

# **RANGE LIVESTOCK PRODUCTION SYSTEMS IN THE NEAR EAST**

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## **Summary**

Several production systems, ranging from nomadic, semi-nomadic, transhumant, agro-pastoral to different forms of sedentary small holder and large-scale commercial units, exist in the Near East region. Hence enhancing pastoral production systems, sustaining resources upon which they depend, and securing livelihoods of dependent communities is of great concern. Several factors natural or man-made have caused resources degradation and resulted in production systems disruption thus undermining their long-term sustainability. Climatic and socio-economic changes currently taking place require practical and socio-politically acceptable interventions and more innovative production techniques and efficient management approaches to enhance production systems, concurrently sustain resources, and make these systems economically attractive and rewarding.

Establishment of efficient and economically viable pastoral production systems would require: acceptable settlement of land tenure and grazing rights in pastoral areas, conducive policy environment, pastoralists convinced and actively involved in proposed interventions, an institutional and market framework capable of absorbing capital invested, providing the required goods and services to producers, and efficiently

handling livestock and their products, coordinated development efforts, more integration with rain-fed and irrigated farming systems and a supporting efficient research and technology transfer system. It became evident that no approach to sustainable resource use and production system development could be satisfactory unless it addressed land tenure and users rights issues, coupled with economic incentives to producer communities. Existence of political will to address these critical issues and officially recognize linkage between resources and dependent communities are also important.

Participation of local communities and empowerment of their traditional institutions and community-based organizations is vital for sustainable management of range resources and development of pastoral production systems and improvement of livelihoods. It is increasingly realized that empowering pastoral communities should merit very high priority among actions targeting pastoral production systems development. Local communities should be involved in programs targeting their resources and production systems from planning stage through implementation, monitoring and evaluation. Development assistance should, in collaboration with government and target communities, confront tenurial insecurity, understand traditional producers socio-economic setting and approaches, involve traditional community institutions in planning and decision making and integrate local experience and traditional knowledge.

The possibilities to increase efficiency of and production from pastoral livestock and to ensure sustainable utilization of resources exist through appropriate management, improving supply, quality and utilization of feed resources, enhancing animal health services, and by efficient participative research and technology transfer.

## **1. Introduction**

Vast areas of the Near East region are classified as rangelands dominated by arid and semi-arid climate, with low and erratic precipitation, high risks of severe drought and critical shortage of grazing and water. The region is one of the centers of domestication of livestock. Rangelands (steppe, desert, savannah and mountain grazing) cover the largest area under one type of land use in the region. FAO statistics for 2005 indicated that permanent meadows and pasture cover 504 million ha (Pakistan and Turkey not included). They contribute to the livelihoods of millions of Bedouin and pastoralists communities and provide the basis for a variety of livestock production systems. Rangelands are by far the cheapest source of livestock feed providing variable proportions of the feed requirements of different types of livestock. These lands are productive in terms of livestock products and represent a sizable investment on the part of their actual users. In some countries mountain rangelands are important grazing areas for transhumant livestock during summer and early fall. Forest grazing is also practiced on seasonal or year round basis and in some areas contributes significantly to livestock nutrition particularly during the dry season when range vegetation is meager, dry and of low nutritive value. Despite the dominance of arid and semi-arid conditions over the rangelands of the region they play an important role in watershed protection, slope stability, soil conservation, groundwater recharge and water flow through the multitude of seasonal streams, 'Wadis' and 'Khors' that intersect these lands. Various degrees of mutual dependence exist between range-dependent and crop production systems. Rangeland resources have other uses including food, wood and fuel, biodiversity,

wildlife habitats and food, recreation, medicinal plants, herbs, dyes, tannin materials, and materials used as cosmetics as well as materials utilized for local handicrafts and rural industries. These are utilized by rural and pastoral communities for their own use or for sale. Some grazing areas are wetlands of multiple production and environmental functions.

Although not clearly developed at present the demand for rangelands for environmental services (recreation, eco-tourism and clean water) will increase in the near future as a result of population increase and improvement of livelihoods thus forming direct competition to pastoral livestock production. Rangelands and improved pastures can contribute to carbon sequestration through management, improvement and rehabilitation and establishment of new areas of improved pastures that increase plant cover and soil organic matter. Although per unit value of such lands in pastoral use is low, their large extent makes the total value of the natural grazing resource appreciable. A large part of the region's livestock production is dependent to varying degrees on these natural grazing resources (Tables 1 and 2).

The capacity of rangelands as a source of feed for livestock and securing sustainable livelihoods of pastoralists has been drastically reduced due to a combination of factors including degradation due to overgrazing, expansion of cultivation and desertification of large tracks of arid and semi-arid lands. A general trend is a decreasing contribution of range to livestock feed and an increasing contribution of other types of feed as wheat straw and stubble, standing barley crop and barley grains, and agro-industrial by-products. In Tunisia the utilization of supplements by small ruminants increased from 0-80% in three decades. The link with cultivation areas became stronger and the period spent in those areas is becoming longer. The value of rangelands for traditional livestock production systems in some countries of the region is still high despite the decline in the proportion of animal feed provided by this source.

<b>Iran</b>	39
<b>Libya</b>	20
<b>Oman*</b>	40 – 75
<b>Sudan</b>	65 – 80
<b>Syria steppe</b>	10 – 40
<b>Tunisia</b>	10 – 25
<b>Yemen</b>	40

\* 40% in the north and 75% in Dhofar corresponds to 2000 estimate; however, the percentage for Dhofar has declined and may range from 40 to 50% at present.

Table 1. Contribution of Rangelands to Livestock Feed in Some Countries of the Region

\* 40% in the north and 75% in Dhofar corresponds to 2000 estimate; however, the percentage for Dhofar has declined and may range from 40 to 50% at present.

Type of Animal	% Dependence	
	Rangelands	Agricultural Land
<b>Sheep</b>	90	10
<b>Goats Goats</b>	95	5
<b>Cattle</b>	40	60
<b>Buffaloes</b>	0	100
<b>Camels</b>	95	5

<b>Donkeys</b>	95	5
<b>Horses</b>	10	90

Table 2. Estimated Dependency of Livestock on Rangelands for Feed in Baluchistan

Range-based livestock production is a major type of land use in the region. Grazing in rangelands and forests, stubble, straw, failed crops and fallow lands, rain-fed and irrigated fodder crops (green or hay) and supplementary feed in form of concentrates and agro-industrial by-products are all utilized by herds and flocks in the region. Livestock is of great value to the livelihoods of rural populations in the region. Livestock provides the main source of income and nutrition for millions of pastoralists and livelihood support to agro-pastoralists and non-farm based livestock owners. Hence efforts to improve livestock production systems and the resources upon which they depend, particularly rangelands, should rank forefront in governments and international community efforts to combat poverty and sustain livelihoods of these populations.

In most countries of the region, livestock population and animal production used to fluctuate with feed availability which is closely linked to rainfall and plant growth. The occurrence of drought used to reduce livestock population while in relatively wet years animal numbers build up. Presently large amounts of animal products and live animals are imported annually by some countries to meet local requirements. Concurrently large amounts of barley grains and other feeds are also imported to meet national herd feed requirements.

Livestock population of countries of the Near East and North Africa more than doubled in 40 years from 207.5 to 430.3 million heads (Table 3). This increase varies for the different types of livestock (Table 4). The region witnessed a high human population growth of 3.0% per year from 1982-1991 which is expected to double by 2020. The requirement of this population for animal products is on the increase and part of it is covered by imports as in many countries present production systems output lags behind. Still few countries in the region (Mauritania, Somalia, Sudan, Syria and Turkey) are exporters of live animals.

In the rich Gulf Cooperative Council countries, livestock population quadrupled. Small ruminants increased from 3.4 million heads in 1976 to 14.8 million heads in 2007. Increased revenue from oil resulted in a society with higher per capita income. Oil wealth was also an incentive and as a matter of fact induced governments to encourage increased human population. The ultimate result is that in these countries population is doubling every 20 years. Higher per capita income increased demand for range-based products, particularly meat. Governments are therefore responsible for the increase of livestock through a system of subsidies. Initial subsidies were on the basis of per capita heads of livestock owned by individual Bedouin operator. This was later changed to feed subsidy particularly barley (now abandoned). Because of the high cost of meat small, ruminant production became very attractive especially the more manageable Naimi sheep breed from Jordan. This brought about a change in range livestock production from small stock subsistence holdings to highly mechanized large flocks. It is not uncommon to see herds of more than 2000 heads of sheep with expatriate shepherds, water tanker and feed transport trucks. Realizing the increase in livestock

population in the Kingdom of Saudi Arabia, the limited contribution of rangelands to feed this population and the large fund the Government allocates to subsidize the importation of barley (3 billion Saudi Riyal) steps have been initiated to formulate a feeds strategy with the objective of processing animal feeds locally. The Government is expected to subsidize inputs for production of feeds suitable to different types of livestock.

Type of Livestock	1967	2007	% Increase
<b>Cattle</b>	32.15	71.42	122
<b>Camels</b>	9.45	14.28	51
<b>Sheep</b>	106.27	224.78	111
<b>Goats</b>	59.62	120.33	101

\* population million heads

\*\*FAO statistics

Table 3. Increase in Livestock Population\* of the Near East Region in Four Decades\*\*

\* population million heads

\*\*FAO statistics

Country	Cattle		Camels		Sheep		Goats	
	1967	2007	1967	2007	1967	2007	1967	2007
<b>Algeria</b>	0.80	1.59	0.175	0.265	7.13	19.50	2.32	3.7
<b>Iran</b>	4.95	9.78	0.195	0.146	30.47	52.22	13.33	25.86
<b>Mauritania</b>	2.44	1.69	0.660	1.600	4.20	8.85	2.80	5.60
<b>Morocco</b>	3.38	2.70	0.222	0.036	13.41	17.25	7.63	5.30
<b>Saudi Arabia</b>	0.12	0.37	0.091	0.260	2.11	7.00	0.70	2.20
<b>Somalia</b>	3.50	5.35	4.400	7.000	8.00	13.10	14.00	12.70
<b>Sudan</b>	11.01	39.50	2.420	3.700	10.48	49.00	8.29	42.00
<b>Syria</b>	0.47	1.15	0.010	0.024	5.74	21.00	0.83	1.35
<b>Yemen</b>	1.26	1.48	0.236	0.361	2.57	8.42	3.20	8.22

\* population million heads

\*\*FAO statistics

Table 4. Changes in Livestock Population\* by Type in Selected Countries\*\*

\* population million heads \*FAO statistics

As predominantly livestock producing areas', pastoral systems' contribution to economic development is prominent in some countries. The contribution of range-dependent livestock to local milk and meat requirements and in some countries to livestock export, particularly small ruminants, is appreciable. In most parts of the region there is an imbalance between livestock population on one hand and water and land available for grazing on the other causing increasing dependence on other sources of feed. Herds are increasing in size to the detriment of the grazing resource and its long-term productivity. The conditions in the region, which is characterized by large geographical area that extends from Morocco to Central Asia, and diverse environments, economies and cultures, have been conducive to the emergence of several types of production systems. They vary from nomadic, semi-nomadic, transhumant to

sedentary small holder production systems and semi-intensive and intensive large-scale commercial operations. Some of these systems experience various degrees of mobility. The key environmentally related factors influencing pastoral movement are forage (quantity and/or quality) and water availability. As a matter of fact water was the major determining factor in resting and utilizing rangelands of many countries of East Africa and the Near East.

Small ruminants make the largest population of livestock in areas with arid Mediterranean climate, steppe and desert zone. They are also important in arid and semi-arid tropical areas of Mauritania, Somalia and Sudan. Their importance arises from their contribution to H/H food requirements as well as they constitute a major component of the income of mixed farmers, pastoralists and agro-pastoralists, who sell live animals, milk, milk products and wool. Cattle are associated with sedentary production systems including irrigated farming in some countries while in others cattle are raised under semi-nomadic agro-pastoral and transhumant production systems.

The one-humped camel is found throughout the arid and semi-arid parts of the region, which host some 85% of the world's population. Somalia and Sudan have the majority of this population (Table 4). Large areas of the arid rangelands of the region are more suited to the production of camels than other types of livestock. Camels are managed in pure or mixed herds, particularly with small ruminants. Camels' population is decreasing in countries as Jordan and Syria. In Jordan the decline in camels and goats population is attributed to consumer preference for lamb and the readiness with which sheep can be marketed besides the role of camels as pack animals has sharply declined. Flock/herd size and composition is determined by availability of grazing, ability to provide water and supplementary feed, availability of family labor, ability to hire non-family labor and type and age of animals required by local or abroad markets.

Sheep and goats provide milk for H/H consumption which is used as fresh milk, sour milk, yoghurt, ghee, cheese and "Jameed". The surplus is sold to cheese makers or nearby markets. Cattle provide milk which is consumed fresh or used to produce ghee and sour milk. Fresh milk can be marketed in nearby towns or sold to cheese makers. Camel's milk is consumed fresh but also sour "Qaress" and in this later case can be stored for weeks without being spoiled. Camel herders in Oman and Sudan in general do not sell milk as they consider such an act socially unacceptable. It is consumed by H/H and is offered free to guests and passers-by. In Saudi Arabia fresh or pasteurized camel milk is sold locally or at supermarkets, respectively. Wool produced by different types of sheep is mainly utilized for carpet making. Camels and goats hair is used for tents, ropes and rugs.

Livestock owners obtain income from the sale of milk, cheese, ghee, hair, wool, rugs, carpets, leather goods, live animals, and manure. Sale of animals is practiced throughout the year, however, there are seasons and/or social and religious occasions when sales increase. In Muslim countries sales increase during Ramadan (fasting month), pilgrimage (Hajj) and religious celebrations. Animals are sold to obtain cash to meet (i) domestic H/H requirements (ii) agricultural labor and inputs (iii) school requirements (iv) veterinary drugs, vaccines, animal health services (v) water charges and (vi) feeds. In areas with arid Mediterranean or arid tropical climate spring and end of the rainy

season lambs, respectively, fetch good price hence are sold for slaughter or fattening and subsequent marketing. In Baluchistan males which are in good condition during autumn are sold to fetch good price and to save winter feed for the breeding herd.

A variety of livestock diseases imposes losses in flocks and herds reduce their performance and cause economic losses by their owners. Internal and external parasites also cause problems. Nomadic and semi-nomadic herds, particularly those that cross international boundaries may be subjected to diseases not common in their home countries. In most cases they receive less veterinary care when compared to sedentary herds close to animal health services. Health and nutrition are interdependent a condition that becomes more prominent during drought. Vulnerability of livestock to diseases is known to increase during drought which forms environmental and nutritional stress.

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### **Biographical Sketches**

**Dr. Mahgoub G. Zaroug** is a Sudanese and well known educator and researcher. After an undergraduate degree in Sudan, he completed an M Sc in Range Management and Ph D in Ecology from the University of California Davis, USA.

Expertise is in areas of range management and pastoral development, fodder production and conservation, and natural resources management. Particular development competencies include environmental conservation, project design and evaluation, environmental impact assessment and training in the above mentioned fields. Regions of Experience include: The Near East, The Horn of Africa, East and Southern Africa.

He was a former Director General of the Range and Pasture Administration and Adviser for Pastoral Development Ministry of Agriculture in Sudan and FAO Regional Range Management Officer for the Near East.

He is the author of over 60 reports, and papers, in range management, pastoral development, land resources management, environment, fodder production, range livestock, use of grasses as non-traditional food, fodder and pasture seed production, natural resources and integration of range and livestock with crop production systems.

**Mr. Mohamed Mirreh** is from Somalia with an M.Sc in Rangeland Management from University of Arizona.

Mr. Mirreh is Rangeland Management and Fodder Crop Production Officer for FAO Regional Office for the Near East and North Africa (Cairo Egypt). He has more than 30 years experience in research and development in rangelands of arid ecosystems with emphasis on monitoring and rehabilitation. Most recently he has been addressing the specific challenge of influencing regional and national policies for sustainable use of natural resources as means of conservation of biodiversity, combating desertification and improvement of livelihoods of resource dependent communities.