ROLE OFLIVESTOCK IN THE ECONOMY OF GEDARIF STATE, SUDAN

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ABSTRACT

Livestock is a critical element in livelihoods, income generation, food security and agricultural development of Gedarif state of Sudan. This paper attempts to shed light on the role of livestock in the economy of the state. The study relies heavily on secondary data. It finds that Livestock plays an important role in the state's economy and in the welfare of the people. Livestock production is the second major economic activity in the state after agriculture and it provides a mean for risk management during drought and crop failure period. Livestock sector is faced by different problems such as diseases, difficulty in access to finance by producers and inadequate services. It is recommended that veterinary services, livestock breed and natural pastures for grazing should be improved and studies on the economics of livestock and livelihoods should be conducted. Demarcation of migration routes, reduction of taxes, training of pastoralists and other stakeholders and provision of water for animals and households are very important for improving livestock production.

Keywords: Livestock, Economy, Gedarif, Sudan.

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INTRODUCTION

Sudan is a country in Northern Africa. It is bordered by Egypt to the north, the red sea, Eritrea, and Ethiopia to the east, South Sudan to the South, the Central Africa Republic to the Southwest, Chad to the west and Libya to the northwest. It is the third largest country in Africa and it won independence from the British in 1956.The River Nile divides the country into eastern and western halves. Sudan's population was estimated at 39.6 million in 2016. (Maha and Mustafa, 2015).

Gedarif state is one of the 18 wilay at or states of Sudan, located on the country's eastern border with Ethiopia. It is composed of ten localities, namely: Gedarif municipality, Center of Gedarif, Botana, Eastern Gallabat, western Gllabat, Goraisha ,Hawata, Guali-Alnahal ,Fao and Fashaga. It has an area of 75,263 sq.km and an estimated population of approximately 1,400,000. Gedarif city is the capital of the state; other towns include Doka, Hawata, Fao, Shuwak, Guali-Alnahal and Gallabat.

Livestock sector plays a critical role in the economy of the state. Livestock production is the second major economic activity in the state after agriculture. Livestock is raised in all parts of the state and is owned by nomadic tribes and some of the rainfed farmers. Because the pastoral livestock system is very well adapted to the state's climate, it shows a relatively higher economic potential than any other form of livestock production. Pastoralists in the state use natural resources more intensively than any other system of animal farming, moving herds around the state and the neighbouring states in response to weather conditions and resulting available forage (FAO, 2019). Livestock provides a mean for risk management during drought and crop failure period. Cattle, sheep, camel and goats are raised, but sheep is by far the dominant in the herd and the prevailing livestock are mainly local breeds. Livestock is a critical element in livelihoods, income generation, food security and agricultural development (Wilson, 2018).

The aim of this paper is to shed light on the role of livestock in the economy of Gedarif state of Sudan. The rest of the paper is structured into: A literature review, methodology, analysis and discussion and conclusion.

LITERATURE REVIEW

Conceptual framework

Livestock is commonly defined as domesticated animals raised in an agricultural setting to produce labor and commodities such as meat, eggs, milk, fur, leather, and wool. The term is sometimes used to refer solely to those that are bred for consumption, while other times it refers only to farmed ruminants, such as cattle and goats. Livestock, farm animals, with the exception of poultry. In Western countries the category includes primarily cattle, sheep, pigs, goats, horses, donkeys, and mules; other animals, such as buffalo, oxen, llamas, or camels, may predominate in the agriculture of other areas. Livestock as a word was first used between 1650 and 1660, as a compound word combining the words "live" and "stock".(Encyclopedia Britannica, 2019).Livestock are animals kept or raised for use or pleasure especially farm animals kept for use and profit(Merriam Webster,2019).The terms "livestock" and "poultry" are used in a very broad sense, covering all domestic animals irrespective of their age and location or the purpose of their breeding. Non-domestic animals are excluded from the terms unless they are kept or raised in captivity, in or outside agricultural holdings, including holdings without land (FAO, 2017).

Literature Review

Sudan has the second largest livestock inventories in Africa, next to Ethiopia. Good natural pastures cover almost 24 million hectares and the nomadic pastoral sector accounts for more than 90% of the huge animal population. Animal diseases severely affect livestock production countrywide. In coordination and cooperation with the state Ministry of Animal resources and Fisheries, three Federal Departments, the Animal Health Department, the Epizootic Disease

Control Department and Veterinary Public Health Department are responsible for controlling disease through veterinary clinics, animal health centers and hospitals at the district, provincial and regional levels(FAO,2004).

Gedarif state is characterized by vast land suitable for agriculture, and the largest projects for rainfed agriculture in Sudan. Livestock in the state is estimated at around 5 million heads and builds up to 7 million heads in the rainy season when seasonal pastures available. About 80% of the land in the state is designated for agriculture and only 20% for pasture. Livestock are most prevalent in the rain-fed farming areas of the state where they are raised under nomadic and transhumance systems. Ruminant feed consists of pastures, browse, crop residues, and supplements of cereals and oilseeds (Idris, 2018).The expansion of large-scale mechanized rainfed and irrigated farming has transformed the ecological environment of the pastoral area in the state. The nature of the area has been changed from a predominantly pastoral one into a rich agricultural one with cash crops such as cotton, sesame and sorghum. Therefore the development of irrigated and mechanized agriculture was made at the expenses of both traditional rainfed agriculture and pastoralism (Catherine, 2005).Poor pastoralists, in general, work as contract herders for rich pastoralists (particularly those with their own boreholes or water reservoirs), rain fed or irrigation farmers and other investors, in addition to raising small numbers of their own stock. Most pastoralists sell their animals in primary markets and rarely in secondary markets. Sellers are often surrounded by brokers offering to purchase on credit or installments. Often, four to six middlemen wedge themselves in the chain between the producer and the terminal markets. During drought livestock prices fall and grain prices rise. Pastoralists do sell livestock during drought and use the income to meet immediate household food needs and protect remaining livestock.

The large-scale rain-fed farms of Gedarif have not only displaced the pastoral population but have provided the farm owners with the opportunity to raise large numbers of livestock on fodder and crop residues. They also sell crop stalks or fodder to poor pastoralists. Other livestock investors in non-farmed areas include wealthy pastoralists and businessmen who own boreholes or haffirs and who employ herders to manage their livestock (Aklilu and Catley, 2009).

The impact of livestock on the economy of the state and its social uses within the pastoral sector are central in the future development of the state. Food system, store of value, wealth, power, and authority represent the role of livestock for pastoralists in some parts of the state. There are four major uses of livestock in the state; namely, domestic, economic, social, and political (Ahmed, 2014).

METHODOLOGY

This paper relies heavily on secondary data. The data used is generated from secondary sources such as textbooks, journals, papers, magazines, publications, studies conducted by researchers and websites. Descriptive statistics is used to analyze the data.

Analysis and Discussion:

Livestock offers huge opportunities to improve people's livelihoods, given the many functions it provides in numerous systems, pastoral as well as mixed crop livestock systems (Ashley, 2016). Domestic animals are very important to human being. They provide precious food products such as meat, milk, eggs and honey and valuable non-food-industrial products such as wool, hair, silk, , skins, bones, horns, etc.(FAO,2017).Livestock accounts for around 43% of agricultural gross domestic product globally .Traditional livestock systems support the livelihoods of around 70% of the world's poor, while intensive, large-scale operations cater to the growing demand for meat, milk, and eggs worldwide. (Campanhola and Pandey, 2019). Livestock contributes about 20 % to Sudan agricultural GDP

and generates some US $ 170 million in a given year representing 25 % of the total foreign exchange earnings (before oil production).

Table (1) below shows livestock population in Gedaref state in 1999. The total number of animals is estimated to be 3,897,134 heads. Sheep herds constituted 48.2% of the total animal number followed by goats 24%, cattle 23.6% and camels 4.2%. Pastoralism is subdivided into nomadic and settled or semi-settled traditional pastoralism. The first category specializing in camel, cattle, sheep and goats are nomadic throughout the year while in the second category, the young people look after the herds and their families remain behind, practicing rain-fed farming. However, the semi or settled pastoralists constitute the prime source of milk to the neighboring cities. Livestock provides a mean for risk management during drought and crop failure period(Rajaa, 2006).

Table 1: Livestock population in Gedarif state (1999)

Type of livestock	Number	Percentage
Sheep	1,878,852	48.2
Goats	938,276	24
Cattle	917,921	23.6
Camel	162,085	04.2
Total	3,897,134	100

Source: Rajaa, 2006.

According to table (2) below, livestock population was estimated in 2006 to be 1,103,682 cattle, 2,117,589 sheep, 1,070,140goats ,221,803 camels and 569,429 equines(MARF,2009).

Table 2 : Livestock estimates in Gedarif State (2006).

Cattle	Sheep	Goats	Camels	Equines(Horses& Donkeys)	Total
1,103,682	2,117,589	1,070,140	221,803	569,429	5,082,643

Source : Ministry of Animal Resources and Fisheries Annual Report (2007) , Khartoum , Sudan .

Sheep and goats are the most dominant class of livestock across all ecological Zones of Gedarif State. Cattle are present mainly on the low rainfall Savanna on clay zone while Camels are confined mainly in the northern part of the State. Main feed sources during the rainy season are natural range, crop residues, purchased forage and Sorghum and processed concentrates and forage. Use of crop residues as animal feed during the dry season is highest at the State whereas use of natural range is highest during the rainy season. The amount of failed crop land which becomes available for livestock feed varies from season to season but may average between 5 % and 10 % of the cropped area. Not all of the crop residue on these lands is necessarily available as feed resource for livestock. Some of the crop farming lands is remote from permanent sources of water supplies during the wet season being no more than sufficient for the farm labor force during sowing , weeding and harvest periods . Such lands are only accessible to animals such as camels which can tolerate long periods without water. Other croplands which lie closer to main centers of settlement or a long principal roads with good access to urban areas many sell a substantial amount of their crop residues as building and fencing materials or as feed for livestock kept in urban areas (such as Gedarif city) .Crop residues are also customarily used in all villages throughout the rural area for building and fencing purposes and this also represents an attrition of the total feed resource . The total loss of feed resources is estimated to be 25 % for Sorghum and Millet and 10 % for the other crops . The balance of the feed resource is 50 % consumed . This happens due to the following constrains :-

- Not all residues are consumed when livestock are allowed to forage on the fields .
- Crop residues from the much smaller area of other crops , mainly Sesame , are of low nutritional value.

- The amount of crop residues presently burnt may account to 2 % of the total available .
- At present few farmers plough in their crop residues as a post-harvest tillage operation.
- A proportion of the cropped land is remote from permanent water and can only be grazed early in the season or by certain classes of stock.
- It has been assumed that on average the crop residue on 15% of the total Sorghum/ Millet area is either used locally for domestic purposes or sold to urban markets.

Rainfed semi – mechanized farming practice has a negative impact on livestock . This practice causes pasture deterioration, disputes between farmers, disputes between pastoralists and small farmers, animal raids on farms and isolation of marahil or stock routes (World Bank,2009).

- Contribution of livestock

□e livestock sector plays a critical role in the Sudanese economy and in the welfare of the whole population. It yields a □ow of' essential food, brings in a large amount of foreign exchange from export earnings, is a major means of transport, produces draught power in support of crop production and processing, provides dung for fertilizer and fuel and creates employment. For all these reasons and especially from the equity and livelihood perspective it is an important, indeed a major, component of poverty alleviation.

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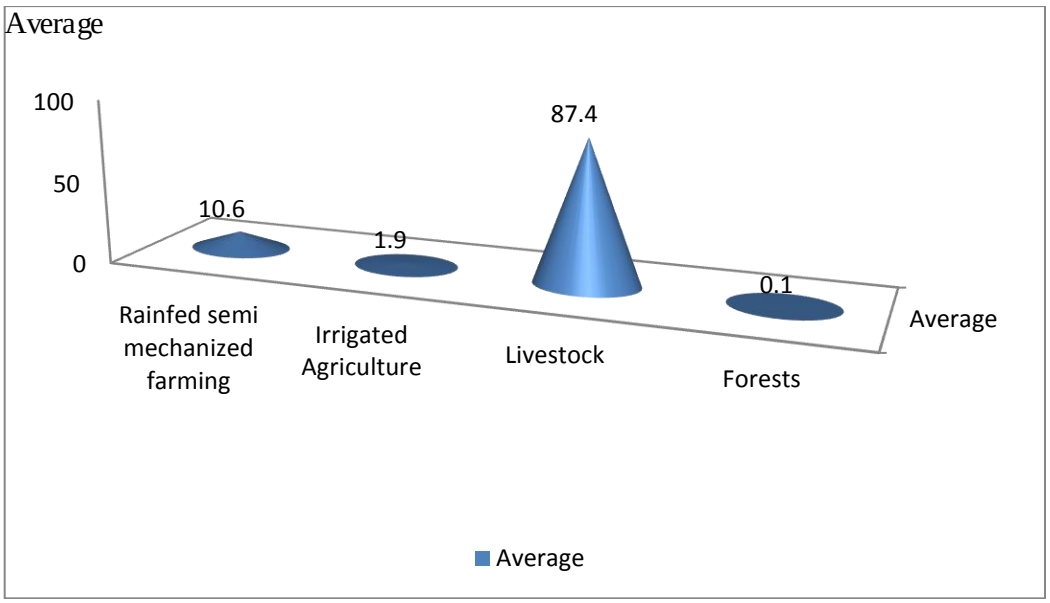
Livestock sector plays an important role in the state's economy and in the welfare of the whole population. It is an important component of poverty reduction. Livestock do not receive sufficient attention in the central and state governments policies. Almost all animals are owned by traditional pastoralists or smallholder farmers. Livestock are faced by different problems such as diseases, difficulty in access to finance by producers and inadequate services.

Table 3 : Contribution of livestock sub-sector and other agricultural sub-sectors to total production of agricultural sector in Gedarif state(%) in 2003-2007.

Year / Explanation	2003	2004	2005	2006	2007	Average
Rainfed semi mechanized farming	11.4	10	14	9.8	7.9	10.6
Irrigated Agriculture	2.3	1.9	1.5	1.8	1.9	1.9
Livestock	86.2	88	84.4	88.3	90.1	87.4
Forests	0.1	0.1	0.1	0.1	0.1	0.1
Total	100	100	100	100	100	100

Source: Third Economic Overview,2008

Figure 1: Average contribution Percentages of agricultural sub-sectors to total production of agricultural sector in Gedarif state (2003-2007).



Source: Third Economic Overview(2008)

Table (3)and figure (1) above highlight the high contribution of livestock sub-sector to total production of agricultural sector. The sub-sector constituted the largest component of agricultural sector and it contributed an average of 87.4% to total agricultural production of the State and an average of 72% to the State's GDP during 2003-2007. This shows clearly that the State depends greatly on livestock to improve the GDP of the State which depends largely on agriculture.

Table 4 below shows the contribution of the productive sectors to the GDP of Gedarif State during 2003-2007. The agricultural sector contributed the highest rates to the GDP of the State during the period i.e. 87.2%, 84.6 %, 83 %, 80.3 % and 78.3%sequentially and this proves that the economy of the State depends largely on agriculture. The table indicates also that livestock contributed 75.2%, 74.4%, 70%, 71.% and 70.5% to the GDP of the state in 2003, 2004, 2005, 2006 and 2007 respectively.

Table 4: GDP of Gedarif state in current prices (000,000 SDG) during the period (2003-2007).

Explanation	2003	2004	2005	2006	2007
Agricultural Sector :					
Irrigated Farming	31.67	25.15	21.04	25.02	27.15
Rainfed Semi Mechanized Farming	151.99	135.71	201.26	137.39	113.47
Livestock	1152.63	1188.89	1205.06	1243.64	1287.13
Forests	0.90	0.95	0.91	0.99	1.11
Sub-Total	1337.19	1350.70	1428.27	1407.04	1428.86
Industrial Sector:					
Agro-Industries	0.20	0.21	0.22	0.22	0.22
Water and Electricity	32.93	30.48	35.99	32.82	37.32
Construction	29	33.50	36.31	44.41	44.05
Sub-Total	62.13	64.19	72.52	77.45	81.59
Service Sector:					
Government Services	65.40	85	123.25	168.65	192.26
Other Services	68.15	97.12	96.16	99.66	123.24
Sub-Total	133.55	182.12	219.41	268.31	315.50
GDP	1532.87	1597.01	1720.20	1752.80	1825.95
Growth Rate	0.7%-	4%	7.7%	1.9%	4.2%
Average Growth Rate	3.4%				

*SDG: Sudanese Pound.

Source: Third Economic Overview,2008.

- Livestock marketing

The structure of livestock marketing is primary market at the village level, secondary market at the regional level, and terminal market for final domestic sales or exports. Management of formal livestock market is the responsibility of state and localities. Besides the cost barriers, the continuous decrease of the Sudanese currency against the dollar has reduced the international competitiveness of Sudanese livestock(Idris,2018).The Ministry of Animal Resources and Fisheries (MARF) undertakes delivery of animal health and quarantine services along with the certification of animals for exports. The most important livestock export destinations are Saudi Arabia, Libya, Egypt, Iraq, Kuwait and United Arab Emirates(U.A.E.). One common perception about pastoralists is that they are not keen to sell their

animals (even in times of hardship) for reasons of security against future losses , wealth status in the community and non – integration into cash economy. Some also say that access to free pasture and water is what keeps pastoralists from selling their livestock readily in the market(MARF,2007) . The following problems are faced by livestock export trade:

Taxation :

Exporters have to pay taxes and fees at the national level for exporting live animals or chilled / frozen meat(see table 5) . This is in addition to what they pay in fees and taxes for local councils . Though taxes and fees are necessary, their application should equate with the services provided in this particular case since exporters can't keep on exporting if they don't make profits (World Bank,2009).

Table 5 : Sudanese live sheep marketing margins and costs in Sudanese pound (SDG) for Gedarif State .

SN	Item	SDG
1	Market fees	3.00
2	Middlemen Commission	1.00
3	Guarantor	0.50
4	Veterinary health certificate fees	1.80
5	Value added tax	1.85
6	Municipality tax	5.00
7	Business tax	1.25
8	Pastoralists Union	0.0
9	Education Support fees	0.0
10	Veterinary services fees (local authority)	1.80
11	Federal wounded tax	0.25
12	Zakat	0.40
13	Shepherd and water cost (3 days)	3.00
14	Showak Quarantine : inspect , vaccination , supervision, brucella test	3.85

15	Federal vet. (inspection , vaccination)	1.50
16	Incentives : inspection , vaccination	0.60
17	Brucella test	0.60
18	Transportation cost to Port Sudan	4.68
19	Truck driver incentives and labor for guarding and sheep in upright position during the drive	0.50
20	Port Sudan local authority fees	0.50
21	Port Sudan inspection incentives	0.50
22	Uploading at Port Sudan and loading to Sawakin	0.50
23	Transportation costs (Port Sudan / Sawakin)	3.00
24	Ulloading at Sawakin and shepherd costs	0.50
25	Feed and water Port Sudan / Sawakin (7 days)	5.00

* Local traders and exporters profit margin excluded .
Source : Ministry of Animal Resources and Fisheries (MARE) , 2007.

Inadequate Finance and Technical Services

Trade Finance / Capital Investment:

Finance Services are not easily available. Even when they are, the cost of servicing loans is very high. A separate bank has been established solely for livestock related business under the name of the Animal Resources Bank (ARB). This Bank has some twenty one branches throughout the Country. The Bank provides trade finance on short – term basis for transport, customs and letters of credit (LCs) on conditions that repayments are made within 2 – 4 month. In fact, since Bank interest is not allowed in Sudan, the Bank operates under a system called Murabaha (Cost-plus financing). The current level of Murabaha translates into a profit rate of around 24 % per annum . However , the current profit rate that runs at around 24 % (under the Murabaha system) is too high for livestock exporters , especially if one considers the fact that livestock business is not always profitable . Banks need collaterals to advance loans .Unfortunately , exporting livestock is a highly capital intensive business for which raising collaterals is beyond the means of most traders. Many livestock traders , therefore , rely on the trust system to overcome

this problem . Even if loans are available traders would opt to forego them because of the high profit rate. Financial problems have led to investment problems. Assistance should be provided to livestock and meat traders / exporters to access trade finance / capital investment loans from local and regional banks(World Bank,2009).

Letter of Credit:

Letter of credit (LC) is a standard bank guarantee document that the buyer will effect payments upon receiving the consignment (s). In normal international trading practices letters of credit have to be irrevocable. In the buyers' market of the Gulf, however , livestock are transacted without the need to open LCs. Sudan uses less conventional methods by which exporters are allowed to bring their foreign exchange earnings after selling their livestock(MARE , 2007).

Access to Foreign Exchange Earnings:

Exporters should be allowed to access at least a portion of their foreign exchange earnings either for importing commodities or for other needs(World Bank,2009).

Technical Constraints:

At times, investments are made based on poor feasibility studies. Proper feasibility studies require:

* Determining what data to collect, defining the purpose and identifying the responsible agencies to undertake such operation.
* Establishing linkages for exchange of data between those who collect the primary data (Ministry of Agriculture, Veterinary Department …etc.) and those who could make further use of the same data (investment authorities, tannery owners … etc).
* Provision of technical expertise for appropriate feasibility studies on new investment projects(MARE) , 2007).

Shortage of Cold Chain Facilities:

Cold chain involves the transportation of temperature sensitive products along a supply chain through thermal and refrigerated packaging methods and the logistical planning to protect the integrity of these shipments(Paul and Notteboom,2017).Shortages of cold chain facilities at Khartoum airport limit the amount of chilled / frozen meat to be exported at any given time .

Conditioning Live Animals for Export:

Live export is the commercial transport of livestock across national borders. The Sudanese livestock is characterized by its dependence on natural grazing and its purity from industrial and chemical components. This makes it highly demanded in the international markets(Babiker et al,2011). Importers Complain that livestock arrive in poor physical shape . This happens due to different reasons such as overcrowding , lack of feed and water during the shipping etc.

Rolling Quarantine :

Quarantine is a combination of physical space, housing system, and procedures to ensure containment and isolation of animals imported from sources identified as posing potential risks to existing colony health. Animal quarantine is designed for the purpose of preventing infectious diseases of domestic animals entering Sudan and foreign countries. Quarantine procedures are a must particularly for live animal exports . This period of observation lasts for 21 days before the livestock are shipped(Mark and Thomas,2015).

External Market Information Gap :

One apparent area of weakness is the lack of interest and capacity to collect regular market information from livestock importing countries . No vital information is collected on regular and systematic basis.(World Bank,2009).

- Policies

The Ministry of Animal Resources and Fisheries is responsible for controlling livestock diseases, regulating domestic and export trade,

and formulating national livestock policy. Policy in general with regard to livestock and range has usually been subordinated to crop agriculture. Development policies and projects have continued to promote the horizontal expansion of crop production to the detriment of livestock and pastoralism. Political and economic forces that affect the design and implementation of livestock policies include:

- Diversion of funding and government attention away from development policies and programs.
- Horizontal expansion of crop production at the expense of livestock production and pastoral livelihoods.
- Insufficient consideration of the aspirations of livestock owners.
- Production of oil diminished the importance of livestock production for the Sudanese economy.
- Flows of international aid and assistance that have supported policies that harm pastoral livelihoods .

Better coordination of federal/state ministries and agencies, promotion of efficient market-based production incentives and sustainable land use, rebirth of agricultural research and extension, rehabilitation and modernization of rural infrastructure, improvement of rural services, enhanced marketing and export services and improved access to rural credit are needed to support livestock production (Wilson, 2018).

-Problems

The problems to livestock production in Gedarif State include:

- Biting insects are common during the wet season in the southern parts of the State, forcing pastoralists to move with their herds to the drier areas in Botana where conditions are not conducive to the multiplication of the biting insects.

- In the past animal health services are adequately organized, sufficiently supplied and reasonably operated. From the mid-eighties and for various reasons these services declined and then witnessed a degree of collapse.
- A high rate of mortality prevails, particularly among young stock.(World Bank,2009).

Livestock activity is faced with other problems such as disease, inadequate water source and pasture, raiding and conflict, poor transport and marketing system. Environmental issues such as land degradation, shrinking grazing areas due to climate change, and land grabbing by elites and investment companies have had a negative impact on the role of livestock in Gedarif state(Ahmed,2014).

5. Conclusion

Livestock sector plays a critical role in the economy of the state. Livestock which includes cattle, sheep, camel , goats and equines(horses&donkeys) provides a mean for risk management during drought and crop failure period. It is raised in all parts of the state and is owned by nomadic tribes and some of the rainfed farmers. The expansion of large-scale mechanized rainfed and irrigated farming has transformed the ecological environment of the pastoral area in the state. Livestock in the state is estimated at around 5 million heads and builds up to 7 million heads in the rainy season. Main feed sources are natural range , crop residues , purchased forage and Sorghum and processed concentrates and forage. Livestock are faced by different problems such as diseases, difficulty in access to finance by producers ,inadequate services , environmental issues and marketing problems. The agricultural sector contributed the highest rates to the GDP of the State during 2003-2007(i.e. 87.2%, 84.6 %, 83 %, 80.3 % and 78.3%) consecutively. It is recommended that government, private sector and Nongovernmental Organizations (NGOs) have to boost up veterinary services and adopt the necessary strategies in order to improve natural pastures for grazing. Improved

variety of livestock is highly needed to increase production efficiency and reduce the amount of resources and inputs required for livestock production. Besides demarcation of migration routes, reduction of all internal taxation, encouragement of livestock export and training of pastoralists and other stakeholders on animal disease detection, policies governing movement of livestock and how to access credits is crucial. Studies on the economics of livestock and livelihoods should be conducted. Sudanese policy makers have to take practical steps to support the livestock sector. Finally, provision of water for animals and households in general by constructing ground water reservoirs, building earth dams and haffirs, digging wells, drilling boreholes and widening the available sources of water is very important for improving livestock production.

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