

CHAPTER ONE

INTRODUCTION

The importance of animal resources comes from its increasing economic role; it amounts to 106 million heads, in the Sudan, it provides food security and source of living for 40% of the inhabitants in addition to poverty alleviation and the large value of export returns which had approached 3/4 billion (750 million dollars) according to the Ministry of Animal Resources, Fisheries and Rangelands (MARFR, 2014).

The participation of the animal resources sector in the Gross Domestic Production (GDP) was estimated at 47% from the official agricultural exports and more than 60% of the added value estimated for the agricultural sector (LGAD, 2013). It was of the highest participation than agricultural and petroleum sectors during the period 2002-2010.

Sudan ranks highest for sheep production in the Arab countries in which sheep number was estimated at 177 million heads of which Sudan produces 39.6 million heads (22%) according to the Arab Organization for Agricultural Development (AOAD, 2013).

Sheep export from the Sudan stands at 90% of the total live animal exports of which 26.5% comes from Kordofan State which again represents the main source of the best type of the Desert Sheep namely "EL Hammry and EL Kabbashi" according to the MARFR (2014).

In spite of the high animal wealth demanded in the local and international markets, animal production still depends on traditional animal breeding, in open range grazing system in the study areas.

Khatab and Faisal (2005) stressed that the traditional grazing system was considered the main source of animal production for local consumption and export. Dagash (2005) stated that pastoralists and sheep raisers mainly depended on natural grazing for animal feed.

Animal production as an economic activity oversteps the agricultural

production by being dependent on the private sector in all its activities, by few inputs mostly available locally but the contribution of animal resources in foreign trade and total economy is limited, as it participates by approximately less than 1/2 of the country's animal number. The other 1/2 is redundant resources not used but for social purposes, prestige which, then poses pressure on the pasture.

The AOAD (2015) reports stated that the estimated protein milk and meat is 12.8 kg per year in Arab countries compared to 23.9 kg internationally.

There are efforts from the different animal resources institutions to develop the production, but these efforts did not concentrate on veterinary extension and pastoralists and producers training being the main owners of the animal wealth, which resulted in no or little interaction by the producers to adopt the recent means or methods to improve on and develop animal production; This was authenticated by the "Extension and Technology Transfer Directory of the MARFR (2012)". The limited involvement and the deficient producers Earning led to the weak effect of the development projects on the behavior and attitude of the producers towards the animal resources.

Sara (2012) indicated in her study, that the limited extension programs and training affect production negatively, which also agrees with DECRP (1976) who stated that "for true development is essential that the land users be part and parcel of the program from the preparation stage to the complete fulfillment".

Productivity improvement leads to increased production size and better quality, awareness of the producers should be elevated for improvement of productivity and production.

This study concentrated on the perception of animal breeders and producers on the economic value of the animal resources and the economics of agro-animal production using the knowledge as a working base to meet the principles and economics aims of the integrated agro-animal production.

This is represented by the efficiency of using the animal production components (technical – distributional and economic efficiencies) to meet the maximum profit or maximum best production or cost reduction for economic animal production and for reaching the economic welfare of the producer.

Production indicates total produced outputs for each single unit of the inputs, while productivity is a measure of these outputs.

As such attention should be on productivity betterment but sheep producers care more for the total flock size production rather than the betterment of the single animal productivity (quantity rather than quality). This is pertaining to flock head individuals of both males and females and the ability of giving birth more than once a year, twinning ratio living off-spring ratio, size of the new born at birth, age of sexual maturity and mating, amount of milk, growth rate... etc. (El Neima,2012).

The informed educated producer is considered one of the pillars of animal resources sustainable development as he will be able to participate in setting plans for development programs and will be able to execute these plans efficiently, ability to withstand shocks and capable of the progressive and conductive management of the available resource. Also the ability to participate in inventing effective marketing programs which can lead to stability, sustainable development of productivity and production and betterment of national stock types

The study selected North Kordofan State (2012) being of the largest livestock concentration and the main sheep source of the Sudan under different breeding and management systems according to the (MARFR, 2014).

The production parameters for the stock are very low; a situation precipitated by many factors; social, economic, legislative, environmental and sanitary. In addition to that, these factors collectively led the animal producers to be unaware of the economic value of the animal resources and the economics of animal production. This, then, led to the continuity of the traditional animal

production system represented by keeping low producer breeds feeding on open natural pastures, extensive or semi-intensive production systems, limited care and veterinary supervision and no records nor regular guidelines to manage the flocks, etc. This led to low productivity, high production cost and weak competition in the international markets.

1.1 Research Problems:

- a) Deficiency and lack of quality productivity and production in animal resource generally and sheep in particular and its association with low or absence of the producer awareness on economic value of the animal resources and how to invest in it and develop it and the limited effect of the projects and programs on the promotion and development of the awareness led to the retardation of the animal resources development.
- b) A sum of social, economic, cultural, institutional and legislative factors affecting producers awareness.
- c) Lack or limited information for policy makers in planning area development programmers.

1.2 Study Objectives:

Main Objective:

The main objective is to study and analyze the role of the animal resources development projects in elevating sheep producers' awareness for increasing productivity and production for sustainable animal resources development.

The Specific Objectives are to:

- a) Assess the range of sheep producer's awareness on production perfection, the economic value of the animals.
- b) Identifying social, economic, cultural and legislative factors affecting the level of the producers awareness.
- c) Assess the sheep producer's awareness and its role in increasing productivity, production and sustainable development. Diagnose the

built-up previous producers knowledge, legacies and applied practices of the local communities in animal husbandry and how to amalgamate them with scientific approaches and practices.

- d) Investigate the reasons of the ineffectiveness or failure of institutional, grassroots entities of the animal resources producers, projects or development programmes and point constraints of setting and executing strategic development plans and/or programmes.
- e) Avail data for policy makers to help future area development planning and animal production promotion particularly sheep in Kordofan States.
- f) Assessment of the producers awareness and vision on marketing sheep (economic value and value chain).

1.3 Research Hypotheses:

- a) Animal resources producers and specially sheep producers raise animals by traditional animal production systems which lead to low productivity and production and poor or low product quality.
- b) Lack of awareness, lack of knowledge and low level of interest in intensive production or completely and fully integrated projects, collective enterprises and cooperatives reflected negatively on productivity, production and sustainable producer development.
- c) Sheep production system is the traditional open grazing in all the localities irrespective of the many tribal and cultural variations.
- d) The narrow producer economic vision for the animal as a social marker rather than an economic asset and the ignorance of producers on management and production led to low mass and type of production and less individual and national returns.
- e) Absence and negligence of training and extension for producer development and absence of complete records on their activities and practices resulted in failure or lack of effectiveness and success of

community development and sustainable development programmes and/or projects.

f) Lack of or weak involvement, intervention and interaction of the grassroots producers resulted in weak performance of official institutions, grassroots entities and productive groups or societies.

g) In spite of the global competition of the Sudan sheep export being an organic produced product, the lack of awareness of the producers on marketing requirements (supply and demand, costing and pricing, profit calculation...etc.) led to high export cost, limited returns and thus weak product/price competition.

1.4 Study Importance:

The importance of the study springs from the significance of studying and analyzing the present situation of the awareness of the animal resources producers on the economic value of the animal resources as a main pillar for development. Also defining the role of the animal breeders and producers economic role in developing animal resources in Kordofan State, being the biggest reservoir of the best sheep types in Sudan for local consumption and for export.

The importance of the study is also from assessing and analyzing the role of the development plans and projects in promoting and increasing awareness of the animal resources breeders and producers about the economic value and economics of production of animal resources. This is to pin-point the strong and weak points for providing suggestions and overview to promote and increase awareness in animal production systems, animal resources development and betterment of social life that leads to elevation of the production capacity, efficiency and quality of production for sustainable animal resources development.

CHAPTER TWO

LITERATURE REVIEW

2.1. Economic Importance of the Animal Resources

2.1.1. Participation of the livestock sectors in the national economy:

Animal resources are one of the most important pillars in the national economy. This is due to its big participation in availing hard currency from export, in (GDP) by 20%, in agricultural sector approximately 45% and by maintaining living for about 40% of the population (MARFR, 2015).

The importance is represented by a national stock numbering over 106 million heads according to the estimates of the (MARFR, 2015), composed of 30.3 million heads of cattle, 40.2 million heads of sheep, 31.2 million heads of goats and 4.8 millions of camels. This is in addition to wild life of animals, birds, fishes and water life.

The total number of nomads solely, dependent on animal resources are about 8.5% of the population, while the sedentary in rural comprise about 60% of the population most of them work in agriculture and raising animals.

The value of the animal resources can be estimated from the export prices of livestock and meat locally and internationally and what it secures for food security. For the export of 2015 (January to October) and the figures of The General Directory of Quarantines and Animal Health, (MARFR) the total number of export was 5 million heads of which 4.4 million were sheep, 384.9 thousand cattle and 164 thousand camels.

As for meat export, generally and from 1998 the trend and direction is continually diminishing and most of the exported meat was mutton.

The hides sector brings hard currency and participates in the national economy by availing labor space during its processing from the abattoirs, hides agencies, tanneries and hides industry.

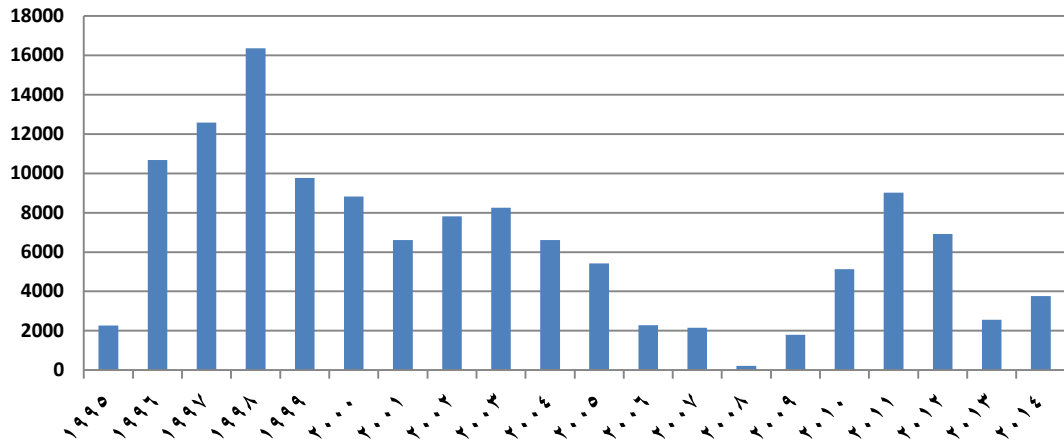


Figure (2.1): Sudanese meat export during the period 1995 – 2014 (Tons).

Source: MARFR (2014)

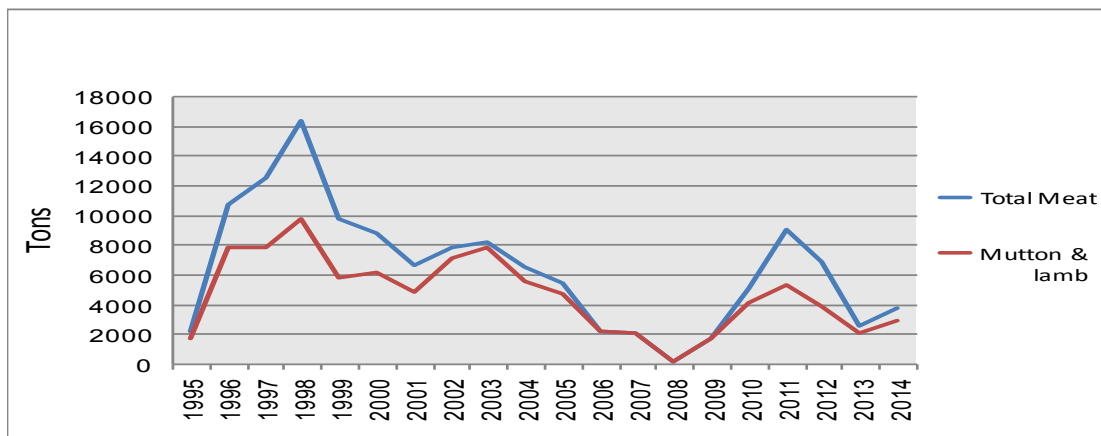


Figure (2.2): Comparison between total Sudanese meat exports in tons, in comparison with mutton and lamb exports during the period 1995 – 2014

Source: MARFR (2014)

2.1.2 Comparing some prices of animal products with other commodities.

2.1.2.1 International meat and hide prices:

By comparing international prices of meat and hides with other commodities using the Ministry of Foreign Trade data in the Daily Bulletin of International Prices, Directory of Studies and Promotion – Studies and Prices Division, it is noted the high international prices as a ton of beef from Australia and New Zealand at 4905 US Dollars with the fine sorghum 238 dollars a ton, Alfalfa 285 dollars for a ton and ethanol 1.46 dollars/gallon. All are important inputs for meat production for export and it goes without say concentration should be on production of high price meat and use of production inputs.

Table (2.1): International prices of meat and hides and other commodities

No	Commodity	Unit	Price in dollars
1	Beef, Australian and New Zealand 85% lean fores, CIF U.S. import price	Dollar\ton	4905
2	Lamb, frozen carcass Smithfield London	Dollar\ton	2438,33
3	Poultry (chicken), Whole bird, Georgia docks	Dollar\ton	2098,70
4	Sorghum, Texas, FOB Texas ports	Dollar\metric ton	238
5	Alfalfa Large Square Supreme	Dollar\ton	285
6	Ethanol	Dollar\gallon	1,46

Source: Ministry of Foreign Trade, Daily Bulletin of International Prices, Directory of Studies and Promotion, Section of Studies and Prices (2015).

Table (2.2): shows comparison between livestock international prices, cotton, alfalfa, and petroleum prices (August, 2015).

	Commodity	Price	Unit
1	Mutton and lamb meat	٥٠٧٠	Dollar\metric ton
2	Calf meat	٤٦٨٠	Dollar\metric ton
3	Chicken meat	٢٥٥٠	Dollar\metric ton
4	Cotton	١٥٨٠	Dollar\metric ton
5	Alfalfa	٢٧٤	Dollar\metric ton
6	Petroleum\Raw(Average)	٤٥,٧	Dollar\ barrel

Source: Ministry of Foreign Trade, Daily Bulletin of International Prices, Directory of Studies and Promotion, Section of Studies and Prices (2015).

2.1.2.2 Prices of Sudanese livestock exports:

It is noted that the prices of livestock and meat are higher than other agricultural commodities, which supports the opinion that the concentration should be on the valuable livestock commodities. This is , as, it is noted that agricultural inputs of plant origin are higher than livestock inputs as it indicated by livestock and livestock export returns in high currency, according to the different types. For the financial year 2015 and from the period January to July returns were 491,802,267 USD, 12,407,063 Euro and 11,447,702 Emirates Dirhams. The exports return in 2014 were 730 million USD and are expected to rise up to 890.8 million USD by the end of the year 2015 according to the (MARFR, 2015).

2.2. International prices of some abattoir by – products:

There are 18 types of cattle by-products exported from some international modern abattoirs (example Allan abattoirs of Indian Origin). These types include bones, cartilage, fish and rumen contents could be used for heating boilers in abattoirs.

For these modern abattoirs meat is considered as a secondary product and the

by-products the main product. The prices of the by-products prepared for export maintains very high prices as dog and cat feed and the price more than meat.

2.3. The National Livestock Aims:

According to ElNeima (2015) these include:

Attain food security, improving livelihood, alleviation of poverty pressure, creating new jobs in the area and increasing per capita income. Also include balanced development, encouraging rural settlement and natural resources protection, national livestock protection from epidemics and transit diseases. The aims include livestock export development for increasing financial resources from renewed resources, strengthening the competitive status of the national animal resources exports (most important are specifications and quality control), encouragement of animal production and exports through stability in the present markets, pushing in markets in the Middle East and in the African continent and by delivering new production techniques to increase productivity, production and lower cost.

2.4 Importance of Veterinary Services:

The importance of the veterinary services depends on its power of

- a) Facing zoonotic diseases, biodiversity loss, climatic changes and population growth.
- b) Also in facing nutritionally transferred diseases.
- c) Meeting the challenges imposed by globalization as the increase of food exports and imports in all parts of the world, increase in animal movement, which necessitates (sticking to cleanliness) and hyaline of primary and secondary production parameters and guarantee of fair trade. The entails re-organization of the setup of the veterinary services to satisfy the quality control parameters recognized internationally (Marbelli, 2003). This is in addition to training veterinary officers in wide range of specializations (Buncie, 2011).

- d) To guarantee the minimum limits of animal welfare in international trade (OIE, 2002) and in framing international agreements (European Commission, 2001).
- e) Maintaining the rural environment properties and diminishing pollution (Marbelli, 2003) and safe disposal of dead animals (Urban Hygiene).

One of the outstanding achievements of future economic return in Sudanese livestock export is the (Law of Animal Welfare) for its importance for all importing countries and to meet the international requirements.

2.5 The Veterinarians, Veterinary Coverage and Social Participation:

The veterinary coverage depends on the number and distribution of the veterinarians and the assisting cadre. The number of veterinarians registered in the Sudan Veterinary Council records are 8250 half of whom are females (SVC, 2015). Of these 1750 work full time in the government services both centrally and in the states assisted by 1440 technicians. And the private sector plays a vital role in offering veterinary health services through about 1350 veterinary doctors in either the commercial sector or the rural areas and also they participate in disease surveillance and notification on in remote and marginal areas.

Those who works in social veterinary health in some areas play a sizeable role that should be strengthened. The understanding of social veterinary health has been encouraged by the (OIE) and other related organizations (Hassan, 2001).

2.6 Obstructions Impeding Offering Veterinary Services in Sudan:

2.6.1 Geographical factors and infrastructure:

- Areas of animal breeding are in remote areas with animal production depending on nomadism, which makes fixing veterinary services unfeasible.

- In certain areas conflicts and insecurity affect negatively implementing wide spread vaccination campaigns.
- Political and cultural barriers: Most of the pastoral groups lack political support and by depending on livestock raising and nomadic life made them looked at by urban as loosing reactionary group. Most governments lean to the sedentary idea as a solution to the nomadic system (Oxby, 1989).
- Poor infrastructure as roads for example.
- Weak system for restoring cost.

2.7 Limited number of veterinary cadre working in traditional breeding areas:

Limited veterinary staff working in the pastoral production systems and concentration of the private veterinary clinics and pharmacies in urban or semi urban areas (Tambi et al,1997).

2.8 Legal Problems and Constrains in Livestock Sector Development:

2.8.1 Problems and Constrains (Yousif, 2015)

Laws and regulations in the sector are weak for many reasons:

- a) Stoppage or refusal of proposed regulations or draft laws, due to power overlapping between the Center and States (Powers given to State authorities in planning, legislation on land use, national resources and animal resources). Many draft laws were submitted but not affected.
- b) The weak representation of the sector in the discussing committees of attorney general (inability of the representatives to convince concerned areas).
- c) Weakness of Regulations Revising Committees (Some do not have enough knowledge on the subject).
- d) Unqualified laws and regulations revising committees including some not fully informed persons on the subject. This is in addition to the

weak presentation of the sector in Transitional Constitution of Sudan, which made it difficult for the proper development.

- e) Many of the animal resources rules and regulations do not cope with new advancements, due to time lapses as the hides regulations of (1954).
- f) Reflection effect of the separation and/or amalgamation of the Ministry of Animal Resources with or within other ministries and the impact of that on the rules and regulations, services and development policies.
- g) Incorporation of some research stations to some universities or to agricultural research centers. This is together with the dissolution of the General Animal Production Corporation and the General livestock and Marketing Corporation.
- h) Assigning leadership in some livestock key posts to non-professional persons.
- i) Lack of suitable recognition of all working in the veterinary field and profession.

2.9 Management Practices and Resource Utilization:

For Management practices and resource utilization until recently, it was thought on a large scale, that there is no management for traditional herds. This trend is still held by some but by deep thinking the falseness of this trend will be disclosed (Ahmed, 2005).

Pastoralists, generally as managers are generally better than farmers, agro-pastoralists or crop producers who depend on small scale for earning living from animals.

Nomadism and migration are a reflection of an improved reaction for always, non-available or decreasing resources.

2.10 Folk Resource Management:

The idea of folk resource management is globally practiced and in all continents, Sudan is not an exception. A good example is the trial of the Directory of Feed and Pasture as stated by EL Neima (2015), which is summarized by the agreement to assign a certain area without fencing by full group agreement and active participation of the local society groups. The role of directory will be technical advice and consultancy and the local society groups by protection the site and utility.

2.11 Local Species Preservation:

The effort by the public and government institutions, non-government organizations need the active participation of producers and pastoralists who own these animals. Management by those involved in the society is the key of success and is a tool among others for rural development.

The involvement of the producers and pastoralists with the non-government organizations as participants for the preservation of the local farm animals is an active association for:

- a) Incorporation of the sustainable utilization of the animal species in the removal of poverty plans and delegation of authority to the rural and pastoral society groups.
- b) Building on experience, knowledge and local values built during the public resource management of the natural resources.
- c) Evaluation and recognition of the participation means, suitable institutional support and the full integration of all participants as a main success factor.
- d) Calling for a political framework, marketing opportunities, rights of idea ownership and economic evaluation of the local species.
- e) Animal breeding companies and research centers in the industrial areas keep information about the species while in the developing countries

farmers and pastoralists participate by the genetic material and their knowledge without any return, a thing which needs consideration.

In spite of the international and local interest, in all the different countries for local species improvement, yet there is a deficit in constructing good programs. Even in those trials for local herd's improvement the involvement of breeders in constructing and executing those programs was at minimum (Okeyo, 2000). Added to that government services started to diminish and do not meet keeping stud animals in the research centers and attached farms (Ex Sutu Conservation). On the other side the Sutu Conservation by folk activities is distinguished by:

- a) Local species are the product of biological and cultural environments and their genetic constitution will be affected if they are removed from their original sites. Moving tame animals to closed government environment will subject their adaptive qualities to the danger of gradual diminution.
- b) Animal species are not dormant beings but were structured and adapted continually to respond to the biological and economic changes. Opposite to the plant genetic potentials, the genetic animal potentials need active support by breeders, who own and use these potentials.

As such the rural breeders' knowledge and their style of raising their animals is the one that conserve bio diversity and not only the style of storing animals.

2.12 Local knowledge in Breeding and Genetic Resource Management:

Local knowledge in breeding in pastoral and agro-pastoral societies and genetic resource management comes in many faces, of which according to Koehler – Rollefson (2000) includes:

- a) **Objectives of animal breeding;** differ from the intensive system being in addition to production including beauty preferences (As color or color distribution), religious rituals, animal behavior as docility,

paternal behavior, groups in herds, walking long distances, loyalty to the owner and above all the ability of the animal to avoid climate dangers (Drought, heat, cold) and this overwhelms and is more important to the producer than high productivity.

- b) -Style of practicing breeding:** The traditional animal producers developed institutions and tools to maximize genetic types in the framework of the handicaps in their local environment, some of which are:
- a) Setting social regulations banning keeping productive animal females outside their societies being social movement.
 - b) Exchanging animals within society members as in loans to encourage renewal of the species blood.
 - c) Selection mainly in the male side is measured by the female performance of the relatives, strength, livability and phenotypic appearance.
 - d) Testing the progeny on a small number before accreditation (Mostly used with camel herders).
 - e) Common ownership of stud males and some of the traditional owner groups pool money to secure and maintain stud males. They also decide at what time to dispose of the stud male to avoid inbreeding.
 - f) Castration of unsuitable breeder males as a tool to improve wanted characteristics.
 - g) Most of the pastoral and agro-pastoral communities, mentally keep progeny records for their animals for up-to seven past generations.
 - h) For adaptation to new area, some tribes by local stud males to enable their animals to withstand prevailing diseases.

For the animal breeders the animal meets many values including risk aversion, live bank account easily changed to liquid money, ploughing,

transportation means, labor source, fertilizer, fuel for cooking and food source.

2.12.1 The main obstacles facing folk management and veterinary services include:

- a) Limited grazing areas.
- b) Few agricultural lands for fodder cultivation.
- c) Low nutritional level.
- d) Limitation of genetic improvement reaching veterinary services.
- e) Non-satisfactory pricing of the animal products.
- f) Inaccessibility to reach markets.
- g) Difficulty of reaching veterinary services.

Jones et al., (1998) shed light on obstacles and solutions for offering veterinary services for the marginal pastoral areas through using folk management, participation and privatization as basics for active sustainable services. He stated that the main withdrawals for such programs in many areas, included limited veterinary staff, poor transportation means, non-available paved roads, climatic factors and instability.

2.12.2 Some of the solutions offered were:

- a) Training local groups to offer these services for their community, especially in war areas and remote difficult areas to reach. A good example practiced is the "Veterinary Attendants".
- b) Selection of the suitable site for the program execution depending on the community needs and the support to the idea and on the light of community needs evaluation.
- c) Acknowledgement and follow-up of veterinary rules, regulations and laws.

2.13 Animal Production Systems:

2.13.1 Animal Production System in Sudan:

Variation in climatic conditions and type of soils resulted in the appearance of more than one production system.

a) Extensive System (Nomadism):

It refers to nomadic or migratory production system (Traditional Pastoralism). Salih (1990) defined it as a production system composed of the interaction between the pastoralists and the animal. It is also a socio-cultural system and an example of resource management. It is a pastoral system in which breeders and their animals move from one area to another during the year without a fixed base, in search of water and pasture (extensive grazing system).

It is, solely, an animal production system (National main meat production source). It is characterized by large herd numbers, collective labor, low production, stress of difficult continuous mobility, on guarantee of feed and water, handling and marketing of products and pertaining socio-economic problems following.

This is the main system practiced in the study area.

b) Ruminant Production Systems in Sudan:

Follow the traditional production system of mainly low livestock carrying capacity (Animals : Land) few labour, low management system practiced per unit area, very limited inputs and can be subdivided in to the following systems, according to the type and degree of nomadism (Nur, 2003); Pastoral Nomadism, Semi Nomadic Pastoralism and Agropastoral.

2.14 The Marketing System (ElNeima, 2015):

2.14.1 Commercial agreements:

Commercial agreements are made between investors and herdsmen, in North Kordofan by young herdsmen and investors by which the later provides funds for purchasing ewes and young lambs, which the herdsmen keep and

maintain for 6 months to one year. Returns are divided 1/3 for the herdsmen, 1/3 for the investor and 1/3 added to the capital investment apparently but it actually goes to the investor. Agreements can be made up to 200 heads of sheep owned by the investor.

This kind of agreement helps the needy youth to build their own herds in addition to meeting their urgent cash requirements.

About 70% of animals supplied to the local markets and for export come from the western states (Darfur and Kordofan). Nomadism and seasonal migration by the herdsmen from these states covers long distances in the country and across borders of Chad and Central Africa during the long drought periods, which might extend for 10 months. As such the herdsmen are kept away from secondary markets, to which they get access in winter (About only 3 months) when they move to North Kordofan and Darfur.

2.14.2 Animal Resources Marketing System:

The animal resources marketing system starts at the primary producer and passes through many mediators and middlemen to the bulk trader, the unit trader and the export outlets.

The markets of the main ports excluding Kosti use the "Quiet Auction", where the middleman runs the transaction between the seller and the buyer on separate basis. The animals are sold by bulk price and not on weight basis and the agreed price will be known only by the buyer, seller and the mediator. Animal supplies to the markets are changed with season and affected by armed conflicts, environmental factors and political stability.

The main production areas remain to be 600-1000 Kilometers far from the marginal markets, to which animals are derived on hoof or transported by trucks or railways.

The primary producer might get only 1/8th of the export price. Middlemen and mediators dominate the livestock marketing system in Sudan, some of them work as small traders, some as agents and some are branch agents for

big traders. They collect livestock, cattle and small ruminants from the small dispersed villages, sell them to other mediators or middlemen on site or in the primary markets and this same repeated in the secondary markets. This process continues until the animals pile before being sent to the final market; where again the same process is repeated as the agents and branch agents transport the animals to the big trader.

It is assumed that animals are exchanged more than 6 times from the primary purchase points to the terminal selling point, where the animals are either transported to Port Sudan or are slaughtered for local consumption or export. It is generally accepted that the role of the middlemen and mediators form a weak point in the livestock marketing system in Sudan, as it hurts the producers who sell animals when they need cash money, but under the present marketing system payment may be delayed. The go-between agents and the traders pass the risks of merchandizing the livestock to the producers, who obtain their money after the final sale of animals or might even not get it at all (ElNeima, 2015).

The producers lack the information about the prices at the terminal markets or the international prices that could have helped them to make decisions on their animal sales.

2.14.3 Marketing Obstacles:

Weakness of the infrastructure (Transportation and communication services) leads to large market margins, due to high cost of transporting products to destinations. It also handicaps the transfer of price indicators due to non-competitive practice between traders. On the other side, development of the infrastructure can play an important role by integration of livestock markets, facilitating competition, encouraging investment, distributing inputs in a more efficient way and supporting the free market (ElNeima, 2015).

Due to the available infrastructure in Sudan, the animal production areas failed to attain these big jobs. For a big wide stretched country like Sudan,

where animal wealth comes second to petrol deep consideration for investment in roads and communication means improvement needs to be answered to enable this important sector to spell out its capabilities.

Sudan applies one of the most complicated and over excessive system of livestock taxation in the entire region, as most of the states depend on livestock fees and taxation as main income source. These fees and taxes might go up to 27% of the cost of the exported animal and might rise to 40% if feed is included.

Taxes and fees are laid on livestock in all the marketing cycle, starting from the village up to the terminal markets. Taxes on animals are collected manually by the local authorities at different rates on different livestock. These taxes comprise an important source of income for local governments. After sale by the primary producer and entering the market chain "commodity" 20 or more fees and taxes are forced before reaching the terminal market at Khartoum or Port Sudan.

Fees and taxes collectively with escalating prices by the middlemen and traders, made the export price 8 times the amount received by the primary producer.

In some cases, these taxes and fees are taken against services, such as veterinary care, water, grazing or safe pass in certain areas, as some sort of extortion. Taxes on traders and exporters, also, affect the production and export prices.

It, then, becomes a necessity to improve the internal marketing efficiency, export procedures and product quality. As for type real attention should be paid to both animal and plant health parameters that match with the international agreements.

2.15 Perception of Development:

The first important phase during the 1950 and 1960 equated development with economic growth, as defined by Todaro (1994), who stated that

“Development has traditionally meant the capacity of a national economy, whose initial economic condition has been more or less static for a long time, to generate and sustain an annual increase in its Gross National Product (GNP) at rate of perhaps 5% to 7% or more” The experience of this concept resulted in levels of living of the mass of people in the developing countries remaining unchanged. Economic growth, where it was achieved did not trickle down to tackle the issues of poverty, unemployment and did not reflect the distribution of income among the different categories of people, thus accumulation of wealth in few hands can reflect a high GNP although the majority are still poor. Economic growth does not include the informal economy, which is often very substantial in developing countries.

Oakley and Garforth (1985) and Todaro (1994) described the process of four main elements of development:

- a) Economic development is a process by which people through their own individual or joint efforts boost production for direct consumption and to have a surplus to sell for cash. However, this requires that people themselves analyze the problems, identify the causes, set their priorities and acquire new knowledge. It also requires them to organize themselves in order to coordinate and mobilize the effective application of all the factors of production at their disposal. This means that they must plan, implement and manage their own economic activities. The higher income that accrues through increased savings and investments can be used to satisfy a wider range of the peoples wants enabling them to realize greater well-being.
- b) Social development which refers to those investments and services carried out or provided by a community for mutual benefit of the people. These include the provision of social amenities and services such as health services, education, water supplies, energy, transport system, communication and welfare. Likewise, social development is

dependent upon parallel and sufficient economic development to provide the resource base from which investment capital and operating funds are allocated. No social development activity is without cost. Without an economic base to cover these costs social investment will collapse.

- c) Human development which is concerned with the development of the people themselves, to realize their full potential to use their skills and talent, to play a constructive role in shaping their own society and become more self- confident, self-reliant, and cooperative.
- d) Political development is a process of gradual change over time in which the people increase their awareness of their own capabilities, their rights, and their responsibilities and use this knowledge to organize themselves so as to acquire real political power necessary (a) to participate in decision-making through their leaders and representatives at higher levels of government; (b) to plan and share power democratically; and (c) create and allocate communal resources equitable and efficiently among individual groups.

The relationship between social, economic, and political development can be illustrated according to Burkery (1993) as two columns representing economic and political development and a girder representing social development where the girder is dependent upon support of the two columns which in turn upon a foundation of human development. (Figure3) below explains this fact.

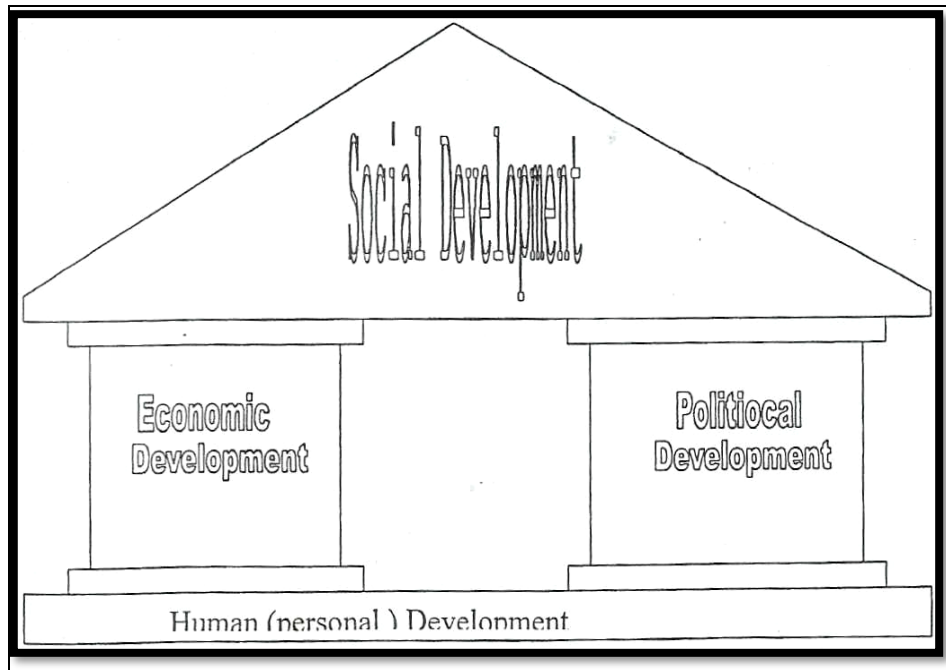


Figure (2.4): Building Development

Source: Burkery, 1993

As stated by Todaro (1994) a fact that at least three basic components or core values should serve as conceptual basis and practical guidelines for understanding the inner meaning of development. These Core values are life sustenance, self-esteem, and freedom. These represent common goals sought by all individuals and societies. They relate to fundamental human needs that find their expression in almost all societies and cultures at all times.

2.16 The Rural Development Concept

The development of rural areas is vital for the development of the whole nation and society. Rural areas should be given the priority not because rural migration complicates the problems of urban but for the sake of rural development. In this context the World Bank in Griffn (1981) mentioned that rural development is intended to reduce poverty, it must be clearly designed to increase production and raise productivity. Rural development recognizes that improved food supplies and nutrition, together with basic services, such as health and education not only directly improve the physical well-being and quality of life of the rural people, but can also indirectly enhance their

productivity and their ability to contribute to the national economy. Rural development is concerned with the modernization and monetization of rural society; and with its transition from its traditional isolation to integration with the national economy. Rural development as a concept has experienced diversification in views and theories. The improvement of living standards of the low- income population is the central theme shared between all definitions.

Uma Lele (1975) has stated that rural developing is concerned with improving the standards of the mass of the low- income population residing in rural areas and making the process of their development self-sustained. This definition has three important features:

- a) Improving the living standards of the subsistence population involves mobilization and allocation of resources so as to reach a desirable balance over time between the welfare and productive services available to the subsistence rural sector.
- b) Mass participation requires that resources be allocated to low-income regions and classes and that the productive and social services actually reach them.
- c) Making the process self-sustainable requires development of the appropriate skills and implementing capacity and the presence of the institutions at the local, regional and national levels to ensure the effective use of existing resources and to foster the mobilization of additional financial and human resources for continued development of the rural sector. Self-sustenance thus means involving, as distinct from simply reaching, the subsistence populations through development programs.

Also Chamber (1983) stated that, the rural development is a strategy designed to improve the economic and social life of a specific group of people, the rural poor. It involves extending the benefit of development to the poorest

among those who seek a livelihood in the rural areas; the group includes small-scale farmers, tenants and landless.

Rural development, in the light of the above, is the outcome of a series of quantitative and qualitative changes occurring among a given rural population and whose converging effects indicate, in time, a rise in the standard of living and favorable changes in the way of life of the people concerned. Rural development does not mean isolated programs of “community development”, rural animation, mass education, agricultural extension, health and nutrition, extension or any of the terms applied to sectional programs which are carried out in rural areas or within the rural community. It means, rather a comprehensive development of the rural areas. It encompasses all the strategies, policies and programs for the development of rural areas and the promotion of activities carried out in these areas with ultimate aim of achieving a fuller utilization of available physical human resources and thus higher income and better living conditions for the rural population, as a whole and the rural poor participation in particular (Anker, 1973).

2.17 Sustainable Development:

There is a difference between project sustainability and sustainable development. While project sustainability concerns itself with the continuity of a project until it attains its objectives, sustainable development is concerned with the continuity of the positive development impact associated with the project. In other words, the latter concerns itself with the change in the quality of the life of the people brought by a project intervention (Mulwa, 2008). Swanepoel (1993), capture the essence of sustainable development by maintaining that “when people are involved in a community development project, their objective is always concrete. The objective can be precisely described and can quite often be seen and touched. The peculiarity, though, is that while people are striving towards a concrete objective, they at the same

time researching abstract goals that they may not even have thought of'. While striving to get a clinic established (a concrete objective) they gain in something abstract such as self-reliance, self-sufficiency and human dignity. These abstract gains are enduring and permanent results of community developments, which enable people to help themselves" what Swanepoel (1993) refers to as concrete objective are the concerns at the level of project sustainability, while what he refers to as abstract gains are the concerns at the level of sustainable development. The latter have more to do with human development than material development.

2.18 Understanding the Concept of Rural Extension:

The meaning of the term agricultural extension is well known in extension organizations and services, but is not well understood in the wider community. Rural extension is now a common activity in most countries in the world and its basic element is program and project formulation to bring about changes in rural areas. There are many definitions of extension and each deserves attention. Briefly it may be said to be a system and process of services and education designed to meet the needs of people whether in urban and rural areas. Van den Ban and Hawkins (1997) stated that extension is a tool to remove farmers barriers which are: lack of adequate knowledge; lack of motivation; lack of resources; and lack of power .Adams (1982) adds that extension can remove such barriers, by describing extension as assistance to farmers to help them to identify and analysis their problems and become aware of the opportunities for improvement.

2.18.1 Veterinary and animal husbandry extension:

It is defined as an applied techno-social discipline developed for the improvement of production and health aspects of livestock through educational means. The agricultural extension and veterinary extension may be the same with respect to philosophy, principles, approaches and contents

but they differ with regard to objectives, strategies, methods, subject matter specialists, clients, applications, situations and services. (Sharma G.R.K, 2008)

2.18.2 Objectives of extension work:

The main objective of all extension work is to teach people living especially in rural areas how to raise their standard of living by their own efforts using their own resources of manpower and materials with the minimum assistance from Government (Paul Leagans, 1960). The broader function of extension work is to help people to solve their own problems through the application of scientific knowledge is now generally accepted.

Extension is largely educational in nature and approach . Hence, the words “extension” and “extension education” are used interchangeably .Education is a process of bringing desirable changes into the behavior of human beings. These changes must be desirable to the society at large. The education is effective when it results in changes in all the following behavioral components as specified by Paul Leagans (1960) :

- a) Knowledge - What an individual knows ?
- b) Attitudes -What he thinks ?
- c) Skills (both Physical and Mental) -What he can do ?
- d) Action - What he actually does ?

2.18.3 Roles for extension:

Roles for extension can be enumerated as:

- a) Empowerment Role:

The empowerment role can be a cornerstone of the new approach to extension. Extension personnel need to develop a new philosophy where their role is to help farmers and rural communities organize themselves and take charge (empowerment) of their growth and development. (Chamala, 1990).

b) Community-Organizing Role:

Village extension workers must learn the principles of community-organizing and group management skills (Chamala and Mortiss, 1990) in order to help the community, especially the poor or weaker sections, to organize itself for development. Understanding the structures, by-laws, rules, and roles will help leaders to plan, implement, and monitor their programs and to perform this new role effectively.

c) Human Resource Development Role:

The human resource development approach empowers people and gives new meaning to all other roles. Development of technical capabilities must be combined with management capability. Training modules are now available (Chamala and Mortiss, 1990; Mortiss and Chamala, 1991) to help develop individual and group management skills. The entire philosophy of human capacity building is to encourage rural communities to understand their personal and group styles of managing themselves and to improve their planning, implementation, and monitoring skills.

d) Problem-Solving and Education Role:

Problem solving is an important role, but the role is changing from prescribing technical solutions to empowering to communities solve their own problems. This is achieved by helping them to identify the problems and seek the right solutions by combining their indigenous knowledge with improved knowledge and by using their resource properly. Similarly, there is a shift in the education role from lectures, seminars, and training to learning by doing and encouraging farmers to conduct experiments and undertake action-learning projects (Manalili, 1990).

2.18.4 Background of the extension in Sudan:

Veterinary extension started in the Sudan in the year 1975 under the umbrella of the General Administration of Public Affairs and the evolution that has

become a public administration of the departments within the Ministry of Livestock and Fisheries (MARF, 2006).

2.18.4.1 Network management:

Consist of the General Administration for guidance and technology transfer and development of the three shepherds ran a major Extension, Technology Transfer and Development Department sponsors and management of documentation and communication to carry out all administration tasks and activities are integrated with each other to achieve the goals of the administration as a whole (MARF, 2006).

2.18.4.1.1 Extension and Technology Transfer:

The management of central and followed her guidance department and the Department of Field Research and Technology Transfer, and holds the administration of the following tasks: -

- a) Collect research results of applied research centers of livestock and veterinary colleges and animal production and research in the formulation of those templates guidelines understandable to the target audience.
- b) Evaluation of transitions and changes induced by the introduction of practices of the target audience.
- c) Focus on public awareness programs, and guidance through the preparation and implementation of the campaigns extension in coordination with other relevant jurisdiction.
- d) The provision of veterinary information and guidance service through educational means available.
- e) Curriculum development and implementation of the guidance material and training programs for sectors working in the field of livestock (MARF, 2006).

2.18.4.1.2 Department of Development Sponsors:

This is made up of sponsors and Services Section, which in turn consists of two units, unit training pastors and unit tracks and Nomadic Pastoral and Department regulations and these sections work in coordination with each other to achieve the functions of the administration and which can be summarized as follows:

Services Section Sponsors:

- a) Training of family members, pastoral proper methods and techniques of modern interest in the animal and make the most of its products to increase the income of the family pastoral and increase national income.
- b) Interest tracks and Nomadic and opened with the provision of water and veterinary services in coordination with the relevant authorities (MARF, 2006).

2.18.4.1.3 Department of Pastoral organizations:

Strengthening of the pastoral organizations and raise the level of its members, socially and economically healthy sponsors awareness of their rights, duties and care of their interests within the limits of the laws in force in the country.

- The development and dissemination of cooperation in the pastoral sector and the establishment of the projects that accrue to the benefit sponsors (MARF, 2006)

2.18.4.1.4 Documentation Management and Communications:

It consists of management of technical communications department and technical department and performed the following tasks: -

- a) Production of extension materials and methods.
- b) Documentation of symposia and seminars and workshops and special events in the ministry.
- c) Arrange and participate in internal and external exhibitions of livestock.

- d) Participation in the camps and campaigns guidance in the technical side and documentary.
- e) Documentation of medical conditions and rare anomalies that come to the veterinary hospital and in the farms.
- f) Participation in the documentation of training courses organized by the Extension and the different departments (MARF, 2006).

2.18.5 Extension Situations in the Sudan:

2.18.5.1 Crop-based and animal health-based extension:

Despite its growing importance, livestock production extension is a field neglected both by policy-makers and by researchers. The importance of livestock to household welfare, fertility maintenance and production is still under-recognized in many developing countries. Livestock production extension faces the additional institutional problem of being marginal to both agricultural extension and animal health services.

Agricultural extension services have developed around crop production, and remain tied largely to the seasonal nature of cropping. Such a system is less useful for livestock production, with a longer time-scale and a lack of synchronization of different animals and herds.

Livestock services and the ministries or departments that are responsible for them, are mainly run by veterinarians, and focus on animal health issues: curative treatment of individual animals, preventive health, and health screening of animal products.

While many special projects, area-based or sub-sectoral, concentrate on livestock production issues and are run by animal protectionists. Few countries can afford a separate livestock production extension service. Livestock production has often held a marginal status in official circles, between two well-defined sectors with associated interest groups, sometimes neglected by both, sometimes shuffled between them (ODA, 1995).

2.18.5.2 Improving livestock production extension:

In the present climate of retrenchment, governments are unlikely to start creating new institutions, or funding new services, to deliver extension on livestock production, so this growing need must be met by reforms of existing institutions and services. In most of Africa this will mean the national crop-based extension systems. But in all settings, participatory assessment of producers information needs is essential before institutional forms are decided upon.

There is a continuing role for the state in providing extension, especially to poorer producers, and in areas where there are significant positive externalities such as those linked with soil fertility maintenance and resource conservation. Cost-recovery from poorer crop-livestock producers will be difficult to implement, but recovering costs from relatively wealthy producers (such as per-urban fatteners or dairy farmers) may free public resources for extension to poorer producers(Bourn and Wint, 1994).

2.18.5.3 Livestock extension within crop-based systems:

Livestock production is both a highly specialized sub-sector with a strong claim to and sufficiently integrated with other forms of agricultural production to warrant inclusion in extension services. The solution lies in decentralization of all extension, and the integration of crop and livestock information delivery under local structures in response to local needs and conditions.

Most models for the integration of livestock into national extension systems will require cross-training of crop-specialist staff in livestock production and the course has been found too short and too classroom-based.

Low-cost participatory needs assessment methods are now well established and can assist in the understanding of priority needs. By contrast with crops, livestock extension has to cater for wide inter-household differences in husbandry systems and relative resource endowments, even within small

areas. In the African context of resource constraints governing crop-livestock integration, the point at which it becomes worthwhile to invest labor in fodder cultivation, construction of hay barns, and manure pits will arrive at very different times for different households, even within one locality. Similarly, the new opportunities for commercialized livestock production will be taken up unevenly by households(Sara,2012).

There are thus three linked but distinguishable imperatives for livestock production extension: participatory needs assessment, responsiveness to inter-household variation, and ability to address information needs as they arise, not as determined by a calendar. In meeting these needs, livestock production extension must learn from 'farmer-led extension' initiatives (Scarborough, 1996), but public sector reform is likely to be essential. Reforms to national systems can be incremental participatory needs assessment methodologies can be introduced, extension calendars compiled at lower levels, and treated more flexibly, and extension workers empowered to present options rather than set messages, but such reforms will require continued resourcing. They will also require improved research-extension linkages. Here, livestock research may suffer from specific problems of: compartmentalization and distance from the departments responsible for the linkages with extension; and under-developed methodologies for adaptive research and particularly participatory on- farm research. In Burkina Faso, for example, linkages between central livestock research and extension are mediated through a 'horizontal program' in production systems research, and in practice minimized. Seventeen adaptive research centers are managed at the regional level, but virtually no livestock research is carried out in any of them.

2.18.5.4. Production extension via specialist services:

The independent extension of livestock production information, separate from both crop extension and animal health, has largely occurred in special

donor-funded projects, as a subsidiary activity of universities and research institutes.

These services have much in common: they are open to participatory forms of needs assessment and technology development, and often use innovative media to transmit extension messages. They may work on a commodity basis with the whole livestock production cycle, material inputs and marketing opportunities, rather than information on its own. Some donor projects have dedicated research components, and both donor projects and Non-Government Organizations (NGOs) can network information effectively among themselves, rather than relying on normal research-extension linkages. On the other hand, donor and NGO projects often have high levels of resourcing, with hidden subsidies. They are also likely to work in favorable target areas, and may apply only to a restricted sub-set of farmers. These conditions can lead to very high adoption rates, but a low level of institutional sustainability and explicability. Their role is likely to be either: catalytic in that they serve to test interventions and approaches which may then be transferred in less intensive forms to national services; or time-bound, in that in combination with spontaneous diffusion processes, they can successfully spread a specific innovation on a one-off basis (ODA, 1996).

2.18.5.5 Production extension within animal health services:

There are few examples of animal health services successfully delivering production information to mixed crop-livestock farmers, other than information linked specifically to material inputs such as drugs, vaccines or semen. Disease prevention through vaccination campaigns, reduction of mortality and morbidity losses, and meat hygiene have remained priorities. This is understandable since human health is an important consideration, diseases cause visible losses and solutions are available (ODA, 1996).

Further, the working patterns of animal health staff tend not be conducive to regular mass extension: animal health services are usually focused on

district clinics to which farmers can bring animals, or on call-outs to individual animals. Veterinarians and privets are unlikely to have training in communication skills. Their professional reward systems usually revolve around concrete targets of animals treated/vaccinated or drugs supplied and are not conducive to the provision of 'pure' information. Animal health services, then, have not yet fulfilled their potential as vehicles for mass extension to mixed crop-livestock farmers. A case can be made for information dissemination to widely scattered producers through animal health and fertility camps organized by animal health services, as in India. A case can also be made for complementing animal health services with a parallel livestock extension service, possibly operating from the animal health clinics and hospitals, but staffed separately. Para veterinary projects, many run by NGOs, have a good record with pastoralists around the world (Butcher, 1994), including to some extent with production information. Government animal health staffs are playing an increasing role in extension to more specialized livestock producers the per-urban or the wealthier in rural areas. Pressures are increasing to make this advice available for a fee or to hand it over to the private sector (ODA, 1996).

2.18.6. Extension gap:

The need for agricultural and rural information and advisory services is likely to intensify in the foreseeable future. In much of the world, agriculture faces the challenge of keeping pace with rapidly increasing population with few reserves of potentially cultivable land. Farmers will have to become more efficient and specialized.

From government perspectives, whatever priority is given to production, extension will remain a key policy tool for promoting ecologically and socially sustainable farming practices. Some of the most promising recent developments in extension methodology have occurred where the key agenda

is environmental or is concerned with equity, for example in the need for the joint management of forests by professionals and local forest users and in integrated pest management.

A consistent theme running through the innovative approaches being used, such as participatory rural appraisal (Chambers, 1993), is a fundamental change in what are the respective roles of extension agent and clients. The agent is no longer seen as the expert who has all the useful information and technical solutions; the clients' own knowledge and ingenuity, individually and collectively, are recognized as a major resource; solutions to local problems are to be developed in partnership between agent and clients. Since the scale at which extension support is required is thus often larger than the individual farm, extension workers need new skills of negotiation, conflict resolution, and the nurturing of emerging community organizations (Garforth, 1993; Smith, 1994).

The future is also likely to witness a reversal of recent trends towards bureaucratization within hierarchical extension services and a reduction in their levels of public funding. Moreover, a rapid increase can be expected in the use of information technology in support of extension. The forces for change in these areas (Rivera and Gustafson, 1991) will come from four main directions.

2.19. Communication for Development:

2.19.1. Definition of communication:

The term communication stems from the Latin word "Communis", meaning common According to (Rogers and Shoemaker, 1971). Communication is the process by which messages are transferred from a source to receiver. Van den Ban and Hawkins (1997) defined communication as the process of sending and receiving messages through channels which establishes common meanings between a source and a receiver. Leagans (1961) defined communication as the process by which two or more people exchange ideas,

facts, feelings or impressions in ways that each gains a common understanding of the meaning, intent and use of messages. Communication then is a conscious attempt to share information, ideas, attitudes and the like with others.

2.19.2 Communication processes within the extension systems:

The term "extension" has been used to cover widely differing communication systems. Two particular issues help to define the type of extension: how does communication take place, and why does it take place. (Roy M. B. et al., 2010).

2.19.3. Role of communication in an extension system:

paternalism versus participation.

Early books on extension often describe a model of communication that involved the transmission of messages from "senders" to "receivers". As part of this model, senders are usually people in authority, such as government planners, researchers, and extension staff, while receivers are usually farmers who are relatively poor and uneducated. Although this model might include something called "feedback", it is clear that the senders are in control of the communication process.

The transmission model of communication is closely related to the idea that extension workers are the link (i.e. message carriers) between researchers (senders) and farmers (receivers). Extension programs based on this model have been described as "paternalistic"; in other words, the actors in the communication process have a parent/child or teacher/student relationship. Other authors have used the term "top-down" to describe these programs.

In many countries, paternalistic extension is gradually being replaced by more participatory approaches, in which the knowledge and opinions of farmers are considered to be just as important as that of researchers or government officials. Participatory approaches involve information-sharing

and joint decision-making. The terms "interactive" and "bottom-up" have been used to describe these approaches (Abdelraouf, 1993).

The development of participatory extension requires a re-examination of the communication process. At the present time, no single description has replaced the transmission model that is referred to above, but two ideas are becoming widely accepted:

- a) Although some actors in the knowledge system have more authority than others, communication usually involves a negotiation rather than a transmission. What takes place is a dialogue, with actors collaborating in the construction of shared meanings rather than simply exchanging information.
- b) Communication in the context of participatory extension cannot usefully be described in a linear manner with distinct groups of senders and receivers. Instead, extension activities take place within a knowledge system consisting of many actors who play different roles at different times.

The related, but separate field of agricultural communication has emerged to contribute to in-depth examinations of the communication processes among various actors within and external to the agricultural system. This field would refer to the participatory extension model as a form of public relations rooted two-way symmetrical communication based on mutual respect, understanding, and influence between an organization and its stakeholders (publics) (Heyman and Richard, 1994).

2.19.4 Persuasion versus education:

Although extension programs have many different goals, most programs fall into one of two basic categories:

- a) systems of communication that aim to change the behavior of rural people.

- b) Systems of communication that aim to change the knowledge of rural people there is, of course, a close relationship between knowledge and behavior: changes in the former often lead to a change in the latter.

If government policy-makers, project managers or researchers direct the topics addressed and projects undertaken, then the purpose of extension is to change behavior. This approach to extension has been variously described as directive extension, social marketing and propaganda. If farmers and other rural people direct the extension towards their own needs, then the purpose of extension is changing knowledge. This knowledge helps rural people make their own decisions regarding farming practices. This approach to extension is closely related to non-formal education.

- a) Informal Methods:

Informal methods include participant observation, case studies, key informants, individual interviews or discussions, group interviews or discussions, oral testimonial and life histories, longitudinal studies, cross-sectional studies, interdisciplinary terms, reconnaissance survey, diagnostic studies, rapid rural appraisal, and participatory rural appraisal (Beebe, 1987; Casley and Lury, 1987; Hildebrand, 1981; Nichols, 1991; Pratt and Loizos, 1992; FAO, 1992; Kumar, 1993).

- b) Formal Methods:

Formal methods include using the population and agricultural census; sample surveys such as random sampling, including simple, systematic, stratified, cluster, and multistage; nonrandom sampling, including purposive, quota, and accidental (Shaner al., 1982) and special studies.

Among these, the sample survey occupies a unique place. A sample, as a representative part of the population, enables us to draw reasonable inferences about the characteristics of the population. As such, the sample survey will constitute the "handover" of monitoring methodologies.

2.19.5 Development communication:

Development communication is a communication which is purposive, pragmatic, goal directed and audience oriented. It has 'popular participation' as an essential component. Development communication is used to inform and motivate all levels and sectors of a poor or developing country, to use new skills and equipment in accordance with their needs. Without this social aspect, development will remain detached from the intended population because of the cultural gaps which exist in the society. (Sharma G.R.K,2008) Mere acquisition of information will not result in development. For example, a communication programme cannot supply fertilizers, provide loans or establish industries required for economic development.

As such, communication programmers should be so timed that these facilities are available to the audience almost simultaneously (Sharma G.R.K, 2008).

2.20 Extension and Veterinary Public Health

2.20.1 Veterinary public health:

One of the primary concerns of the nation is agriculture's contribution to gross domestic product. A large percent of the U.S. population depends on the agriculture and forestry sector for their livelihood. Raising livestock is a particularly important activity for limited-resource farmers and stakeholders. Livestock is a means of accumulating capital and acts as a social safety net. Because animal or herd-health information is of potential importance not only to the farm business but potentially also to animal welfare and public health, understanding the types of sources of animal/herd health that farmers can utilize is important (Jensen et al., 2009).

Safeguarding animal health is of paramount importance to the U.S. economy, public health, and food supply. To ensure the continued productivity of livestock, there is a national need to educate farmers, including women and ethnic minorities, on livestock best-management practices.

In addition, there is a need to build concurrent capacity in Extension in ethnic minorities' livestock-raising issues.

Limited-resource farmers need one-on-one contact. Small farm operations are operated by individuals with different knowledge bases. Understanding the profile characteristics of the minority farmers who need and participate in our Extension programs is important for those concerned with the process of planning Extension programs for our stakeholders. Extension program planning should be approached primarily from the point of the small farmers we serve, and secondarily from a subject matter point of view (Martin, 1988). FAO, WHO and OIE define Veterinary Public Health (VPH) as "The contributions to the physical, mental and social well-being of humans through an understanding and application of veterinary science". Veterinary public health contributes to public health through the knowledge, skills and resources of veterinary science. This generally relates to the understanding, prevention and control of zoonotic diseases and food safety issues. The scope of VPH is clearly multidisciplinary, involving not only veterinarians in public and private sectors, but also other health and agriculture professionals, communication experts and scientists as well as paraprofessionals. An interdisciplinary team approach to problem solving, research, control programs and communication is essential for the improvement of human health in a significant and sustainable manner (FAO, 2005).

Livestock are important in supporting the livelihoods of poor livestock keepers, traders and laborers throughout the developing world. Diseases affecting livestock can have a devastating impact on animal productivity and production, on trade in live animals, meat and other animal products, on human health and, consequently, on the overall process of economic development.

The role of animal feed in the production of safe food is also recognized worldwide, and several events have underlined its impacts on public health,

feed and food trade, and food security. More common food problems associated with *Salmonella*, *Enterohaemorrhagic Escherichia Coli* and other contaminants, have encouraged professionals and the feed industry to scrutinize more closely the causes of these diseases and methods for their control. Measures may require limiting the use of some ingredients or radically changing the way in which they are prepared (processed) or sourced. In some cases the locations where animals are grazed need to be restricted. FAO therefore provides current knowledge on animal feed and its impact on food safety and orientation and advice on this matter (FAO, 2005). Animal health impacts are felt by livestock owners and traders at the local, national, regional and global levels. There are also trade and social impacts. In developing countries livestock owners and national governments are unable make the investments required and this is an example of market failure.

For this reason, veterinary services are now considered as international public good and there is a need to provide assistance for the less developed countries to develop their capacity (DFID, 2002).

A recent study by the Department for International Development (DFID) has estimated that as many as 150 million poor people (one eighth of the world's poorest people) perceive livestock to be an important livelihood asset (DFID, 2002). According to International Food Policy Research Institute's (IFPRI) estimates, by the 2020, developing countries will produce an average 40% more meat and 60% more milk per capita than in the early 1990s. Such dramatic increase in the livestock production has implications for human nutrition, food security and poverty alleviation, environmental sustainability, world trade and food prices, and public health (Riviere, 2004).

2.20.2 Herd Health:

One such definition is that herd health is a planned animal-health and production-management program that uses a combination of regularly

scheduled veterinary activities and good herd management designed to optimize animal health and productivity (Blood, 1979).

In any livestock production system, certain diseases and production constraints can be anticipated on the basis of accumulated experiences. Herd-health management and preventive medicine programs are designed to minimize potential adverse effects of these predictable constraints and to protect against unexpected ones. Principles of these programs may include pregnancy diagnosis, bull breeding soundness evaluations, consulting on vaccination and treatment programs, becoming involved in biosecurity and food safety issues, and it may also involve organizing and reviewing a recordkeeping system (Campbell and Jelenski, 2006).

Diseases affecting livestock can have a significant impact on animal productivity and production; on trade in live animals, meat, and other animal products; and on human health zoonosis, and, consequently, on the overall process of economic development.

Prevention of diseases in beef herds is essential for being profitable. Waiting until signs of a disease appear to institute a herd-health program is too late. Once most diseases are finally apparent, they have been seething in the herd for months and have been reducing herd profits. Unfortunately, many of these diseases have no treatment, so prevention is critical.

Disease surveillance will help determine the most important diseases of a farm operation and will present clinical approaches that can improve detection, diagnosis, and treatment of herd-based problems. There are a number of animal diseases of concern that affect the adequacy of the food supply for a growing world population and have a huge implication for global trade and commerce, such as Exotic Newcastle Disease, Foot and Mouth Disease, West Nile Virus, and Bovine Spongiform Encephalopathy. The outbreak of Foot and Mouth Disease in the United Kingdom in early 2001 caused many producers to re-evaluate their own herd-health programmes.

2.20.3 Animal health services

Different livestock production systems determine the level of demand for animal health services. If these services are to be provided on a financially sustainable basis, they must be tailored to meet actual rather than perceived demand. Identifying an appropriate model for animal health service delivery thus requires careful analysis of the production system to be targeted. Governments and donors can play a useful role in providing resources for this type of study as well as for appropriate market studies, business planning, training and access to soft loans (Huttner, 2000).

Financial stringencies severely constrain the ability of many developing countries' governments to provide basic animal health services, particularly in rural areas. Given that the livelihood of smallholders often depends, at least partially, on livestock, lack of access to 'minimum' animal health services increase these people (FAO, 2005).

Addition, of trade barriers and at times complete export bans undermine the already weak economies of most of these countries (FAO, 2005). Recently, many developing countries have introduced and encouraged the community-based animal health services, decentralization and privatization.

These community-based interventions are expected to be more efficient, transparent, cost effective and flexible according to the local management and resources. These services involve the empowerment of local people, to make them able to be more self-reliant and to take more responsibility for the services that they need through the transfer of some services to non-state providers (UNDP, 1998). Privatization of animal healthcare systems in developing countries, particularly in sub-Saharan Africa, has had very limited success.

Introduced with inadequate transition time and too few resources, many livestock owners either cannot afford or unable to access to the services they

need. Poor livestock owners in remote rural areas suffer the greatest disadvantage (FAO, 2004).

In community-based animal health services system, although there are many different variations in the basic model, however, the local individuals / farmers are trained as animal health workers that develop their own business by providing basic veterinary and livestock services to their other members of the villages and / or their neighbors.

The self-help associations or committees are formed to identify the opportunities, technical improvement, proper undertaking of their own products through establishment of milk collection centers, chilling facilities and marketing. The self-sustained social welfare activities like education and human health care centers, for the children and family of the farmers, are also unique features of this system (Leyland and Catley, 2003).

There is also a large number of livestock population, that is still deprived of the basic animal health services either from public sector or from any community-based association and is kept on conventional or no system basis. In those marginal areas, the basic data regarding the health and status of the farmer and livestock has not been properly analyzed so far (Raja and Bajwa`, 2005).

2.20.5 Targeting poverty and improved livelihoods:

Sheep and goats are very closely associated with the poorest of the poor, often in marginal and harsh environment (Devendra, 1992; Devendra, 2000). Development programs that focus on improving productivity thus also have the effect of alleviating poverty. Increased resource use is therefore also justified to target the poor and the poverty focus. Resource allocation by national programs and donor agencies for research and development projects concerned with these species merits additional support. Their association with the poor, poverty alleviation and food apply only to a restricted sub-set

of farmers. These conditions can lead to very high adoption rates, but a low level of institutional sustainability and reliability.

Their role is likely to be either: catalytic in that they serve to test interventions and approaches which may then be transferred in less intensive forms to national services; or time-bound, in that in combination with spontaneous diffusion processes, they can successfully spread a specific innovation on a one-off basis.

The increasing potential in many developing countries for improving livestock production through the provision of extension on production techniques, but livestock extension has been marginalized by major interest groups (crop-based extension and animal health services) and by a lack of a clear understanding of livestock farmers' needs. Crop production needs and animal health problems are more easily diagnosed and addressed than livestock production needs. Livestock farmers are frequently dispersed and are usually non-uniform in their needs (even within a particular community). The sorts of reforms and modifications necessary to introduce some livestock production messages successfully into crop-based extension services are now clearer. Many of these reforms are needed anyway by those services if they are to work effectively with poor farmers. Other information may be handled by animal health services, given certain reforms, particularly in professional reward systems. The choice of institutional context for livestock production extension cannot be made in the abstract, but has to be based on the nature of producers' information needs, and on available resources.

The Cooperative Extension system, with roots dating back to the Smith-Lever Act of 1914, represents a distinct approach for meeting the educational needs of citizens and helping them lead high-quality, productive lives.

With an emphasis on improving rural life, efforts were made to disseminate the results of agricultural research to farmers and to provide families with needed information on nutrition, childcare, home management, and youth

development. Considering its organizational structure and underlying philosophy for addressing relevant social issues, Cooperative Extension has established a responsive system for adapting its program focus to accommodate social trends and changing societal needs (Decker et al., 1989; Rogers, 1995). The results of a needs assessment conducted to develop area Extension program in the new area of "intergenerational programming." Intergenerational programming, which is gradually receiving the attention of county-based and state-level Extension personnel across the country (CSREES, 1999), refers to the wide range of initiatives that aim to bring young people and older adults together to interact, stimulate, educate, support, and provide care for one another.

The International Consortium for Intergenerational Programs, an organization founded in 1999 for the purpose of bringing together policy makers, academics, and practitioners to promote intergenerational practice, defines intergenerational programs as "social vehicles that create purposeful and ongoing exchange of resources and learning among older and younger generations." Intergenerational programs are found in a variety of settings, including schools, community organizations, retirement communities, hospitals, and places of worship. These initiatives tend to mobilize the talents, skills, energy, and resources of older adults (as well as young people) in serving people of other generations (Henkin and Kingson, 1998/1999).

Over the past 20 years, there has been a growing recognition of the importance of the intergenerational program area to Extension. Intergenerational activities have often been integrated into Extension program areas such as human development and aging, 4-H/ Youth Development, horticulture, and community development. The intent is typically to provide educational enrichment and additional social support in the lives of young people and older adults and to produce tangible benefits at

the community level, such as through community gardens, 4-H curriculum materials or projects, reading programs and murals (CSREES, 1999).

However, these efforts tend to result in small-scale initiatives that are not easily sustained.

To sustain such work, there needs to be a greater commitment--displayed at the local, state, and national levels--to systematically develop and support intergenerational approaches and integrate them into existing Extension programs (Kaplan and Brintnall-Peterson, 2001/2002).

In 2000, Penn State Cooperative Extension established an "Intergenerational Programs and Aging" specialist position to provide area support for Extension educators and other professionals interested in conducting/facilitating intergenerational programs. Once this position was filled, the specialist pursued the following three-pronged strategy to provide direction on program development issues:

- a) Conduct a series of "exploratory" site visits to Cooperative Extension county offices. Twelve visits, conducted over a 10-month period, provided basic information on local needs and how county-based Extension offices work to address those needs. County Extension personnel were also engaged in discussions about intergenerational relations issues and program possibilities.
- b) Establish an "Intergenerational Initiatives Advisory Group." The advisory group consists of Extension educators and other professionals interested in the intergenerational programming area (including university-based outreach staff, agency and community organization staff involved in Extension programs, and university faculty members). Members serve the dual function of communicating county needs and ideas to the university community and bringing information and program development opportunities to each of the county Extension offices. Advisory group members also provide input

regarding the development of new intergenerational models and concordant resource materials (e.g., curriculum guidebooks, fact sheets, circulars).

- c) Conduct the "Intergenerational Program Possibilities" Assessment. Through this needs assessment, Extension educators were asked about their interests and preferences for intergenerational program/resource development. Most of the items on the assessment were derived from program development ideas that emerged from the county site visits and Intergenerational Initiatives Advisory Group meetings and discussions

Farmers' markets have become more common throughout the United States, and more communities are now interested in their development (USDA, 2010). The resurgence in farmers' markets is good news for consumers, communities, and farmers (Abel et al., 1994). Outlets for locally produced foods provide more than just the freshest possible food, they also help:

- a) Establish connections between consumers and food producers.
- b) Provide additional income source for farmers.
- c) Serve as a tool for community development.

2.20.6 The impacts of animal diseases:

Animal diseases can have significant effects on animal production, human health and trade and the local, regional and global economies. This has been vividly demonstrated recently by the impact of the outbreak of highly pathogenic avian influenza (HPAI). There are many diseases that have significant impacts on animal production, however, it is the major transboundary diseases (e.g. Foot and Mouth Disease (FMD), Rinderpest and Classical Swine Fever) and the zoonotic diseases (e.g. Nipah Virus, Bovine Spongiform Encephalitis (BSE) and (HPAI), that have the greatest potential for negative impacts on economic development. A feature of animal diseases is the potential for change and the emergence of new diseases and evolution

of existing diseases have been observed for many years. Previous experience shows that new and emerging diseases are likely to increase (King, 2004). This is due to rapid changes in hosts, agents, production systems and environment and the greater overlap of animals with human populations.

The global spread of the Pan-Asia topo-type of the type O strain of FMD to previously free zones such as South Africa, Korea, Japan and Europe, have shown that globalization is contributing to an increase in the risk from FMD. The emergence of new strains and increased international travel and trade are contributing factors of the new and emerging diseases seen in recent times, many of these are zoonotic and it is likely that this trend will continue (King, 2004).

Recent examples include Nipah virus, BSE, Severe Acute Respiratory Syndrome (SARS) and HPAI and each one of these have had severe economic, trade and social impacts. These disease events have shown the inadequacy of veterinary services in many parts of the region. This includes failure of surveillance systems, lack of transparency and reporting of disease events and absence or slow response to significant animal diseases. Global trade in animal products is now driven by the WTO and its Sanitary and Phytosanitary (SPS) Agreement. This specifies that for animal health, animal welfare and preharvest aspects of food safety, the OIE will develop standards, guidelines and recommendations. These are used for the facilitation of trade and determination of animal health status. They have the potential to remove unnecessary restrictions on trade in animals and their products. These standards are scientifically based and aim to provide practical ways of facilitating safe trade in animals and their products. In addition to standards and guidelines for veterinary services, disease control and protocols to be used by trading partners they also provide guidance for risk assessment. The OIE codes, standards and guidelines (OIE, 2004) are under constant review

and are developed in a consultative process involving expert groups working in a consultative process with the 166 member countries.

At present there is limited participation by many countries and it is important that all countries participate in the consultative process. Practical approaches to achieving access to trade and minimizing the economic impacts of animal disease include risk assessment and zoning. Zoning is widely used as a geographically based tool for disease control and also as a more cost effective method to achieve market access. Compartmentalization is a relatively new concept and involves confirming disease free enterprises for situations for a limited range of diseases such as HPAI where the risks can be managed at the enterprise level. Its first application is likely to be for HPAI in commercial poultry enterprises in order to maintain access to trade under strict conditions (OIE, 2004). These countries are also excluded from trade due to many other SPS barriers because they are unable to demonstrate a capacity to provide the required assurances of meeting criteria for food safety, chemical residues and other contaminants.

2.21 Programme Development and Planned Change:

In one way or another, when we talk of program development, we talk of some kind of planned change, that is, deliberate efforts to change a given state of affairs. Social, economic, cultural, or technological changes are commonly assumed to be the purposes of planned and systematic extension actions. As change facilitators, extensions should then be concerned with the preparation of programs and projects that are responsive to the needs and interests of rural communities and farm families.

Some would argue that planning is a difficult mission, especially in the developing world, where the level of political and economic uncertainty is high. This leads to on-the-spot decisions or very short-term and incipient planning work. However, we strongly argue that the lack of adequate planning and continual evaluation is a major reason for the frequent failure

of development projects and extension activities (Koehnen et al., 1992) planners do not look at the diversity embedded in most situations; different clientele groups are not systematically involved, and some (surprisingly, major ones) are neglected; alternative solutions are not carefully compared; objectives are too rigid, not clearly defined, or not linked to activities; results are not duly studied; and the distribution of benefits is overlooked. So in many situations the challenge seems obvious: to allocate more time for planning and evaluation and to stop acting hastily and mechanically, without direction and purpose, like a clock lacking hands.

Extension authors and professionals strongly support planning. (Forest and Baker, 1994) for instance, underline that "program planning helps justify budget appropriations and brings understanding among the public," adding that "the planning process offers opportunity to people who participate in it to learn, thus building leadership skills in the community that will likely contribute to self-help, independence, and positive end results." In general, adequate planning and evaluation do the following:

- a) Involve an integrated analysis of needs and interests, opening up new horizons for action
- b) Promote a concentration of efforts, channeling energies and resources in appropriate directions, and helping accomplish complementarities and synergies.
- c) Strengthen program resources and attract funds, thus allowing the sustainability or expansion of activities.
- d) Improve team and community capacities, motivations, performance, and autonomy.
- e) Show commitment to address and solve problems
- f) Strengthen the quality of projects and staff performance
- g) Serve as a means to open dialogue with other organizations involved in development.

In this sense, it is understandable that "planning extension programmes has become an increasingly accepted practice among national authorities" (Maalouf and in Rivera, 1987). This shows in the flowing diagram by (Delp et al., 1977).

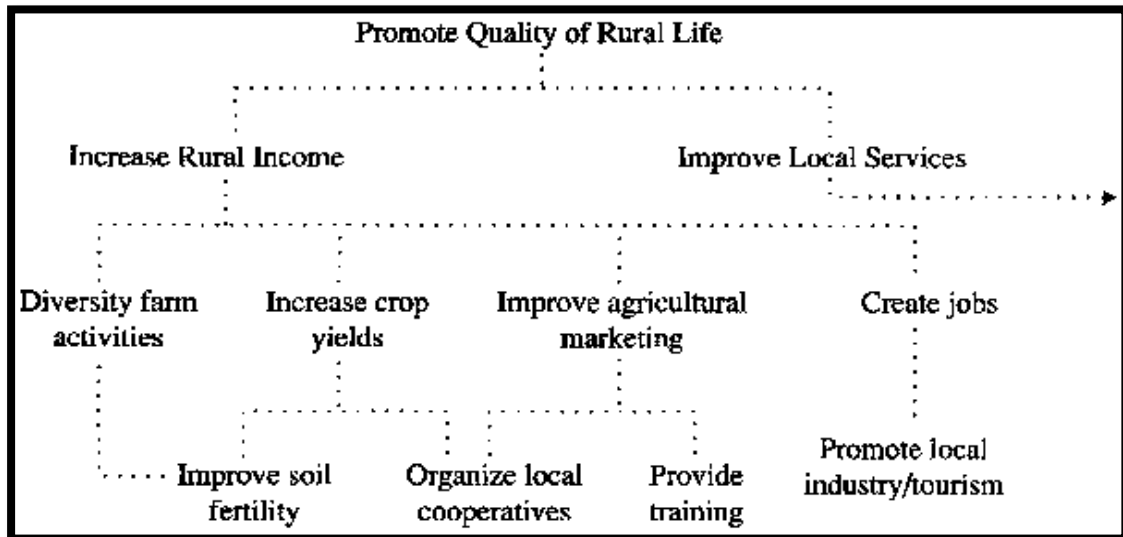


Figure (2.5): Objective tree for rural development project by (Delp et al., 1977)

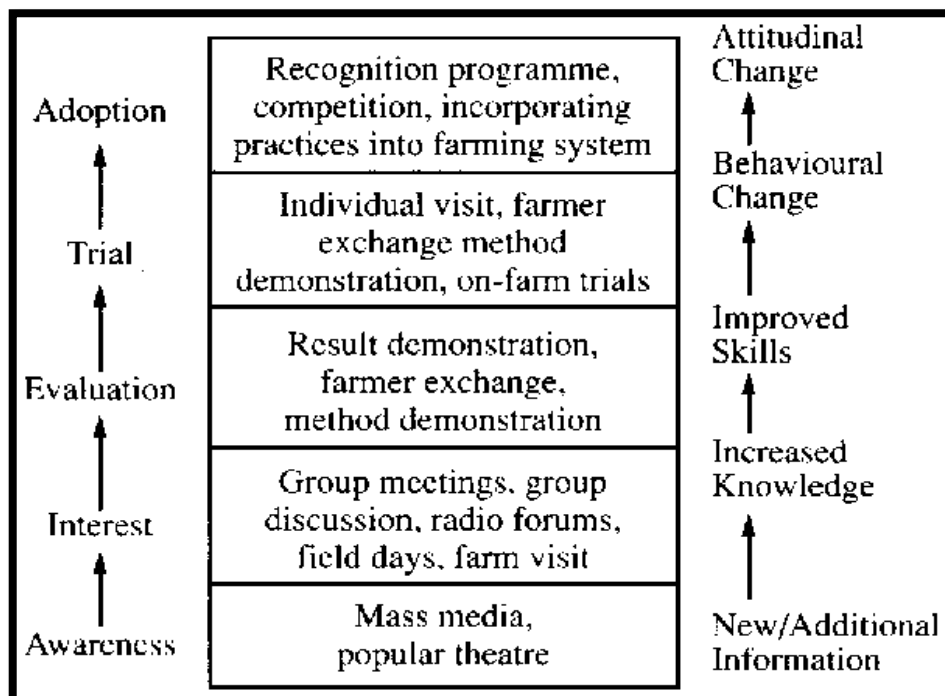


Figure (2.6): Recommended extension methods for use at different stages of adoption Ven Den Ban and Hawkins (1985).

Also indicated that majority of the farmers in the area identified only few veterinary services, as suitable for cost recovery according to their need and importance. Majority of the livestock holders belong to marginal, small and medium categories. Hence, rationalization of service delivery is an advisable approach, wherein, the services which provide direct individual benefits viz., production and curative services could be brought under cost recovery, and services which are of public service type such as prophylactic and extension services could be provided free by government. Keeping in view of the social and equity aspects, continuation of subsidies for socially and economically disadvantaged communities is also advised. In total, it can be concluded that the government has to play a welfare role, though it is changing in the context of liberalization and globalization.

2.22 Definition of participation:

Participation by the people in the institutions and systems which govern their lives is a basic human right and also essential for realignment of political power in favor of disadvantaged groups and for social and economic development. Rural development strategies can realize their full potential only through the motivation, active involvement and organization at the grassroots level of rural people, with special emphasis on the least advantaged, in conceptualizing and designing policies and programs and in creating administrative, social and economic institutions, including cooperative and other voluntary forms of organization for implementing and evaluating them Burkery(1993).

The United Nations Research Institute for Social Development, 1979 (UNRISD), defined participation as the organized efforts to increase control over resources and regulative institutions by groups and movement to those excluded from such control (Shepherd, 1998). Participation in this context leads to greater control by the poor over their own life situation. Through the acquisition of knowledge and awareness the poor become better able to

understand the causes of their poverty and are in a better position to mobilize and utilize the resources available in order to improve their situation. A key element in this process in which the poor gain greater, themselves, control over their own lives is collective effort i.e. organizing to carry out activities in like-minded groups. It is generally accepted that participation is meaningless outside the collective context. Poor people must come together and pool their human and material resources in order to attain the objectives which they set for themselves (Burkery 1993).

Participation as defined by UNRISD is closely tied up with equity and empowerment. Empowering rural people has become an accepted term in development. Empowerment is more fundamental and essentially conceived with enabling rural people to decide upon and to take the actions which they believe are essential to their development. Others see it as development of skills and abilities to enable rural people to manage better themselves. Rehrnan, 1990 in Shephererd (1998) identified several dimensions of empowerment: (a) Organization of the disadvantaged and underprivileged in structures under their own control; (b) knowledge of their social environment and its process developed by the disadvantaged; (c) self-reliance; caring and sharing of collective identity; (d) creativity; to do a job assigned to in a way that promote a lay out (e) institutional development, in particular the management of collective tasks, and mass participation in deliberation and decision making (f) solidarity, the ability to handle conflicts and tension to care for those in distress, and a consensus that all should advance together; (g) progress for women in articulating their points of view, and the evolution of gender relations towards equality, as assessed by women themselves . Empowerment would also imply that there were changes going on in the wider society as a result with grassroots change: the development of human dignity, popular democracy, and cultural diversity.

As explained by Oakley and Marsden (1987) participation is described as a voluntary contribution of the people to the development and sensitization of the rural to be involved actively in the decision-making, and planning, processes of implementing programs and control of their own resources. Oakley, explained two main vehicles for implementing the notion of participation: (a) community development programs which were aimed at preparing the rural population to collaborate with government development plans and (b) the establishment of formal organizations (cooperatives, farmers association, village development committees, etc) which were to provide the structure through which the rural people could have some contact with, and voice in, development programs. Jazairy *et al.*, (1992) stated participation is based on people's awareness of their social entitlements and economic opportunities, which moves them away from dependency to self-reliance and to having a role in decision making, so people want to be part of the hi processes that shape their lives.

Shepherd (1998) mentioned that participation in rural development is not about inclusion or involvement of the rural people in development projects only but about the development of organizations and sets of organizations in which the rural people can articulate their interests, defend what they have, and stake out new fields of promise.

2.22.1 The arguments for participation in development:

There is supporting evidence in favor of participation of local community in the functioning of development. In this light, Oakley (1991) stated:

“People's participation can increase the efficiency of development activities, by involving local resources and skills; and by better use of expensive external cost. In addition to this, community participation can also increase the effectiveness of such activities by ensuring people's involvement, activities are based upon local knowledge and understanding of problems and will therefore be more relevant to local

needs. Moreover, self-reliance can be ensured through participation, which helps to build local capacities and develop the abilities of local people to manage and negotiate development activities”

2.22.2 Elements of effective participation:

The preparation of the rural people to participate effectively must be seen as an important project activity. Oakley (1991) identified most important elements of participation as follows:

- a) The disaggregation of the rural poor and the identification of discrete socio-economic groups as the basic unit of development;
- b) Existence of bottom-up with the absence of any pre-determined models and the emphasis upon emergence spontaneously of a relevant approach from below;
- c) The principle of self-reliance and the need to reduce a development based upon dependence;
- d) The groups control the development project activities; and
- e) The groups take collective action to tackle the problems, which they confront.

2.23 The characteristics of the Community Based Organizations

As explained by Oakley (1991) the characteristics of the rural people organizations are externally designed and directed, function as receiving mechanism or as a means for people’s contributions to projects. Here, emphasis is upon strong leadership and central decisions motivated by immediate economic benefit, government-supporting, emphasis upon management procedures and professional staff, formal and legal structures large membership and representatives.

Oakley (1991) mentioned that, participatory organization is based upon indigenous patterns of organization, organic growth of organization, spontaneous evolution, members self-management, emphasis upon action linked to tackling exploitative situations, redefining leadership and decision making in order to avoid repression, threatening to existing structures and

small membership and participatory, organizations with the above characteristics are common place in rural development; they have brought tangible benefits to some rural people. Also they have helped to develop links between rural people and existing government services and moreover, they have been the means whereby many rural people learn a variety of management and communication work.

Also in line with the same argument Solomon (1981) listed a numbers of characteristics of the CBOs conducive to people's participation in development. These included the following:

- a) Membership 'and Leadership: It is important to loosen up the rigid social structures of traditional villages by creating new leadership opportunities, and subjecting traditional leaders to competition and to the choice of becoming leaders of development or risking the loss of their prestige. The low rate of participation in CBOs was mostly due to the governing bodies that exist on papers and tendency of official to use organizations to advance personal interests.
- b) Access to training and education: Access to training and, education has been selected as one of the important factors of highly' successful CBOs because the level of education has been consistently associated with speed of adoption of the all types, of innovations. A new kind of membership and leadership by education is considered to be necessary to create a true rural people membership organization, demonstration, communal responsibilities but responsive to needs of its members.
- c) Mechanism to mobile resources: CBOs are means of mobilizing the human resources of the rural community for development. Any real success in CBOs for rural development depends upon the ability to involve a large percentage of the farm community; such organizations must offer advantage to potential participants. The mobilization of human resources includes:

- Growing middle class through the withdrawal of upper class who did not need such organizations.
- The lower class farmers who receive little economic benefits.
- The charismatic leaders who play important roles in the success of new organizations.
- An outside support of the political system and advice and assistance of professionals.
- The illiterate subsistence farmers who need such an institution through which they can promote their interests and which can help them work together and rationalize and coordinate at local level various programs and policies of national agencies.

Because of the low levels of magnetization at the subsistence level in many developing countries, the initial financing and capital investments in agriculture have to come from outside especially from governments, and some other donors, These include loans (but not under a mortgage system), marketing and the mobilization of local capital through saving and investments.

- d) Access to power and influence: In developing countries only urban groups, large landowners and merchants...etc are the ones who have greatest access to government resources. Peasant tenants and rural laborers, as long as they are unorganized have little or no voice, and lack access to power and influence. Power may be exercised through economic influence or political pressure groups. However; without strong allies and institutionalization CBOs are restricted to local influence and vulnerable to repression.
- e) Access to markets: This item refers to the need for mechanism whereby farmers control their access to both production input markets and product markets and whereby they can receive the best possible price

and efficient storage, processing -and transport of their products to central markets.

In addition to the above mentioned of the CBOs characteristics, Strand and Morten (2003) mentioned that the CBOs differ from Non-government organizations (NGOs) by furthering the interests of their members, whereas, NGOs may pursue commitment that do not directly benefit their members and differ from local governments by being voluntary and choosing its own objectives.

2.24 Social Mobilization:

Social mobilization is an approach and tool that enables rural people to organize for collective action, by pooling resources and building solidarity required to resolve common problems and work towards Community advancement. It is a process that empowers women and men to organize their own democratically self-governing groups or community organizations, which enable them to initiate and control their own personal and communal development, as opposed to mere participation in an initiative designed by the government or an external organization.

Effective social mobilization goes beyond community organizations, harnessing the potential and efforts of government, non-government sector and citizens to work towards sustainable social, economic and political development. The benefits of social mobilization to community organizations and its impact locally and nationally can be best sustained within an enabling political, policy and regulatory environment and where mechanisms for linking experiences and lessons at the community level to policy are developed. (Herbert and Irene, 2008).

From the past experience of the world the following are the four key elements of social mobilization.

- a) Organizational development. A process in which community members and, especially the poor form their own groups or organizations based

on common development interests and needs that are best served by organizing themselves as a group. Before one becomes a member of a Community Based Organization, the individual struggles against a harsh environment. One he/she is organized in a broad-based group, the individual has leverage with which to address and tackle problems which he/she could not have done alone (Pandy, 2002) Organizations can be created with a specific focus (for example, a tenant association, a credit union, or cooperative) or as broad-based, multipurpose groups or community organizations with an overall aim to improve the situation of their members and the community in which they live. Organizations with a holistic focus are more inclusive of the poor, (who have a much broader array of needs) and can be effective vehicles for poverty alleviation, community wide development and establishing strong links with local government. Mobilization can start with small groups as the first step for the participation in larger community wide organizations, which are in some cases, associations of small groups. In other cases, community organizations mobilize the poor members of their organizations into small groups in order for them to work on alleviating their poverty. In both cases, the larger organizations serve as a support network for small groups and an important link to local government and external organizations that provide various forms of services and support, e.g. micro finance, marketing, business development support, matching grants for local infrastructure rehabilitation and social services delivery

- b)) Capital formation for development through community savings. Capital formation through mobilization of savings enhances a community organization's power to realize its full potential. Savings generated by individual members are the assets of the community organization and the first step towards their self-reliance (Pandy,

2002). Accumulated savings can be used for internal credit, to enable individual members to engage in income generation activities which at the same time, accumulating the organization's capital base. They can also be used for development activities at the community level. Savings can serve as the basis for community organizations contribution to local development initiatives, which is essential in localities where government capacities to address all social needs of a community are very limited.

- c) Training for human resources development: Community members can maximize their potential not only by organizing themselves but also by upgrading their existing skills to manage new inputs, business and community initiatives and establish effective links with local government and other actors. The change agent e.g. organization, individual facilitating the social mobilization process can support direct training exchange visits and other capacity building activities based on needs identified by the members of the community organizations. These can cover: organization development, leadership, savings and credit programs, agriculture, natural resources management, and other key areas. Local human resource development can best be promoted when trained individuals take up the responsibilities to train other community members.
- d) Socio-economic development, initiatives are great incentives for community members to organize themselves. It is important, therefore that an initiative, which includes social mobilization, provide support in form of matching grants or access to credit, marketing and other services that will lead to tangible improvements in social economic conditions within the community. The process of identifying community priorities, participatory planning, implementing and monitoring of community projects and managing partnerships with

local government, private sector and other actors helps not only to improve local conditions but also to empower people and their organizations. If well facilitated, this process can result in increased institutional capacity, enhanced social status and voice (especially for disadvantaged people, including women, the poor and youth). These results in turn motivate people to remain organized and they begin to enjoy the benefits of collective action and recognize its potential to create or influence change in their communities.

2.25 The Self-Help Group (SHG):

Self-Help Groups (SHG) are mostly informal groups whose members pool savings and relend within the group on rotational or needs basis. These groups have a common perception of need and impulse towards collective action. Many of these groups got formed around specific production activity, promoted saving among members and users the pooled resources to meet emergent needs of members, including consumption needs. Sometimes the internal savings generated are supplemented by external resources loan/donated by the voluntary agency, which promoted the SHGs. Since SHGs were able to mobilize savings from the poor who were not expected to have any savings and could also recycle effectively the pooled savings among members, they succeeded in performing/providing bank services to their members, may be in a primitive way, but in a manner, which was cost effective, simple, flexible at the door step of the members and above all without any defaults in repayment by borrowers.

Involvement of SHGs with financial institutions could help in overcoming the problem of high transaction costs in providing credit to the poor, by passing on some financial institutions responsibilities regarding loan appraisal, follow-up and recovery etc. to the poor themselves. In addition, the character of SHGs and their relations with members offered ways of overcoming the problem of collateral, excessive documentation and physical

access, which reduces the capacity of formal institutions to serve the poor (Verhagen, 1987).

Based on local conditions and requirements the SHGs have evolved their own methods of working. Some of the common characteristics of functioning of these groups are indicated below:

- a) The groups usually create a common fund by contributing their small savings on a regular basis.
- b) Most of the groups themselves, or with help of others, evolve flexible systems of working and managing their pooled resources in a democratic way, with participation of every member in decision- making.
- c) Request for loans are considered by grouping their periodic meetings.
and competing claims on limited resources are settled by consensus.
- d) Loaning is done mainly on trust with a bare minimum of documentation and without any security.
- e) The amounts loaned are small, frequent and for short duration, The loans cover a variety of purposes, some of which are nontraditional and rather un- conventional.
- f) Periodic meetings of members also serve as a forum for collecting dues from members.
- g) Defaults are mainly due to group pressures and intimate knowledge of end use of credit.

2.26 Gender and Development:

It is now widely demonstrated that rural women as well as men, throughout the world are engaged in a range of productive activities essential to household welfare, agricultural productivity and economic growth. Rural women contribute to social and economic development at the level of society,

state, household and coming generation, but still they are the poorest segment in the society (Mutiso and Chitere, 1991).

Bullock (1994) Stated that, women have always worked and their labor plays a key role in the survival of millions of families. They work longer hours than men and have a greater range of responsibilities; but the work they do is often neither publicly nor privately acknowledged. Women are not a minority group or special category. Similarly, women's work is not just another issue. Although Women have been subordinated and marginalized in different ways.

The typical rural women in the third world is a hardworking producer of food who remains with her children, short of food and malnourished, the food is consumed by the husband rather than the wife, by men rather than by women and children, by landlords rather by tenants, by town people rather than rural people, by rich consumers rather than poor producers, Longwe, (1989).

The central issue of women's development is women's empowerment, to enable women to take an equal place with men, and to participate equally in the development process in order to achieve control over the factors of production on an equal basis with men.

CHAPTER THREE

METHODOLOGY

3.1 Study area:

3.1.1 Study area description:

The study was conducted during the period 2013-2016 at North Kordofan State (before being divided into North and West Kordofan States). At that time North Kordofan State was located between latitudes (20° 36' 16" and 00° 14' 12" north and longitudes (20° 21' 32" and 30° 56' 26" in the east. The state was bordered in the North by River Nile State, in the west by North Darfur state, in the south by South Kordofan State, in the northeast by Khartoum State and the east by the White Nile State see (Appendix 3.1)

The population of North Kordofan State was estimated at 2.9 million persons (National Census, 2008). The main economic pattern prevailing in the State is agriculture and livestock breeding. The State is divided into nine administrative localities (Um Rwaba, Sheikan, Bara ,Ghebaish, Sodari, El Nuhood, Jabrut Elsheikh, - El Khawiand Wad Bunda). Five localities were selected for the study purpose, namely Sheikan and Sodari (from North Kordofan State) and ElKhawi, ElNuhood and Ghebaish (from West Kordofan State).

These localities have the highest sheep numbers in the States see table (3.1), main animal markets are found in those States, lie on the pastoralists traveling roots during autumn from South to North and opposite (Maps and Resource Management Programs, Western Sudan (2011)) and also lie on the animal trade route from the West to the East, according to the maps of the Trade Roots Company, Limited (Appendix 3.2 and 3. 3).

Livestock:

In Kordofan States there are 27,953,256 heads of livestock which is equivalent to 26.4% of the total number of animals in the Sudan. Sheep

number is 10,499,41 representing 26,5 % of the total number of sheep in the Sudan. Sheep export stands at 90% from the total export of live animals in the Sudan (MARFR, 2014). These States harbour the best sheep breeds (El Hamari and El Kabbashi); in the two states there are 528 families who so occupation is livestock breeding (equivalent to 72% of population in the two states) (General Administration of Animal Resources, North Kordofan States, 2011).

3.2 Population of the Study:

The study inculcated sheep producers of both breeders and herders (pastoralists).

3.3 Data collection:

The methodology used in this study was the Explanatory Descriptive method to study relationships among the variables and establish causal relationships among them. A survey was run through questionnaires, interviews and direct observations.

3.3.1 Primary data:

3.3.1.1 Questionnaires

250 questionnaires were filled between 15 May 2014 to 23 November 2015 See (Appendix 3.4), to assess awareness of the sheep producers about: Principles of sheep production, Sheep breeding pattern, Problems with livestock breeding, Availability of veterinary services, Opinion on genetic improvement, Use of modern means and techniques to increase production, How to improve the animal productivity, Economic benefits from the animal and its products, Type of animal development programmes, Link or participation with any union or production group, Animal insurance and Type of animals.

A second questionnaire for institutions see (Appendix 3.5) was filled by 28 persons from organizations and institutions related to animal production including government institutions, corporations, private sector development

projects, civil groups organizations, specialists and philanthropic projects to assess: Goals related to animal breeders, Criteria for livestock developmental programmes, Degree of participation by the targeted (livestock breeders), Presence of veterinary extension and training programs, System of evaluation and Obstacles.

3.3.1.2 Interviews:

The interview started by introductory presentation and then questions (what were the problems of livestock) and all questions were built around: Animal production systems, Veterinary services status, Obstacles in animal breeding, Level of participation in setting livestock developmental programmes and Presence of veterinary extension and training programmes.

A total of 77 interviews were run with veterinarians in the government and private sector, key-men in local communities, managers of related institutions, managers of programmes and projects on site.

3.3.1.3 Directs observation:

Observation on the general health of the producers and animals and the living conditions were recorded (by picture).

3.3.2 Secondary data collection:

Data was collected from records and reports from Veterinary Governmental Institutions and available livestock developmental programmers and projects in study areas for information of: goals, type of veterinary services, presence of veterinary extension and training programs, animal producer numbers and obstacles.

3.3.3 Sample selection, size and calculation:

3.3.3.1 Sample selection:

North Kordofan states was selected for the study being the main area of concentration of sheep breeding and production (MARFR,2015). Five localities were selected in the State for the following merits:

- Maintain the largest number of livestock in the state (see table 3.1 and figure (3.1)).
- Supply by veterinary services (see table 3.2 and figure 3. 2).
- Most of the livestock development projects in the states were planned and executed in the 5 localities.
- The five localities are found in the grazing areas, and on the animal routes.
- Supply by road and traffic services.

Table 3.1: Enumeration of animal resources in North Kordofan States (2011)

	Animal type	camels	Goats	sheep	cows	total
	locality					
1	Sodari	٣.٩.٥٠	٤٥٥٩٧٠	٤٤٤٧١٢٨	٨١٩٦٣	٥٢٩٤١١١
2	Bara	64142	194132	4020255	2331	4280860
3	UmRwaba	109543	458783	587206	88574	1244106
4	EiNhuood	٨٠٠	٦٦٤٠٦	٣٨٦٧٦٠	١٣٤٦٤	٤٦٧٤٣٠
5	Sheikan	٢٧١٧٥	٢١٧٨٢٥	٤٥٩٢٦٢	٨٥٣٧٥	٧٨٩٦٣٧
6	Gabru	١٦٧٢٤٥	٣٩٢٥٦٧	١.٢٣٩٥٦٤	٥٦٤٩٦	١.٨٥٥٨٧٢
7	EiKhawi	1726	37690	679009	28711	747136
8	WaBunda	٨٠٨٥	١٦١٦١٦	٧٦٧٩٨٩	٧٣٢٤٧	١.٠١.٩٣٧
9	Ghebaish	١٢٣٤٦	٧٤٦٥٥	٩١٣١٨٤	٣٤٤٧٨	١.٠٣٤٦٦٣
	Total	٧٠.٠١١٢	٢.٥٩٦٤٤	٢٢٥٠.٣٥٧	٤٦٤٦٣٩	٢٥٧٢٤٧٥٢

Source: Animal Resources and pastures Administration, North Kordofan States (2010).

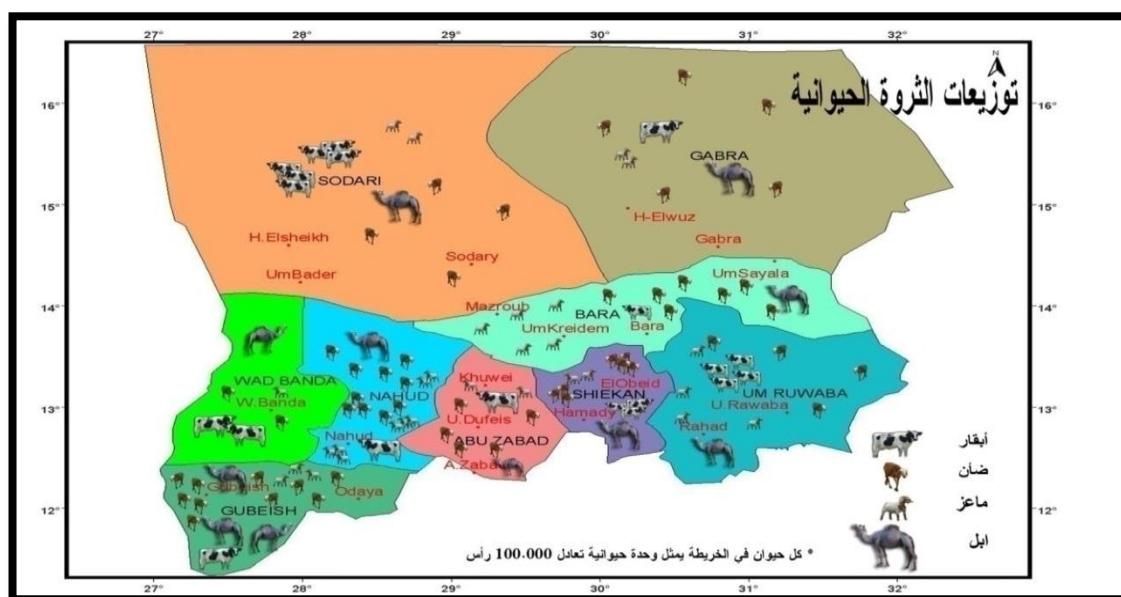


Figure (3.1): Animal distribution in North Kordofan States (2011)

Source: Khlooj, 2012 and General Administration of Animal Resources, North Kordofan States (2011).

Table 3.2 : Veterinary services distribution in North Kordofan State (2011)

		Mobile clinic	Fodder factory	Veterinary inspection point	Remedy point	Veterinary unit	Veterinary clinic	Veterinary hospital
1	Sheikan	1	1	1	-	8	1	1
2	UmRwaba	1	1	1	1	9	1	1
3	Bara-West Bara	2	-	1	-	1	1	-
4	Sodari	1	-	1	-	2	1	-
5	Jabru	1	-	1	-	2		-
6	EiNuood	1	-	1	-	3	1	-
7	Ghebaish	2	-	-	2	5	-	-
8	EiKhawi	-	-	2	-	1	-	-
9	WadBunda	1	-	-	2	2	-	-
		10	2	8	5	33	5	2

Source: Animal Resources and pastures Administration, North Kordofan States (2010).

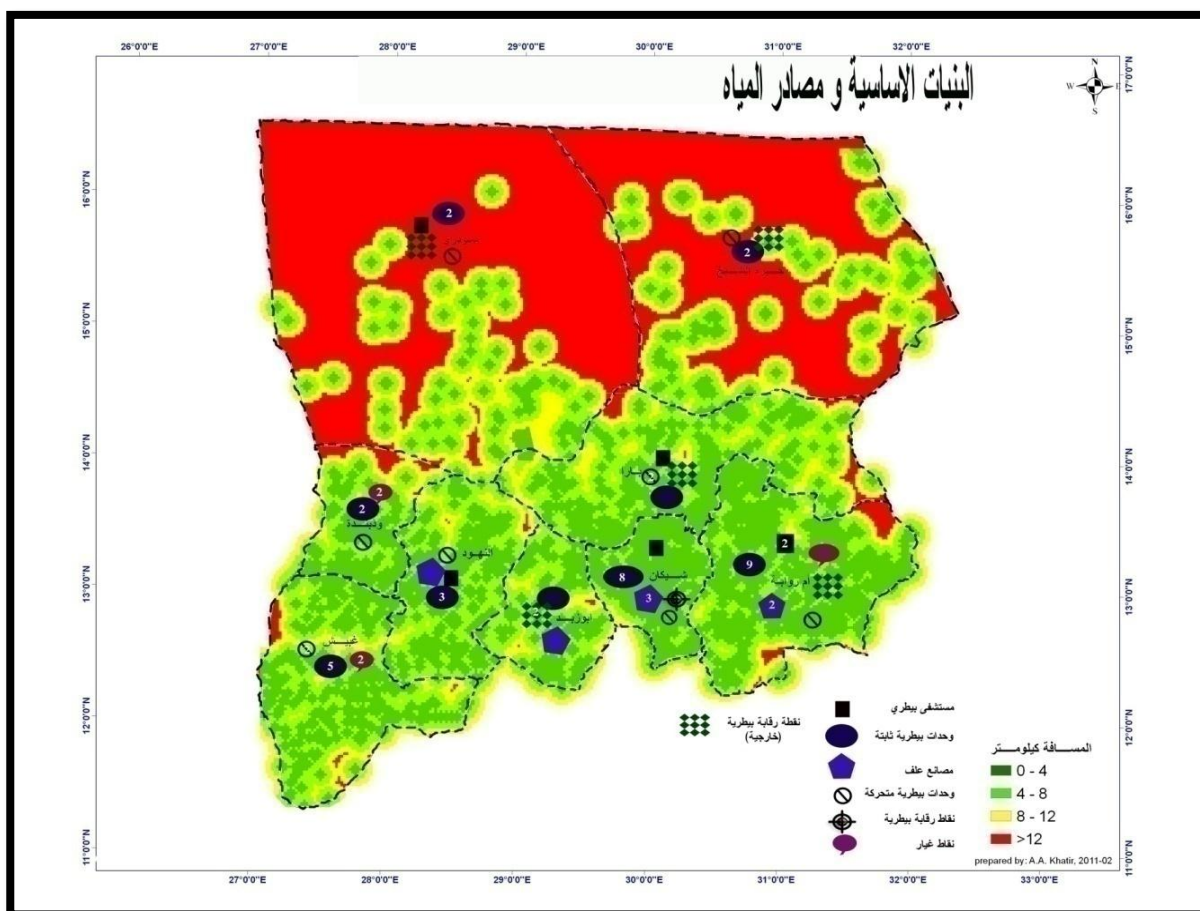


Figure (3.2): Veterinary services distribution in North Kordofan State 2011).

Source: Khlooj, 2012 and General Administration of Animal Resources, North Kordofan States (2011).

3.3.3.2 Sample Size:

Stratified Random Sampling technique was followed for a total sample size of 234 animal Producers from the five localities.

3.3.3.3 Sample Calculation:

- a) According to the National Census (2008) the total human population in North Kordofan State (North and West Kordofan states currently) was 2,920,000 including 72% livestock producers (2,103,114). The selected samples for this study 234 livestock producers were selected from the five localities out of 9 localities (in the two States North and West Kordofan) (described on table (3.3) and see figure (3.1)

b) For the locality population weight related to the total number of livestock producers see table (3.3) as calculated according to the following formula:

$$\frac{\text{Number of sheep producers in locality}}{\text{Total Number of sheep producers in the (5) study localities}} \times 100$$

c) The sample size for each locality was determined for the sheep producers in the five study localities as a percent of 234 animal producers for the study see table (3.3)

d) Sample individuals were selected randomly within each of the five study localities, from the gathering centers in the localities (animal markets, grazing areas and water points).

Table 3.3: Estimation of the number of livestock producers, locality population weight and number of sheep producers in the study localities:

	Locality	*locality population	livestock producers %	Locality population weight	Number of Sheep Producers(targeted)
1	Shaikan	540898	389447	35.2%	82
2	Sodari	271465	195455	17.7%	42
3	El Khowai	178110	128239	11.6%	26
4	El Nuhood	256432	184631	16.7%	39
5	Ghebaish	290619	209246	18.8%	45
	Total	1537524	1107018	100.1	234

*source: National Census, 2008.

3-3-4-Data analysis:

Data was tabulated and statistically analysed by Statistical Package of Social Science (SPSS) Version 21. In addition, Chi-square test as advanced analysis was used to calculate the significant differences.

CHAPTER FOUR

RESULTS

The data recorded was tabulated, statistically analyzed and summarized in the following tables and figures:

4.1 Results of Sheep Producer Questionnaires:

4.1.1 Sheep producer family status:

There was wide variation in the number of family members, Table (4.1) shows 52.6% of the families of the producers consisted of 5to10 members and 14.6% consisted of 11to15 members or more than 15 members.

Table 4.1: Frequency distribution of respondents by Family size

	Family members	Frequency	Percent
Valid	Less than 5	68	29.1
	5 to 10	123	52.6
	11 to 15	17	7.3
	More than 15	17	7.3
	No answer	9	3.8
	Total	234	100.0

Table (4.2) shows the low education level of family members, as 39.3% of the producers were illiterates and 35% have basic education and basic religious education(Khalowa).

Table 4.2: Frequency distribution of producers by education level

	Education level	Frequency	Percent
Valid	Illiteracy	92	39.3
	Secondary	42	17.9
	Diploma	2	.9
	Primary	73	31.2
	Khalowa	9	3.8
	University	16	6.8
Total		234	100.0

Table (4.3) shows that the children education level was low too, 34.6% of them have primary education, 24.4 % of them are illiterates and 16.2 % had university education.

Table 4.3: Frequency distribution of Children by educational level

	Education level	Frequency	Percent
Valid	Primary	81	34.6
	University	38	16.2
	Illiteracy	57	24.4
	Secondary	31	13.2
	Khalowa	11	4.7
	Not answer	16	6.8
	Total	234	100.0

4.1.2 Herd management

4.1.2.1 Sheep breeding pattern

Table (4.4) shows that majority of the animal breeding pattern in the localities were sedentary (60.4 %) the 50.0%, 59.2%, 63.8 %, 64.3% and 66.7% for ElKhawi, ElNuhood Sheikan, Sodari and Gebaish respectively. The difference is not statistically significant ($P > 0.05$).

Table 4.4: Cross tabulation of sheep breeding pattern by locality

	Sheep breeding pattern		Locality					Total
			ElNuhood	Sheikan	Sodari	Gebaish	ElKhawi	
	Sedentary	Count	29	51	9	26	24	139
		% within locality	59.2%	63.8%	64.3%	66.7%	50%	60.4%
	Nomade	Count	6	16	5	10	18	55
		% within locality	12.2%	20.0%	35.7%	25.6%	37.5%	23.9%
	Semi nomade (transhumance)	Count	14	13	0	3	6	36
		% within locality	28.6%	16.3%	0.0%	7.7%	12.5%	15.7%
Total		Count	49	80	14	39	48	230
		% within locality	100.0	100.0	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.498 ^a	8	.018
Likelihood Ratio	20.069	8	.010
N of Valid Cases	230		

a. 2 cells (13.3%) have expected count less than 5. The minimum expected count is 2.19.

4.1.2.2 Sheep production system

Table (4.5) and Figure (4.1) show that the majority of the animal production system are traditional system (85.2 %) at 50% 79.2%, 85.7%, 90% and 94.9% from Sodari, ElKhawi, ElNuhood, Sheikan and Gebaish respectively. The difference was not statistically significant ($P > 0.05$).

Table 4.5: Cross tabulation of animal production system by localities

	Animals production system		Locality					Total
			ElNuhood	Sheikan	Sodari	Ghebaish	ElKhawi	
	Traditional system	Count	42	72	7	37	38	196
		% within locality	85.7%	90.0%	50.0%	94.9%	79.2%	85.2%
	Semi-modern	Count	1	0	1	0	2	4
		% within locality	2.0%	.0%	7.1%	.0%	4.2%	1.7%
	Transitional	Count	6	3	0	0	2	11
		% within locality	12.2%	8.3%	.0%	.0%	4.2%	4.7%
	Modern	Count	0	5	6	2	6	19
		% within locality	.0%	6.3%	42.9%	5.1%	12.5%	8.3%
	Total	Count	49	80	14	39	48	230
		% within locality	100.0	100.0	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	49.281 ^a	16	.000
Likelihood Ratio	44.367	16	.000
N of Valid Cases	230		

a. 19 cells (76.0%) have expected count less than 5. The minimum expected count is .24.

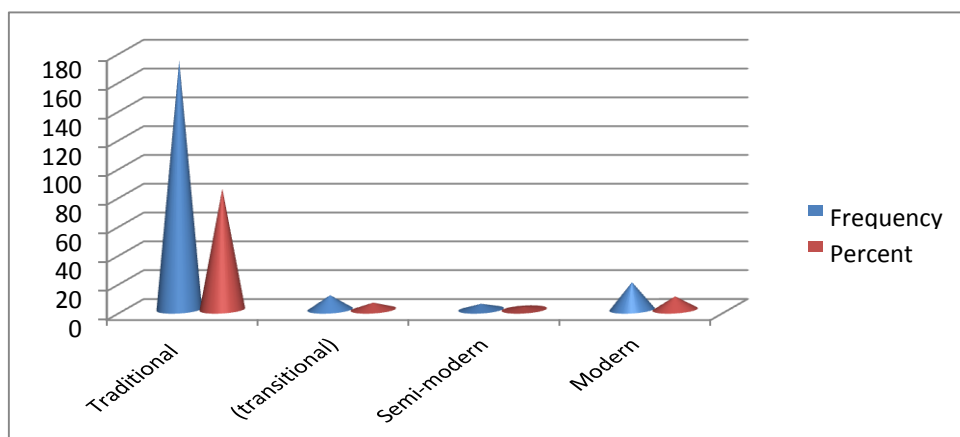


Figure 4.1: Animal production system in the study area

Table (4.6) illustrates that the care and supervision of the herd depended mainly on the producer and his family, as 53% of the producers themselves directly supervise the herd, 13.2% of herds were supervised by a family member and 31.3% supervised by hired herdsmen.

Table 4.6: Frequency distribution of animal care taker

	Care taker	Frequency	Percent
Valid	Owner	124	53.0
	Hired	73	31.2
	One of the family member	31	13.2
	No answer	6	2.6
Total		234	100.0

Table 4.7 shows that 63.7% of the animal owners care about animals by themselves.

Table 4.7: Time allowed for animal care

	Time	Frequency	Percent
Valid	Full time	149	63.7
	Partime	83	35.5
	No answer	2	.9
Total		234	100.0

Tables (4.8) explain that the most herd size less than 50 and between 50 - 200 heads of sheep, the herd size of 51-200 was 41,9% and the herd size less than 50 head was 15.8%.

Table 4.8: Frequency distribution of females in the herds

	Number of ewes	Frequency	Percent
Valid	Less than 50	37	15.8
	50 to 100	47	20.1
	101 to 150	19	8.1
	151 to 200	32	13.7
	201 to 250	11	4.7
	251 to 300	12	5.1
	301 to 350	5	2.1
	351 to 400	12	5.1
	401 to 450	2	.9
	451 to 500	5	2.1
	501 to 550	1	.4
	551 to 600	1	.4
	601 to 650	1	.4
	651 to 700	1	.4
	951 to 1000	1	.4
	More than 1000	1	.4
No answer	46	19.7	
Total		234	100.0

Table (4.9) the number of males in the herd less than 5 heads is 48.7% of the herd, herd of 5-10 heads is 17.9%. In some commercial herds, the herd size could reach up to thousands.

Table 4.9: Frequency distribution of males in the herds

	Number of rams	Frequency	Percent
Valid	Less than 5	114	48.7
	5 to 10	42	17.9
	11 to 20	13	5.6
	21 to 30	12	5.1
	31 to 40	3	1.3
	41 to 50	2	.9
	51 to 60	2	.9
	71 to 80	1	.4
	81 to 90	2	.9
	91 to 100	4	1.7
	141 to 160	2	.9
	161 to 200	2	.9
	201 to 300	4	1.7
	301 to 500	3	1.3
	have not	2	.9
	No answer	26	11.1
Total		234	100.0

Table (4.10) shows the percentage of the females to males in the herds, where 58.5% of herds the ewes were more than the rams, in 13.7% of herds the number of rams was equal to ewes and most herds were raised for production purposes.

Table 4.10: Frequency distribution of sheep by sex in the herds

	Proportion	Frequency	Percent
Valid	Male and female are equal	32	13.7
	Male more than females	47	20.1
	Females more than males	137	58.5
	Irregular	12	5.1
	The proportion depends on the purpose of production	6	2.6
Total		234	100.0

Table (4.11) shows that, there are no correct standards for choosing the best or good sheep to form the herd, instead of that, the animals are selected depending on phenotype apparent features (color, size and shape) in 91.5%. And the absolute majority of sheep producers 88.0% prefer Hamari sheep to form their herds.

Table 4.11: Criteria for best sheep selection

	Criteria	Frequency	Percent
Valid	No answer	16	6.8
	Shape (Color ,size and shape)	214	91.5
	Specific productivity	1	.4
	Specific productivity+ shape	3	1.3
Total		234	100.0

Table (4.12) Demonstrates that the sheep herds are usually left grazing freely in open pastures in the daytime protecting themselves from the hot sun by the shadow of the trees in the pasture, the harboring animals systems is traditional, only 41.0% of producers makes animal sheds (for the small animals and newborn ewes) of thorns and twigs of trees.

Table 4.12: Type of sheds and fencing

	Type	Frequency	Percent
Valid	No answer	123	52.6
	No sheds	9	3.8
	Locally	96	41.0
	Bricks	5	2.1
	Wire	1	.4
Total		234	100.0

Table (4.13) A number of 62.8 % of the producers rely on cauterization or cuttings for marking and labeling their animals, only 9.4 of producers using ear tags. No records to manage herds and follow-up production and productivity.

Table 4.13: Animal identification system

	Identification system	Frequency	Percent
Valid	Cauterize	66	28.2
	Cutting	81	34.6
	Ear tags	22	9.4
	Cauterize and cutting	38	16.2
	Cutting and ear tags	4	1.7
	Cauterize +cutting and ear tags	7	3.0
	No answer	16	6.8
Total		234	100.0

Table (4.14) shows the inefficiency of the reproduction system used by the most of producers, where in 88.0% of herds, sheep females (ewes) give birth once a year.

Table 4.14: Reproductive efficiency and birth rate

	Birth rate	Frequency	Percent
Valid	Once a year	206	88.0
	Three time every tow year	3	1.3
	Twice a year	11	4.7
	Once and twice a year	6	2.6
	No answer	8	3.4
Total		234	100.0

Tables (4.15, 4.16, and 4.17) explain that producers do not separate the lambs (males and females) from their mothers, but keep them with the mother in the pasture up to the age of 3-5months, 80.8% of the producers separate the male lambs at the age of 3 - 4 months and sell them in local markets, and keep the majority of the females at 82.2% on the pasture with their mothers to raise production number.

Table 4.15: Age of lambs when separated from their mothers

	Separated age	Frequency	Percent
Valid	Less than 3 month	1	.4
	3 to 4 month	154	65.8
	4 to 5 month	35	15.0
	No answer	44	18.8
Total		234	100.0

Table 4.16: After being separated from the mothers distribution of females

	After distribution of females	Frequency	Percent
Valid	Breeding	192	82.1
	Selling	3	1.3
	No answer	39	16.7
Total		234	100.0

Table 4.17: After being separated from the mothers distribution of male

	After distribution of males	Frequency	Percent
Valid	Selling in the local market	204	87.2
	Breeding and sale	3	1.3
	Breeding	12	5.1
	No answer	15	6.4
Total		234	100.0

4.1.2.3 Sheep feeding:

Table (4.18) shows that herbs and the natural pasture plants are considered as the main nutrition for sheep, 48.3% of the producers feed their animals on the pasture with some natural additives, 44.1% gives their animals sorghum, oilseed cakes (sesame and bean seeds) and bran.

Table 4.18: Type of sheep feeds

	Type of feed	Frequency	Percent
Valid	No answer	4	1.7
	Natural feed	113	48.3
	oilseed cakes + sorghum	75	32.1
	bran +salt	7	3.0
	sorghum + oilseed cakes + bran	28	12.0
	Sorghum	4	1.7
	sorghum + oilseed cakes + bran + mineral	3	1.3
Total		234	100.0

Table 4.19 these additives (as little as they are) are not given to the animals on regular basis, 62.9 % of the producers gives them in summer.

Table 4.19: Time of feeding additives

	Time of feeding	Frequency	Percent
Valid	No answer	54	23.1
	Summer	90	38.5
	Winter	13	5.6
	Autumn	19	8.1
	Summer morning evening	40	17.1
	Summer evening	17	7.3
	winter and summer morning	1	.4
Total		234	100.0

Table 4.20 shows that the producers are not taking advantage of the agricultural residues and 62.4 of them buy animal feed from the market.

Table 4.20: Sources of feed

	Source	Frequency	Percent
Valid	No answer	3	1.3
	market and farms	34	14.5
	Market	112	47.9
	Farms	85	36.3
Total		234	100.0

Table (4.21) Water sources in the study area are various, including Donkey 34.2%, Haffir 14%, wells 22.6% and some areas contain more than one water source.

Table 4.21: Water Sources in the study area

	Water sources	Frequency	Percent
Valid	Wells	53	22.6
	Haffir	34	14.5
	Donkey	80	34.2
	Wells + Haffir	4	1.7
	Wells +Haffir +donkey	8	3.4
	Haffir +Donkey	11	4.7
	By Tanker	14	6.0
	Storage tank	1	.4
	Outside the region	1	.4
	Wells+ donkey	4	1.7
	Donkey+ Pumps	4	1.7
	Pumps	3	1.3
	Wells+ pumps	1	.4
	No answer	16	6.8
Total		234	100.0

4.1.3 Veterinary Services and Herd Health:

Table (4.22) shows the availability veterinary services as viewed by the respondents, where 11.5% of the available veterinary services is veterinary hospitals, 13.2% veterinary units and 8.5% private sector, where veterinary units do not have a veterinarian, but veterinary technicians or assistant veterinarians. There was a wide variation in the availability, level and use of the veterinary services in the five localities. The difference is statistically significant ($P > 0.05$)

Table 4.22: Frequency of veterinary services distribution in the area as viewed by the respondents

	Service	Frequency	Percent
Valid	Veterinary Hospital	27	11.5
	Veterinary Unit	31	13.2
	Private Sector	20	8.5
	Hospital and Private Sector +Unit	42	17.9
	no services	99	42.3
	Assistant veterinarians	10	4.3
	Hospital +Unit	5	2.1
Total		234	100.0

Veterinary services are mostly provided in a comprehensive and general manner for all types of livestock and its producers. There are no specialized veterinary services were available for each kind of animals separately (92.9% of veterinary and other related institutions are providing general services for livestock). In Table (4.23) shows a total of 76.9% of the animal producers obtain drugs from veterinary pharmacies.

Table 4.23: Source of veterinary drugs

	Source	Frequency	Percent
Valid	Sellers in the local markets	30	12.8
	From friends	8	3.4
	Veterinary Pharmacy	180	76.9
	Local market+ Veterinary pharmacy	14	6.0
	From friends and Veterinary pharmacy	2	0.9
Total		234	100.0

Table (4.24) indicates that the 84.3% of the producers are treating their animals by themselves or through livestock attendant; where they select the drugs and doses under no veterinary supervision. Only 15.7% of producers are seeking the help of veterinarians. There is no significant difference ($P > 0.05$) among localities for number of producers depending only on their knowledge for treating their animal.

Table 4.24: Cross tabulation of animals treatment by localities

Sick animals are treated by		Locality					Total
		ElNuhood	Sheikan	Sodari	Ghebaish	ElKhawi	
Owner or shepherd	Count	42	61	13	33	45	194
	% within locality	85.7%	76.3%	92.9%	84.6%	93.8%	84.3%
Veterinarian	Count	4	2	0	5	2	13
	% within locality	8.2%	2.5%	.0%	12.8%	4.2%	5.7%
Veterinary hospital or unit	Count	2	5	1	0	1	9
	% within locality	4.1%	6.3%	7.1%	.0%	2.6%	3.9%
Owner and Veterinarian	Count	1	11	0	1	0	13
	% within locality	2.0%	13.8%	0.0%	2.6%	0.0%	5.7%
livestock attendant+ wner + shepherd	Count	0	1	0	0	0	1
	% within locality	0.0%	1.3%	0.0%	0.0%	0.0%	0.4%
Total	Count	49	80	14	39	48	230
	% within locality	100.0	100.0	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.613 ^a	16	.035
Likelihood Ratio	30.750	16	.014
N of Valid Cases	230		

a. 20 cells (80.0%) have expected count less than 5. The minimum expected count is .06.

Most sheep producers 88.0% treat their animals against parasites (deworming), table (4-25) shows that 59.8% of them treat their animals three times a year.

Table 4.25: Frequency of deworming

	Frequency	Frequency	Percent
Valid	Once per year	24	10.3
	Twice per year	24	10.3
	Three times per year	140	59.8
	When the animal is sick	9	3.8
	Monthly	11	4.7
	4 times per year	1	.4
	Total	209	89.3
	No answer	25	10.7
Total		234	100.0

Table (4.26) shows that 44.9% of the sheep producers do not vaccinate their animals regularly with no significant variation in the five localities ($P > 0.05$).

Table 4.26: Cross tabulation of regularity of vaccination by localities

			Locality					Total	
			ElNuhood	Sheikan	Sodari	Ghebaish	ElKhawi		
Vaccinate animals regularly	Yes	Count	24	38	9	25	30	126	
		% within locality	49.0%	47.5%	64.3%	64.1%	63.8%	55.0%	
	No	Count	8	13	4	3	5	33	
		% within locality	16.3%	16.3%	28.6%	7.7%	10.6%	14.4%	
	Some time	Count	9	7	1	4	7	28	
		% within locality	18.4%	8.8%	7.1%	10.3%	14.9%	12.2%	
	When there is an outbreak	Count	8	22	0	7	5	42	
		% within locality	16.3%	27.5%	.0%	17.9%	10.6	18.35	
	Total		Count	49	80	14	39	47	229
			% within locality	100.0	100.0	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.414 ^a	12	.135
Likelihood Ratio	19.521	12	.077
N of Valid Cases	229		

a. 4 cells (20.0%) have expected count less than 5. The minimum expected count is 1.71.

Table (4.27) shows that 52.1% of producers gave various reasons for no vaccination (Vaccination is not important, do not know the necessary vaccines, the area is too remote/far, cannot afford the cost of vaccination and no veterinarian).

Table 4.27: Reasons for not vaccinating animals regularly

	Reasons	Frequency	Percent
Valid	Vaccination is not important	12	5.1
	I do not know the necessary vaccines	27	11.5
	The area is too remote/far	53	22.6
	Cannot afford the cost of vaccination	13	5.6
	No veterinarian	17	7.3
	No answer	112	47.9
Total		234	100.0

Table (4.28) shows that most of the animal producers 61.5 vaccinate their animals in autumn season.

Table 4.28: The most convenient (best) time for vaccination of animals

	Vaccination time	Frequency	Percent
Valid	No answer	33	14.1
	Autumn	144	61.5
	Summer	16	6.8
	Winter (Drat)	35	15.0
	Summer and winter	1	.4
	Winter and autumn	2	.9
	All the year	3	1.3
Total		234	100.0

Table (4.29) shows that 75.6% selecting the specified vaccination time because of prevalence of diseases in this season.

Table 4.29: Reasons for selecting the specified vaccination times

		Frequency	Percent
Valid	No answer	24	10.3
	The emergence of diseases	177	75.6
	concentration of herders	18	7.7
	Colder air	8	3.4
	luck of feed	7	3.0
Total		234	100.0

Table (4.30) shows that most of the nomade 61.1 % vaccinating animals regularly.

Table 4.30: Crosstabulation of animal breeding pattern by vaccinate animals regularly

Vaccination and animal breeding pattern			Vaccinate animals regularly				Total
			Yes	No	Some time	When there is an outbreak	
Sedentary	Count	76	19	16	28	139	
	% within animal breeding pattern	54.7%	13.7%	11.5%	20.1%	100.0%	
Nomade	Count	33	9	6	6	54	
	% within animal breeding pattern	61.1%	16.7%	11.1%	11.1%	100.0%	
Semi nomade (transhumance)	Count	17	5	6	8	36	
	% within animal breeding pattern	47.2	13.9	16.7	22.2%	100.0	
Total		Count	126	33	28	42	229
		% within animal breeding pattern	55.0%	14.4%	12.2%	18.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.790 ^a	6	.705
Likelihood Ratio	3.961	6	.682
Linear-by-Linear Association	.040	1	.841
N of Valid Cases	229		

a. 1 cells (8.3%) have e expected count less than 5. The minimum expected count is 4.40.

4.1.4 Productivity and Production Improvement:

For productivity improvement, 53% of producers seek to improve the productivity of their animals and table (4-31) show that the majority of producers relied on their experience or on personal experiences of their shepherds, family and neighbors or friends by 68.7%, on governmental veterinary services and veterinarians 7.7%.

Table 4.31: Sharing experiences and trials with others

	Sharing with	Frequency	Percent
Valid	No answer	46	19.7
	Academicians	11	4.7
	personal experienced	89	38.1
	Family	20	8.5
	Family and shepherds	14	6.0
	Residents of the area(neighbors)	13	5.6
	Veterinarians	7	3.0
	Shepherds + Personal	23	9.8
	Governmental veterinary services	11	4.7
Total		234	100.0

Figure (4.2) shows that 24.4% of the producers limited their improvement of productivity by improving nutrition through more grazing, 17.1% by increasing veterinary care, 10.3% improving nutrition and increasing veterinary care, 10.7% by using genetic enhancement, 51.8% of producers don't know any improvement programs.

And a small percentage of producers 28.6% sort out the highly producing animals for improving productivity.

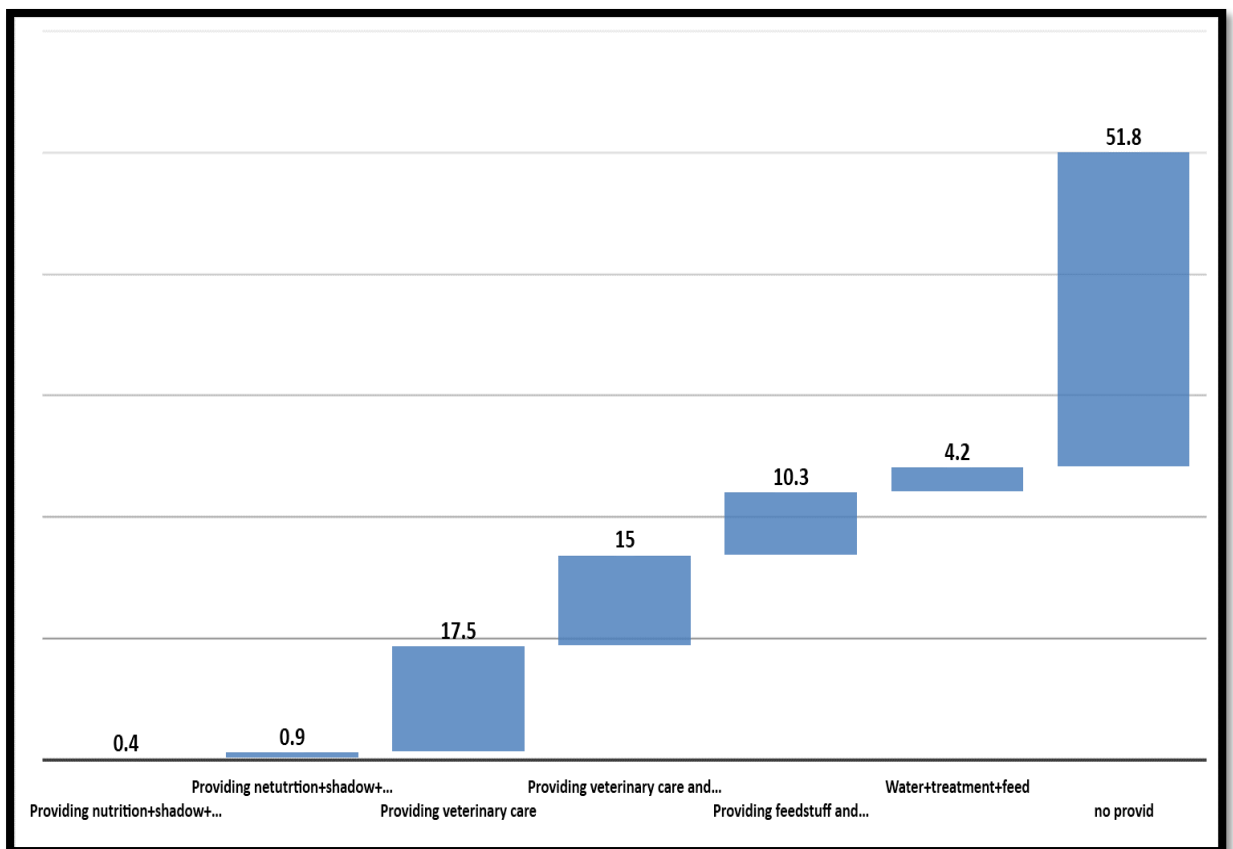


Figure 4.2: Methods of increasing productivity by the producers in the study area

The study displays the high percentage of producers who prefer natural selection to improve productivity at 84.6% and 50.9% accepts to use the genetic improvement method in productivity improvement. Table (4.32) shows reasoning for abstaining from genetic improvement the major reason was the lack of knowledge about genetic enhancement at 79.9%.

Table 4.32: Reasoning for lack of genetic improvement

		Frequency	Percent
Valid	No need	27	11.5
	No adaptation to environment	24	9.9
	Lack of knowledge	185	79.1
Total		234	100.0

4.1.5 Breeding and Production Problems

Table 4.33 shows for the problems that hinder sheep raising the most important problems mentioned were the narrow pasture area at 38.4 %, Lack of water, pasture and veterinary services 30.4%.

Table 4.33: Animal production problems

Problems		Frequency	Percent
Valid	No answer	4	1.7
	The emergence of oil in place grazing	29	12.4
	Soil infertility	20	8.5
	Water+ treatment + pastures	8	3.4
	Lack of attention	1	.4
	Lack of veterinary services	2	.9
	No problems	16	6.8
	lack of herder	2	.9
	Stealing	2	.9
	Insecurity	1	.4
	(diseases)+high feed cost	3	1.3
	Lack of water and veterinary care+ lack pasture+ animal death	2	.9
	Lack of water	21	9.0
	Lack of water and veterinary care	23	9.8
	Narrow pasture	39	16.7
	Lack of veterinary care	28	12.0
	Lack of veterinary care and pasture	27	11.5
	Lack of water and pasture	1	.4
	Diseases	4	1.7
Higher feed cost	1	.4	
Total		234	100.0

Table (4.34) presents producers' proposals for production improvement programs, where 44.4 % of proposals were about water supply and feed programs, 25.2% breeding programs, 6% genetic improvement and 5.9% veterinary services.

Table 4.34: Producers improvement proposals

proposals		Frequency	Percent
Valid	No answer	36	15.4
	Construction of water source	90	38.5
	Genetic improvement+ feed	12	5.1
	Water tanker	1	.4
	Increase production	4	1.7
	Union pastures	1	.4
	Feed factory	3	1.3
	Water +feed+ vet serves	1	.4
	Feed farms	8	3.4
	Farm meat	4	1.7
	Dairy project	6	2.6
	Slaughterhouse+ quarantine	10	4.3
	Fodder project+ vet service	7	3.0
	Veterinary service	8	3.4
	Breeding animal	21	9.0
	Water and drug	6	2.6
	Fodder project+ water	9	3.8
	Genetic improvement	2	.9
Water + vet service	5	2.1	
Total		234	100.0

4.1.6 Economic Benefits of Sheep and Sheep Products:

Figure (4.3) show limited economic benefits of sheep and sheep products, where 79.1% of the producers were limited to economic benefit only from the sale of the live animals in the local market and 12% selling the live animals in addition to the sale of milk and meat. No significant variation in the five localities ($P > 0.05$).

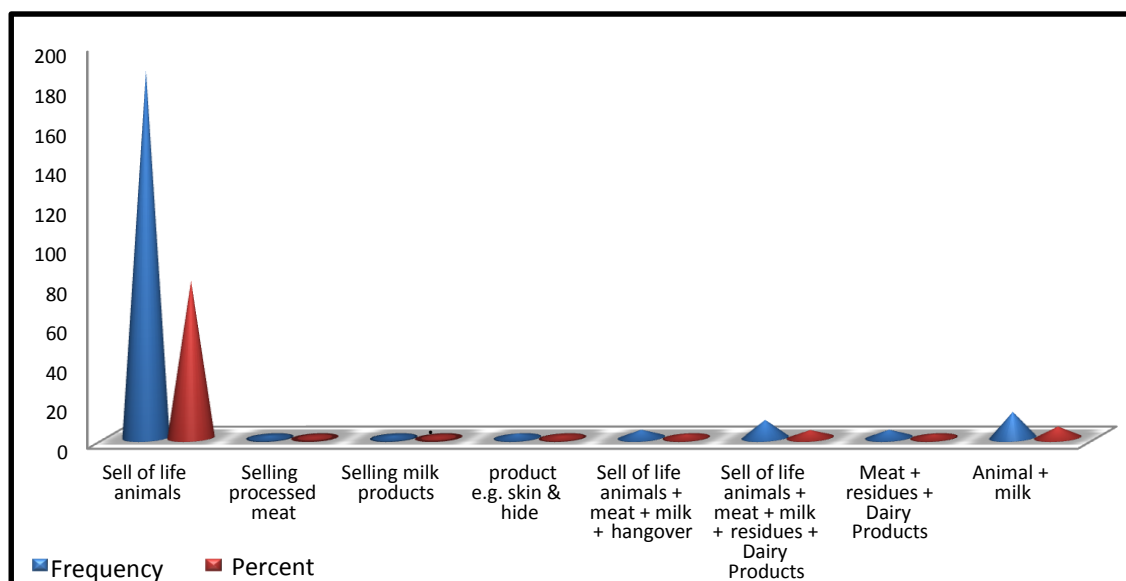


Figure 4.3: Economic benefits from animals and their products

Table (4.35) the majority of the female sheep sales was at 53.4% due to the inefficiency of the female in the production process.

Table 4.35: Animal marketing by sex

	Reasons for sale	Frequency	Percent
Valid	Sold males and females animals are equal	9	3.8
	More females are sold	1	.4
	More males are sold	29	12.4
	Females are sold if sick, old, disease, low production.	125	53.4
	All female	1	.4
	No answer	69	29.5
Total		234	100.0

Table (4.36) shows that there are no bases for determining the animal sale prices, mostly sold animal estimate the price at the discretion of its size by the naked eye in 43.2% of cases. No weight sales standards in the animal markets, but in 73.9% of all cases are estimating weights of animals through palpation or dentition first, and then put the price.

Table 4.36: Animal Price determination factors

	Factors	Frequency	Percent
Valid	By size	101	43.2
	Dentition	73	31.2
	Weight	13	5.6
	Size+ dentition	28	12.0
	No answer	19	8.1
Total		234	100.0

Figure (4.4) demonstrates the control of middle men in the animal markets, where the proportion of 63.7% of the producers sell their animals in the markets through intermediaries.

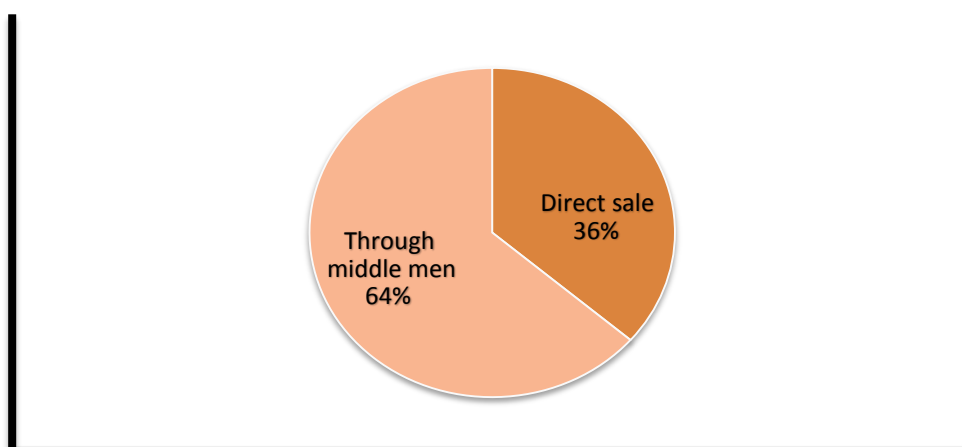


Figure 4.4: Selling system in the animals market

4.1.7. Institutions' that Provide Animal Resources Development Services:

Table (4.37) shows the institutions that provide animal resources development services: Government institutions, Private, Civil groups, Voluntary and philanthropic institutions, NGOs and charity, but 57.3% of producers confirmed that there were no any institutions offering any veterinary services in their areas.

Table 4.37: Institutions that provide animal resources development services

	Institutions	Frequency	Percent
Valid	No answer	3	1.3
	Government institutions	29	12.4
	Private	24	10.3
	Civil groups and institutions	6	2.6
	Voluntary and philanthropic institutions	12	5.1
	No service	134	57.3
	NGOs+ private sector	15	6.4
	NGOs+ voluntary and charitable.	8	3.4
	NGOs+ private sector+ voluntary and charity	2	.9
	NGOs + private sector +voluntary and charity	1	.4
Total		234	100.0

Table (4.38) shows the services type that provided by the animal resources institutions, 77.4% no services provided.

Table 4.38: Services provided by animal resources institutions

	Provided services	Frequency	Percent
Valid	Eugenics	3	1.3
	Vaccination campaigns	13	5.6
	No answer	9	3.8
	Provision of drugs	4	1.7
	Awareness	1	.4
	Ownership of women's associations animals	3	1.3
	Extension	4	1.7
	Cash	1	.4
	protectorate area	1	.4
	drug+ fodder+ water	6	2.6
	water project	8	3.4
	No services	181	77.4
Total		234	100.0

Table (4.39) shows how these institutions offer their services to the producers, 51% of the producers obtained veterinary services through veterinary teams, 5.6% obtained the services while participating in pastoral camps and 6.8% through the purchase of such services.

Table 4.39: Programme execution methodology by institution

Methodology		Frequency	Percent
Valid	No services	190	81.2
	Team work	12	5.1
	Community participation	13	5.6
	Through association	3	1.3
	Services by price	16	6.8
Total		234	100.0

Figure (4.5) Discloses the Lack participation of the producers and pastoralists in the programs and animal resource development projects, presented to them by the animal resource institutions or those institutions working in animal resource development, where 87.6 % of producers confirmed that they do not have any kind of involvement or participation in such programs.

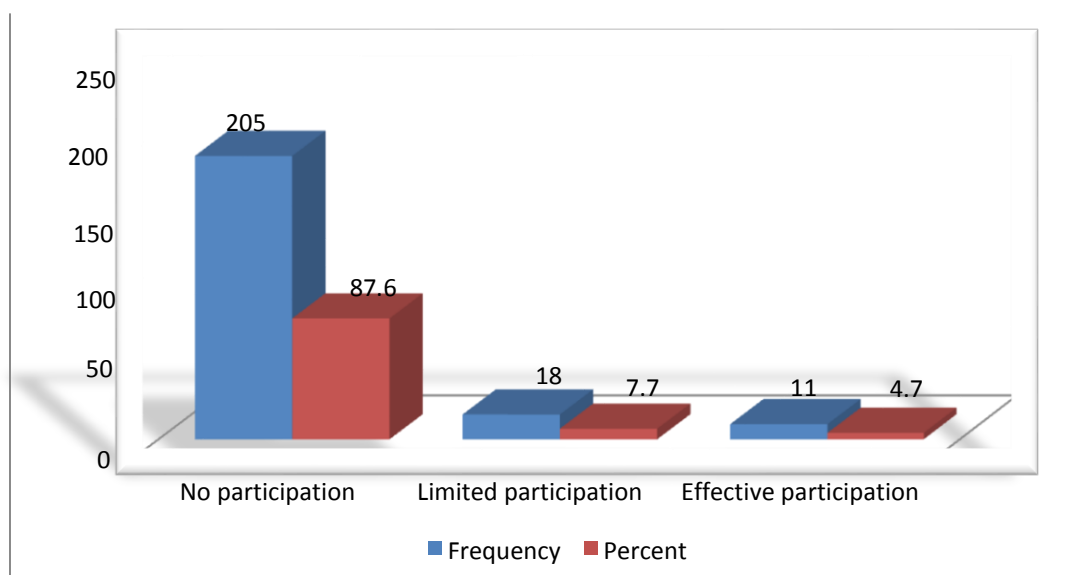


Figure 4.5: Participation in designing program and execution of proposed projects.

Table (4.40) Shows 78.7% of the producers confirmed that, these programs and projects did not affect or develop them.

Table 4.40: Effect of programmes and projects on human development in the study area

	Effect	Frequency	Percent
Valid	Yes	46	19.6
	No	184	78.7
	No answer	4	1.7
Total		234	100.0

Table (4.41) Shows the influence and effect of these programs, when 9% of producers programs led to development of livestock and increase productivity.

Table 4.41: Development created

	Development	Frequency	Percent
Valid	Development of livestock and increase productivity	21	9
	Building the administrative and planning capacity	42	17.9
	Increase income and improve living cost	6	2.6
	Use modern technology and techniques to increase productivity	2	.9
	Capacity building+ modern technology	2	.9
	No improvement	4	1.7
	No answer	157	67.1
Total		234	100.0

Table (4.42) Demonstrates that 42.3% of studied areas have not intensive animal breeding projects.

Table 4.42: Presence of intensive production projects or farms

	Presence	Frequency	Percent
Valid	Yes	12	5.1
	No	99	42.3
	No answer	123	52.6
Total		234	100.0

Table (4.43) displays the reasons of failure and lack of animal resources development programs from the point of view of the producers, where 10.3% stated lack of supportive potentials, 2.6% not requested from the community, 9.4% lack of interest in livestock and 70.9% of producers stated don't know.

Table 4.43: Obstacles facing the institutions for programme execution

Obstacles		Frequency	Percent
Valid	Lack of supportive potential	24	10.3
	Not request from community	6	2.6
	Lack of interest in livestock	22	9.4
	Don't know	166	70.9
	Not available in area	1	.4
	Rare of information	1	.4
	No services	11	4.7
	Lack of assistant	1	.4
	Lack of security	1	.4
	Lack of awareness	1	.4
Total		234	100.0

4.1.8 Livestock Insurance:

Where 75.2% of producers stated that their animals were not insured, in table (4.44) shows that 26.1 % of those producers mentioned that they did not know what animal insurance is.

Table 4.44: Reasons and justifications of no-insurance

Reasons and justifications		Frequency	Percent
Valid	No answer	49	20.9
	Lack of knowledge	61	26.1
	Not available	93	39.7
	No contentment	9	3.8
	I have no desire	4	1.7
	Do not need	7	3.0
	He is(neglect + lazy +not serious)	4	1.7
	Lack of awareness	4	1.7
	Religious belief	1	.4
	height cost and complicate of procedure	2	.9
Total		234	100.0

4.1.9 Participation or Links with Unions or Production Groups:

Majority of the producers 80.3 % do not belong to any production society, union or association. Table (4.45) shows the reason for that 41.0% of them stated no point to support unions, 19.7% no free time.

Table 4.45: Explains and justifications for no link

	Explains and justifications	Frequency	Percent
Valid	No answer	59	25.3
	No free time	46	19.7
	No point of supporting unions	96	41.0
	Lack of conviction	15	6.4
	Lack of knowledge	8	3.4
	No desire	9	3.8
	No union credibility	1	0.4
Total		234	100.0

4.2 Institutional Role:

4.2.1 General goals of the institution:

Tables (4.46, and 4.47) Indicate that the goals set for the animal resources development lacks detailed activity programs and specific time frame for execution. Goals aimed at were 17.9% for development of research and training. There are no significant differences between the overall objectives of the various institutions related to animal resources, but there were significant morale differences between the goals related to the livestock producers acceptance.

Table 4.46: General Goals of the Institutions

	General Goals	Frequency	Percentage
Valid	Development and localization of leather industry	3	10.7
	Development of livestock markets	11	39.3
	Provide the veterinary services	3	10.7
	Develop research and training	5	17.9
	Develop the dairy industry	1	3.6
	Improve the animals' species	1	3.6
	Improve the quality of meat products	2	7.1
	Facilitate the export of livestock	1	3.6
	No answer	1	3.6
Total		28	100

Table 4.47: Goals Related to Animal Producers

	Goals	Frequency	Percentage
Valid	Raise the care and attention for animal resources development	4	14.3
	Improve the veterinary services and improve the health care of animals.	13	46.4
	Develop research	4	14.3
	Develop marketing	4	14.3
	Adjust policies and amend laws	2	7.1
	No answer	1	3.6
Total		28	100.0

Table (4.48) Shows that institutions do not rely on field surveys in animal resources development programs, but relying on: 17.9% laws and standards, 21.4% Improving the production and marketing, 10.7% Paying bigger attention to production and 10.7% Attracting technical support from outside.

Table 4.48: The targets of animal resources development programs

	Targets	Frequency	Percentage
Valid	Laws and specifications	5	17.9
	Improve the production and marketing	6	21.4
	Pay bigger attention to production	3	10.7
	Training and Guiding	6	21.4
	Attract technical support from outside	3	10.7
	No answer	5	17.9
Total		28	100.0

Table (4.49) shows that, lack of funds stops 64.3% of the programs and activities from being implemented in scheduled time, and if somehow and with limited budget it was implemented, the results and outcomes were usually weak and limited or implemented in unsuitable time.

Table 4.49: The obstacles that prevent the institutions from achieving the goals

	Obstacles	Frequency	Percentage
Valid	Laws and the increase of the exchange rate	1	3.6
	Poor infrastructure	3	10.7
	Lack of funding	18	64.3
	Economic embargo	1	3.6
	Lack of awareness	1	3.6
	lack of understanding from the producers side of the importance of the lab	1	3.6
	No obstacles	2	7.1
	No answer	1	3.6
Total		28	100.0

There are no customized veterinary services suitable for each kind of animals separately, the veterinary services are mostly provided in a comprehensive and general manner for all types of livestock (92.9% of general animals types) and its producers, Table (4.50) shows that the services provided by institutions 25% marketing of livestock products and 30.3% animal health care³

Table 4.50: Services provided by institutions:

	Services Provided	Frequency	Percentage
Valid	Marketing of livestock products	7	25.0
	Animal Health Care	11	39.3
	Training and scientific research	4	14.3
	No services available	1	3.6
	Quality control	4	14.3
	No answer	1	3.6
Total		28	100.0

The results show that 67.9% of institutions confirmed the presence of records, but there was no information of the number of livestock producers and social studies about their current status. Table (4.51) shows that 78.6% of the institutions follows up and evaluates the performance of producers participating in a project that. The majority of this follow-up 75.0% was done by government agencies, but this follow-up and assessment does not continue after the project is finished.

Table 4.51: Follow-up and evaluation of the performance of producers participating in a project

	Follow-up and evaluation	Frequency	Percentage
Valid	Yes	22	78.6
	No	3	10.7
	No answer	3	10.7
Total		28	100.0

Table (4.52) shows methods that institutions use to increase production and productivity: Producers' Training (39.3%) and marketing improvement.

Table 4.52: Means to increase productivity and production

	Means	Frequency	Percentage
Valid	Through planning and quality study.	4	14.3
	Improve the marketing	6	21.4
	Producers' training	11	39.3
	Research development to increase production	5	17.9
	No answer	2	7.1
Total		28	100.0

Table (4.53) shows the confirmation of the institutions that 71.4% of the producers are actively participating in their development programs and projects.

Table 4.53: Extent of participation of producers in developing programs

	Extent of participation of	Frequency	Percentage
Valid	Limited Participation	4	14.3
	Active Participation	20	71.4
	No Participation	2	7.1
	No answer	2	7.1
Total		28	100.0

Table (4.54, and 4.55) shows that 78.6% of these institutions have their own animal resources projects, and 78.6% of the institutions had some projects previously.

Table 4.54: Animal resources projects presence

	presence	Frequency	Percentage
Valid	Yes	22	78.6
	No	3	10.7
	No answer	3	10.7
Total		28	100.0

Table 4.55: Animal resources projects previously executed

	Execution	Frequency	Percentage
Valid	Yes	22	78.6
	No	1	3.6
	No answer	5	17.9
Total		28	100.0

4.3 Secondary Data Analysis:

Little information was available about the animal producers in North and West Kordofan States, veterinary records and other institutes records.

-Government veterinary services are very limited, or are not available in the pastoral areas, and most of the services available are limited to animal vaccination and treatment of sick animals only and the producers pay all the financial costs. (Performance Report of the General Administration of Animal Resources, 2014 (Attached)).

-The presence and distribution of veterinary services in both states does not match quantity and quality, firstly the services are not available in remote production areas far from the cities, secondly the services must be distributed according to the number of the livestock, and accordingly it must be heavily available in areas of livestock concentration.

-Veterinary hospitals and units are not equipped with the necessary equipment's for veterinary work.

-Veterinary services of the private veterinary sector are limited mostly to sell drugs and provide some guidance on how to use it³

-Veterinary extension programs provided to the producers in veterinary camps, are very limited and confined only to the vaccination and treatment of animals.

- Producers' training to improve and increase production is usually provided in a very tight range and mostly funded by third parties. These programs are usually limited to small number of producers.

-Lack of Participation of producers in developing programs and development plans: reports and interviews confirmed the lack of active participation of the producers, but for only limited participation after submitting the plan or project.

-Reports from the operating projects record, IFAD reports (2013,2014), CDF,2014 programme and Khlooj Livestock Investment Company (2012) in Sheikan, Ghebaish, El Nuhood and El Khawiand, analysis it was observed there was improvement and increase in animal production outputs and in the returns to the producers involved actively specially those trained though the records did not contain the exact numbers the producers group numbers.

-IFAD reports (2014) indicated that the producers reacted more positively with more extension work in the field.

-CDF programme concentrated more in supporting education, health and water and noted that groups in the area were very reactive positively for supporting such projects and were inclined for more participation and involvement in development. The main limitations were organization and funding.

-Reports of the Ministry of Agricultural and Animal Resources (N. Kurdofan, 2012) showed that khlooj Project considered the field practices of the sheep breeders in the area and depended on cooperative development investment by involving and sharing with the producers during the development and execution of the project.

-One important observation by researcher was that some producers tended to cross the good breeds El Hamary and El Kabbashi to produce more thirst or water deprivations restful standing strains which will be against the good meat producing animal demanded locally and regionally.

4.4 Observations by the researcher:

Photographic observations reflect the same observations in the study area, photograph (1) shows the producers family status, photograph (2) indicate the suggested model of atypical village, photograph (3) presents the water sources (Haffir) non-healthy use by both humans and animals, photograph (4) shows the model of healthy water stations, photograph (5) shows the companion between pasture in autumn season and limited or non-availability in summer, photograph

(6) shows an improving Livestock market, photograph (7) shows traditional livestock market, photograph (8) shows price estimate by discretion an eye vision, photograph (9) shows the open system grazing under hot condition, photograph (10) reflect the practiced grazing system in the open pasture system, photograph (11) shows the harsh life of nomadic women in the study area.



Photograph (4.1) Producers family status (poor life)



Photograph (4.2) Suggested model of typical village as presented by Extension Department, 2015



Photograph (4.3) Water sources (Haffir), non-healthy environment



Photograph (4.4) Model of healthy water stations (livestock Root Company,2015)



Photograph (4.5) Obtainable the pasture in autumn season but rare in summer season



Photograph (4.6) ElNuhood livestock Market (Improving Livestock Production and Marketing Project,2015)



Photograph (4.7) Middle men estimate the sheep price at the discretion of its size by the naked eye.



Photograph (4.8) local livestock markets in ElKowai.



Photograph (4.9) Sheep protecting themselves from the hot sun by the shadow of the trees



Photograph (4.10) Sheep herds are usually left grazing freely in open pastures



Photograph (4.11) A Nomadic Life (difficult life)

CHAPTER FIVE

DISCUSSION, CONCLUSIONS and RECOMMENDATIONS

5.1 Discussion:

The study findings showed that the awareness of the sheep producers on the economic value of sheep was very low due to the sizeable percentage of illiterates or non-learners as a result of nomadism, migration and remoteness from urban areas. An additional important factor is the traditional animal production system practiced by the sheep producer's breeders and owners (85.2%).

The main perception of the animal breeders in of herds, Kordofan, is building up and number increasing irrespective of quality or market demand. This because the animal is considered an asset of prestige, a component for many institutional rituals and for financial risk aversion but not for the economic value, returns or profit and economic development.

The study results showed that the majority herd size range between 50–200 heads and up to 1000 in some commercial herds. Producers (91.5%) depend on the phenotypic appearance and personal knowledge for herd building or reproductive parameters for selecting replacement animals considering the adaptability of the animal more than the economic parameters. This finding agrees with Khattab and Faisal (2005) and with Dagash, (2005). Selection is not under veterinary supervision or control which might result in decrease at fertility or reproductive disease dissemination.

The inefficiency of this system is indicated by that 88.0% of the herds the ewes give birth once a year and the twinning rate is low due to the hard environmental conditions led overt ability and lack of any breeding programmer. A total of 87.2% of the producers separate the male lambs at

the age of 3–4 months and sell them in the local markets but (82.2%) keep the majority of new-borne females on pasture with their lams for number increasing are prestige sign.

As for economic benefits and animal marketing the study showed that 79.1% sell live animals because no meat processing industry is available in the area and 12% live animals and locally produced products. The price determination was 43.2% by size 31% by dentition and only 5.6% by weight and the selling chain goes through middle men and mediators for 63.7% of the study sample which renders the returns to be very low for the produce and mainly goes to the middle men and animal traders and merchants.

For sheep production improvement in the study area many bodies were involved including MARFR, private sector, government institutions, voluntary and civil groups, NGOs, and philanthropic affiliations. Most of the projects involved in by these bodies included vaccination campaigns, veterinary service, providing fodder, water projects, cash, eugenics and small ruminants for women associations.

The largest contribution was by philanthropic institutions at 57.3% followed by government institutions at 12.4% and the most provided projects were water at 38.5%.

The main services targeted by the helping institution included animal health care at 39.3%, 25% marketing of livestock products, 14.3% on quality control and 14.3% on training and scientific research.

In spite of this the study results showed limited benefits from such projects reasons by given by the targeted group was no knowledge mainly because of lack of participation or involvement though some mentioned lack of supportive direction, not meeting the community needs or requested by

them and limited interest in livestock. Those involved in the institutions at 64.3% mentioned lack of funds and 10.7% poor infrastructure. For means to increase productivity and production by the institutions producer training was 39.3%, marketing improvement was 21.4%, research development 17.9% and through planning and quality study at 14.3%.

The study, through interviews found that the main goals or aims set by the institution for animal resources development programmers were short of detailed activity specific time framework, comprehensive field surveys when developing the programmes, surveillance and in depth follow-up through 67.9% of the institutions stated presence of records of those who benefited from the programmers. Those records, stated, did not show sustainability, follow-up, actual producer number, social development obtained, ideas on the programmes, acceptance and adoption and progress evaluation. These observations agree well with Khalid (2002) who stated that lack of self- effectiveness by the producers to improve productivity and production are factors of inefficiency of livestock directed projects and animal resources promotion. These findings also agree with the MARFR-Extension and Transfer of Technology Reports (2012) which stated that behavior, culture and limited involvement and participate of producers and training shortage weakened livestock development programmes. This is also agreeing with Saria (2012). Who stated that limited extension training affective production negatively.

The study findings showed that 87.6% of the producers confirmed that they did not have any kind of involvement or participation in development projects and 78.7% of them stated that the development programmes did not have any positive effect on them. This may be due to no or limited effective organized programmes to strengthen the producer weak and very

limited consideration of the economics of production and best utilization of available resource. This agrees with Oaklay and Graforth (1985), Swanepoel (1993), Tadro (1994) and Mulwa (2008), on the role of participation and project change effect on the producers.

Participation and involvement in development programmes is better supported by group work or group links and/or affiliations folk better awareness and valuation of the animal resources development projects.

The study findings showed that 80.3% of the producers had no any group affiliation the majority of whom stated no need, 19.7% do not have time, 14.0% no of supporting unions, others for no conviction, no knowledge about and lack of creditability. This is in disagreement with Oakley and Marsden (1987) who stated that participation is described as a voluntary contribution of the people to the development and sensitization of the rural to be involved actively in the decision-making and planning processes of implementing programmes and control of their resources. They stated two main vehicles for implementing the nation of participation (a) community development programmes which aim at preparing the rural population to collaborate with government development plans (b) establishment of formal organization (cooperatives, farmers associations village development committees etc) to provide the structure through which rural people could have some contact with and voice in development programmes. Jazairy et.al, (1992) stated that participation is based on people's awareness of their social entitlements an economic opportunity which improves them from dependency to self-reliance and to have a role in decision making.

The study findings as stated above showed the absence of participation and hence awareness on the economic values of livestock though Yasin (2010)

in a study in North Kordofan noted high degree of response, by rural people, to participate in community based organizations and different development programmers.

Animal health care is a highly important component for livestock development yet awareness of this importance is well realized by the animal breeders and the pastoralist in particular. At ranks high for awareness assessment but many defaults practiced by the sheep owner and pastoralist defeat the purpose. This is the practice of animal treatment by the producers themselves (84.3%) which is against the regulations of the Sudan Veteran Council Act (2004) and (WHO, 2001).

This kind of animal treatment can lead to mishaps including side effect, adverse drug reactions, harmful effects, toxicity, intolerance, large economic losses and health hazards for both humans and animals as stated by Boisseau, (1993). This is in addition to the limited veterinary services in the remote areas and lack of extension service as stated by Saira (2012) and as confirmed by the General Administration of Animal Resources (2014) who noted the highest rate of parasitic infection and feed toxicity in Kordofan States as a result of drug abuse and faulty treatment. This indicates lack of knowledge, weakness of animal health awareness among the producers and

reflects negatively of the economic value of livestock and animal resources and wealth. The study found that 42.3% of the producers lack veterinary series both in North and West Kordofan Sates as was confirmed by the Committee of assessment of the Situation of the Animal Sector in North Kordofan (2011).

The study noted absence of livestock development research in general and particularly on sheep in Kordofan States though a research station on sheep

production and development was established at El Nuhood but remained out of function since the nineties.

In conclusion the study found that the economic perception of the sheep producers on the economic value of livestock generally and on sheep in particular in the study area was low for many single or collective reasons including environmental factors, social, political and economic reasons.

This was due to the low degree of awareness among the producers including low levels of education, social values and norms, the outlook to the animal, the position of the pastoralists in the government development policies, absence of participation and involvement in the development programmes and projects, limited or absent extension services and training, lack of knowledge or information on improving productivity and production, on quality standards or market demand and dynamics and lack of both social and economic development research in all Kordofan States and in particular the study area.

5.2 Conclusions:

The study results showed that in the present situation sheep breeders and producers in North and West Kordofan States awareness lack on the economics of animal production, the economic value of sheep and means and methods of improvement are weak. Through reasoning analysis of lack of improvement of sheep producers in both it was clear that the social, cultural and environmental effects were limited and not statistically significant. On comparison of the breeding and production systems among the localities no statistical difference was found. The prevailing sheep production system is the traditional open grazing in all the localities irrespective of the many tribal and cultural variations. Migration effect was not statistically significant and was limited as pertaining to lack of animal

production system development in all management practices being traditional of sedentary, semi-sedentary or nomadic in all the different climates and environments.

-Regular veterinary care and regular animal vaccination were limited to personal experience and producer knowledge experience.

-The study noted that herd numbers were declining and herd management and care became family rather than tribal affair. Also noted family members specially youth tended to refrain from herd ownership or building-up new herds or even animal management. This indicates threat of loss and disappearance of local experience in animal breeding and management which is important pillars animal production in Sudan. Youth activity was diverted to trade, gold mining and emigration to other outside countries which threatens being and animal resources development.

-Tariffs, taxes and duties add more to production cost and reducer the market competitiveness of Kordofan high quality sheep which, also, reflects negatively on sheep export markets.

-The study noted limited effect of the livestock programmes and projects offered by the government institutions and other working in livestock improvement and producers awareness and change.

- Producers participation and involvement with these institutions in laying out and \or executing animal resource development programmes was very limited or absent.

- Lack and absence of producer groups unions or organization was one limiting factor in developing producers awareness on the importance of the animal resources sustainable development programmes. This is in addition to the absence or lack of socio-economic studies before developing the

programmes and building and developing suitable, sustainable and applied extension programmes and models.

-One important observation by the study was lack of sheep producer awareness on animal breeding development programmes due to the absence of any relations with any research institutes or stations, directed to sheep production and improvement, inside or outside the state.

-The study recognizes that big launch was made to boost veterinary services in the study area but still the role of extension services is very limited.

The study concludes by the recommendation of setting plans and extension programmes to raise the producer awareness on the socio-economic value of livestock for his own and national benefits.

5.3 Recommendations:

- a) More official recognition and involvement of the rural and pastoral group when setting development programmes or projects.
- b) Establishing and building unions and group organization for more awareness, involvement and in programmes execution.
- c) Provision of more services as seed dispersion, fire lines, water points, veterinary services and the like on sustainable bases for continues sustainable production.
- d) Development more effective pastoralists oriented and directed extension programs.
- e) Development and establishment of rural schools oriented to nomads and pastoralist development within the animal resources matrix.
- f) Establishing and mobilizing research centers to promote productivity, production and quality and standards to be market oriented starting by ElNuhood livestock (sheep) Research Station.

- g) Strengthen courses in the education system included extension and community development and the basics of economics and relevant technical back – up facilities.
- h) Encourage and increase sheep breeder's awareness not to cross or intercross the high quality meat producing sheep with other types for more adaptation sacrificing the economic value.

REFERENCES

- AbdelRaouf, M.M. (1993). North Kordofan State (ElObeid) Sudan- Rural area Development-Case study, Arab Symposium on Agricultural Development Management in the Arab Country- 30/11-312/1993/
- Abel, J. Thomson, J. and Moretzki, A (1994) Extension role with farmers, consumers, and communities Journal of Extension (online) 37(5) Article 5FEA4. Available at <http://www.joe.org/foe/1999October/94.DHP>.
- Adams, M. (1982). Agricultural Extension in Development Countries, Intermediate Tropical Agricultural Series, Longman, UK.
- Adelman, I., and Morris, C. (1967). Society, Politics and Economic Development. Baltimore Md: Johns Hopkins University Press.
- Ahmed, A. Livestock Roots Co. (2012). El Obeid, " El Obied -North Kurdofan State "Annual Report,2012 and 2015.
- Ahmed, I.Y. (2005) General characteristics of the traditional animal production system in Sudan (Cattle, Sheep, Goat and Camel) – Damascus, Syrian Arab Republic, July 17-19 (2005).
- Anker, L., (1973). Rural Development Problems and Strategies, Intermediate Labour Office, Geneva.
- Arab Organization for Agricultural Development (AOAD) Annual Report (2013,2015).

- Bahal, R., Swanson, B. E., and Farner, B. J. (1992). Human resources in agricultural extension: A worldwide analysis. *Indian Journal of Extension Education*, 28 (3, 4), 1-9.
- Beebe, J. (1987). Rapid appraisal: The evolution of the concept and the definition of issues (p. 47-68). In *Proceedings of the 1985 international conference on rapid rural appraisal*. KhonKaen, Thailand: KhonKaen University.
- Blunt, P., and Warrants, M. (1996). *Indigenous Organizations and Development*, Intermediate Technology publications LTD, UK.
- Blood, D. C. (1979). The veterinarian in planned health and production. *Can. Vet. J.*, **20**:341-347.
- Boisseau, J. (1993). Basis of the evaluation of the microbiological risks due to veterinary drug residues in food. *Vet. Microbiol*: 187192.
- Bourn, D., and Wint, W. (1994) 'Livestock, land use and agricultural intensification in Sub- Saharan Africa.' *Pastoral Development Network Paper 37 a*, and comments by various authors, 37b. London: ODI
- Bradfield, D.J. (1966) *Guide to Extension Training* (1st Edition), FAO.
- Brunner, E. and HsinPao Yang, E. (1949) *Rural America and the Extension Service*, Columbia University.
- Butcher, C. (1994) 'Extension and pastoral development: Past, present and future.' *Pastoral Development Network Paper 37d*. London: ODI3

- Buncic S. (2011) Integrated Food Safety and Veterinary Public Health.
<http://bookshop.cabi.org/Uploads/Books/PDF/978085199081/9780851999081.pdf>. Retrieved 15th April 2011.
- Bullock, S. (1994). Women and Development United Nations Non-Government Liaison Service, Bath press Avenue United Kingdom.
- Burkery, S. (1993). Ecle First, Guide to Self-Reliant. Participatory Rural mentZed Books LTD New York USA.
- Campbell, J.R., and Murray, J. (2006) Herd health in cow/calf operations in North America. World Buiatrics Congress. Retrieved from: <http://www.ivis.org/proceedings/wbc/wbc2006/campbell.pdf?LA=1>
- Casley, D. J., and Lury, D. A. (1987). Monitoring and evaluation of agriculture and rural development projects. Baltimore and London: Johns Hopkins University Press (published for the World Bank).
- Chamala, S. (1990). Establishing a group: A participative action model. In S. Chamala and P. D. Mortiss, Working together for Landcare: Group management skills and strategies, p. 13-38. Brisbane: Australian Academic Press.
- Chamala, S., and Mortiss, P. D. (1990). Working together for Landcare: Group management skills and strategies, p. 368. Brisbane: Australian Academic Press
- Chamber, R. (1993). Challenging the Profession-Frontiers for rural development. London: Intermediate Technology Publications, p. 67.

- Chambers, R. (2003). Whose Reality Counts? Putting the First Last, Intermediate Technology and Development Group, UK.
- Clifton., R. and Dahms, A. (1993). Grassroots Organizations, Second Edition, Wave Land Press Inc. USA.
- Committee of assessment of the Situation of the Animal Sector in North Kordofan (2011) Report, El Obied -North Kordofan State, December-2011
- Cooperative State Research, Education, and Extension Service (CSREES) (1999). Into the 21st century: Intergenerational programming. Washington, D.C.: The CSREES, U.S. Department of Agriculture.
- Dagash, Y. M. I.. (2005) Pasture and Feed, 1sted.P 15-30. Qatar University-Qatar.
- DECARP (1976): In Khalid, I. E. (2002). Local groups trial in combating desertification – Case Study, Gragikh Project for pasture rehabilitation. North Kurdofan State, March (2002).
- Decker, D. J., Noble, L. A., and Call, D. L. (1989). Forward with the original Land -grant concept. Journal of Extension [On-line], 27(2).Availableat:<http://www.joe.org/joe/1989summer/tp3.html>.
- Delp, P., Thesen, A., Motiwalla, J., and Seshadri, N. (1977). System tools for project planning. Bloomington, IN: PASITAM.
- Devercuk, D., and Pares, H. (1977). A manual of Credit and Savings for the Poor of Development Countries, Oxfam, UK.
- Devendra,1992; Devendra,2000: In Sara, T. A. I. (2012). Assessment of Extension Needs to Improve Animal Health and Production

- Delivery System in Alsyal Village, River Nile State, Sudan. Master's Research - University of Khartoum - the Department of Preventive Medicine (2012).
- DFID, (2002): In Sara, T. A. I. (2012). Assessment of Extension Needs to Improve Animal Health and Production Delivery System in Alsyal Village, River Nile State, Sudan. Master's Research - University of Khartoum - the Department of Preventive Medicine (2012).
- Directory of Animal Resources – North Kordofan State. Annual Reports ,2008, 2009, 2010, 2011, 2012,2013,2014, 2015.
- Disease-Map. Reports of the disease profile picture (2009). General Administration of Animal Resources in North Kordofan state (2009).
- Dixon, C. (1990). Rural Development in the Third World, Bidlles LTD, Guidford and Kingslynn, London.
- Eade,D,(1998).An Approach to people Centered Development ,Oxfam, UK and Ireland.
- EL Neima, A.Kha. M, (2015), Role of the Veterinary Profession in the National Economy Development, Symposium Strengthening of Veterinary Doctors Capabilities – Veterinary Association, Khartoum, Sudan, November, 2015 (In Arabic).
- EL Neima, A. Elkh. M. (2012). (Animal Production Systems, Local species and Productivity Development). (2nd.edition Pages 17,72,91 and 92). daralummah. abudhabi- United Arab Emirates

- Elnour, A., Balgis, O., and Nagmeldien, G. (2001). Community Based Natural Resource Management in Sudan, Khartoum.
- European Commission (Directorate general for Agriculture) (2001). Nontrade concerns, Chapter 6. In EU agriculture and the WTO, September. European Commission, Brussels, 11-12 (europa.eu.int/comm./agriculture/external/wto/newround/fiche_6.pdf accessed on 17 July 2003)
- Extension and Technology Transfer Directory -MARFR. Annual Report (2012)
- FAO (1992). Sociological analysis in agricultural investment project design.FAO Investment Centre Technical Paper 9. Rome: Author
- FAO (2001). Pastoralists in the new millennium, FAO Animal production and health. Paper (150). Rome
- FAO (2004). A public choice approach to the economic analysis of animal healthcare systems. PPLPI working paper No. 11: ii.
- FAO (2005). Animal health policy and practice: Scaling-up community-based animal health systems, lessons from human health. PPLPI working paper No. 22: ii-23.
- Forest, L. B., and Baker, H. R. (1994). In D. J. Blackburn, (Ed.), Extension handbook: Processes and practices (p. 86-99). Toronto: Canada: Thompson Educational Publishing.
- Garforth, C. (1993). Rural people's organizations and extension communication in northern Thailand. Journal of Extension System, **9** (2), 33-64.
- General Administration of Animal Resources-North Kordofan State. Annual Report (2009,2010,2011,2012,2014,2015).

- Grey,1997,1998: In Sara, T. A. I. (2012). Assessment of Extension Needs to Improve Animal Health and Production Delivery System in Alsyal Village, River Nile State, Sudan. Master's Research - University of Khartoum - the Department of Preventive Medicine (2012).
- Hassan, A. M. (2001) Restructuring of veterinary services through consolidation of private veterinary practice and introduction of new approaches to integration of target groups in Middle East, technical item (1) OIE regional commission for Middle East, Beirut, September, 2001.
- Helen, N, and Kurland, M. (2001). Social Work with groups, Third Edition Columbia University Press.
- Henkin, N., and Kingston, E. (1998/1999). Keeping the promise: Intergenerational strategies for strengthening the social compact. *Generations*, **22**(4) Special issue3
- Herbert, J., and Irenes, S. (2008). Community organizing and development Forth dition. United States of America.
- Heyman, Richard. Why Didn't You Say That in the First Place? How to Be Understood at Work. 1st. San Francisco, Ca: Jossey-Bass Inc., 1994. Print.
- Hildebrand, P. E. (1981). Combining disciplines in rapid appraisal: The sondeo approach. *Agricultural Administration*, **8**, 423-432.
- Huttner, K. (2000). Impact assessment of a community-based animal health service program in Northern Malawi, Master's thesis. Epidemiology Centre, Massey University, Palmerston North, New Zealand, pp 134.

- IGAD. (2013). "The Contribution of Livestock to the Sudan Economy." Policy Brief Series. International Crisis Group. 2013.
- Sudan's Spreading Conflict (II): War in Blue Nile. Africa Report: 204 (18 June 2013).
- Improving Livestock Production and Marketing Project- North Kordofan State. Annual Report 2014 and 2015
- Jazairy, I, Alamgr, M. and Panuccio, T. (1992). The State of World Rural pçyçrty, An Inquiry into its causes consequences, WAD, Intennediate.
- Jensen, K. l., English, B. C., and Menard, R. J. (2009). Livestock farmers' use of animal or herd health information sources. Journal of Extension, [Online], **47**(1)Article Number 1FEA 7.A availabl eat: <http://www.joe.org/joe/2009february/a7.php>.
- Jones,B., Deemer, B., Leyland, T.J., Mogga, W., and Stem, E. (1998). Community-based animal health services in Sudan: the experience so far. Community-based Animal Health and Participatory Epidemiology Unit (CAPE), OAU.
- Kaplan, M., and Brintnall-Peterson, M. (2001/2002). In search of an intergenerational agenda for Cooperative Extension. Journal of Higher Education Outreach and Engagement. Fall/Winter.7(1/2), pp. 127-144.
- Kenneth, J. (1952): In Padmanabhan, K. (1988). Rural Credit Lessons for Rural Bankers and Policy Makers, Intermediate Technology publications, London.
- Khalid, I. E. (2002). Local groups trial in combating desertification – Case Study, Gragikh Project for pasture rehabilitation. North Kurdofan State, March (2002).

- Khattab, H.I. and Faisal, A. (2005). Production systems in the nomadic pastoral sector, workshop on National Development Programs for Animal Productivity Improvement in the Traditional Sector, Damascus, Syrian Arab Republic. July 17-19 (2005).
- King, L.J. (2004) Emerging and Re-emerging Zoonotic Diseases: Challenges and Opportunities. Report of the 72nd General Session of the OIE (World Organization for Animal Health, 23-28 May 2004. OIE, Paris, France.
- Kireshina, A, (2003). Partnership between Local Governments and Community — Based Organisations Exploring the Scope of Synergy. Public Policy and Political Science, Duke university, Durham, NC, USA.
- Kirkpatrick, D.L. (1976). „Evaluation of Training“. In Craig, R.L., and Bittel, L.R. (Eds.). Training and Development Handbook. ASTO/McGraw Hill, New York.
- Khlooj Livestock Investment Company (2012). Report on desert sheep investment and development –El Obeid, Jan. 2012.
- Koehnen, T. L., Portela, J., and Cristóvão, A. (1992). Bilateral curriculum development for assistance in food security in Lusophone Africa. In A. Bonano (Ed.), The agricultural and food sector in the new global era (p. 195-212). New Delhi: Concept Publishing.
- Koehler-Rollefson, I. (2000) Management of Animal Genetic Diversity at Community Level. GTZ, Managing Agrobiodiversity in Rural Areas. Eschborn, Germany

- Kumar, K. (Ed.). (1993). An overview of rapid appraisal methods (p. 1-22). In K. Kumar (Ed.), Rapid appraisal methods. Washington, DC: World Bank.
- Lawrence, S. (1999). The Skills of Helping Individuals Families Groups and Communities Forth Edition, United States of America.,
- Leagans, J.P. (1960), India's Experience with Training in Extension Education for Community Development, Cornell University of Illinois, U.S.A.
- Leagans, J.P. (1961), India's Experience with Training in Extension Education for Community Development, Cornell University of Illinois, U.S.A.
- Leeuwis, A. B, and Van den Ban. (2004), Communication for Rural Innovation: Rethinking Agricultural Extension (3rd Edition), Blackwell Publishing.
- Levi and litwin, 1986: In Oakley et al, P. (1991). Prolect with people, the practice of Participation in Rural Development, International labourOffice, Geneva.
- Lewis and kellab, 1983: In Todaro, M. P., (1994). Economic Development in the Third World, Fifth Edition, Longman London and New York.176.
- Leyland, T. and Catley A. (2003). Community-based animal health delivery systems: improving the quality of veterinary service delivery. In Organization of Veterinary Services and food safety. Seminar Proceeding, 27-28 September 2002, Tunis. OIE, Paris, 129-144.
- Longwe, S. (1989). Supporting women's Development in the third World Distinguishing Between intervention and interface,

Paper presented at a training FI-Obiecl. programme in
Women in development issues for Finnida Staff, Helsinki.

Maalouf, W. D. (1987). In W. M. Rivera (Ed.), *Planning adult learning: Issues, practices and directions* (p. 106-126). London: Croom Helm.

Manalili.A.G.(1990), *community organizing for people's empowerment*. manila: kapativan- kannlaran foundation.

Marabelli R (2003). The role of official veterinary services in dealing with new social challenges: animal health and protection, food safety, and the environment. *Rev. sci. tech. Off. int. Epiz.*,2003, 22 (2), 363-371.

Martin, R. A. (1988). Factors associated with participation of Iowa young farmers in agricultural Extension programs. *Journal of Agricultural Education*.29 (1).

Maunder, A. (1973) *Agricultural Extension: A Reference Manual* (1st Edition), FAO.

MARF, (2006) Ministry of Animal resource and fisheries website.

Meyerholz, G. W. (1974). Extension and the practicing veterinarian. *Journal of Extension*, [Online], **12**(3). Available at: <http://www.joe.org/joe/1974fall/1974-3-a5.pdf>

Ministry of Animal Resources and Fisher (MARF,2006). Annual Report.

Ministry of Animal Resources, Fisheries and Rangelands (MARFR). Annual Report,2012,2013,2014,2015.

Ministry of Foreign Trade – Studies and Prices Division (2015) Annual Report.

Mosher, A.T. (1976). *Getting Agriculture Moving: Essentials for Development and Modernization*. Praeger, New York.

- Morris, D. (1979); In Todaro, M. (1994). Economic Development in the Third World, Fifth Edition, Longman London and New York.
- Mulwa, F. (2008). Demystifying participatory Community Development, Second Edition, Don Bosoc Printing Press Makuyu, Kenya.
- Mutiso, R and Chitere, O. (1991). Working with Rural Communities a Participatory action Research in Kenya, Nairobi University press.
- National Census, (2008). National Census-North Kordofan State. Annual Report (2008).
- Nagel, U. J. (1997) Alternative Approaches to Organizing Extension, in Swanson, B. "Improving Agricultural Extension: A Reference Manual" (3rd Edition)" FAO.
- Nichols, P. (1991). Social survey methods: A field guide for development workers. Development Guidelines No. 6. Oxford: Oxfam.
- Nur, H. M. (2003). Supply limitation to livestock trading and export expansion strategy of the Sudan. A thesis submitted to the U. of K. for the fulfillment of the requirement of the degree of Ph. D (Animal Production)
- Oakley, P., and Garforth. (1985). Guide to Extension Training, FAO Series NO 11, Rome, Italy.
- Oakley, P., and Marsden, D. (1987). Approaches to Participation in Rural Development, International Labour office, Geneva.
- Oakley, P. (1991). Project with people, the practice of Participation in Rural Development International labour Office, Geneva.
- OIE (World Organization for Animal Health) (2002). Third Strategic Plan, 2001-2002. OIE, Paris, 63 pp.

OIE (Office International des Epizooties) (2004) Terrestrial Animal Health Code.Ed., 2004. OIE, Paris.5

Okeyo, A. M. (2000). The role of crossbreeding in the development of a dual purpose goat for small-holder production systems in Kenya. In Proc, Workshop on Dairy Goat Research and Production in Kenya:20

Oklahoma (1999): In Sara, T. A. I. (2012). Assessment of Extension Needs to Improve Animal Health and Production Delivery System in Alsyal Village, River Nile State, Sudan. Master's Research - University of Khartoum - the Department of Preventive Medicine (2012).

Oxby C. (1989). African livestock-keepers in recurrent crisis: Policy Issues Arising from the NGO Response. Dry lands Programme, International Institute for Environment and Development, London.

Padmanabhan, K. (1988). Rural Credit Lessons for Rural Bankers and Policy Makers, Intermediate Technology publications, London.

Pandy, k. (2002). Social mobilization: Concept and Application for Poverty reduction and Self-governance. Paper for regional Workshop on promoting effective participation of civil society in local governance and poverty alleviation in the ECIS region- challenge and good practice.

Raja, R. H. and Bajwa R. (2005). Community based public private partnership in livestock sector, paper presentation (proc. under publication) in International Livestock and Poultry Congress, Lahore, Pakistan, December 13-14, 2005.

- Report for ODA and World Bank 1995 (to be published by NRI). Morton, J. and Wilson, R.T. (1996) Burkina Faso Case Study
- Reports of ODA/World Bank Livestock Extension Project (all available from NRI): Barton, D. and Reynolds, L. (1996) Kenya Case Study.
- Richard, R. (1995): In World Bank, (1997). Design of Social Funa, Partnership, Demand Orientation, and Local Organizational Capacity Washington, USA.
- Rivera, W, and Gustafson, D. (1991). Agricultural extension: Worldwide institutional evolution and forces for change. Amsterdam: Elsevier.
- Rivera, W, and Kalim, M. (2004). Agricultural extension: Worldwide institutional evolution and forces for change. Amsterdam: Elsevier.
- Riviere, (2004): In Sara, T. A. I. (2012). Assessment of Extension Needs to Improve Animal Health and Production Delivery System in Alsyal Village, River Nile State, Sudan. Master's Research - University of Khartoum - the Department of Preventive Medicine (2012).
- Rogers E.M. and Shoemakers, C (1971): Diffusion of Innovations, The freepress, New York.
- Rogers, E. M. (1995). *Diffusion of innovations*, 4th Edition. N.Y.: The Free Press
- Raja, R. H. and Bajwa R. (2005). Community based public private partnership in livestock sector, paper presentation (proc. under publication) in International

Livestock and Poultry Congress, Lahore, Pakistan, December 13-14, 2005.

Roling, Niels. (1988) *Extension Science-Information Systems in Agricultural Development*, Cambridge University Press, Cambridge, UK.

Roy M. Berko, et al., *Communicating*. 11th ed. (Boston, MA: Pearson Education, Inc., 2010) 9-12.

Russell, S., and Richard, L. (2006). *Understanding Macroeconomics*. Thomson South — Western Singapore

Pratt, B., and Loizos, P. (1992). *Choosing research methods: Data collection for development workers*. Oxford: Oxfam.

Project Document, (2014). *Kordofan Area Development Scheme*. El Obied.

Salih, M. A. M. (1990). *Pastoralism and the state in African arid land. Nomadic peoples*. No. 25-27

Sara, T. A. I. (2012). *Assessment of Extension Needs to Improve Animal Health and Production Delivery System in Alsyal Village, River Nile State, Sudan*. Master's Research - University of Khartoum - the Department of Preventive Medicine (2012).

Scarborough, V (ed.) (1996) 'Farmer-led approaches to extension: Paper presented at a workshop in the Philippines, July 1995.' *Agricultural Research and Extension Network Papers 59a-c*. London: ODI.

Schein, N 1987: In Clifton., R. and Dtns, A. (1993). *Grassroots Organizations*, ISecond Edition, Wave Land Press Inc. USA.

- Shaner, W. W., Phillipp, P. F., and Schmehl, W. R. (1982). Farming systems research and development: Guidelines for developing countries. Boulder, CO: Westview Press.
- Sharma, G.R.K. (2008). Cyber Livestock Communication: Extension Education. Concept Publishing Company. New Delhi.
- Shepherd, A. (1998). Sustainable Rural Development, Street Martin's press INC. United State of America.
- Smith, V. (1994, summer). A learner centered approach to social skills for technical foresters. In from the field. Rural Development Forestry Network Paper 17e (p. 12-20). London: Overseas Development Institute.
- Solomon, D. (1981). Characteristics of local Organization and service Agencies Conducive to development in Grouch, B. and S. Chamala. Extension Education and Rural Development, Volume 2, The Macmillan Company India LTD.
- Strand, A., and Morten, A. (2003). Community Driven Development, Michelsen Institute Bergen Norway.
- Sudan Veterinary Council (2015) Annual Report.
- Sudan Veterinary Council Act (1995) amended (2004).
- Swanepoel, H. (1993). Population and Development. Paper delivered at a National Conference on population. Kempton Park.
- Tambi E.N., Mukhebi A.W., Maina O.W. and Solomon H.M. (1997). Privatization of Animal Health Services in Kenya: an evaluation of Kenyan Veterinary Association Privatization Scheme (KVPS). OAU/IBAR/PARC and ILCA, Nairobi.
- Todaro, M. P., (1994). Economic Development in the Third World, Fifth Edition, Longman London and New York. 176

- Uma, L. (1975). *The Design of Rural Development, Lessons from Africa*, International Bank for reconstruction and Development, Washington, USA.
- UNDP, (1990): In Todaro, M. P., (1994). *Economic Development in the Third world*, Fifth Edition, Longman London and New York.
- UNDP (1998). *The partnership for government reforms in Indonesia, a report of the partnership secretariat, united nation development programme (UNDP)*, JI MH Thamrin 14, Jakarta 10240.
- UNDP, (2004). *Human Development Report*, Hoechstetter Co. New York, USA.
- United Nations Research Institute on Social Development(UNRISD), (1970), *Contents and Measurements of Socioeconomic Development*, Geneva.
- United Nation Research Institute on Social Development, 1979: In hephered, 1998. *Sustainable Rural Development*, Street Martin's press [NC. United State of America.
- United States Department of Agriculture-AMS-Marketing Services Division (2010). *Farmers Markets and Local Food Marketing*. Retrieved from:[http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateS&navID=Whole saleand Farmers Markets and left Nav=Whole sale and Farmers Markets and page=WFM Farmers Market Growth anddescription=Farmers%20Market%20Growthandacct=frmdirpkt](http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateS&navID=Whole%20saleandFarmers%20MarketsandleftNav=Whole%20saleandFarmers%20Marketsandpage=WFMFarmers%20Market%20Growthanddescription=Farmers%20Market%20Growthandacct=frmdirpkt).

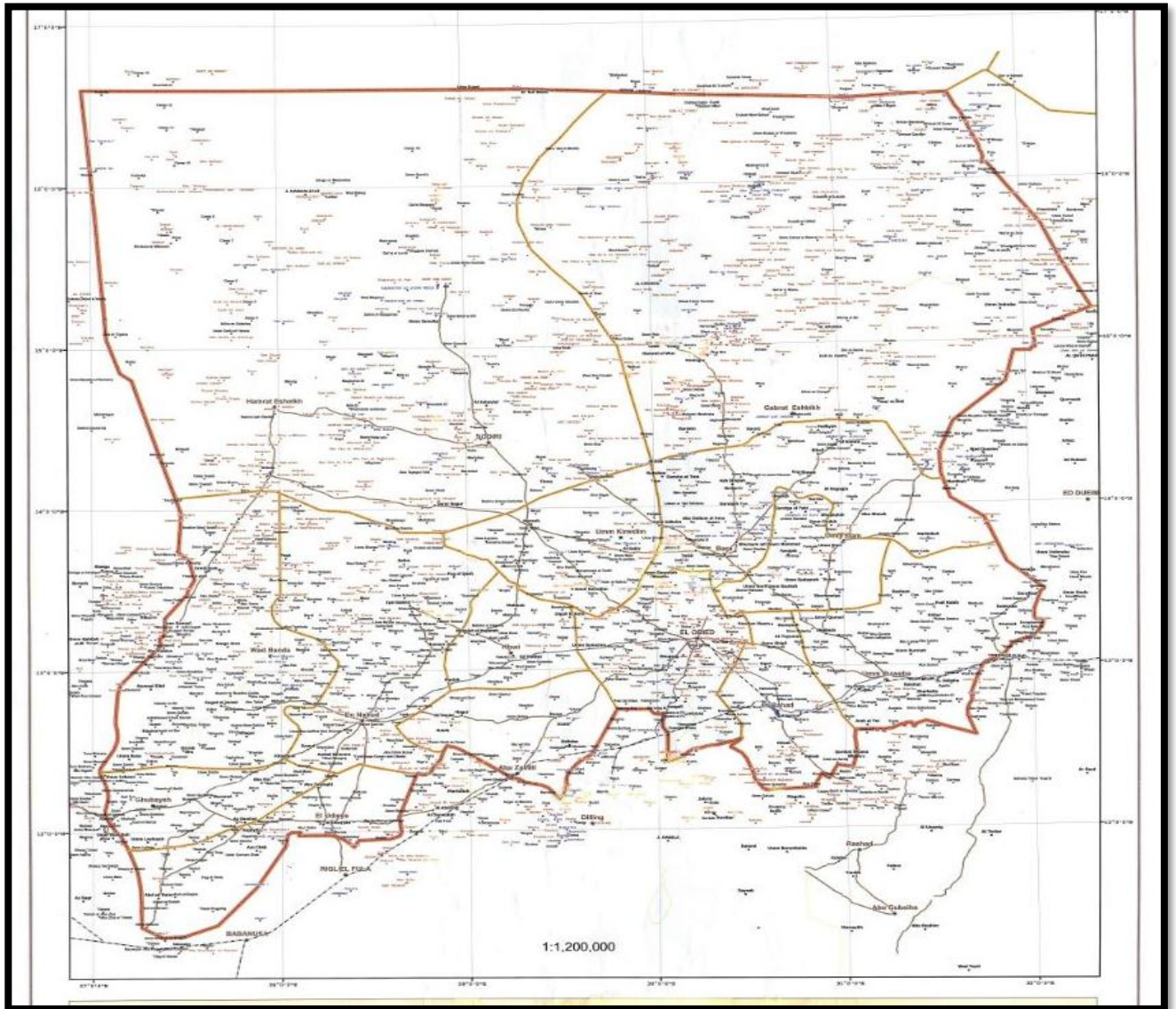
- Uphoff, N. 1986. In World Bank, (1997). Design of Social Funds, Partnership, Demand Orientation, and Local Organizational Capacity Washington, USA.
- van den Ban, A. (1974) Inleiding tot de Voorlichtingskunde, (Dutch edition first published by Boom, later quoted in English editions: 1988, van den Ban and Hawkins, and 2004, Leeuwis and van den Ban)
- Van den Ban, A. W., and Hawkins, H. S. (1985). Agricultural extension. New York: Longman Scientific and Technical.
- Van den Ban, A.W and Hawkins, H.W. (1996) Agricultural Extension, 2nd Edition, Blackwell Science, London
- Van den Ban, A., and Hawkins, H. (1997). Agricultural Extension, Second Edition, Black well Science, USA and London.
- Verhagen, K, (1987). Self— Help promotion a Challenge to the NGO community, Roger Tropical Institute, the Netherlands.
- World Bank, (1997). Design of Social Funds, Partnership, Demand Orientation, and Local Organizational Capacity Washington, USA.
- Wentling, T. L. (1992). Planning for effective training: A guide to curriculum development. Rome: FAO
- WHO (2001). Monitoring Antimicrobial Usage in Food Animals for the Protection of Human Health, Oslo, Norway.
- Yameen M. (1989) Epidemiology and economic importance of various livestock diseases in district Lahore. M. Sc. thesis, College of Veterinary Sciences, U.A.F. Faisalabad.
- Yasin, I. M (2010). The Role of Grassroots Community Organizations in

Rural Development-Case Study -El Obeid Rural
Development Project - North Kurdofan, Sudan (2010).

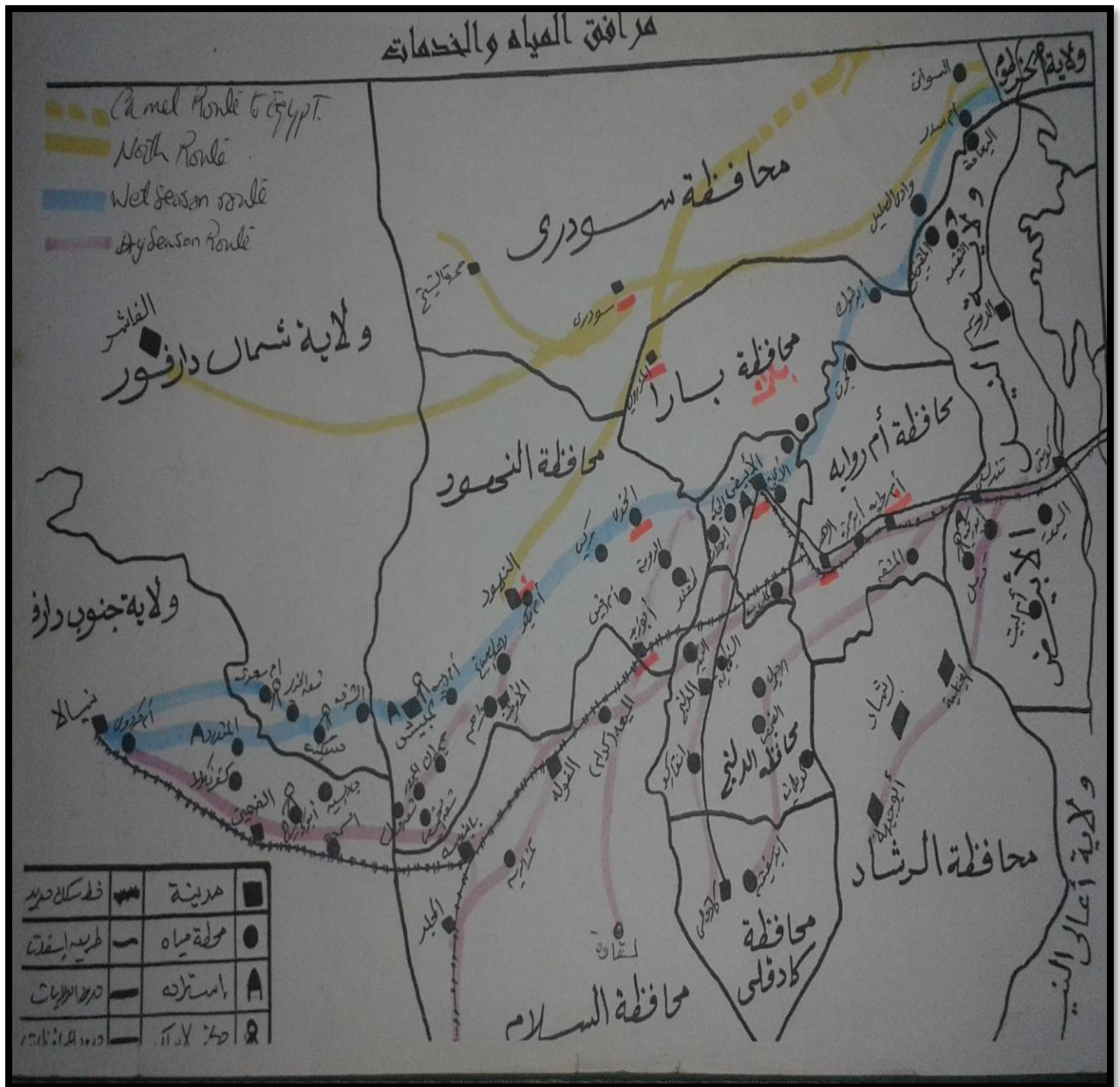
Yousif, M. Abd El. (2015). Laws and Legislations of the Vet. Profession
and services. Sym. On the role of Vet. Assn for
strengthening capabilities of Vet. Drs. And improvement of
the profe. Kh. 2015

APPENDIXES

Appendix(1)North Kordofan State map.



Appendix (3) livestock Market routs (Trade Roots Company, Limited- ElObeid)



Appendix (4) Producer Questionnaire

Date:

Form number:

1- Residence: locality: ... Administration: ... Village:

2- Animals owner Educational level

3- Number of the family members Children educational level.....

4- Animals care taker: Owner Hired..... family member.....

5- Animals care taker: Full-time..... Part- time.....

6- Services available in the residence area:

- Education: Number of schools..... Secondary..... Primary Other...
 - Veterinary services: Hospital.. Veterinary unit... Private sector. Other...
 - Human health services. hospital...health centre.... health unit... Other....
- 7- Water sources. Wells..... ponds..... Donki..... Other.....
- 8- Animal breeding pattern: sedentary.... nomadic... transhumance.....

Name the animals grazing areas

9- Animal production pattern or system:

- Traditional pastoralism (Open grazing)
- Semi-modern:(Specialized-fattening or production and improved nutrition)
- Traditional and semi-modern (transhumance).....
- Modern production (intensive production- balanced feeding – veterinary care and technology)
- Other.....

10- Do you vaccinate your animals regularly: (Yes) ... (No)
(sometimes) (on disease appearance)

11- Best time for vaccination campaigns in your area..... Why?.....

12- Do you treat the sick animals.....?

- (Yourself or the herder).....
- (call on a veterinarian).....
- (Take the sick animal to the hospital).....

• Other.....

13- Do you periodically treat your animals against worms? (No)

If yes- by: (Periodically once a year) (Periodically twice a year)
(Periodically three times a year) (Only when animal is sick) ...

14- From where do you buy animal drugs? (sellers in the local markets)..(experienced producer friends)... (veterinary pharmacy)... other....

15- Number of rams and ewes in the herd:

(Equal) (more rams than ewes) (more ewes than rams)
(irregular) (number of rams and ewes according to breeding purpose.....)

16- Types of sheds or barns:.....
.....

17- Type of identification: cauterizing... cutting ear tags other...

18- Animal feeding :

•name types of feedstuffs

•feed sources

•animal feeding times.....

19- Your opinion on genetic improvement :

(A agree) (Disagree).....why

Suggested animal type for genetic improvement

20- Your opinion on nationalization of breed strains: (nationalization is Selection of local breed or strain and improving its production) (A agree) ... (Disagree) ... (why).....

Breed type of animal suggested for nationalization

.....

21- Name the breeding problems:

22- In your herd any outstanding high producers state number....

23- Do you sort out high productivity animals? (no).... (Yes)....

24- Do you seek ways to keep and improve high productivity animals?
(No).... (Yes).....

25- How do you improve the productivity of your animals?.....

26- With who do you share your trials and research?.....

27- Name the projects you suggest for animal resources.....

Best area in your locality to establish of animal resources projects...

Why.....

28- Economic benefits from the animal and its products:

- Live animal selling: selling meat.....sale processed meat....

- sale of milk: selling of milk products

- Selling of slaughter offal – hide and skins

- other.....

29- State the characteristic of the high Producer sheep:

30- Name the best sheep breeds:.....

31- Reproduction: How many times an ewe in your herd gives birth?

- Once a year.....

- three times every two years.....

- Twice a year.....

32- The lambs age at separation from their mothers (Weaning age) ...

33- After lambs separation from mothers what do you do with them?

(Male).....

(female).....

34- Number of twining ewes in your herd:

number of high fertility rams

35- Name markets which trades from.....

36- Marketing style (direct with buyer) (indirectly through
mediators)

37- State type of mediators.....

38- How determined the animal price when selling?

- According to size look (large animal, meddle size, small size animal) ...

- Prices determined by dentition at sale time (teeth examination)

- Prices determined according to animal weight

39- Animals weights on sale determined by: (balance)... (by estimated)

40- Do you sell females? (yes)..... (no)..... if yes:

- Sell the same number of females as for males
- Sell more females than males
- Sell more males than females
- Females are sold for(aged)...(sick)... (low production) ... (all there reasons)
- 41- If you don't regularly vaccinate your animal, then why?
- Not convinced by vaccination.
- Lack of knowledge about vaccination
- Area distance
- Lack of vaccination cost
- 42- Slaughtered than males in your area are (more female)
- (Equal numbers) ... (Less than males) ... (Because of low price)...

development programmers:

- 43- What are the type of programmers and projects offered to you by the?
- Ministry of animal resources and fisheries (government institutions)
 - Private institutions
 - Institutions and Civil groups
 - Voluntary and philanthropic institutions
- 44- What the handicaps facing these institutions for programmer execution:
- 45- what type of services cue offered by these institutions?
- Cash (Quantitative; extension and training) Other...Name same of the services.....
- 46- How dose these institutions execute their programmers with you;
- 47- Does the effect of these programmers continue after the project pausing or being finished(no).....? (yes)
- name same of these programmers.....
- 48- The level of your participation in setting programmers or the excuted or suggested programmers in your area;
- No participation..... limited participation.... active participation

49- Do you feel any improvement or personal development(no).....
 if yes-specify area in the following; Due to these participation or projects;

- In animal breeding and production increase
- In you managerial and planning abilities
- In increase income and improving living standard
- By using modern means and techniques to increase production

50- Do you insure your animals? (yes)... (no)... why?.....

51- Do you participate or link with any union or production group?

52- Are there any intensive animal production projects in your era?
 name them.....

53- type of animals you own:

Type of animals	Number		Observation on the general health of the animal
	females	males	
Sheep			
Goats			
Cattle			
Camels			
Donkeys			
Horses			
Poultry			
Other-name			

Thanks

Appendix (5) Institutions questionnaire

Date.....

Form number:

- 1- Name of the institution:
- 2- Sector: Government sector..... Private..... Voluntary or developmental..... Other.....
- 3- General goals of the institution:
.....
- 4- Date of establishment.....
- 5- Goals related to animal producers:
- 6- Institution goals achievement: Weak.... Acceptable Good.....
Very good..... Excellent.....
- 7- Are there any criteria for offered producers programs ? No..... Yes....
Name these criteria:.....
- 8- Types of livestock targeted:
- 9- Allocated budget for this program:
- 10-Number of targeted producers for the programs.....
- 11-Name the producers classification criteria:.....
- 12-Are there any available information records on the producers?
No...Yes..
- 13-Any follow-up and evaluation of the beneficiary producers or
programmer after finishing ? No ... Yes ... name how to follow –up....
- 14-Type of services offered : cash.... services.... Name them.....
- 15-Means for the programme implementation:.....
- 16-Degree of participation by the targeted on programme lay out : No
participation. Limited participation... Active participation.....
- 17-How are productivity and production assessed?
- 18-How is the level of development in the are assessed:
 - Poor undeveloped area characteristics specifications.....
 - Middle undeveloped area characteristics specifications.....
 - Developed area characteristics specifications.....

- 19-How are the producers classified?.....
- 20-Has the institution any animal resources project? (No Yes)
previously (no Yes) Name the
projects.....
- 21-Obstacles facing the institution to achieve its goals:

Thanks