for rice and 3,000 ha for wheat. Rice is cultivated on irrigated land whereas wheat is a rain fed crop. The availability is therefore based on 2 tons of rice straw and one ton wheat straw per hectare. The potential production of straw is expected to be approximately 6000 tons from rice and 3000 tons from wheat per year. Straw is an important component in the rations of livestock projects.

2.7.2.4. Sesame Stalks

There are 70,000 hectares under this crop (Agricultural Statistics, (1977). The availability of sesame stalks is around two tons per hectare. The potential production of stalks is therefore , in the order of 150,000 tons/year. Dry sesame stalks are now used in 21st October farms as roughage for dairy cattle.

2.7.2.5. Sugar Cane Products

Sugar cane is the most important commercial crop grown for domestic consumption. It is produced by the SNAI (Societe National Agricole Industriale) Estate of Jowhar. The present production of sugar cane is Somalia is presented in Table 2.25.

Table (2-25) Production of Sugar Cane in Somalia

Period	Cultivated area/ha	Production in 1000 tons
1971	5,489	407.7
1972	5,242	404.7
1973	5,308	423.0
1974	6,267	382.6
1975	7,006	370.0
1976	6,556	333.3

Source :- Annual report and Statement of Acounts, Central Bank of Somalia, Dec. 1976 .

Three main by-products are available from sugar cane namely :- (a) Leaves and tops (b) Bagasse (c) Molasses. It is estimated that each hectare of sugar cane in Somalia may produce about 3 tons of tops and leaves ; thus the total annual production ca be 20,000 tons. Sugar cane bagasse is around 30% of the cane crushed in the mills (1), and is used an a roughage in livestock feeding in many countries. Average annual production of 133,120 tons of bagasse was achieved in the last for years(1). SNAI Jowhar utilizes the bagasse at the rate of 17,000 tons/year to generate electricity(1). It has also a distillary to produce alcohol (29,000 hecto-litres) from 15.000 tons of molasses/year (1,2) . It is believed that a great portion of the annual bagasse production and pith can be oriented to animal feeding in Somali.

2.7.2.6. Cotton Stalks and Hulls

In the near future it is expected that 10,000 ha of cotton will be cultivated(2). Based on 2 tons of stalks and leaves, it

(1) UNDID Report, Ministry of Industry, Mogadishu 1978.
(2) Annual Report and Statement of Accounts, Central Bank of Somalia Dec. 1977

10%, due to inadequacy of fish catch. The plant at Bolimog is not working due to some mechanical trouble in the freezing plant. In the light of these circumstances the present annual production of fish-meal is as follows :(1)

(a) Bolimog :- Production during the year 1974 was 39 tons; thereafter the plant does not seem to have worked.

(b) Laskore :- Average annual production ranges between 250-300 tons.

(c) Somali Fishing Company produce about 300 tons of fish-meal.

It is, therefore, estimated that the present annual fishmeal production is in the neighbourhood of 600 tons. However, attempts are being now made for increasing the fish catch in Somalia ; fishmeal production is expecred to be reasonably improved.

2.8. Animal Health Services

2.8.1. Major Prevailing diseases and control measures

2.8.1.1. Introduction

The economic development of Somalia Democratic Republic (SDR) is to a very large extend still dependent on livestock and livestock industry. The part and the government in SDR are very mush aware of the fact that the future economic growth of the country relies on its greatest part on the development of livestock industry. All development plans since 1963 up to the last 5-yr plan which will end in 1978 concentrated on the intensification of animal health programmes including a major joint project through FAO/OAU JP15 antirinderpest campaign.

The livestock industry provides approximately 60-70% of the

(1) UNDIP Report, Ministry of Industry, Mogadishu (1978)

total export earnings (1) and 70-75% according to World Bank and Somalia government joint report (1977). The exports are mainly in the form of live animals, meat products, hides and skins. Sheep and goats make up about 75% of the livestock exports by value (1). In 1975, according to IBRD report, the number of sheep and goats exported was 1.6 M in addition to 38,000 head of cattle and 28,000 camels. The livestock population based on 1975 estimates a result of a nationwide livestock census includes 3,722,151 cattle, 9,432,320 sheep, 15,275,558 goats and 5,297,239 camels (2). The census was made on the aftermath of the sever drought that his the country on 1973-74 . The loss due to the drought and its consuences was estimated at up to 30% of cattle, 40% of sheep and goats and 20% of camels died nationwide over a period of two years (3). Since 1975 due to improvement in climatic and environmental conditions in SDR the rangelands improved progressively and the animals regained their health. Somalia's 1974-78 5yr development programme planned a total investment of So.Sh. 162 M for the livestock sector This represents 4.2% of the total planned investment (4). Animal diseases, however, constitutes one of the most important constraints to livestock production in SDR. Major epizootic diseases e.g. Rinderpest, contagious bovine pleuropneumonia, Haemorrhagic septicaemia, Black-quarter, Trypanosomiasis and Tick-borne diseases are still menace to Somalia livestock development. The disease control programmes are made more difficult to implement by the nomadic mature of its animal owners. The poor transport and communication methods worsen the situation and make it in many cases impossible to render veterinary sevices to the nomads where they live and to where they migrate.

2.8.1.2. Rinderpest

This disease used to cause enormous losses in Somalia, but since the launching of the Pan African JP 15 antirinderpest

(1) IBRD 1975. 2 - Livestock Census report 1975

(3) Dep. of An. Health report 1975 (4) 5yr plan 1974-78

a sporadic nature in all parts of the country. It is caused by clostridium chavoei which is an anaerobic bacterium that lives in soil and pasture. It is reported from the Southern region as well as from the Northern and Central regions (1). An efficient vaccine is produced in the serum and vaccine Institute in Mogadishu. The vaccine gives protection for one year. Table 2.26 shows the number of cattle vaccinate of annually since 1968 and figures are steadily going up each succeeding year which account for the increasing demands for the vaccine by the stock owners. The Serum and vaccine institute is planning to produce sufficient quantity to cope with the demand. A research programme is also intended to use a better immunizing strain e.g. CH_4 or CH_3 or even a local field strain. It worth mentioning that the central veterinary research laboratory in Khartoum has obtained recently a good immunizing strain from Australia. A cooperation betwen the two countries in field work and research programmes will no doubt result in mutual benifit to both countries.

2.8.1.6. Haemorrhegic Septicaemia (H.S.)

Haemorrhagic Septicaemia is an infectious contagious disease of cattle and other ruminants caused by the bipolar bacterium pasteurell multocida. The disease is found in Somalia and is reported occasionally (2). The annual reports and the veterinarious whom we met do not regard H.S. as a major threat to Somalia livestock since a reliable vaccine is available. Vaccination against HS as shown in table 2.26 is very low and started only in 1973. The stock owners recognize the disease and they call it " GUUX" but it seems that it does not give them much worry. HS, however, could be a serious disease and can cause a tremendous damage to livestock in a very short time. It has a high morbidity and mortality rates but fortunately it can be efficiently controlled if a good vaccine is used coupled with strict quarantine measures and proper means

(1) Annual reports of Dep. of Animal Health for 1972, 1973, 1974
(2) Animal Health Seminar - 1972.

of disposal of carcasses .

It is advisable to increase the quantity of vaccine produced in the Serum and vaccine Institute and that vaccination against this disease should be practiced routinely and the disease be treated as a major epizootic. " Prevention is better than cure" this is a wise statement and people must not wait until the proble becomes a catastrophy.

2.8.1.7. Anthrax

Anothrax is one of the major epizootic diseases found in Somalia (1,2) . It is caused by Bacillus anthracis and practically invades all domestic animals and man hence it is important not only as an acute septicaemic animal disease but also as a zoonotic disease. Annual vaccination is practiced in the country specially in exported animals. Table 2.26 shows the annual vaccination figures which are gradually increasing. The spore vaccine is produced locally in the Serum and Vaccine Institute and gives quite good immunity lasting for about a year with no side effects. The disease spreads all over the country but it is well under control and there is no danger out of it as long as routine vaccination is practiced and proper hygienic precautionary measures are taken in the slaughter houses.

2.8.1.8. Brucellosos (Contagious Bovine Abortion)

Brucellosos in Somalia is only occasionally reported. The annual reports of the Ministry of Livestock Production do not reveal this disease as a national problem. However, this does not mean that the disease is not serious or not existing. The economic impact of the disease is not yet appreciated probably due to lack of diagnostic facilities or due to the fact that other major epizootics have taken over the light from this disease which if not cutered for will hamper livestock production and constitutes

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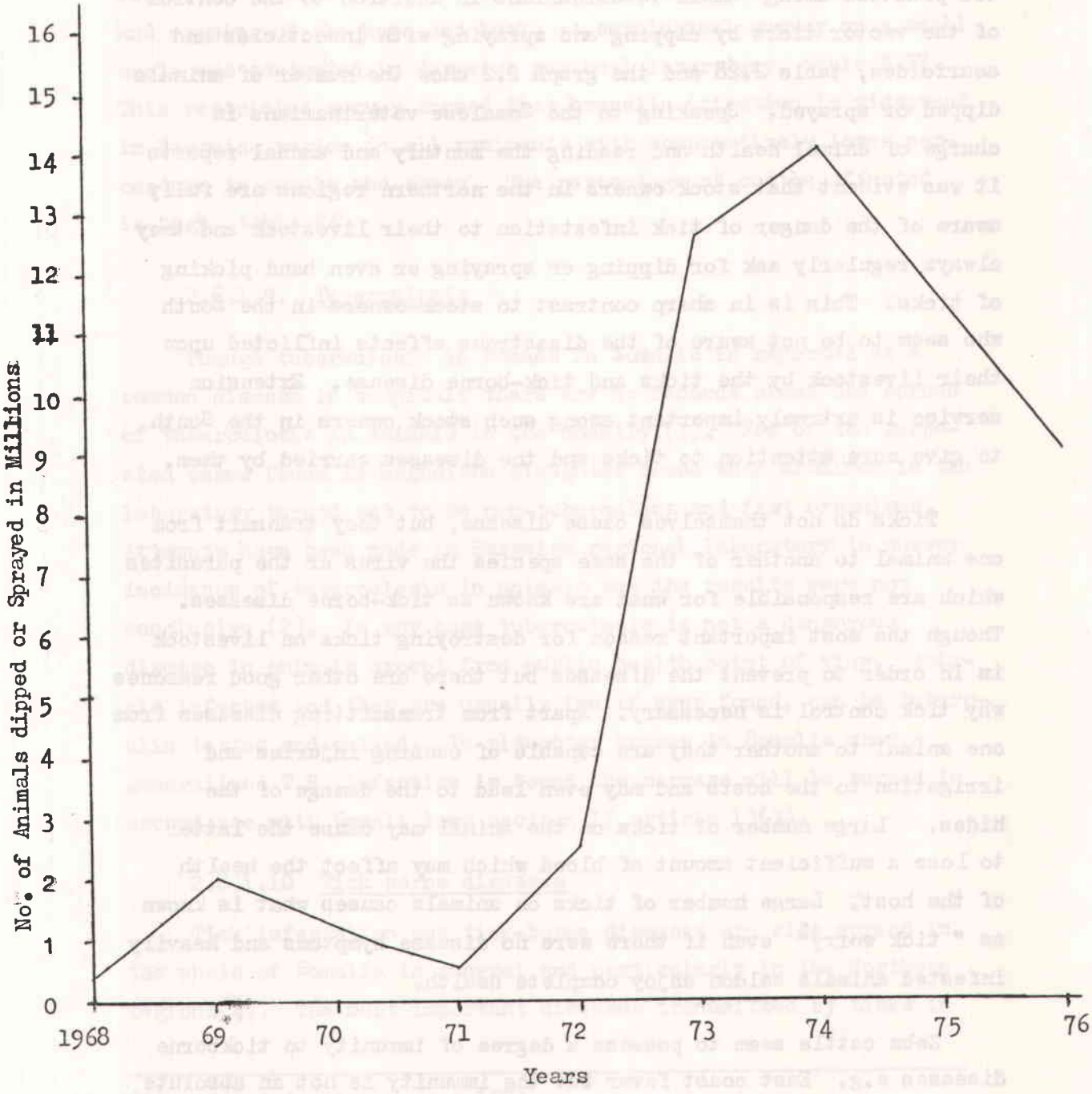
(1) Administration report 1972 - 2) Report of the British V. team 1972.

Fig. 2.2

No. of Animals dipped or sprayed against ectoparasites in the Years 1968 - 1976.



cattle. The Boran breed and certainly the Sahiwal and the Eropean breeds and their crosses with Somali Zebues would succum to to tock-borne diseases and the death toll among them would be great if they are not regularly dipped or sprayed. Proposals for control of tick-borne diseases will be taken over in chapter 7.2.6. The ticks species found in southern Somalia, though not identified with certainity are believed to be of the following species (1) :-

1. Rhipicephalus appendiculatus which transmitts East coast fever, corridor disease, babesiosis and Nairobi sheep disease.
2. Amblyoma spp. and this transmits heartwater and Nairobi sheep disease.
3. Rhipicephalus evertsi which is a two-host tick and can transmit East coast fever and babesiosis.
4. Ayalomma spp. and these transmit the cattle sweating sickness. Inspite of the fact that the vectors are available in Somalia, yet the disease has not yet been reported.
5. Boophilus decloratus is a one-host tick which can transmit babesiosis and gall sickness.

In northern Somalia a group of Yugoslav scientists conducted a survey of ticks on animals in 1977 and they identified the following species :-

Argus persicus
Ablyoma lepidum
A. varigatum
A marmoreum-group
Amblyoma sp. not identified
Hyaloma dromedarii
H. rufipes
H. excavatum

(1) Cankovic, M & Nevjestic, A. Report - 1977

(2) Serum and vaccine Institute report - 1974
(3) Report of British vet. Team, Hargeisa - 1972

ver mycodes. Still others (Abu Sheiba) consider the rol of mycoplasma in CCPP as secondary invadors and suggested E. Coli, Pasteurellas and pseudomans as primary causes. Whichever the cause CCPP needs more research in the fields of detiology and immunology. A cooperation between the Serum Institute in [illegible]

losses. However some of these dips are not operating (.e.g. Hargeisa dip) because of lack of water or chemicals. About 700 mobile dips were distributed to stockowners who were also given the chemicals and informed as to the use of such dips. Five quarantines were established in Bu'ale, Sakow, Dinsor, Koryole and Uflurow. Check points were also established in the borders between Kenya and Somalia and Somalia and Ethiopia. The latter check points are not working because of the deterioration of the conditions between the two countries. Slaughter houses, majority being class 3, were established in all regional headquarters and some districts. Mogadishu has a modern abattoir. Meat Inspection is carried in all these slaughter houses by assistants or trained veterinary skilled workers.

Drugs and vaccines are supplied free of charge and vaccination programmes work the whole year round throughout the country. Transport facilities are sluggish and constitute one of the most important constraints in animal health services (See para 7.1.2.).

2.8.3. The existing animal health projects

2.8.3.1. Northern Rangeland Development Projects

This project is designed to overcome the consequences of drought which occured in 1973 - 1975 which had a great adverse effects on the nomadic livestock owners of Northern Somalia. Within this national project a small project for strengthening of animal health services is designed with an objective to minimize livestock losses in the northern rangeland project area around Tugdeer, Nugal and Sanaag. Specifically the project will provide :-

1. Technical director for veterinary services.
2. Construction and equipment in each region a small diagnostic laboratory unit for diagnostic & investigation purposes.
3. In service training by an experienced senior veterinary, officer to his Somalese counterparts.
4. Construct and equip distric centers as well as field stations in selected locations.
5. Provide housing for professional and intermediate level.

6. Construction cattle crushes and provide funds for in-situ and mobile dips.
7. Provide transport and radio tranceivers.
8. Training of Somalese veterinarians abroad.

Summary of Project Cost (1)

Veterinary Services :	(So. Sh.) 000
Construction	3,047
Vehicles	1,681
Equipment	0,802
Operating cost (4 years)	15,392
Total	20,922

The animal health component of the northern rangeland project is supposed to start on the second year of the project. The whole project is financed by the Kuwaiti fund.

2.8.3.2. Serum and Vaccine Institute

The Serum and Vaccine Institute was first started during the italian rules in 1914 at Merka for diagnosis and production of vaccines on limited scale at that time. It was working until 1962 when flood destroyed the whole of the institute with its equipments. In 1968 the institute was restablished at El Jaalle with limited activities on diagnosis. In 1969 it was once again transfered to Mogadishu for purposes of antisera and vaccine production. In 1975-76 through FAO/UNDP aid the existing modern institute was established and supplied with up-to-date sophisticated laboratory equipment.

The institute comes under the responsibilities of the director

(1) Northern Rangeland Development Project - 1976

of animal health department and is run by an enthusiastic director, Dr. Abucar. The institute consists of the following departments :

1. Administration
2. Parasitology
3. Pathology and Histology
4. Virology
5. Bacteriology
6. Serology

The present staff of the institute is as follows :-

	Somalia personnel	FAO personnel
Vet. Research officers	6	5
Bilateral veterinarians	-	3
Laboratory technicians	25	1
Other staff	34	-
Grand total 65+9 = 74	65	9

The objectives of the institute are as follows (1) :-

1. Production of most important vaccines to suffice the countries demand.
2. To provide diagnostic services to field veterinarians.
3. To conduct disease surveys in the whole country.
4. To carry out applied and fundamental research in various fields of veterinary science .
5. To provide training and in-service training to Somalia Staff.
6. To carry out diagnosis and joint research with the medicals on zoonotic diseases.

The institute has produced the following doses of vaccines :-

---

(1) Somalia five year development plan 1974-1978.

	1976	1977	1978
Rinderpest vaccine	-	-	1.000,000
C.B.P.P. "	1,000,200	150,050	537,500
Anthrax "	648,000	512,250	-
B. Q. "	261,877	130,140	12,604
H. S. "	210,750	255,200	165,000
Brucellosis "	-	-	-
Bov.Para/cid "	-	11,133	183
C.C.P.P. "	-	200,000	-
Newcastle "	75,000	72,000	-
Fowl pox "	-	-	-
Fowl Ty/oid "	-	-	20,000

The institute is well equiped with modern equipment for research, diagnosis and vaccine production. In addition the institute possesses two mobile laboratories. There are two regional laboratories one in the North at Hargeisa and the other in the South in Kismayo. The Hargeisa regional laboratory follows administratively to the Serum and Vaccine Institute, while the regional laboratory in Kismayo is run by West German personnel under direct responsibility of the director of animal health department. When it finishes as a project it will come under the administration of Serum and Vaccine Institute. Hargeisa regional laboratory was run by Yugoslav personnel but when their contract was over and due to shortage in the qualified staff the activities in the regional lab. decreased and presently the laboratory is run by an assistant research officer.

2.8.3.3. Kismayo Regional Veterinary Laboratory

The Kismayo regional veterinary laboratory was established by West German aid (1,2) . The laboratory was established with the objectives to help in strengthening veterinary services in the in the southern region which encompasses a number of livestock

(1) Dr. Abdi Mohamoud, Director Animal Health - Personnel Communication 1978.
(2) Transjuba Development Project - 1975

Fig. 2.4 Set up of the Department of Animal Health

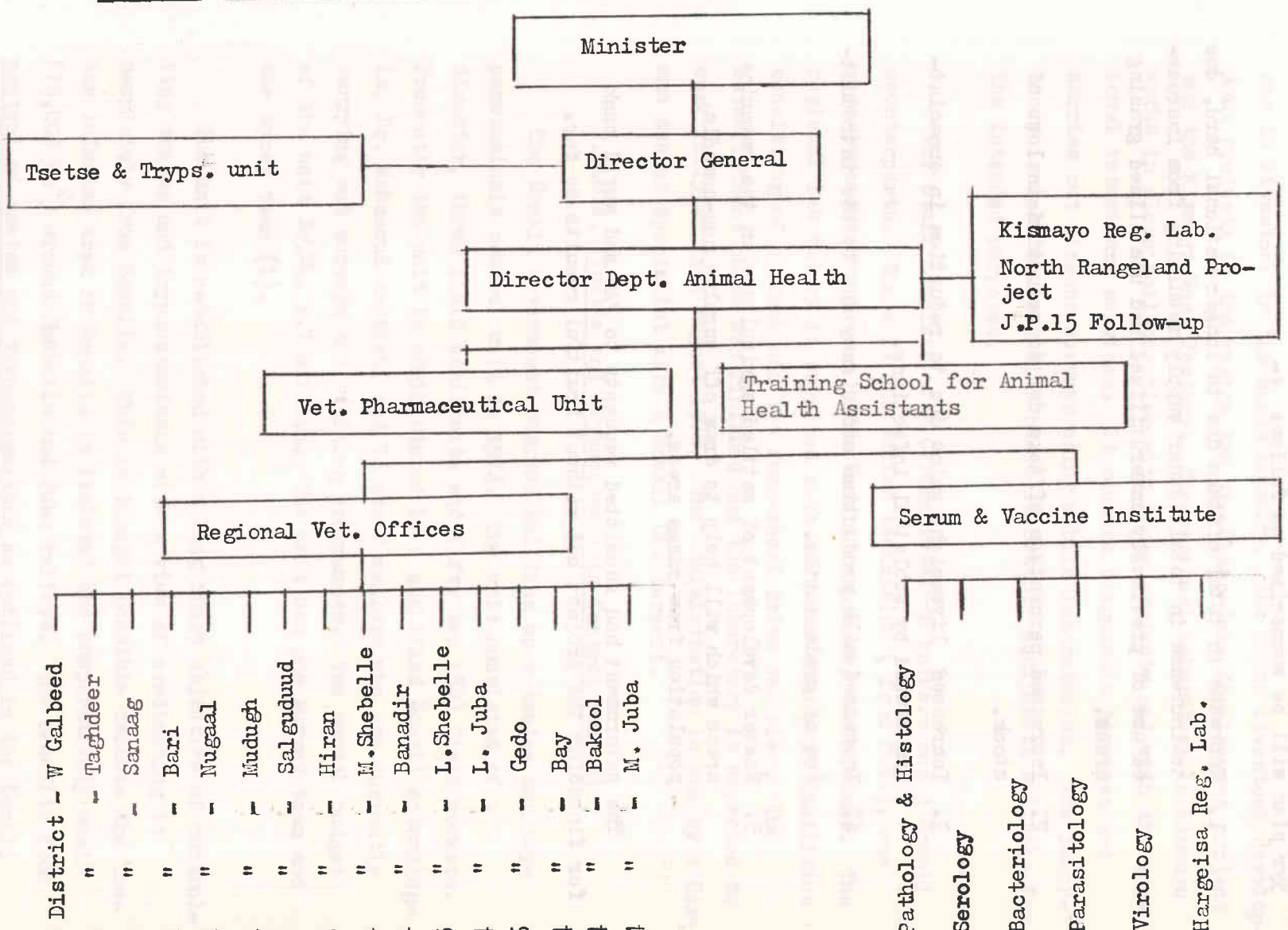


Table (2-30) Veterinary Staff in the Department of Animal Health

Location	No. of Vet. Doctors	No. of vet Assistants or Tech/ns	No. of Vac-cinators	No. of other staff	Total	Animal Units/ Region
Headquarters	2	-	-	3	5	-
Serum/Vaccine inst.	6	18	-	30	54	-
Animal Health School	1	4	-	90	95	-
Vet.pharmaceutical unit	1	5	-	15	21	-
J.P 15 project	-	1	-	50	51	-
Lower Shebelle	-	25	60	9	94	857,685
lower Juba	1	24	25	5	55	1,477,301
Middle Shebelle	-	9	39	7	55	800,692
Middle Juba	-	15	8	2	25	-
Bay	-	17	29	8	54	785,806
Bari	-	7	25	7	39	699,465
Bakool	-	9	20	7	36	404,024
Hiran	-	22	20	4	46	959,101
Nugal	1	12	24	6	43	312,484
Mudugh	-	9	23	10	42	1,780,548
Sanaag	-	11	20	5	36	580,317
Togdheer	1	12	25	6	44	674,146
W/Galbeed	1	19	55	15	90	1,525,645
Galguduud	-	8	17	4	29	1,003,683
Banaadir	-	3	22	1	26	25,630
Tsetse and Tryps	4	3	39	43	89	-
Total	18	233	451	327	1029	13,584,317

: Reports of Animl. Health Dep. 1977.

Subject	Total Hours	Total % of course
4. Animal Husbandry	260	12.7
5. Animal Health	632	41.0

Animal Production Assistant Course

Subject	Total Hours	Total % of Course
1. English	340	16.7
2. Basic Science (Zoology, Botany, Chemistry & Maths)	484	23.8
3. Anatomy, Physiology & Biochemistry	164	8.0
4. Animal Husbandry	668	32.9
5. Animal Health	308	14.9
6. Somali Language and Rev. Education	76	3.7
	2040	100.0

Laboratory Technician Course

Subject	Total Hours	Total % of Course
1. English	340	16.7
2. Basic Science (Zoology, Botany, Chemistry & Maths)	484	23.8
3. Preclinical subject (Anatomy , Physiology, Biochemistry)	164	8.0
4. Animal Health subject	424	20.8
5. Laboratory Technique	512	25.1
6. Animal Husbandry	40	1.9
7. Somali Language & Rev. Ed.	76	3.7
	2040	100.0

Meat Inspection Course

Subject	Total hours	Total % of Course
1. English	340	16.7
2. Basic Science (Zoology, Botany, Chemistry and Maths)	484	23.8
3. Anatomy, physiology and Biochemistry	164	8.0
4. Animal Health subjects (Bacterial and Viral Diseases, Parasitic Diseases etc.)	360	17.7
5. Meat Inspection	576	28.2
6. Animal Husbandry	40	1.9
7. Somali Language and Rev Ed.	76	3.7
	2040	100.0

From 1969 to 1977 the school has trained the following number of assistants :-

Animal health assistants	207
Animal production assistants	95
Meat inspection assistants	58
Laboratory technicians	52
Range management assistants	13
Grand total	425

2.9.1.3. The Range Management Training Institute, Burao

This training institute was established in 1974/75 through cooperation of the UNDP/FAO project. It is intended to train students to be range management assistants to satisfy the needs of the ambitions range rehabilitation projects carried out by NRA. The plan was to accept students finishing 8th grade (Intermediate School) for a 2 year course of range education. However, the first batch enrolled were veterinary high school graduates, who worked 2 years as range assistants. This group was graduated in December 1977.

The present class which will finish in December 1979 are intermediate school graduates.

Starting this year (1978) Forestry was introduced as a second option in the institute. This has been in response to NAR wish to further train 10 of its forestry assistants. Each 11-month academic year is divided into 3 terms of 3 month duration. During each term students receive 30 hours of lecturing. Upon final examinations of each of the first two terms, students receive practical training in range management for one month. The curriculum for range management students can be summerized as follows :-

		Total Hours
1. Basic Sciences		256
Botany	100	
Zology	52	
Chemistry	26	
Mathematics	78	
2. Range Management		465
3. Soil and Water conservation		39
4. Watershed Management		39
5. Forestry		22
6. Animal Husbandry		592
7. Extention		27
8. Government Administration		18
9. English Language		342
Total		1800

Range management students are taught the following courses, range management :

1. Introduction to range management (3 units)
2. Pasture management (5 units)
3. Principles of range management (6 units)
4. General ecology (6 units)
5. Range inventory (4 units)

6.	Wildlife and range use	(2 units)
7.	Grazing management and planning	(4 units)
8.	Range improvement	(6 units)
9.	Water development in r/lands	(6 units)
10.	Range economics	(3 units)
	Total	45 units

Instruction is in Somali language. However, since texbooks and lecture notes are in English, the students receive an intensive course in English throughout the 2-year period.

The institute consists of 2 classrooms, a laboratory-library herbarium room, a dining hall and dormitory. A small range enclosure of about 10 ha is maintained by the institute near Sheikh for practical range training.

Staffing : two range management training experts from the UNDP/FAO project had the responsibility of training the first group of graduates. Since their departure, Somali teachers took over and at present the staff consists of :-

1. Institute Principal - teacher (B.Sc. Biology)
4. Teachers (Diplomas in Range Management)

The present staff instructs both range management and forestry students.

Teaching facilities present

1. Teaching aids : One slide projector, one 16-mm movie projector with screens.
2. Laboratory Equippment : Four microscopes, some glassware.
3. Library : about 20 textbooks. Students mostly rely upon stencilized notes prepared by staff.
4. Herbarium : Four cabinets and presses. No mounting paper.
5. Survey Tools : two levels, chains, steel tapes, soil augers, hand scissors and forage clippers, soil moisture tester.

3.2. Internal Marketing

3.2.1. Internal Trading and Markets

Part of the domestic consumption of livestock products in Somalia is supplied through the slaughtering done in the municipal slaughter houses at the main towns. The other part, which is considerable escapes these houses to avoide municipal taxation through the widespread traditional practices of private or home slaughtering. Urban dewellers and butchers usually buy their animals either at the municipal market, or through direct transaction with the pastoralist. If one disregards the latter form of transaction, which is common only outside the main urban centres, it will be found that middlemen do engage in wholesale trading for the household slaughter market, in urban centres.

A high proportion of trade in livestock in Somalia, on the other land, passes through local markets, which must be registered for local government tax collection purposes. But here also, and despite the network of registered markets, and diligent tax collecting, a large number of transactions, possibly up to 40 per cent, occur outside of the registered market.(1)

It will be possible to register and tax a major part of these unregistered transactions with the extension and development of veterinary control outside the export areas to the inland. Through such extensions, a more accurate picture of the market turnovers and trade will emerge.

3.2.2. Middlemen

Despite the simplicity of the flow pattern of livestock trading the functional relationship between the various part is of transactions are extremely complex. The marketing network has been characterised as involving physical supply links, information

(1) Ibid, p. 140

links, financial links, and above all, bonds of kin and friendship. It is, therefore, necessary to examine the role of different parties in the trade and their functional relationships for a better understanding of the marketing system.

The selling of various types of livestock is almost always done through a middlemem, called dillal the Dillal - client relationship is based entirally on strong family ties and the dillal's reputation. Competition among these middlemen is keen , especially in large markets such as Hargeisa, where there are more than 300 of them operating at commissions from 2 to 3 per cent.

There are various variations of the dillal - producer selling system, and these variants can best be categorised on the basis of their collection function. The first and most common type of dillals operate in collecting centres where the producer brings his livestock, contacts a dillal and gives him his reserve price. The dillal then tries to locate a buyer (a merchant/dealer or usually an exporter) and tries to a obtain as best a price for the producer as possible. In return he gets a small commission from the seller.

The second type of dillal visits adjacent nomadic areas by trucks or camels, and buys livestock from producers on behalf of a merchant or exporter. He gets a commission from the merchant for every animal bought on his behalf, or if he is well known and trusted he may simply sell animals on behalf of the nomads. In this way he provides a valuable market service by spreading market information in the nomadic camps and by the limited collection of animals.

In spite of the fact that the working capital is provided by the merchant, it is difficult to know whether the dillal protects the interests of the merchants or those of producers. In general, he tries to be fair to the producers and helps in protecting their interests from exploitation by the merchants.

A third type of dillal is the nomadic or local trader who uses his own working capital to finance his own purchases. This type specialises in short term transactions through buying animals in distant nomadic camps and then moving then to the Northern collection centres of Hargeisa and Burao where prices are usually higher. By engaging in such function the dillals performs some speculative trading operation especially between the small rural markets and the collecting centres. Moreover, by travelling far out into the Haud, they are able to profit from emergency sales of stock in the dry season (most often due to water shortage or high prices rather than conditions of stock). These animals are either trekled directly to a major market or held with the traders own flocks until the next rainy season when prices rise.

Yet, a fourth type of dillal is the large merchant trader engaging in a much larger scale of operations and over wider areas. They are characterized by the possessment of a large amount of domestic capital in the form of stock, farms or trucks. Because of this , they are the traders responsible for long term holding and finishing operations. To increase the flexibility of such operation, they often invest in fodder supply and transport.

3.2.3. Livestock Marketing in southern Areas

Due to the very small size of livestock exports in the southern areas of Somalia, the collecting and holding functions by various middlemen are considerably reduced. The bulk of transactions in such areas involve only one and at most two middlemen between producer and consumer. Another distinguishing feature of the marketing system in such areas is the development of the auction system, especially in the LDA controlled markets supplying the Kismayo meat factory.

The auctioneers organise the buying agents and interested private individuals into a group and conduct the auction or the group burgaining process. There is considerable lattitude for

such brokers to form cartels covering several market and so exploit producers. In view of the amount of collusion present among brakers and buyers, it is not accurate to call this sytem an auction in the usual free market sense of the word.

Another special case is the LDA supervised markets, where the LDA's buying operation are really a fixed price buying service, which is varied within very narrow limits. As a result traders have been able to exploit this pricing structure and consequently LDA has suffered substential trading losses. This clearly shows the need for a realistic pricing and marketing strategy that reflects the various factors affecting demand and supply of livestock.

3.3. Exports

3.3.1. Export Trading :

The following table (table 3.1) shows the numbers of live animals exported during the period 1974-77, an monthly basis . It can be seen from the table that exports of sheep and goats has been reduced considerably during 1976 to almost half their levels in 1974 and 1975. In 1977 they started rising again but not to their previous level. On the other hand, exports of cattle has reversed this trend in 1976 by increasing by almost 50 per cent than their level in 1974 and 1975. There is no such observable trend for the exports of camels.

As regard to the seasonal variation in livestock exports, it can be easily recognised from the table that such variation exists mainly for sheep and goats, where exports achieve their highest levels during the period extended from the beginning of Ramadan and up to the end of Haj season. This period coincide in 1977, with the period from August to November.

Table (3.4) Export Charges

Export Charge	% of Retail Unit Value
Customs duty	2.0%
Veterinary certificate	0.5%
Stamp Tax	0.8%
Local Government tax	0.3%
Harbor tax	1.1%
Chamber of commerce charge	-
Shipping	0.3%

Source : JASPA Report, p. 295.

3.3.4. Export prospects for Somali Livestock

The Hunting consultants surveyed in detail the Middle Eastern market for Somali livestock exports, with the objective of assessing present situation, indicating future market prospects, and identifying ways to improve performance in such a market where Somalia has a natural advantage. Our discussion in this subsection which is concerned with the export prospects for Somali livestock in the importing countries (first in terms of the level of import, then in term of composition of these imports, and finally in terms of their expected prices, will be based partly on their findings.

Due such factors as the rapid increase in income per capita, a high rate of population growth, and increased urbanization, it is expected that demand for live animals and red meats in the Middle East will continue to rise rapidly in almost all countries of the region i.e. Saudi Arabia , the Gulf States, Iraq, Iran and Lybia. Recent economic developments in the A.R. of Egypt of rapid economic growth since 1975, points to the same direction. On the other hand, market expansion in the PDR. of Yemen is restricted by

2. The Hunting Report Vol. 3. pp. 191 - 272.

its adverse economic situation, shortages of foreign exchange, and the government present policy of import substitution in the fields of livestock production.

An additional factor contributing to the increase in the level of imports of livestocks and products is due to the fact that there is little scope for increasing domestic livestock output in countries such as Saudi Arabia, the Gulf States and Lybia. In addition, production costs of livestock output are relatively high. As a result of these two factors, most of the growth in demand in these countries will be met by imports. Because of geographic proximity, Somalia should have a comparative advantage over other livestock exporting countries in capturing a major part of this demand increase, provided it maintains an efficient and effective marketing system .

As for consumer preference in most of these importing countries it may be noted that sheep and goat mutton in still the preferred meat, although beef consumption is growing. If one considers the quality preference for Somalia mutton (because of its low fat content, similarity of rearing conditions, and suitability to the methods of cooking in the areas), it can be easily seen that Somalia competitive edge over other competitors in increase.

It has also been observed that the composition of imports in terms of live animals and carcase or processed meat varies widely from one importing country to the other. Saudi Arabia and the Gulf States import mainly live stock, while Lybia imports sheep live but carcass or processed beef. On the other hand Iraq and Iran bring in both live stock and meat. In most markets the percentage of imports in the form of meat rather than live stock appears to be steadily increasing, although this is more pronounced in the case of beef than for sheep and goat mutton.

It appears, thus that export prospects for Somalia live cattle are less favorable than for sheep and goats. This is due to the

general appears promising for Somalia, the prospects of exports of cattle in carcass form can't be easily assessed. Comptition from Australia, Argentina, Roumania, Sudan and other producers will be intense and difficulties may be experienced in meeting the health regulations of certain countries such as Iran. On the other hand consumer preferences in these importing countries are oriented more towards chilled rather than frozen meat.

This orientation necessitates the use of planes to move the required meat imports, and therefore gives closer supplying countries such as Somalia, a competitive edge over other remote suppliers.

Finally, the price prospects for Somali Livestock exports over the next decade appears to be favorable. Competition from lowcost Australian exports may exert some downward pressure, but this will probably be balanced by the rapid rise in demand in the Middle East, and the quality preference for Somali livestock. Long term projection made the world Bank(1) suggest that real prices (i.e. after allowing for price increases due to inflation) of beef are likely to rise rather than fall over the next 10 years. Since there is considerable substitution between different red meats, this would indicate that recent mutton and goat meat price levels should at least be maintained or may even increase.

3.4. Livestock Marketing :- Performance, efficiency, and constraints

After this brief survey of the existing livestock marketing it is important to make a thorough appraisal of it in terms of performance, efficiency, and constraints. The importance of this point stems from the fact that improvement of the existing marketing system is likely to be the most effective way of raising the economic returns from the livestock sector. It has been mentioned before that despite the efficiency of the system, it has limited

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1. IBRD, long term projections for Middle Eastern and East African Consumption, Production, and trade in meats 1975.

ability to adapt to rapidly altering export market requirements, some of which are created by inappropriate government intervention measures such as export bans on unproductive females and minimum price legislation. The ability of the system to identify and develop new export markets in the face of fierce international compitition from other competing countries is also limited. To cope with these and other recent developments, the marketing system needs rapid modification. Such changes would undoubtly require among other things devising plans for possible improvements, providing financial resources required for implementation, and above all determining the proper degree of government intervention in the system.

This section is going to be concerned with an appraisal of the existing marketing system in terms of its performance, efficiency and constraints. Required plans and policies for the development of livestock marketing will be discussed in part 9.

3.4.1. The performance of the Marketing System

The performance of the system will be discussed in term of annual livestock supply. Total supply of livestock depends on the size of the livestock population ; net inflow from or outflows to neighbouring countries ; and the percentage offtake. While it was possible to get the stock population size in the 1975 census, conducted by the LDA, reliable estimates of the livestock growth rate cannot be made until more data on stock inflows, offtake rates and other parameters are available.

On the other hand, there is a very regular movement of stock between Somalia, Kenya, and Ethiopia. While it has been possible to make some estimates of the net inflow from Kenya and Ethiopia for cattle and camels in a reasonable way, available, estimates vary widely, and this figure remains to be a major unknown parameter. Unit the net inflows are determined reasonably, especially for small stock, it will be impossible to estimate the annual livestock supply.

Table (3-6) Total Marketing Costs (So.Sh./Head) in 1975

Total marketing cost from	Sheep/goats	Camel	Cattle
Hargeisa to Jeddah (via Berbera	102.34	879.48	522.83
Mogadishu to Jeddah	108.39	982.18	546.63
Kismayo to Jeddah	106.74	977.38	546.73

Source : Hunting Report, Vol. 1 P. 144

The table indicates that the total marketing costs(1) between the main export producers in Hargeisa and c.i.f. Jeddah is around So. Sh. 120 per head of sheep and goats, So. Sh. 879 per camels and So. Sh. 532 for cattle. These margins represent 51 per cent, 59 per cent and 75 percent additions respectively to the assumed producer prices.

It should be noted, however, that there is seasonal variation in the size of the marketing margins, when these cost estimates can change quite rapidly. Thus in good season turnover increases and margins decrease due to fiercer price competition. During the dry season, however, even limited holding of animals is very expensive as they must be fed on purchased grass. In addition it takes longer time to collect a shipment which further increases holding costs. Hence prices and consequently marketing margins, rise

(1) These marketing costs include two main groups, the first of which the per head cost which includes the dillal commission, veterinary certificates, trucking or trekking, direct taxes, shipping, fodder for pre shipping and for voyage, livestock attendant on voyage, exporters commission, and mortality. The second group is the per head equivalent of the overhead costs which includes certificates of origin and witnessing, export permit, bank charges exchange rate differential, and interest on letter of credit.

during the dry season.

It should also be emphasized that the various estimates of costs and margins presented above do not necessairly relate directly to the producer price. This is due to the widespread use of unofficial exchange rates, which pushes up the Somali shilling real value of the letter of credit considerably. Thus the actual difference between the export price and the marketing costs and margins, which represents the producer price is much higher if it is calculated by the unofficial exchange rate, i.e. black market rate, than by the official one. Any attempt to organize exchange transactions will lead to a reduction in actual producer prices, and it will require a reduction in export taxes which may offset any likely economic gains from such an attempt.

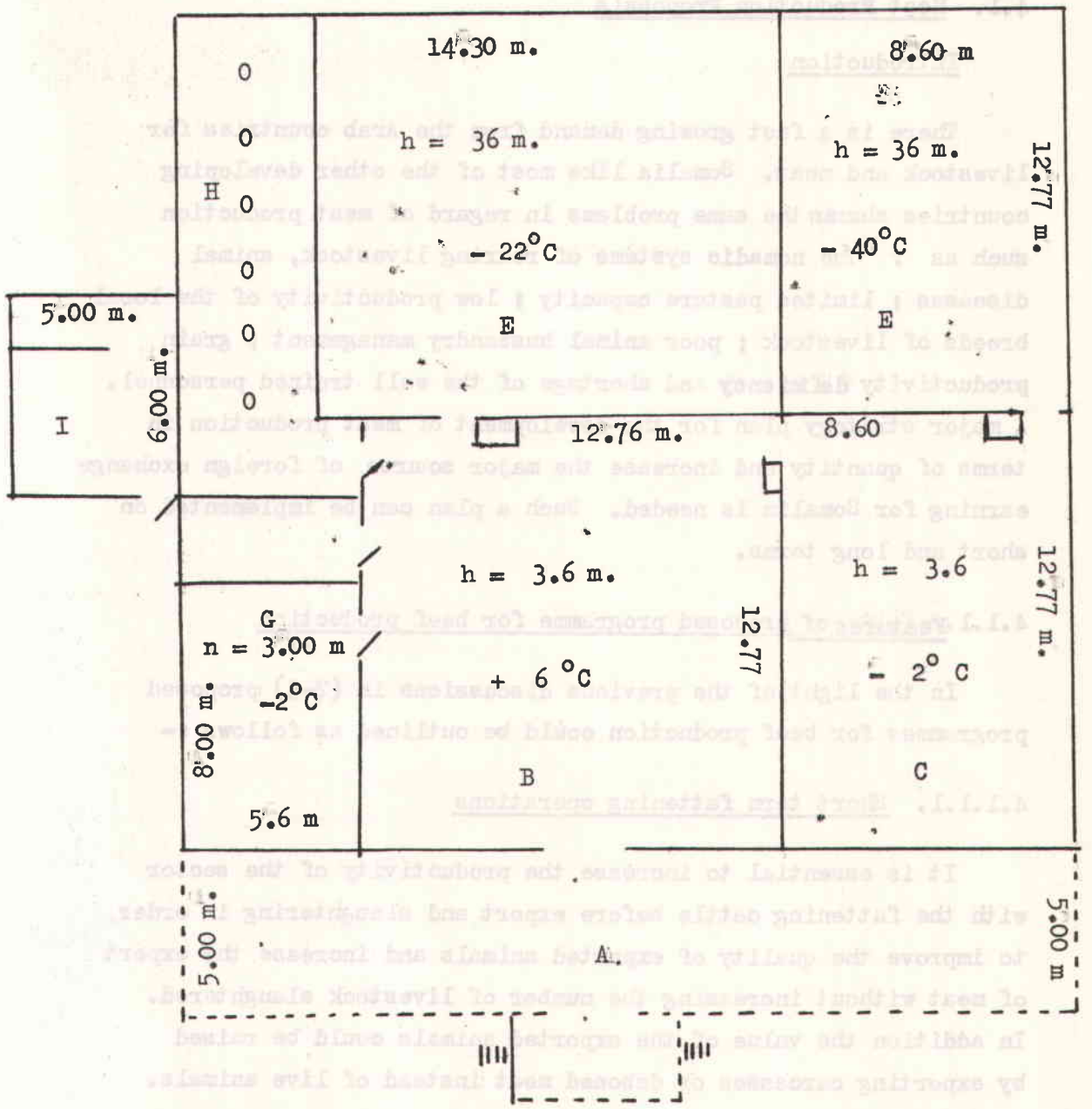
3.4.3. Constraints on the Livestock Markeing System

The last point in this review of the marketing system in aconcerned with the principal constraints on the development of the livestock marketing particularly for the maintenance of the current levels of export and their eventual expansion in the near future. These constraints can be divided into two interlated groups, the first of which relats to marketing difficults proper while the second refers to other relevent socio-economic constraints.

As for the marketing constraints, one can mention first the inadequate and lack of required infrastructure services, marketing export facilities, publicity and market extension. The lack of such facilities leads pastoralists to trek their animals for a long distance to the market and then to the port or the slaughter house along trade routes which do not have adequate watering, grazing and holding grounds. As a result of this animals arrive at final destination in very low condition. The consequences are a high mortality rate, and the loss of too much weight.

Secondly, the inadequacy and lack of an effective market

Diagram (4-1) Facilities required for the proposed Training Centre for the Mogadishu cold Storage.



A & B - Processing room C - Chilling room D - Tunnel freezer
E - Cold Storage G - For the use of Municipalities.
H - Engines room I - Store rooms or any suitable place in the cold storage area.

(1) The partetion between A & B should be removed.

(2) Carcasses will be brought from SMP & MSH to be chilled or processed for Export.

Table (4-1) Total increase in both liveweight and carcasses for the exported livestock in Somalia 1977

Items	Sheep	Goats	Cattle (1)	Total
Exported live animals/heads)	465005	461268	54956	961229
Av. daily gain (kg)	0.1	0.1	.7	-
Total gain in 60 days/head/kg.)	6.0	6.0	42.0	-
Total gain in 60 " for all animal/kg	279003	2767608	2308152	7865790
Total carcasses produced (kg)(2)	1339214	1328452	1154076	3821742
Percent from the total	35	35	30	100

Source : LDA report on exporting livestock for 1978.

(1) Cattle for both Kismayo & Sopral meat plants are not included.

(2) Improved dressing percents about 48% for both sheep & goats and 50% for cattle.

From the fore going table, the total carcasses produced will be around 3822 tons of improved quality.

The government should encourage the private sector to add some finishing to their cattle pior to export and slaughtering. This kind of operations need establishing feed mills for production of different feedlots rations to meet the fattening requirements of sheep, goats and cattle. Such operations could be concentrated around the areas of exporting live animals and slaughter houses like kismayo & Sopral meat plants.

4.1.1.2. Intensive beef production Systems

Introducing intensive beef production systems in areas of high fodder potential should provide an improvement of the production output in the short run. A 65% of the total cattle in the country is represented in the southern region. This region has an excellent fodder potentiality and an irregated project with good water resources. So integrating cattle with the irrigated projects could lead to utilization of all the crops residues. Fattening cattle on good quality of silage and hay (as roughage phase), and then putting them in feedlots (as drylot phase) for short time 30 to 60 days for finishing could increase the liveweight and produce beef with first grade that have significant improvement of carcass characteristics.

The adoptions of intensive beef production has so many advantages both on the short and on long terms.

On the short term, it represents a most useful production sector that should permit a significant increase of the export value with little interferance on the traditional livestock sector that greatly contributes to the best utilization of natural resources.

On the long run, a close coordination and integration between production (both extensive and intensive), Marketing and industrial stages of the livestock sector should be aimed at. In particular the integration between the extensive stage for feeder cattle production and intensive stage for the finishing process,

could reduce cattle numbers on the grazing land. Rangelands would thus be mainly used by breeding and rearing stock, and the smaller cattle numbers should decrease devastation of range resources at present apprehended for part of the country.

4.1.1.3. Improving Animals Breeds

To increase the feed efficiency and a carcass characteristics of cattle, sheep and goats, it will be necessary to improve the local breeds. Although current plan lays an emphasis on this aspect of livestock development apparently not much is being done.

It is not proposed that the existing livestock breeds of Somalia be eradicated. On the other hand there is a need to establish breeding programmes in each region for developing nuclear stocks of selected bulls and rams for sale to herds men at subsidized prices. Selection among local breeds and grading up with foreign breeds that have proved capacity to stand local environmental conditions would lead to stimulate action for developing breeds for meat production. Some promising results have already been obtained at km 7 feedlot project. Also promising results obtained at the experimental centres in some neighbouring countries will be of great benefit.

4.2. Meat Processing Proposals

There is no doubt that the easiest and immediately most profitable export is that of livestock to the Gulf countries. (with no technology or investment problems) lowering local consumption of meat to achieve maximum exploitation of this market is clearly of the highest priority. Geographic, proximity to large markets is Somalia's greatest advantage in being able to export meat on the hoof without a large infrastructure and cost burden of various meat processing installations. The meat processing proposals are :

4.2.1. Centralization in building modern slaughter houses SH in Somalia

Usually slaughter houses are build close to the production areas to minimize the extra cost of transportation and to overcome risk

B. Frozen deboned secondary cuts

Canned meat	=	1080 Tons
Ground beef	=	500 "
Hamburger and domastic sausags & pasterma (receipe should fit the midele east consumer)	=	500
TOTAL		2080

There will be different prices for each kind of product, depending on the quality of the cuts.

The production could be increased whenever the demand increases. Chilled cracasses can be exported upon demand.

The five year Development Programme consists of expanding the capacity of the cooling facilities from 360 tons to 1000 tons ; the present capacity has never been fully utilized (2.3.2.1.), and with the problems already facing the plan, it is not advisable to to increase the existing capacity.

4.2.4. Proposal for Hargeisa Slaughter House

With problems already facing the meat industry in Somalia, it will be a good idea to postponed any new establishments until the situation is controlled.

4.2.5. Proposed know how needed and establishment of a training centre

Exports of livestock and meat being the back bone of the Somali economy for the time being and the time tocome it is, therefore ; a must to provide the qualified and well trained personnel and specialists for the meat industry in order to handle and develop this industry to increase the earning of foreign currency.

The major staff required for developing meat industry in Somalia are :-

Meat processing

Meat Inspection
Meat hygiene and quality control
Refrigeration engineers
By-product processing Specialist
Extension livestock specialist (for hides & skins).
Livestock marketing specialist

4.2.5.1. Proposed meat Processing Training Centre

Location : Municipal cold storage at Mogadisho aims to :-

1. Mainly for export of chilled and frozen carcasses and processed meat such as :
   - frozen deboned meat (beef)
   - Fancy cuts
   - Ground beef
   - Hamburgers
   - Domestic sausages and pasternia

2. Re-organized the local meat market with processed meat in order to increase the export of livestock.

3. Training of the local butchers about the modern methods of cutting and processing meat.

4. Preparing professional qualified labor to handle the meat industry all over the present and projected slaughter houses in Somalia.

Present and required facilities

Present facilities are shown in diagram (4.1). The new required facilities are :-

- Expanding of the receiving hall (which is going to be a processing room) to about 5 W X 26,96 L X 3.6 h. meters
- Two store rooms for ingredients, packing materials and spare parts each 5 W X 6L X 3.6 h meters.

marketing department and it is very important to have good telex and telephone connections to be uptodated concerning world prices of livestock and meat and to receive orders from importers.

The commission should realize the present and future requirements of transport of exported livestock and meat by setting a plan for providing its own ship and air cargo to supply any order in any time which is the main key to stay in competition.

(5) Dairy Cattle Production

- Improving arid and semi-arid areas which are usually used by nomads to find out a balanced situation between stock and land
- Bush clearing and controlled bush invasion
- Improving water supplies for cultivated areas.
- Introducing a forage/crop production policy
- Establishing rotational grazing systems along with water and feed reservoirs.
- Providing better animals for cattle owners by selection and upgrading methods.
- Application of management systems aiming at the improvement of herd structure, productivity and offtake.
- Adequate cattle housing, health, artificial insemination and marketing services.
- Extensive in-service training and extension service.

b) The Pastoral Sector

In order to draw the interest of the pastoral sector in milk production and to allow time for extension and technical services to achieve reasonable results, it is recommended that, at early stages of the development programmes, prompt marketing services at reasonable price for raw milk, and proper incentives be provided.

A net-work of small unit of milk collection and processing into products that would only need limited experience and low cost equipment (eg. ghee) might be first established. In this respect, a project was proposed by UNIDO (1) in 1976 to collect 36500 tons of milk annually for industrial processing by establishing 25 milk collecting centers in Sanaag and lower Juba regions. These centers would also operate as focal points for other livestock activities such as artificial insemination, health services, feed mixtures sale, and production recording . Mobile units for milk processing would also provide quick and readily available services.

(1) UNIDO, 1976. op. cit.

a) Small Farms

The lack of interest shown by cattle owners to enter the milk colony scheme made it necessary to seek other ways for providing urban areas with clean and regular milk supply. It was recommended (1) that planning should commence on establishing small holders milk schemes, whereby family units can set up self-contained farms that include, among other activities, milk production both for family consumption and marketing. The farm units would be centered around milk collecting/cooling centers each serving a radius of 6 km^2.

Demonstration/research units would be first established under government authorities to determine the desired size of family unit, an animal crop system of farming and expected returns from such units. These units would be also operated as fore-runners to the proposed small-holders milk producers scheme (1).

d) Intensive Farms

It seems more comprehensive for the purposes of the overall dairy cattle improvement plans to use the concept of intensified farms which can provide both production and solutions for breeding and management problems by the use of modern techniques in dairy farming. These farms should be run strictly on commercial lines under high levels of breeding, managarial and health control. The plan could be started with small farms of commercial sizes at economic transportation distances from large cities. The farms should be gradually provided with pedigreed cattle, use cultivated fodder and concentrates, be connected with marketing and artificial insemination schemes, and be supervised by a technical staff on improving production and quality of milk to satisfactory standards.

Dairy farms could be usefully linked with the beef production industry which is more important in many regions of the country. Extra males and females culled for breeding reasons and routine

(1) JASPA report. 1976. op. cit.

h) Research (1)

Experimental work aiming at obtaining the necessary basic date would help evaluate existing situation and examine future prospects. There is no reason to assume that higher yield and better performance can not be achieved when improved conditions are provided. Greater research efforts into identified problems which limit dairy cattle development are, therefore, needed. Such areas for research may be:

- Survival, reproductivity and productivity of local breeds, exotic breeds and crosses.
- Management method
- Major diseases
- methods to increase forage production
- The use of local food resources.
- Marketing
- Socio-economic aspects of dairy cattle improvement.

5.2. Dairy Cattle Breeding Programmes

a) Breeding Policy Under Favourable Conditions

Under favorable conditions, results of experiments and practical experience have given evidence that in sub-tropical and dry tropical areas where diseases are under control, where feeding is good (often zero grazing is best) and where animals can be protected from direct sunlight, European dairy breeds will produce more milk than local breed or cross. The friesen is the breed that has been proved to produce most milk and meat, reproduce and survive under a wide range of environmental conditions (2).

The breeding plan could be outlined as follows :

- A basic breeding unit of 500 purebred Friesen cows is established, and a controlled production recording system is applied. The size of the basic breeding stock may be increased if necessary .

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(1) Research institutions will be discussed in (Chapter 10)
(2) Mason, I'L Livestock improvement in Egypt. 3rd Conference of animal production Cairo 1969.

- Cows will be inseminated with imported frozen semen of tested bulls. Periodical changes in the origin of the semen will make available, the semen of the best bulls in different countries, and will lessen, or lead the avoidence of, inbreeding depressions.
- The best young bulls produced in the basic unit could be used for artificial insemination (AI) where well managed herds exist or for natural breeding to up grade local breeds where AI cannot be applied.
- Without any increase in the size of the basic unit, and even if natural breeding is used, the unit can produce young bulls enough to breed 10000 - 15000 heads annually. With the use of AI and breeding stocks, this number can be largely expanded.
- When sufficient numbers of cows are available, a breeding programme based on good performance records is carried out to develop the type adapted for local conditions.
- Selection within the Friesian breed should be continued for milk yield and fertility, that is directly for economic objectives. This seems more sensible than selecting for heat tolerance and food consumption since these traials are correlated with economic desiderata.
- Attention should be given to nutrition, management, and hygiene. Special care in rearing calves, provision of shade and continuous water supply especially in summer, control of ticks and flies are of crucial importance.
- Obviously, the adoption of such a policy for intensive milk production, involves complete cooperation among all institutions and authorities interested in dairy cattle production.

b) Breeding Policy under unfavorable conditions

Where critical environmental conditions and low level management prevail, progress, can be made in the milk output from existing cattle population by :-

- Selective breeding among local breeds and/or
- Crossbreeding local breeds with Friesian bulls or bulls from other superior breeds.

Selective breeding

Improvement of milk (and meat) production could be achieved by testing the productive capacity of the indigineous breeds of cattle, selection of high potential breeds, maintaining these breeds in adequate members, and carrying out an intensive selection programme. Rate of improvement depends on the number of animal in the breeding stock and on the accurancy of the accumulating information. A nationall study for each breed would be needed to preserved and maintain "purebred" stock, and make it available for distribution to local breeder. In order to get use of modern techniques, such as progeny testing, the size of the breeding stock should be about 1000-2000 cows. At early stage of the programme, mass selection, strictly based on production, would be followed. Progeny testing, artificial insemination, and other techniques for increasing the response to selection could be gradually introduced. In Somalia, the Duara cattle seems to originate from a common origin and the animals show considerable degree of uniformity. This breed is maintained for milk production and is kept in some government owned farms for crossbreeding purposes. These herds could be used in the selection of breeding stock.

Cross-breeding

The second method for improving local breeds is crossbreeding with pure breeds that proved capability of producing and reproducing under local environmental conditions. Under high levels of nutrition, health services, crossbreeding can be carried out to reach F_1 and F_2. The F_1 animals can be easily obtained and can usually perform well.With proper management, or more exposure to climate, the crossbreeds might prove superior to the pure breeds. The grading up scheme can be followed to produce higher grades of crossbreed animals. However, this should be approached with caution since it is possible to get animals that show lower fertility and

higher mortality rates. It would be recommended in such cases to keep the percentage of Foreign blood at the 50-70% level by the use of crossbred progency-tested bulls.

The application of crossbreeding requires a good recording system to provide continuous and accurate data on survival, growth reproduction and production of the animals in order to evaluate the different breeds, crosses and grades. Improved system of management would allow for the production of fast growing animals. Good heifers will be used for breeding purposes at early age and permit for replacement and selection. Males will be fattened for higher and better quality meat production.

In Somalia, the stated policy towards dairy cattle improvement has been concentrated on crossbreeding local cattle, mainly the Duara, with Friesian bulls. Boran, Brown swiss, and Sahiwal hulls were also tried, but with no continuity, Results that would provide a useful means of comparison and reliable assessment have not been put aviable.

c) Breeding Policy Under Hardship Conditions

Under the nomadic and semi-nomadic systems of livestock production, existing local cows would be the base for any improvement plan. The gradual use of proven bulls and the systematic sterilization of the undesired males would be paralelled with better range management system , health, marketing and extension services.

5.3. Artificial Insemination and Progeny Testing Programmes

a) Artificial Insemination

The principle feature of artificial insemination (AI) is that it enables an individual male to sire a very large number of progeny. The genetic implications of this can be understood by considering the theoretical expression for the expected genetic gain as the product of the heritability (1), selection

(1) Heritability is an estimate of the ratio of the additive genetic variance to the total variance. It is a measure of accuracy of selection.

intensity (1) and the phenotypic standard deviation (2). AI requires fewer breeding males, so there exists an opportunity to increase the superiority of the selected males and accuracy of selection when choosing sires for AI - use.

Where progeny testing is required, AI service has an added advantage over the traditional breeding programme. It would make possible the use of small herds for testing and selection among bulls under variable environmental conditions.

Developments in the frozen semen techniques made it possible to choose from a wide variety of bulls, and maximize the output per bull by permitting the most efficient use of semen. Longterm storage and transportation are easy and economic because a large number of doses can be kept in a minimum of space. The basic types of equipments needed for an AI network using frozen semen techniques are :-

- Laboratory equipments for processing the semen.
- Liquid Nitrogen production equipment.
- Liquid Nitrogen storage, transfer and handling equipments.
- Containers for freezing and storage of the semen.
- Containers to transport the semen to sub-centres and inseminator's bases.
- Field equipments.

The liquid nitrogen consumption for an AI - net work designed to inseminate 10000 cows per year is 695.5 litres per week (3)

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(1) Intensity of selection is the selection differential (that is the superiority of the selected parents over the population mean) in standard deviation units.

(2) Phenotypic standard deviation is the square root of the phenotypic variance.

(3) Livestock Improvement by means of AI. Phillips 1976

This estimate is based on the following assumptions :-

- There is one main centre where the liquid nitrogen plant and the processing laboratory are situated.
- There are 10 inseminator's bases which surround the main centre at an average distance of approximately 50 km.
- Four inseminators work from each inseminator's base.
- There are 10 bulls from which semen is collected.
- Each of these bulls ejaculates once a week and each ejaculation is sufficient for approximately 400 straws.
- Each inseminator's base is supplied once a week with liquid nitrogen and frozen semen from the main centre.
- Each cow has to be inseminated twice a year since their fertility is not exactly known.

Obstacles to the use of AI techniques are purely economical. The low density of the animal population in many areas and the small size of herd flocks would increase the cost of AI. A second problem is that of failure in heat detection and timely AI service. The result is that conception rates are decreased, and costs are increased because of the added insemination expenses and labor requirements. These barriers could be overcome by adequate location of inseminator's bases and close technical and extension supervision.

A possible genetic drawback to extensive use of AI is that the rate of inbreeding may increase if only a few bulls are used to inseminate the entire population of females. This would result in an immediate depressing effect on performance, and a tony-term reduction in genetic variation. In reality, the inbreeding problem is more acute for the strictly closed herd situation where the number of animals is small . Considering the national population as a whole, there has been some debate as to the optimum structure in terms of AI units and their interrelationships. In view with experience in dairy cattle, flexibility is available for the structure when the population is split into several independent unit,

and semen is exchanged among AI units .

AI has been carried in Somalia since 1969 using processed bull semen imported from Kenya. However the foreign exchange involved, and therefore, the restricted supply has limited the use of AI in the country. A net work of AI sub-centres was proposed in the 1974 - 1978 plan. The only implementation that took place was the establishment of an AI centre at Afgoi in which fresh diluted semen is produced (1).

The establishment of an AI net work using both imported and locally produced frozen semen would be of relevance to improvement programmes in dairy cattle. It is recommended that the use of AI be confined, at the beginning, to the large scale farms and densely stocked areas which can be put under close technical supervision and health control. This would continue for some years to come until conditions in rural and nomadic areas are improved.

b) Progeny Testing

In order for AI service to exert a favorable genetic influence it is necessary to use tested bulls to insure accurate choice among the males that are available within large herds, mainly kept in Government-owned farms. Progeny testing could be possible using natural matings. To get use also of the small herds for testing, and to be able to compare bulls under various conditions, a country wide system of AI should be instituted and be used for all available cows. This system would be supported with a good recording scheme for milk yield and reproductive efficiency.

A countrywide AI system will have the further advantage that it can supply services to progressive farmers who want to cross their animals with foreign breeds or to use selected local bulls for the improvement of their livestock.

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(1) For details, see section (2-4-6-, e) of this study.

Recommended AI - progeny testing system to improve milk yield in dairy cattle will consist of the following steps :-

- Young bulls for testing will be selected on their's dams yield and on their own growth rate.
- A proportion of the cow population will be used for testing a large number of young bulls at the rate of about 100 cows/bull.
- Services from bulls is restricted until results of the progeny test are known.
- Bulls are evaluated on the basis of their's daughter's yield, and superior bulls are brought back to service. They may be also judged by conception rates and still births shown by their mates, and on the fertility and ease of calving of their daughters.

(6) Animal Feeds and Rangeland

6 - PROGRAMMES FOR THE DEVELOPMENT OF ANIMAL FEEDS AND RANGELAND .

6.1. AGRO-INDUSTRIAL BY-PRODUCTS AS LIVESTOCK FEEDS

6.1.1. Objectives

It is unquestionable that increased forage production is the number one requirement of livestock production in Somalia. Through the right planning, development strategy and mangerial skill, there is little doubt that forage production could be increased to a level where livestock numbers will eventually be doubled and annual off-take tribed. It is clear that there is no other industry which would boost the country's earnings to this extent. In this field the two most profitable areas for development are improvement of the largest single resource, namely the northern and central rangelands and the efficient utilization of the immense amounts of the agro-industrial by-products available in the country. Because of Somalia's extremly variable rainfall patterns annual or seasonal herbage growth is unpredictable. Utilization of agro-industrial by-products must, be regarded as complementary to that of range grazing and is an aid to feeding of livestock at critical periods. All efforts should therefore be directed towards the maximum utilization of all by-products of efficiency of livestock production. It can be used for fattening or increasing the fertility during normal or used as survival feeding of range animals during droughts, thus turning a potential loss into a profit.

A summary of the potential by-products in Somalia and their nutritive value is shown in Table 6.1. It is indicated that the potential contribution of the agro-industrial by-products is in the order of 565, 531 tons of TDN/ year. Naturally this value depends greatly on the availability of the by-products. It is also believed that this value can be significantly increased through rational programmes for the efficient utilization of the by-products available in Somalia.

Assessment of the potential contribution of the agro-industrial by-products in animal feeding in Somalia, is included in Table 6.2 Assuming a daily TDN intake of 1.5% and 1.25% of liveweight of

TABLE 6.1 SUMMARY OF THE POTENTIAL BY-PRODUCTS IN SOMALIA AND THEIR NUTRITIVE VALUE WHEN USED AS ANIMAL FEEDS

By Products	Annual Production (Tons)	TDN %	Annual TDN Production (Tons)
Banana stems	200,000	50	100,000
Sorghum and Maize Stover	600,000	52	310,000
Rice Straw	6,000	40	2,400
Wheat Straw	3,000	50	1,500
Sesame stalks	150,000	40	60,000
Sugar Cane Tops	20,000	30	6,000
S Baggasse	133,120	41	54,579
Cotton Stalks	20,000	40	8,000
Cotton seed Hulb	600	44	290
Fruit Processing Products	1,200	55	660
Wheat Bran	4,390	66	2,897
Sesame Cake	10,000	71	7,100
Cottonseed Cake	3,000	70	2,100
Groundnut Cake	4,000	70	2,800
Sorghum and Maize Bran	5,500	66	3,630
Blood Meal	917	84	771
Meat & Bone Meal	3,207	65	2,084
Fish Meal	1,000	72	720
T O T A L			565,531

TABLE 6.2: POTENTIAL CONTRIBUTION OF AGRO-INDUSTRIAL BY-PRODUCTS TO LIVE-STOCK FEEDING IN SOMALIA

Animals	Av. Live Weight (Kg/ Head)	Daily Intake TDN % of Live-stock	Annual Intake TDN Ton/Head	Feeding potential Heads/Year
Sheep & Goats	25	1.5	0.137	4,127,360
Cattle	250	1.25	1.14	496,168

sheep & goats and cattle respectively, it is indicated that the available by-products can satisfy the nutritional requirements of 4,127,360 heads of sheep and goats or approximately half a million heads of cattle for a year. These values can easily be doubled if the by-products are fed only during the dry seasons in the year, It is therefore, asserted that the utilization of the animal and plant by-products can be an important aid to feeding of livestock at critical periods in Somalia.

6.1.2. Features of The Proposed Programme

In the light of the above described circumstances, a national programme for the maximum utilization of the Agro-industrial by-products in livestock feeding should be set up end given a top priority in the national plans. The utilization of by-products can be outlined as follows :-

1) A comprehensive survey of all the by-products of plant or animal origin, presently produced in the country : A team of feeds and feeding specialist should be recruited for this survey. The availability of the total amounts of by-products, should also be determined.

2) A study of the nutritive value of all the by-products available in Somalia. The staff in the nutritional laboratory in By-product unit at Km. 7 can be strengthened in order to be best suited for the analytical work of the proposed study. Digestibility trials should be conducted using cattle, sheep and goats in order to determine the potential nutritive value of the by-products (TDN and DP contents) when utilized in livestock feeding. The By-product Unit, Km 7 should therefore be provided with digestibility crates and facilities. Two livestock assistants should also be trained to conduct digestibility trials and balance experiment.

3) A study of various conventional methods used for improving

the nutritive value of low-quality by-products. The methods suggested for this purpose are :-

a) Microbiological methods : This mainly apply to silage making procedure. Various types of silage have been made from poor quality by-products and therefore the nutritive value was improved. The daily intake of these low quality by-products is improved as a result of the ensiling process. Experiments under similar conditions in Egypt and Sudan have indicated that silage making is a successful method for improving quality and intake of a number of by-products. Different types of silos have to be tried in order to select that most suitable for Somalia's conditions. Various additives should also be attempted in order to secure the maximal conditions for producing good quality silage from the agro-industrial by products. The period after which the silage could be fed to dairy and beef cattle under Somalia's environment, should be determined.

b) Chemical Treatments : This mainly includes the treatment with Alkali ; namely Sodium hydroxide, calcium hydroxide or ammonium hydroxide. Experiments in many countries showed that the alkali treatment improved greatly the nutritive value of the poor quality by - products such as maize stover, rice straw, wheat straw, bagasse and sesame stalks. Wet and dry alkali treatments should be attempted in order to investigate the most effective procedure under the climatic condition prevailing in Somalia. The optimal period of exposure to the alkali treatment must be determined. Simple and effective methods of alkali treatment should be selected in order to attract the small livestock owners to use the treated by-products.

c) Urea addition :- In many cases urea has shown a synergism with the poor quality by-products. The addition of urea to maize stover or the bagasse results in a great improvement in the nutritive value of these by-products due to

improved in nitrogen contents and digestibility of crude fiber in the by-products. On the other hand, urea utilization was stimulated in the presence of fibrous by-products. Urea addition is now widely used in animal feeding in many parts of the world. Urea is added to dairy cattle rations produced in the feed mill at the by-product Unit, Km. 7, Mogadishu . Experiments also showed that the addition of Urea to the Alkali treated by-products is beneficial and reduces the need for the addition of great amounts of soluble carbohydrates to the urea-contuining ration.

d) Physical Treatment : Grinding, crushing or treatment with steam are possible physical methods which may improve the nutritive value of fibrous by-products, such as cotton and sesame stalks.

4) A technical and economic, feasibility study for including the treated by products in a feed milling industry : Somalia has started some activities in the field of feedlot operations and dairy production projects. Intensive beef production is now represented by feedlot operations in By-product unit, Balad Feedlot and Trans-Juba Project. Dairy Farms or 21st October and Warmaahen are attempts towards increased dairy production. Municipal Dairy farms are also conducting programmes for milk production. Intensive beef and milk production should be coupled with a sound feed milling industry. Feed milling in Somalia is almost non-existent. Production of animal feeds is only carried out in the Pilot Plant established in the By-product Unit, Km.7. The production of animal feeds in this pilot plant plant in 1976 was as follows :-

a)	Animal feed for meat production	14.3 tons
b)	Animal feed for milk production	461.6 tons
c)	Poultry feed for layers	839.8 tons
d)	Poultry feed for chickens	244.9 tons

These amounts of feeds were utilized by the projects of the Ministry of Livestock, military farms and other small farms. The absence of sound feed milling industry may be partly due to the fact that Somalia is not rich in cereal grains and imports are directed towards human consumption. However, this difficulty could be overcomed by replacing the grains in the ration to the maximum extent by concentrates which are locally available as by-products. Wheat and maize bran, sesame cake, fishmeal, bone and meat meal are examples of these by-products.

In all projects of beef and milk production, the cost of producing the unit of beef or milk should be determined in concrete terms. Normally the cost of feeds and feeding has to be less than 60-80% of the cost of meat produced. Reducing the cost of feeds will certainly lead to greater return in beef and milk projects. It is therefore necessary to use relatively cheaper roughages and concentrates for producing feeds. The use of untreated and treated agro-industrial by-products in a feed milling industry will reduce greatly the cost of meat and milk production in Somalia. High return will encourage livestock owner for the intensive systems of beef and meat production. This trend should be reflected upon the national income of Somalia. It is, thus believed that a technical and economic feasibility study of the use of the agro-industrial by-products in a feed milling industry, should be given a s top priority in livestock development programmes in Somalia.

6.1.3. Requirements and Means of Implementing the Proposal Programme

The proposed programme for the maximum utilization of the agro-industrial by-products can be best carried out in the By-Product Unit located at km.7. The programme can benefit from the present facilities available in this unit ; namely nutritional laboratory, pilot feed milling plant and feedlot yards. However, the facilities and staff in this unit should be strengthened in order to have all the objectives of the programme, achieved with a great extent of

perfection. The requirements of the programme are outlined in the following :-

1) Training Component : The staff of the By-product Unit should be supplied with three well trained assistants. These assistants should be trained to :-

   a) Techniques of feed analysis ;
   b) Conduct digestibility trials and balance experiments ;
   c) Methods of silage making from the agro-industrial by-products ;
   d) Tests of silage quality ;
   e) Chemical treatments of agro-industrial by-products ;
   f) Long-term feeding trials.

Fortunately, there are programmes of similar objectives being conducted in countries which are in a position to help Somalia in the field of training. Two programmes on the utilization of the agro-industrial by-products as animal feeds are now being carried out in Alexandria University, Egypt and in Khartoum University, Sudan. These two programmes include a training component for Somali assistants. An invitation from Alexandria University has already been directed to Ministry of Livestock in Somalia to, select an animal feed technician for Trainings on various aspects of by-products for 4-6 months in Alexandria programme. The Khartoum programme can be immediately approached for accomodating 1-2 feed Technicians from Somalia to be trained feed analysis, digestibility trials and long-term feeding practices. Graduates of Animal Science School are good candidates for training in the programmes of the utilization of the agro-industrial by-products.

2) A study team of experts :- A team of experts should be recruited in order to :-

   a) Conduct a comprehensive survey of all the potential agro-industrial by-products available in Somalia ;
   b) Conduct a technical and economical feasibility study for

including the chemically treated and non-treated by-products in a feed milling industry ;

The team should consist of feeds and feeding expert, Agricultural economist, feed milling expert, agricultural engineer and agronomist. Ministry of Livestock, Forestry and Range can contact a number of International Organization for Agricultural Development (AOAD), league of Arab States can provide Ministry of Livestock with the team of experts upon the request of Somali Government.

3) Feeds and Feeding Consultant : An expatriate consultant is required for two months during which he will advise the staff in the By-product Unit on the means of implementing the proposed programme. He can also conduct " In-Service" training on all aspects of utilization of by-products as animal feed. This consultant should be recruited during three years in order to supervise the progress achieved in the implementation of the programme. Somali Government can approach the Administration of League of Arab States or Arah Organisation for Agricultural Development in order to recruit this this consultant through their programmes for technical aid to member countries.

4) Capital Equipments : In addition to the facilities present in the by-product Unit at Km. 7, the implementation of the proposed programme requires the following capital equipments :-

a) Facilities for the construction of two trench silos, located in a dry place. Each silo shall be 2.5 m. deep, 8m. large and 50 m. long. The internal wall rainforced with cement, shall be 0.5 m. higher than soil level. A silo of this type should contain about 800 tons and cost 50.000 So. Shs.

b) Two tractors are required for the silage making and transportation of the ensiled by-products to the livestock yard. These two tractors cost about 150,000 So. Sh.

c) A land-Rover Pickup for the use of the programme personnels

during the phase of survey and collecting samples of the by-products for analysis and determination of nutritive value. This wagon may cost about 50,000 So. Shs.

d) Equipments for Nutritional Laboratory in by-product Unit in the range of 100,000 So. Shs.

e) Equipments for the modernisation and increasing the capacity of the Pilot Feed Mill at the By-product Unit. A budget of 500,000 So. sh. should be allocated for this purpose.

It is noted that the total estimated budget for the capital equipment needed for the implementation of the proposed programme is in the order of 900,000 So. Sh. ($ 150,000). There are a number of a international Organisation which may be interested to assist Somalia in a programme for the utilization of the agro-industrial by-products as animal feeds. The international Development Research Center (IDRC), Ottowa, Canada has been active in funding and promoting such programmes in developing countries such as Egypt and Sudan. The center can easily support an additional programme in Somalia in the range of $ 250,000 (1,500,000 So. Sh.) upon the request of the Ministry of Livestock, Forestry and Range. The Ministry can seek the help of Arab Organisation for Agricultural Development in recruiting a feed and feeding consultant for preparing the programme proposal in collaboration with the director of By-product Unit, km. 7 Mogadishu. A well prepared proposal will certainly receive positive response from IDRC and thus leads to the implementation of the proposed programme which benefits the livestock industry in Somali Democratic Republic.

6.2. Rangeland Programmes

6.2.1. General Comments

1) The current strategy adopted by NRA for rangeland development hinges around effecting more grazing control over wide areas, than previously achieved, by gradually expanding the areas reserved for dry season grazing. Current rangeland projects work on the implementation of a rotation grazing system to help restore range productivity to potential level. Certainly this policy of grazing control should be fully endorced and given complete support.

It is not certain, however, how much range improvement can be obtained from application of rotation grazing without adjustment of stocking rates. As it seems little emphasis is being given to stocking rates in relation to range productivity. However to reach at the proper stocking rate we have to deal with two problems : One is determination of the potential capacity of the range, the other is how to destock the range if such a measure would be necessary. The carrying capacity cannot be simply determined from measurementsof forage production since range condition has to be considered as well . Variation in carrying capacity following variation in rainfall is expected over most Somalia, but to what extent is not known. It was noted in section 2.6.5.3. that the average stocking rate for Somalia is 22.1 A.U. km^2. This rate is somewhat in excess of the average estimated carrying capacity (17.8 A.U.Km^2) for most rangelands based on available estimates of forage production. This capacity was determined on the basis of an estimated 13.22 m tonnes of dry grazeable forage production from rangelands plus 60% to account for browse. Whether these estimates are valid or not will need to be ascertained by future studies. It is suggested that a sufficient number of range sites would be chosen in each vegetation type and fenced for the measurement of forage production of the end of each rainy season every year. The results of these measurements would be taken as a guide line to adjustment of stocking rate. Though measuring the amount of browse is difficult, some intensive work should be carried out

on its assessment in few sites for each range type.

2) The problem of implementing the proper stocking rate is recognizably more difficult than anything else under the present system of nomadic grazing. The setling up of cooperative ranckes would help in achieving this but cooperatives are not likely to cover at best more than 40% of the rangeland. An approach to the problem may be the setting up of nomadic associations (Section 6.2.2.3.6.) through which a proper range utilization policy can be achieved.

3) The resting of some range areas according to the rotation grazing plan is believed to result in improvement of regeneration of range plants. This, however, will depend upon the length of the rest period and the state of degeneration that has occured. Therefore it is suggested that flexible system of grazing management, be adapted to match range condition (section 6.2.2.3.1.)

4) In addition to exerting control over stocking rate and grazing time, it is recommended to initiate a program for reseeding depleted ranges with adapted grass and legume forage species. In areas of sufficient rainfall (above 250 mm). reseeding may turn out to be more rewarding than protection from grazing as a method of range rehabilitation. A trial project for reseeding is given in Dection 6.2.4.

5) The development of new watering points should always be tied up with a general rangeland utilization policy. The development of a new source in a water less area will result in over-use in this area if it is not suitable for year long grazing. The concept of closure ofwells to control grazing has shown frequent failures in similar countries.

6) Basic search directed to the soultion of many problems related to range utilization should be supported. Particularly, research is needed on : range types ecological significance, chemical composition of grazing and brows forage, the effect of

grazing on botonical composition. The influence of rainfall on range productivity, the effect of protection from grazing, reseeding, bush control and the production of heavy from dryland and irrigated pastures.

7) Training at all levels should also be given more emphasis than present. The establishment of range service should receive serious consideration (section 6.2.2.3.7).

8) For the preservation of wild-life, it is highly recommended to study the feasibility of establishing a national park for wide-life.

6.2.2. Proposal for A Range Development Project for South Central Region

A) Introduction

The crucial importance of rangelands to livestock production in Somalia requires an integrated program of range rehabilitation with the objective of arresting range degardation and realization of its potential as conditioned by climate and soil . Many past decades of misuse have resulted in deterioration of large areas of rangeland and reduction in forage production of most ranges. This is going at an accelerated rate especially with the increased frequency (two years in five) of drought years. The failure of the nomadic pastoralists to realize that the natural range, if used wisely, can be an indefinite resource for their welfare, is one of the most difficult hurdles which all range development schemes have to overcome in order to realize their objectives. Of equal importance as well is to create among them an appreciation for developmental schemes by getting them share the responsibilities of development and the benefits accruing from it.

Planned rangeland rehabilitation should, therefore, have the nomadic pastoralist at its core and radiate all aspects of development therefrom. This approach should find support from the

fact that nomadic pastoralists comprise the whole majority of range users at the meantime. Though in future systems alternative to nomadism may find their place, the change over is going to be slow. Therefore to dissociate nomadism from immediate plans for range development would yield little progress. Stated another way, the most pressing need is to salvage the rangeland from further degradation albeit accepting the present nomadic system as workable until a better system is evolved. It

It is fortunate that national awareness of the need for integrated rangeland development is becoming more explicit every day. This is reflected through the establishment of NRA as a responsible body for range preservation, and the enthusias with which its activities are met with.

The most pressing problems of range development in Somalia are the shortage of funds and technical manpower, the scarcity of b basic information about the range resource and absence of an efficient range extension service.

Agriculture in Somalia is mostly centered in the area between shebelle and Juba rivers. Here both irrigated and dryland farming are practiced in some 600,000 ha, the rest is range. There is considerable potential for integrating agriculture in this area with utilization of the rangeland in the same as well as in adjacent central regions.

On-going or proposed range development programmes in Somalia capitulate upon the application of a unified rotational system of grazing as an important aid to range improvement. No attention is given to range condition or to adjustment of stocking density, which are important management factors.

The Project area includes the Bakool , Hiraan and Middle Shebelle region the surface area of which is about 110 km^2. Live-stock numbers in these regions according to the 1975 census are :-

	Bakool	Hiraan	M/Shebelle
Camel	192,000	460,000	236,000
Cattle	100,000	170,000	366,000
Sheep/Goat	353,000	1,446,000	1,044,000

B) General Description

The principal elements of the project are :-

1. Establishment of grazing management units on basis of range condition classes.
2. Adoption of a flexible grazing system to suit the condition of the range.
3. Adjustment of stocking density according to carrying capacity.
4. Development of new watering points as needed to effect the plan of range use.
5. Integration of agriculture with range utilization.
6. Setting up of nomadic grazing associations.
7. Provide training and establish an extension unit

C) Detailed Features

1. Range Division Units :- It is suggested that the concept of dividing the range areas into grazing reserves of 1000 km^2 units as adapted in the Northern and Central Rangeland projects be changed to one where the rangeland would be divided into management units each of which could be considered as having a uniform range condition. Such units would be classified as "good", " fair" and "poor" according to desirable features of vegetation and the degree of soil erosion. Units need not be of equal size but considerable flexibility should be allowed even to include localized good sites into a large tract of badly damaged terrain. However, if area of one condition class turns a out to be larger than 1500 km^2 then it can be divided into 2 separate units should consider the

Location of watering points such that each will have its own water source or the source would be on borderline between 2 adjacent units. Delimiting special reserves around settlements for the particular use of the settlers will be carried out only when settlers are not totally engaged in livestock production. Even here these reserves would be divided into one or more condition class though most probably such areas would be of one class.

Drought or famine reserve areas will be selected from among those units classified as " good" range. These areas do not seem to be of much great value unless sensibly grazed between the " GU* and * Der" seasons and perhaps year on and year off in order to control undesirable woody vegetation and dry grass stubble. Their forage production during droughts will depend upon rainfall in the previous seasons and the percentage of perennial grass in the vegetation.

Dry season reserves in the project area will be included in the division system just as grazing units and will receive management treatment according to their condition classification.

2. Grazing Systems

In addition to range condition class, the system of grazing for each management until will be influenced for the "good" range by whether the unit is classified into one suitable for year long grazing, for wet season grazing or only dry-season grazing. This classification will depend upon the availability of water from existing points, whether these points are temporary or permanent and on the nature of the vegetation.

" Poor" range units should be closed to grazing for 2 years and open for grazing the " Haga" dry season of the following year then closed again and so on.

" Fair" range units would be grazed one year and closed three years, with grazing only in the dry seasons.

" Good " range units will be grazed any time of the year depending upon the availability of water. However, it is for water less areas of this class that watering points should be developed to extend the time of utilization. The rotation grazing system then can be applied on 4-6 - or 8-years basis with closure during the wet season every fourth, sixth or eighth year depending upon observed response of vegetation to closure.

The distribution of units open for grazing is expected to be as follows :

Range Class	% of Total	Rotation Years	% Area Open
Good	50	6	42
Fair	20	4	15
Poor	30	3	10
	100		67

Thus areas relieved from grazing pressure every year would be about 33%. This is larger than the projected 25% closure under the present NRA policy. However the present system will call for no greater reduction in stocking rate since the rested " poor " areas will produce more forage under the longer rotation.

3. Carrying Capacity

Unless suitable carrying capacities are worked out for ranges of different conditions, any system of grazing will have little effect on range vegetation improvement. Somali rangelands are generally stocked to over their capacity. Over-stocking is more damaging now than ever because of disproprotionate distribution of stock over ranges of the different regions. The average stocking rate for the country estimated as 22.1 animal units/km^2 (table 2-23) is considerably high. Certain " Good " range

northern rangelands project has funds particularly allotted to the purchase of equipment needed for range extension. Also experts will be recruited for this objective. Mobile extension units would be needed including projectors, cameras and other related items.

6.2.2. A Proposal for a Forage Seed Production Project

A ready supply of seed of adapted high yielding forage and pasture crops is one important factor encouraging the introduction of wide scale forage production in Somalia. It was shown earlier that forage production is at present of limited scope both under irrigation or dryland farming in the southern parts of the country. Also in Northern regions there is potential for expanding pasture and fodder crops areas particularly where rainfall is sufficient (North - West region) or where arrangements are being done to expand harvesting of run-off water or utilized flash floods from tugs. At present only sudangrass seed is available for sale in limited quantities. Most of the seed is produced and used on farm.

Seed of other highly productive perennial grasses and legumes are not available and if needed for trial purposes they are imported in small quantities. Permanent pastures suited for forage production in many sites subject to erosion when tilled reply on natural grass vegetation.

Objectives : the objectives of the seed production product are :

1. Develop practices of optimum forage seed production from adopted forage species.
2. Initiate trials to test the adaptation of potential forage species in reprdesentative parts of the country.
3. Practice seed production of adapted species on commercial basis.
4. Provide training for junior agronomists on seed production, seed clearning, seed storage and seed testing operations.

3 balances, 5 flurescent lamps, petri dishes, 2 ovens. The total cost of this equipment is estimated at So. Sh. 100,000.

Output from seed production farms are expected to be 500 tonnes of Sudangrass, 150 tonnes of grass seed. An additional output would be the sudan stover which can be harvested and baled for sale to livestock owners .

Legume seed production should be started on experimental 5-ha areas in order to develop the experience of legume seed production which requires specific skills especially in harvesting operations.

6.2.3. Proposal for A Trial Project on Range Reseeding

There are considerable acreage of range in Somalia where previous grass has been much reduced due to overgrazing. In many such ranges only low quality annual forbs may be present with the result that grazing capacity is substantially reduced. The restoration of grass vegetation in these ranges cannot be achieved by practicing control over the stocking rate or by system of rotational or deferred grazing. Though complete protection from grazing may be helpful, revegetation progresses at a very slow rate especially when rainfall is inadequate. For these areas a successful program of reseeding with adopted legumes and/or grass would increase the carrying capacity several folds in few years.

The carrying capacity of good range sites in the northern region may reach up to 65 A.U/km^2(1). In the same ecological region many pasture have degraded to a meagre capacity. This is an idication that range reseeding my be quite successful if adapted species are tried.

In the lower Shebelle and inter-river area and in many other parts of the southern ranges, considerable areas have also been denuded of their grass cover and low quality bushes of Acacia has taken over. This has come about from the change from camel to cow grazing in recent years. Much of this land is now unsuitable for grazing neither animal. The clearing of bushes to encourage

(1) Abdi, R.A.(1977) Report on Habari-Hashay Cooperative Ranch(Hodan)

grass growth is certainly useful. However, any increase in range carrying capacity upon clearing must offset the cost of clearing. Neither technics of bush clearing nor the economics of it have received any attention and no investigation has yet been done on this problem. The possibility of increasing carrying capacity following a combined program of bush clearing and reseeding seem worth while. Nothing can, however, be certain before data are provided from well-managed trials and on the basis of which policies for bush clearing may be formulated.

Objectives : The specific objectives of the trial project are ; to :

1. provide information on the value of reseeding depleted northern rangeland with adapted forage species.
2. Compare different methods of bush clearing in selected southern range sites with or without reseeding following clearing.
3. Secure data on costs and benefits from bush clearing.

Duration : 3 to 4 years

Implementation : Project implementation will involve the following steps :

1. In the northern region , carefull selection of sites is very important. Grass growth in adjacent protected areas will indicate potential of the degraded site. The vegetation and soil in the site should be analysed. It is suggested that 5 different sites in the northern region (Togdheer, Sanaag, Nugaal) be selected to represent of different soil types. In each site an area 10 ha size is fenced and internally divided into 2000 km2 . Plots (50 plots), two of each will be seeded to one species. In the southern region bush infested range select three 20ha areas and fence each. Divide each into 20 equal divisions. Survey the vegetation and soil of each site. The following bush control treatments are suggested

1) Slashing (Manual clearing) - collection and burning, 2) doser clearing, 3) Chemical arboricides including (2,4 -D), (2,4,5-T), gramaxone and other commercial substances 4) Fire (during the dry season).

The application of the arboricides has to be during active bush growth. Each clearing treatment is done in two divisions one of which will be seeded to grass before the GU' rains, the other is left for natural revegetation.

For all reseeding trials data should be collected on grass establishment, annual forage production and the botanical composition of the pasture at the end of the trial.

The list of grasses suggested for reseeding in given below

	Species	Variety/ Strain	Seeding rate kg/ha
Grasses			
Buffel	Cenchrus Ciliaris	Bilosela	5.0
	Urochloa mosambicensis		4.0
Rhodes grass	Chloris gayana		1.5
Blue panic	Panicum antidotale		4.0
Setaria	Setaria anceps		3.0
Guinea grass	Panicum maximum		3.0
Green panic	Panicum maximum var.		
Legumes	trichoglume		1.0
Stylo	Stylosanthes Guyanensis		3.0
Verano stylo	Stylosanthes hamata		3.0
Siratro	Macroptilium atropur-		3.0
	puerum		
Leucaena	Leucaena leucocephala		15.0

All seed is available from seed firms in Australia.

Requirements : Project requires :

	So. Sh.
1. Seed	24,000
2. Chemicals	5,000
3. Buldozer (Hire)	5,000
4. Fencing	30,000
5. Labour	30,000
6. Technicians	96,000
	190,000

(7) Animal Health Service

7. PROPOSED PROGRAMMES FOR THE DEVELOPMENT OF ANIMAL HEALTH SERVICES.

7.1. CONSTRAINTS IN ANIMAL HEALTH SERVICE

In spite of the intensive care of animal heal th and establish - ment of well thought out projects for development and rehabilitation veterinary services still face serious handicaps which if not catered for will hamper the country's enthusiastic livestock development programmes. It is futile to think of developing livestock industry in a country where epizootic disease are still existing in absence of an objective view to relief all the constraint that face animal health services. Fortunately Somalia is doing every possible effort in its capacity to intensify veterinary infrastructure nontheless the following constraints could be listed.

7.1.1. Lack of Trained Experienced Professional Staff

Out of 18 veterinary doctors working in the department of animal health only 5 of them are with higher qualifications (M.Sc. degree). Three of these work in the serum and vaccine institute, two in the field and one in the tsetse eradication project. A biologist with Ph.D. and other higher qualifications leads the tsetse reclamation project. Nearly all of those with higher qualifi- cations are doing administrative work rather than scientific work. The majority of the Somali Veterinary doctors are young lacking both field experience and scientific work. Their basic training whether at home or abroad is excellent. They have the will and enthusiasm but they lack guidance and experience.

Lack of trained veterinary assistants is being lifted up grad- ually since the establishment of the training school for animal health assistants. The school is graduating enough number of veter- inary assistants that will fill the gap between the university ce erinary professionals and the vaccinators and other veterinary workers.

lowering of the animals resistance to diseases.

7.1.9. Lack of Laboratory Animals

The serum and vaccine Institute is an integral part of animal health department. However, in addition to the shortage in the qualified postgraduate personnel and transport system which are common problems in all animal health diciplines, the institute has its own problems. One of the most important is lack of small laboratory animals e.g. mice, rats, geninepigs, hamesters and rabbits. These animals are very important for diagnostic purposes, record programmes and even for vaccine production and testing of their potencies. The institute lacks a specific pathogen free (SPF) flocks of fowls for the production of newcastle and fowl pox vaccines. This problem though it seems minor, yet it is an extremely important item in vaccine and bilogical products as well as in diagnosis of diseases.

7.1.10. Lack of Library in the Institute

An institute like the serum and vaccine institute which is endulged in production and research work must be adequately supplied with a library that contains text books, journals and periodicals in all veterinary aspects. At present this is not found in the Institute. The University Library is also insufficient in such books and journals.

7.1.11. Shortage of Electrical Power in the Institute

The Serum and Vaccine Institute with all of its machinery complexes is short of sufficient electrical power. 4 electric generators of power 400 kw are needed to enable the institute to work in its full capacity to fulfil the requirements of the country from vaccines and other biological products. Shortage of electrical supply and power cuts cause damage to the manufactured biological products and sometimes cause damage to the instruments.

7.2. Proposals for effective animal health services

7.2.1. Control of C.B.P.P.

Efforts have been made in Somalia as well as in many other countries to launch a joint compaign against C.B.P.P. in much similar ways as the anti-rinderpest JP 15 compaign of 1972-1975. It seems that there are many obstacles handicaping this project. Among these is the problem of finance of the project from the doner international organizations because this project is very expensive and cannot be implemented by a single country. Other problems are technical difficulties concerning the production of a suitable vaccine for this disease. All vaccines available in usage do not give the desirable immunity. Experts on Mycoplasma infections recommend the use of only two vaccines viz. the KH_3J and the T_1-44 strain vaccines. The advantage of KH_3J vaccine is that when injected it does not produce side effects as T_1- strain vaccine. Its disadvantage, however, is that it confers immunity only for 4-6 months. In the Sudan it is said that it produces immunity upto 9 months. The keeping quality of KH_3J vaccine is short (only three weeks at room temperature). The T_1- vaccine on the other hand gives a comparatively long immunity duration which duration which may last upto 14 months. The major disadvantage of T_1- strain vaccine is that it produces undesirable side effects. These side effects are represented by the formation of oedemas at the site of injections. These oedemas sometimes clear up by themselves and sometimes become purulant ulcers which may extend over the whole side of the animal and may even cause death. It is true that the number of cattle which react undersirably when inoculated with T_1 vaccine is very low to the extent that it does not exceed 1-2% in the Sudan, but nevertheless it causes some worry among stock owners and animal traders. An excellent vaccine for C.B.P.P. is that which combines the advantages of both KH_3J and T_1-44 strains. But this is still an illusion and a field for research workers to probe into.

It is obvious that there are so many technical problems not yet solved as far as C.B.P.P. is concerned. In light of this we advise

of two different groups of acaricides when dealing with resistant tick species.

We are inclined to advise using in-situ dips and mobile tank dips. The in-situ dips should be placed in provincial and district headquarters in appropriate cattle routes where adequate supervision by vets or their assistances could be provided. Mobile dips can be used in conjuction with vaccination activities and special workers have to be trained to use them. Routine cattle and sheep dips or spray should be practiced all over the country . If construction of dips and purchasing of mobile tanks are impracticle due to any financial shortages it is advisable to use bucket and sponge method which would cost very little and would give very good results. All that is necessary is to aducate the stockmen to do this job and to supply them with suitable acaricides and to distribute to them suitable measuring divices.

Tick control in itself is not an end but it is a means for controlling the most killing parasitic diseases of animals thus paving the way for better husbandry and hence better production. It must be remembered that tick control is just one aspect of better management and it is absolutely ineffective in the absence of better nutrition, better management and better breeding.

7.2.7. Tsetse and Trypanosomiasis Control

Trypanosomiasis is one of the major diseases problem to man and animals in the majority of African countries and Somalia is only one of these. The disease causes great economical losses to livestock in the forms of death of the animals, losses in their liveweights or decreased production of milk and meat. It is difficult or even impossible to eradicate tryponosomiasis by treatment with chemoltherapeutics because the organism from time to time gain resistance against these drugs and render them useless. It is still not possible to develop a vaccine or vaccines which will give protection against any or all forms of tryponosomes though research programmes in various countries are oriented towards this aim.

Different methods to combat the disease had been implemented but the results for all to see are not very encouraging. One of the earliest methods used was to avoid the infested areas. This might not be practicle in Somalia because the infested areas (map 2.6) provide the best grazing land and the only place where animals can find water easily and in abundance. Water points away from the river valleys are few and situated in places where there are no good pasture.

The other alternative is to resort to the treatment of the infected animals. This although practiced widely in Somali (Table No. 2.3) as well as in other countries but it has some drawbacks. The drugs are expensive and there is always the fact that tryponosomes gain resistance to them especially when these drugs are used indiscriminately by nonskilled personnel or by stock owners.

The most reliable method, yet the most expensive of all of them, is the elimination of the tsetse flies. This is done by many ways e.g. by spraying the infested area with insecticides using light aircrafts. The methods was tried in South Africa and Zaire with excellent results. Another method of elimination is to clear trees and bushes about 2-3 kms. from either side of the rivers, banks and to spray the rest of the area with insecticides. The method is successful at the beginning but no sooner the shrubs grow than the area becomes infested exactly as before. A third method for the elimination of tsetse flies is joint hand spraying with insecticides and hand catching of the flies by fly catchers. The method is tedious and takes a long time but its results are remarkable specially in isolated infected pockets e.g. islands or separated forests. The method has been tried in the Sudan in Nuba mountqins and Jur Narows in Bahr el Shazal Province with the result that the the first area is completely freed from tsetse flies but the second one was reinfested due to lack of veterinary services and flow-up during the political unrest of the southern Sudan.

The most recent method for elimination of the vector tsetse

flies is by bilogical methods or by what is known as genetic warfare. This is accomplished by sterilizing the males of tsetse flies by irradiation and the release of these irradiated males in the infested areas. The irradiation renders the trypanosomes incapable of developing in the irrediated flies and their offsprings which come out carrying the characters of their fathers. This method seems to be a breakthrough the problem of tsetse and trypanosomiasis but its consequences remains up to now everybody's guess. A radio-isotope unit is being built now in the central veterinary Research laboratory in the Sudan in which irradication experiment will be conducted. Researchers in the Sudan would definitely like to have a joint research programmes with the Somali counterparts. Bearing all these facts in mind the best policy to be adopted here in Somalia would be the combination of different methods at the same time. These include the anvoidance of the infested areas wherever possible and this may necessitate establishment of water points away from the river banks and improvement of rangelands which many projects are tackling it now. Treatment of infected animals must naturally continue with the trypanocidal drugs avoiding as far as possible the indiscriminate use by unskilled personnel and stock owners. This in addition to spraying of the infested areas by hand catching and spraying system. Using these methods will certainly reduce the trypanosomiasis incidence to a degree short only of eradication.

7.2.8. Control of Newcastle Disease

Newcastle disease is a contagious viral disease which is extremly fatel to fowls and other birds. In the tropical areas natural reservoirs of Newcastle Disease virus (NDY) exist in wild birds. NDV belongs to the paramyxoviruses. It contains RNA in a nucleoprotein helix surrounded by an envelope containing lipids. Vaccines against newcastle is important because virtually being a virus diseases it has no treatment. The vaccine should be safe and efficient for long duration with a minimum of boaster doses and few complications. Because of the rapid genetic variation in the NDV prophylactic measures are difficult and vary from one country to another depending on the type of the field virus. Virulent

strains of NDV (The velogenic strains) cause fatal diseases while the milder strains (the lentogenic strains) cause low mortality but greatly affect egg production. Vaccines are usually made from the attenuated live viruses e.g. La Sota, Hitchner B_1 and Kamarove strains. Sometimes in special circumstances inactivated vaccines are employed. In Somalia the La Sota strain is used for the production of vaccine and it seems that it works under the present circumstances. But in view of the future intensification in poultry farming it would be justifiable to revise the policy of immunization. If chicks come from immune dams they possess maternal immunity which will be enough to protect them against the disease for at least three weeks. In this case they do not need vaccination at early stage. They can be vaccinated at 3-4 weeks and revaccinated at 6 months before laying and at the age of one year. If chicks are kept as broilers they do not need revaccination as they are got rid of at two months age.

If , however, chicks come from non immune dams then they are liable to get infection at early stage and therefore they have to be vaccinated at 1-4 day old with one of the lentoganic mild strains either B_1 strain or La Sota strain. Kamarove strain is a hot is a hot one and may kill many of the chicks at this stage. The ideal situation will be will be to vaccinate with B_1 or La Sota at 1-4 days and then vaccination is repeated at 4 weeks with Kamarove strain. This will confer solid immunity for one year when vaccination is repeated with Kamarove strain.

7.2.9. Veterinary Personnel

It could be judged from para 2.8.2.2., and table 2.30 and 7.1 that animal health services are suffering great shortage in veterinary doctors, higher qualifications among the existing veterinarians are few. The number of animal units calculated, taking the cow as a base, as shown in table 7.1. is approximately 13.5 million units. If the accepted ration of vets/animal units is taken as 1/35,000 in the tropics, Somalia will be in need of 389 veterinary doctors in the field of animal health alone. If the output of Somalia

a) Training of Field Veterinary Doctors

The training of field veterinarians should be oriented towards short training 1-2 years duration to gain more knowledge and experience to combat and control of tropical, diseases. There are a number of institutions which award degrees in tropical diseases, meat inspection and investigation services. These include the following :-

1) Diploma of Tropical Veterinary Medicine (DTVM)obtainable fromm U.K., France and Belgium (One year) ;

2) Diploma of Veterinary State Medicine (DVSM) ; obtainable from U. K. and Australia (one year) ;

3) Diploma of Meat Inspection from Denmark (one year);

4) Diploma of Animal Health from U. K. (one year) ;

5) Master's Degree (M.Sc.) in Field investigation Service from U.K., Australia, Canada & France (2years) ;

6) Master's Degree (M.Sc.) and Ph.Ds) in various fields of animal health (2-4 years) from U. K., USA, USSR, FRANCE, Canada, Egypt, Sudan etc. ;

7) Master's degree (M.Sc.) in animal health from UK (one year) ;

8) Master's degree (M.Sc.) extension service obtainable from USA, UK, USSR (2 years).

b) For training of veterianiarns and biologists in the tsetse and trypanosomiasis unit we recommend that they be trained to obtain M.Sc. and Ph.Ds since there work needs research and investigations. The following institutions are recommended :-

1) M.Sc. and Ph.D. in entomology and tryponomosomiasis research obtainable from U.K, Belgium, Holland, France ILRAD, Nairobi Kenya ;

2) M.Sc. or Ph.D. in Tryponosomiasis research, U. K., Kenya (ILRAD), Holland (Utrecht), France (Leone) ;

3) M.Sc. or Ph.D. in the use of radio-isotopes in tsetse and tryponosomiasis research , U. K., USA, Holland, Kenya (ILRAD), Khartoum ;

4) M.Sc. (T.V.M.), California USA (2 years).

c) For training of those veterinarians and other scientists who are working in the serum and vaccine institute the choice must be for long and short courses. The nature of work in such an institute for production of vaccines and research requires deep training and knowledgeable professionals and scientists. We recommend the following system.

1) Short training :-

i) Diploma in bacteriology (Dip. Bact.) obtainable from U. K., Canada, France, Austrial (one year)

ii) Master's Degree by research in various fields of animal diseases can be obtained from universities including African Universities e.g. Cairo, Khartoum, Nairobi and Zaria in Nigeria (2 years) ;

iii) Short visits to specialized veterinary research centers from time to time ;

iv) Attendance of veterinary conferences, seminars and scientific gatherings in the continent and abroad.

2) Long Term Training

This should be the adopted policy in training of research workers and biological producers. This usually takes 3-5 years depending on the system of various universities and countries. For the time being until Somali Scientists be trained we recommend the

(8) Training, Extension And Research

8. TRAINING EXTENSION AND RESEARCH

8.1. Training

8.1.1. Objectives

Realising that livestock production is the backbone of the national economy, the Government of Somali Democratic Republic has included in its Five Year Development Programme (1974-1978), some 30 projects in livestock sector. However, it appears that the implementation rate of the various projects and government farms in the livestock sector is not as it was hoped. There are a variety of reasons for this ; the main one is that there are too many projects and government farms operating at present and planned for the immediate future and not enough experienced, skilled manpower available with the organisational and technical ability to develop and maintain them at a reasonable level of productivity. It has been well recognised that the critical constraint on development is without doubt the shortage of skilled manpower. Even if finance of the proposed projects is available this shortage will continue to prevent the full achievement of the planned targets. To overcome this obstacle the government wisely created the right type of technical training institution ; namely faculty of Agriculture, Faculty of Veterinary Science and Animal Husbandry, Training School for Animal Science and the Range Management Training Institute, Burao (2.9) . As those institution have not long been in existence, it will be some years before sufficient technicians become available . A national programme of training should therefore be included in the priorities of the livestock Sector in Somalia in order to secure adequate number of well trained personnels capable of implementing the livestock projects with the greatest possible efficiency.

8.1.2. Features of the Proposed Training Programme

It is always understood that training is not restricted to schools and institutions but could be more especially practiced on farms or current livestock projects. The features of the proposed

training programme may, therefore, be outlined as follows :-

8.1.2.1. In-Service " On-The-Job" Training :

Very often a crash training programme would be desirable to bring livestock and national rangeland agency staffing up to full establishment quickly. Under these circumstances, In-service and On-The Job training are important supplements to formal classroom teaching especially where large numbers of trained personnel are needed. The In-Service training is also useful in keeping the livestock and rangeland technicians well informed with modern practices of livestock production. It is therefore proposed that a series of In-Service training programmes should be arranged for technicians who received intial training at the Animal Science and Range Management Schools and have been working in the field for 3-5 years. These training programmes should be conducted under the supervision of internationally recruited experts and consultants in collaboration with well qualified livestock specialists. The In-Service training programmes could be conducted in the governments farms and projects which at present exist in the whole of Somalia. It is even suggested that some government farms and stations should be changed to demonstration centres, which are to be production oriented and at the same time use for practical field training centres for assistants and technicians into better pasture and animal husbandry techniques. It is also proposed that programmed of livestock projects should include - In-Service training component which allows the project technicians to gain the knowledge and skills during the development of the project. The following training condensed courses could provide the Somali Assistants " sub-professional" with sound knowledge and skill, provided they are conducted in a close coordination with Deparrments of Livestock Production, Animal Health Service and Training, Planning and Research , Ministry of Livestock, Forestry and Range together with National Range Agency :-

a) Animal Health Training Course :

Objectives : To provide a condensed training course for Animal Health Assistants (Middle Level) in the recognisation, diagonsis, Control of Animal diseases chiefly cattle and sheep.

Location : a) Animal Science School
b) Serum and Vaccine Institute

Duration : 6 weeks.

Participants : 20 trainees - Graduates of Animal Science School experience in field work.

Description : Lectures and practical training on :-

1) Basic knowledge of common diseases of cattle and sheep
2) Symptoms
3) Diagnosis-taking and despatch of speciments
4) Care, nursing and treatment ;
5) Prevention ;
6) Environmental factors relative to disease
7) Meat Inspection.

b) Training Course In Poultry Production

Objectives : To provide training for sub-professional [illegible]ional personnels engaged in poultry production with special emphasis on intensive poultry system.

Location : a) Poultry Farm, Km. 13 ;
b) Poultry Unit, Animal Science School.

Duration : 6 weeks ;

Participants : Graduates of Animal Science School, experience in Field work - 20 trainees.

Description : Lectures and practical training on :-

1) Management and administration of poultry farms (for egg and meat) ;
2) Design of poultry houses ;
3) Cleaninees, disinfection, drinking water in poultry farms ;
4) Feeds and feeding ;
5) Poultry breeding systems ;
6) Diseases of common occurence in poultry houses ;
7) Maintenance and care of equipment (hatcheries, incubators, cages and feeding euipment) ;
8) Collection, grading, storage and marketing of eggs ;
9) Poultry for meat production (broilers);
10) Simple and basic principles of poultry economics.

c) Training Courses in Meat Production

Objectives : To provide training for assistants of livestock production in meat production with special emphasis on an intensive beef production ;

Location : a) Feedlot operation, By-product Unit Km7.
b) Feedlot Operation, Balad.

Duration : 6 weeks

Participants : Graduates of Animal Science School working in livestock production Department - 20 trainees.

Description : Lectures and practical training on :-

1) Care and managements of immature animals prior fattening ;
2) Fattening systems ;
3) Feeds and feeding in feedlot operations ;

4) Design of houses and sheds for feedlot operations ;
5) Diseases of common occurence in feedlot operations ;
6) Aspects of meat technology of fattened animals ;
7) Marketing of meat and meat products ;
8) Economic evaluation of feedlots

D) Training Course in Dairy Cattle Production

Objectives : To provide training on various aspects of dairy cattle production.

Location : a) 21st October Dairy Farm
b) Warmahen Dairy Ranch.

Duration : 6 weeks

Participants : Livestock production assistants - 20 trainees.

Description : Lectures and practical training on :-

1) Calf rearing methods ;
2) Care and management heifers ;
3) Heat detection techniques and synchronization ;
4) Pregnancy diagnosis and fertility problems ;
5) Care and management of the milking herd ;
6) Machine milking techniques ;
7) Care and managements of bulls ;
8) Production records and evaluation of animals;
9) Progeny testing and improvement methods ;
10) Common disease of diary cattle and health control ;
11) Health control ;
12) Establishment and operation of dairy farms.

E) Training Course in Artificial Insemination

Objectives : To provide training for sub-professional personnels with particular emphasis on the practical training aspects to enable them to carry out artifical insemination and to be qualified more scientifically and practically to take the responsibilities of their duties.

Location : a) Artificial Insemination Station, Department of livestock Production.
b) Animal Science School.

Duration : 6 weeks

Participants : Graduates of Animal Science School and engaged in artificial insimination - 10 trainees.

Description : Lectures and practical training on :-

1) Principles of artificial insemination and record keeping ;
2) Preparation of apparatus and semen collection ;
3) Examination, dilution and preservation of semen ;
4) Insemination requirements ;
5) Preliminary reproductive physiology and theories of conceiving ;
6) Diagnosis of pregnancy ;
7) Bull management, training and feeding ;
8) Insimination in the field and slaughter houses ;
9) Cleaning and sanitation of artificial equipments ;
10) Frozen semen technique and application.

F) Training Course in Range Management

Objective : To provide training for technicians on the various aspects of rangeland management.

Location : Range Management School, Burao.

Duration : 6 weeks

Participants : Graduates of Range management school and engaged in rangeland projects - 20 trainees.

Description : Lectures and practical training on :-

1) Pasture management ;
2) Range management ;
3) Range ecology ;
4) Grazing systems ;
5) Grazing management and planning ;
6) Range carrying capacity-overgrazing ;
7) Range improvement ;
8) Range rehabilitation ;
9) Water development in rangeland ;
10) Range economics ;
11) Forage production and conservation ;

8.1.2.2. Abroad Training :

In order to strengthen the existing departments ; namely departments of Animal Health, Livestock Production, Training, Planning and Research and range and Environment, Training schedules for prospective senior staff should be arranged. It is not always clearly understood that trained technicians will only partially alleviate the problems of livestock health and production. The next, and perhaps more important step is to find the senior staff with the ability to become skilled manager. Unfortunately, there is no short cut in becoming a good manager as experience in appraisal, judgement and the right decision taking cannot be acquired overnight. In order to give selected senior officers in the field of livestock health and production and management, training in management techniques it is recommended that they should

give a 6-12 month's full time course in this field in reputable international institutions. In this course they will be given a thorough groundwork of administration and system analysis ; they will be challenged with economic appraisals, problem solving oriented studies. In other developing countries where such training programmes were arranged, the results were highly satisfactory in that a gradual but marked improvement in the standard of management occured. The proposed training for senior staff can be organised for periods of three months in 2-3 yearly turns in international livestock health and production institutes. This type of short -term training will provide the senior staff with the most modern techniques of livestock production. They will also be oriented towards sould solutions for problems of livestock production.

8.1.3. Requirements of the Proposed Training Programmes

Both In-Service and Abroad Training help greatly in improving the experience and the skill of the manpower involved in livestock health and production. The requirements of these levels of training are not very expensive and can be easily available to Somalia. The proposed training programme can be achieved if the following requirements are satisfied :-

8.1.3.1. Short Term Consultants and Experts :

These consultants and Experts can be responsible for :-

1) Preparing and conducting the In-Service training programmes in collaboration with senior Somali Staff. These consultants may be recruited for 3 months during which supervision and conducting of the proposed In-Service training can be completed. Four consultants or experts may be recruited each year for the completion of two of the training programmes.

2) Advising the senior Somali officer on matters concerning various aspects of livestock production.

3) Assist the Somali Government in assessing the progress achieved in the current projects in livestock sector.

4) Propose solutions to problems which may crop-out in Government farms.

The Somali Government can secure the service of the short-term consultants by approaching some of the international organisation. Technical aid programmes of arab Organisation for agricultural Development (AOAD), League of Arab States and Near East Animal Development Center (NEADEC), FAO can cater for this type of consultancy upon the request of Ministry of Livestock, Forestry and Range.

8.1.3.2. Long Term Fellowships :

These fellowships can be oriented towards training selected senior Somali staff. The period of these fellowships may range from 6-12 months in international livestock institutes. The fellowships can be secured through :-

1) Training components of newly established livestock projects ;

2) Request from Somali Government to International Organisations concerned with the development of livestock health and production. IDRC (Canada) has been recently interested providing the developing countries with some fellowships for training and conducting applied research in international institutes.

8.2. Extension :

Little extension work in livestock production has been carried out among nomadic and semi-nomadic people (real livestock owners), because of difficulty of serving a moving population. New range and livestock management practices are being introduced in the country through newly established projects. It is therefore assential to develop two-way flow of information between the nomads and extension centres which should be located in various areas in the country.

experimental centres to obtain the answers required for the whole of the livestock and rangeland industry. At present no such research centre exists in the whole of Somalia. There are some farms which are yielding a reasonable size of data but lack the elaborate systems of documentation recording and analysis (CITACO (1) prepared a proposal of the establishment of a livestock research centre on the existing 21st October Dairy farm and Warmahen aroind, in order to conduct applied research, provide in - service training for skilled labour and prospective senior staff. The proposal is realistic because it is believed that research in Somalia should begin in the existing government farms and project. It is therefore, proposed that some of these farms should be strengthened by experts, technical facilities and equipments. Under such circumstances research in various aspects of livestock health and production can be carried in the following government station :-

8.3.1. 21st October Dairy Farm

If this is strengthened with adequate facilities, research on Dairy cattle production and integrated livestock-forage production. The data on breeding programmes can be obtained provided a good documentation and recording system is adopted (See chapter 2-4). The proposed breeding and artificial insimination programmes are discussed in details in chapter 5 of this report.

8.3.2. By Product Unit, Km7

This unit can accomodate research in the following areas of livestock production :-

1) Feeding and management of intensive beef production ;

2) Evaluation of the nutritive value of animal feeds commonly used in Somalia. The potential use of the agro-industrial by-products can also be investigated (see chapter 6.1)

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(1) CITACO : Technical Unit - proposed for the establishment of a livestock Research Centre @ Mogadisho (1974)

8.3.3. Poultry Farm, Km 13

In this farm research on problems of poultry production in Somalia , could be conducted. Adaptation of imported poultry breed could also be examined. Feeding requirements of poultry at various stages and for different purposes may be investigated. Breeding programmes of poultry for eggs and meat production can be set up in the poultry farm, km 13.

8.3.4. Serum and Vaccine Institute

This institute is already research oriented and only needs some research facilities to continue to a good research institute in various aspects of animal health.

It should be emphasised that in addition to Government farms, livestock project may include units which cater for research in certain aspects of livestock health and production. These projects can play a better role in research because they normally possess greater facilities and training components. Some of the project proposals have already begun to realise the importance of research for the successful implementation. The World Bank (1) has proposed the establishment of a National Range Research Center as a component of the Central Rangelands Development Project. The centre's objective would be to obtain the necessary basic data by survey's and trials for the design and implementation of development strategies that would increase the productivity of the rangeland while maintaining their ecological viability. The centre would also give training in the ecology and management of the rangeland.

A notable advantage of research centres in livestock projects is that they can be used as demonstration and practical training schools for educating managers, extension officers, senior staff and selected nomadic personnels in improved rangeland, pasture

(1) Report by the Government of Somalia is support of a loan application to finance a central rangelands Development Project. Mogadishu (1977).

and animal production techniques. Too often, the gap between research findings and practical field application is for various reasons a very large and real one. Having demonstration schools on research centres, therefore, serves the double purpose of proper technical training and the propagation of useful research finding into the field.

(9) Marketing Sub. Sector

9. PROPOSED PLANS FOR DEVELOPMENT OF MARKETING SUB - SECTOR

9.1 Introduction

It has been stressed before that the economy of Somalia has become increasingly dependent on the livestock industry as a source for basic livelhood to the majority of the population, and as the major export earner. The increase in livestock production to meet the demand of export and local consumption has led to over-grazing which led to serious damage to range land. The government of Somalia recognized these problems in the five year development plan (1974 - 78), and among the projects that have been proposed during this period(1), there are three projects (rangeland conservation and development project, Northern Rangeland Development project, and the Central Rangeland Development project) which attempt seriously to improve range land production.

The relative success of such a policy depends, partly, on the fact that an effective market organization system is built up immediately while the projects are under the process of implementation and the offtake of livestock is accelerated to a higher degree.

In addition, such an effective system of marketing is also required in view of the importance of livestock exports to the economy and the growing competition that Somali livestock faces by the other livestock producing countries in the Middle East Market.

The proposed plans for improvement of the performance of the livestock marketing sub-sector should be based upon, and an integral part of, a well defined development strategy. Within the orientation of such a strategy, and after determining the proper degree of government intervention in marketing, short run and long run plans for the development of livestock marketing can be laid out.

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(1) IBRD, National Livestock Marketing Project, 1978, P. 1

9.2. Development Strategy

The principal objectives stated for the pastoral sector in the current Five Year Development Program (1974 - 78) can be summerized as follows :-

- Transforming the traditional mode of production in order to secure basic subsistance, equity, and improved welfare for the pastoralist.
- Providing the transfer of people, commodities and capital from the pastoral sector to other sectors.
- Securing and developing, where possible, Somalia' export earnings.

While these objectives remain to be valid for the near future, the draft of the new three year plan (1979 - 1981) specifies some additional policies in this respect. For the livestock marketing sub-sector ; the draft plan was drawn out by an IBRD mission early this year (1978), and is basically a revised version of the recommendations laid out by the Hunting consultant (1). The new marketing plan calls for :-

- The acceleration of offtake with an expanded and planned program for rangeland improvement.
- To very carefully introduce grading system in livestock at the appropriate time.
- To develop marketing activities rapidly throughout the country.
- Participation of private sector investment in all stages of the project.

Once such a policy is clear, the basic requirement will be for a development program (with two phases, short term and long term) to change the mode of production and to increase productivity while protecting and increasing the welfare of the pastorilists.

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(1) Hunting report Vo. 2. pp. 17-30

The short term phase has to be concerned with the full exploitation of the existing livestock resource through the development and improvement of the livestock marketing system. This could be achieved through the establishment of a marketing structure suitable to the pastoralist migratory operation. Such a marketing infrastructure would be supported with improved stock and trade routes ; with adequate watering and grazing facilities ; holding grounds finishing areas with feedlots ; slaughter facilities ; cold storage ; and meat transport arrangements. This phase would also prepare the ground for longer term development programs.

The longer term phase will be concerned with changing the mode of production and increasing productivity, while at the same time protecting and increasing the welfare of the pastoralists. This could be achieved through the organization of the pastoralists into pastoral cooperative which will provide the structure in which changes and investments can be made by the state or by the pastoralist sector itself in the land, and water resources and marketing structure, which are now subject to the problems caused by the unrestricted access over use, or neglect.

9.3. Role of Government in Livestock Marketing

As for the determination of the proper role of government in livestock marketing, it has been mentioned before that within the existing constraints of the low level of infrastructure development, the marketing system works reasonably well and has permitted the livestock industry to make remarkable contribution to Somali economy. On the other hand, the increased participation of the public sector in livestock marketing through the operation of the LDA since 1969 has not been very successful from the financial point of view . Due to these factors, it seems proper that the government should, in the short run, concentrate more on facilitating the marketing process through the development of physical and institutional infrastructure, than on intervention and regulation.

In the intermediate and longer term, however, and when such developments are materialised, the government can play a more effective role in the marketing system. Moreover, when the government decides to intervene directly into the marketing chain through the operations of the LDA, its intervention should be on a vertically integrated basis through the establishment of adequate holding grounds, providing adequate transportation facilities up to the importing countries, and above all to have a guaranteed importer at the other end. If any link in the chain is missing, the official marketing agency will become dependent on private traders who may exert their influence to disrupt a system which they may view as a potentially damaging competitor.

9.4. Short Term Plans

The national livestock marketing project, laid out by the IBRD mission referred to above, includes certain project for the improvement of livestock marketing, through improving both the infrastructure marketing services, and the organizational and administrative structure responsible for livestock marketing. The implementation of these projects seems to be highly essential for the improvement of the marketing system and for maintaining, and enhancing, Somalia's position in her export markets.

9.4.1. Establishment and Development of Infrastructure

Such development requires, first, the rehabilitation of the present four holding grounds possessed by the LDA, in addition to the establishment of another ten holding grounds all over the country. The new proposed holding grounds are to have approximately 20,000 hectars capacity each. The capital cost of each is expected to be So. Sh. 5.5 million, and the recurrent cost of So. Sh. 250,000 per annum.

Secondly, the rehabilitation of Berbera Quarantine station should get the first priority for the replacement of temporary shades with permanent ones and the development of water reticulation

system. Approximate costs of the former is expected to be So.Sh. 2.156 million, and that of the latter is So. Sh. 500,000

Lastly there is need for three additional marshalling yards, of the ports of Berbera, Kismayo, and Mogadishu. Approximate cost of these comes at So. Sh. 2.169 Million.

9.4.2. Establishment of a large Number of Improved Markets

There exists twelve main markets all over the regions, all of which require further improvement. There is also a need to identify some medium and small markets, estimated at thirty one. Such improvements and identification seem essential in order to achieve the following objectives :-

- Careful introduction of Livestock grading.
- To improve the coverage of the marketing system.
- To act as centres for the dissemenation of extension services and veterinary activities.

Presuming that certain markets are already having watering devices which need improvement, a minimum of fifteen bore wells are suggested for the proposed markets. In addition, if we assume that live grading of stock will be introduced initially at ten markets, there will be need for some forty weigh bridges. The total cost of these bridges is expected to be So. Sh.1.2. millions, that of the well will reach So. Sh. 4.5 million, while that of the market structure will be So. Sh. 1.548.

9.4.3. Development of Rural Roads

These roads, as well as their maintenance, are vital to the livestock transport and efficient marketing. It has been suggested that over a seven year period 700 km. of fodder road and 1500 km of access road should be up graded, besides the annual development of 245 km of fodder road and 834 km of access road. The capital cost given for such a program is So. Sh. 25.8 million, in addition to So. Sh. 4.1 million and 4.7 million for the setting up of a special

maintenance unit, and the recurrent cost respectively.

9.4.4. Provision of Adequate Transport to Industry

With the expansion of marketing activities in the entire country, and the availability of infrastructure in various regions, LDA shall need twelve additional truck trailers for carrying sheep as well as cattle. These trailers will enable the LDA not only to transport its own livestock, but also to provide service to exporters. In addition there is aneed for 10 pick up landrovers and 10 station wagon landrovers. Total cost of these items are So. Sh. 6.912, 0.520 and 0.560 million respectively.

9.4.5. Provision of two livestock Carriers

One of the major livestock marketing deficiencies in Somalia, as mentioned before, is the poor adherence to delivery dates, in addition to the inadequate shipping arrangements. The acquisition of two livestock carriers, in addition to the one owned by the National Shipping Lines, will enable the LDA to keep up as far as possible a definite shipping schedule. The expected cost of these two vessels will be Sh. Sh. 30 million.

9.4.6. Improving Port Facilities

At present livestock Shipping operations from Berbera are severly curtailed by the shortage of berthing capacity. It has been proposed that an additional berth (the approximate cost of which is So. Sh. 1.3 million) be instelled. In addition simple marshalling yards and other loading facilities are badly needed in the small parts of Bosaso, meit, and Oblia. Total cost for such facilities is around So. Sh. 3 million.

9.4.7. Re-Organization of the Livestock Development Agency

The proposed reorganization will bring all the marketing and related services under the control of the LDA. Under this reorganization the LDA will be under the supervision of the Ministry of Livestock, and will have the following five main

divisions ; publicity, extension and trading, processing, livestock marketing and management, export, and common services. It should also have the required financial resources to recruit the required skills, whether local or expatriates.

In this reorganized form, and with the availability of infrastructure all over the country, the LDA will be in a position to provide improved services to the livestock trading in general, and to its own livestock trading in particular. To be able to perform such function effectively, the LDA should have the statutary powers of controlling all livestock trading activities (such as control over traders in granting permits, check over letters of credit, etc.), and of defining realistic prices and taxation structure that can be changed from time to time with the help of a board including representative from relevant ministries and local municipalities.

In addition, the LDA in its reorganized form will provide market intelligence service which includes all dealings related to livestock by whatever individuals or agencies concerned, the details of supply of all classes of livestock, and the monitoring of internal consumption.

In this way, deficiencies in the over all production and marketing system could be identified and accurate forecasting of supplies would become possible. Such information would help to identify trends of surplus and shortages in the internal and export markets, such as overcoming competition from other livestock exports countries, or opening new markets for Somalia livestock exports.

Finally, the availability of such market information will help in analysing the cost structure of the export market. Such an analysis is important in order to find out the extent to which the livestock producers are receiving a fair price for their produce and that the profits are not expropriated largely by the middlemen.

9.4.8. A set of Priorities for the Short and Medium Term

The abovementioned projects and recommendations stated out for implementation in the coming plan period, represent, in our view, a very ambitious goal in view of the current shortage of all trained personnel in all sectors of the economy, the scarcity of funds required for implementation, and the low level of absorptive capacity in the economy.

In view of such constraints, a comprehensive plan for the development of the marketing system should assign priorities for various projects, and determine various actions that have to be implemented immediately to provide a further base for future development.

A crash program, has to be started as soon as possible, for the rehabilitation of existing infrastructure projects that are out of order or in a poorly bad shape. This includes the rehabilitation of existing holding grounds, the cold storage at Hargeisa, the Quarantine station in Berbera, and a definite schedule for the basic liners serving the livestock export trade.

In the medium term, in the coming five to seven years, the various other projects such as the establishment of : new holding grounds, additional marshalling Yards, new markets, rural roads, and the provision of adequate means of transportation (for the inland and the overseas trade) have to be implemented. The longer period suggested here for implementation is necessary in order to avoide the spreading of the existing resources very thinly on too many projects at one time with no guarantees for their satisfactory, completion.

9.5 Long Term Plan

It has been mentioned before that the multi-dimensional problems of the pastoral sector can only be dealt with effectively and in an organised manner, if an appropriate organisational form is established, i.e. pastoral cooperatives. While the establishment of such cooperatives remains to be a long term goal simply because

the magnitude of the task is enormous, a debate among the government the party, and the pastoralists about the most appropriate solution of the problem is highly recommended.

Such cooperatives should offer members positive economic advantages as the reward for obeying the rules of the cooperatives, especially those related to grazing. Since the only way to prevent overgrazing is to give herdsmen other means of security and positive incentives not to overgraze.

The chief tasks of the cooperative will be security against drought and disaster, and rising income and welfare. This can be achieved through various measures determining, the major tasks of such cooperatives in various fields of operations.

In so far as marketing is concerned, the cooperative should act as an agent for selling members animals and for selling food, clothing and consumer goods to members. The cooperative would store its own crops, keep an emergency food store and would experiment with storage of meat and milk.

أما فى المناطق التى تسودها ظروف جوية حرجة فان الانتخاب داخل السلالات المحلية أو خلطها بالسلالات الاجنبية الملائمة يكون وسيلة التحسين المقبولة فنيا • وتحت الظروف الشاقة فان الماشية المحلية فقط تكون هى أساس كل خطط التحسين • وقد اقترحت الدراسة أيضا برنامجا تفصيليا للتلقيح الصناعى واختيار النسل من شأنه زيادة فاعلية خطط التحسين •

ثالثا : المراعى والاغذية الحيوانية :

المراعى الطبيعية تشغل ما يزيد على ٩٠٪ من مساحة الصومال وتعتبر المصدر الرئيسى لغذاء الحيوانات • ومن أهم مشاكل المراعى هى :ـ

١ـ الرعى الجائر بسبب زيادة الحمولة الحيوانية عن طاقة المرعى •
٢ـ عدم انتظام توزيع مصادر المياه تبعا لحالة المراعى
٣ـ تزايد فلاحة الاراضى فى الوديان للزراعة الجافة رغم قلة الامطار
٤ـ انتشار الشجيرات رديئة القيمة العلفية
٥ـ قلة مساحة الاعلاف المزروعة لغرض الحفظ كدريس لاستعمالها وقت الجفاف

وقد اقترحت الدراسة البرامج التالية لتطوير وتحديث المراعى فى جمهورية الصومال الديمقراطية :ـ

١ـ مشروع لتطوير المراعى فى جنوب وسط الصومال ويهدف الى تطوير المراعى باكول وهيران وشبيلى الوسط وهى منطقة تبلغ مساحتها حوالى ١١٠ ألف كم^{٢} ويوجد بها حوالى ٤٫٣٧ مليون رأس من الجمال والماعز والابقار وأهم عناصر المشروع هى :ـ

٢ـ تقسيم المرعى الى وحدات تنظيم رعى واتباع نظام مرن للرعى بالنسبة لظروف كل وحدة وتحديد الحمولة الحيوانية لكل فئة حالة (جيدة/ متوسط/ رديئة)•

٣ــ تنمية مصادر مياه الشرب وتحقيق التكامل بين الزراعة واستغلال المراعـــى وتشجيع تكوين الاتحادات الرعوية البدوية كوسيلة لتحقيق استغلال أفضـــل للمراعى وفى نفس الوقت كخطوط تمهيدية لتوطين البدو والتدريب والارشـاد.

٤ــ مشروع انتاج بذور نباتات العلف والمراعى وكمرحلة أولية يوصى بانشاء مزرعتين فى المناطق الاروائية الجنوبية مساحة كل منها ٥٠٠ هكتار ومزرعتين مساحة كل منهما ٢٠٠ هكتار فى كل من المنطقة الوسطى والشمالية وقد قدرت الاحتياجات اللازمة للمشروع من الالات بحوالى ٢ مليون شلن صومالـــى .

٥ــ مشروع اعادة بذر أراضى المراعى يهدف الى تجربة اعادة بذر المســاحـات المتدهورة من أراضى المراعى فى المنطقة الشمالية بالانواع العلفية الملائمة للبيئة المحلية وذلك لرفع طاقتها الرعوية .

أما بالنسبة للمخلفات الزراعية فبالرغم من أن تغذية الحيوانات فى الصومال تعتمد أساسا على المراعى الا أن المخلفات الزراعية الصناعية يمكن أن تلعب دورا كبيرا فى الاحوال العادية وأثناء سنوات الجفاف حيث تقل الامطار والمراعى وقـــد أمكن حصر كميات المخلفات التى يمكن أن تدخل فى غذاء الحيوان وقد قـــدرت القيمة الغذائية لها فوجد انها حوالى ٧٠٠ ألف طن وحدة مجموع مواد غذائيـة مهضومة وهذه الكمية كافية لتغذية ما يقرب من ٥ (خمسة) مليون رأس من الاغنام أو نصف مليون رأس من الابقار . ونظرا لاهمية المخلفات الزراعية والصناعية فقـــد اهتمت الدراسة الحلية بوضع برنامج تفصيلى للاستفادة القصوى من هذه المخلفـات وقد تم تحديد مكونات هذا البرنامج من خبرة فنية واعتمادات ماليـة .

رابعا : صحة الحيوان والخدمات البيطريـــة :

تختص الصومال مثلها مثل بقية الاقطار الافريقية الاخرى بأمراض كثيرة للحيوان منها الوبائية وغير الوبائية وتشكل هذه الامراض فى مجموعها حجر عثـرة

فى سبيل تقدم الانتاج الحيوانى فى البلاد بالرغم من أن الدولة تعمل كل جهدها لمكافحتها واستئصال بعضها • وقد أوضحت الدراسة انه يمكن تحسين الخدمات البيطرية بالوسائل التالية :

١ــ تدعيم الكادر الحالى بأطباء بيطريين من خارج البلاد للعمل فى المحافظات وفى معهد انتاج اللقاحات والامصال ويمكن الاستعانة بالمنظمات العالمية والاقليمية للمساعدة •

٢ــ تدعيم الخدمات البيطرية فى الاقاليم بسبب المواصلات اللازمة من عربات وراديو فون للاتصال السريع •

٣ــ ارسال الاطباء البيطريين الصوماليين للتدريب فى المجالات المختلفة •

٤ــ تكثيف التطعيم لمكافحة أمراض التسمم الدموى أو زرقام والحمى الفحمية الالتهاب البلورى الرئوى •

٥ــ متابعة التطعيم ضد مرض الطاعون بشكل منظم وعدم الركون ان المرض قد استئصل •

٦ــ مراقبة الحدود وانشاء المحاجر ونقاط المراقبة •

٧ــ تطعيم حيوانات التصدير وأبقار اللبن بالمزارع ضد أمراض الحمى القلاعية والبروسيلا •

٨ــ مكافحة الامراض المنقولة بواسطة القراد وذلك بانشاء المغاطس والامدادات بأجهزة الرش مع توفير الكيماويات وارشاد أصحاب الماشية السليمة لاستعمالها •

٩ــ تكثيف الحملة لابادة ذبابة التسى تسى ومعالجة مرض النوم فى الابقار والجمال مع بحث مصادر التمويل الاجنبى لهذا المشروع الحيوانى الهام •

١٠ــ وضع سياسة جديدة لمحاربة مرض النيوكاسل بعد قيام مشاريع انتاجية

كبيرة فى مجال الدواجن .

خامسا : التدريب والارشاد والبحث العلمى :

- تهتم جمهورية الصومال الديمقراطية بمشاريع الثروة الحيوانية الا أن تنفيذ هذه المشروعات يحتاج الى توفر كوادر فنية عديدة قادرة على استيعاب الاساليب الحديثة فى الانتاج الحيوانى . وقد أوضحت الدراسة النقص الكبير فى هذه الكوادر ولهذا فقد أمكن اعداد برنامج للتدريب فى مجالات الثروة الحيوانية وقد تناول البرنامج اعداد دورات تدريبية فى انتاج اللحوم والالبان والدواجن والتلقيح الصناعى وصحة الحيوان وادارة المراعى . وقد أوضح البرنامج الوسائل العديدة لايجاد الكوادر الفنية على مستوياتها المختلفة .

- وقد أوضحت الدراسة الاهمية القصوى لايجاد جهاز ارشادى فى مجال الثروة الحيوانية وقد اقترح أن تكون المحطات والمزارع الحكومية كحقول ارشادية لقيادات رعاة الحيوانات وكذلك قد أوضحت الدراسة أهمية الوحدات الارشادية المتحركة فى ارشاد الرعاة الرحل الى أحدث الوسائل للعناية بحيواناتهم وللمحافظة على خصوبة المراعى .

- وقد أشارت الدراسة الى أهمية البحث العلمى فى ايجاد الحقائق التى يمكن استخدامها كأساس لاقامة مشروعات الثروة الحيوانية وقد اقترحت الدراسة تطوير بعض محطات ومشاريع الانتاج الحيوانى الحكومية فتكون محطات بحوث يتم فيها دراسة النواحى المختلفة للثروة الحيوانية والتى لا تتوفر حاليا معلومات عنها وقد أوضحت الدراسة أن مزرعة ٢١ أكتوبر لانتاج الالبان ووحدة التسمين فى كيلو ٧ يصلحان كنواة كمحطة بحوث تتناول مشاكل انتاج الالبان واللحوم فى جمهورية الصومال الديمقراطية .

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