

# Range Development in Northern Libya

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The Socialist People's Republic of Libya is a large desert nation of 685,500 square miles along the southern shores of the Mediterranean Sea. Over 95 percent of its surface area consists of mostly uninhabited sand and stone wastelands of the Sahara Desert. With the exception of the coastal uplifts of Jebel Nefusah in the west and Jebel al Akhdar in the east, and the Tibesti mountains along the southern border, the country is flat and dominated by low plains and tablelands below 2,500 feet elevation.

Because of its geographic location between 19° and 33° north latitude, subtropical high pressure systems dominate the weather throughout most of the year. These systems are characterized by subsiding warm and dry air masses, resulting in aridity throughout most of the country. Only the Mediterranean shores are sufficiently northward to receive some winter rainfall from frontal storms that travel further south than usual. This narrow coastal strip is a maximum of 90 miles wide and receives between 4 and 14 inches average annual rainfall. As is typical for arid and semi-arid regions, rainfall is highly variable and unpredictable. Nevertheless, historical records and cultural artifacts leave no doubt as to the importance and widespread practice of small scale irrigated farming, dryland farming, and livestock production during the past 3,000 years.

More than 95 percent of the population lives in the coastal strip. The principal cities are Tripoli in the west and Benghazi in the east (Fig. 1). These and many other coastal cities were colonized by Phoenician and Greek traders between 2,500 and 2,700 years ago. During Roman times, coastal Libya had nearly two dozen large and small towns, hundreds of farms (many fortified) and an extensive road network. Detailed written documents indicate that coastal Libya was an important producer of olive oil, grain, and livestock. Wildlife, including elephant, lion, cheetah, giraffe, ostrich, and many species of gazelle and other ungulates, was common and hunted for meat and sport.

In 1982 Libya's population was estimated at 3.25 million people, including nearly 0.5 million foreign guest workers. Until 1965 the population was predominantly rural and engaged in agricultural production. Rapid urbanization during the past two decades, a high population growth rate (2.8 percent), and until recently, a large disposable income, have combined to make the country increasingly dependent on imported foodstuffs, particularly food and feed grains. In the early sixties the country recognized the need to use its extensive oil revenues to develop its human and natural resources. The development of the agricultural sector, including range and livestock, was recognized as a need of the highest priority. Achieving self-sufficiency in basic food production,

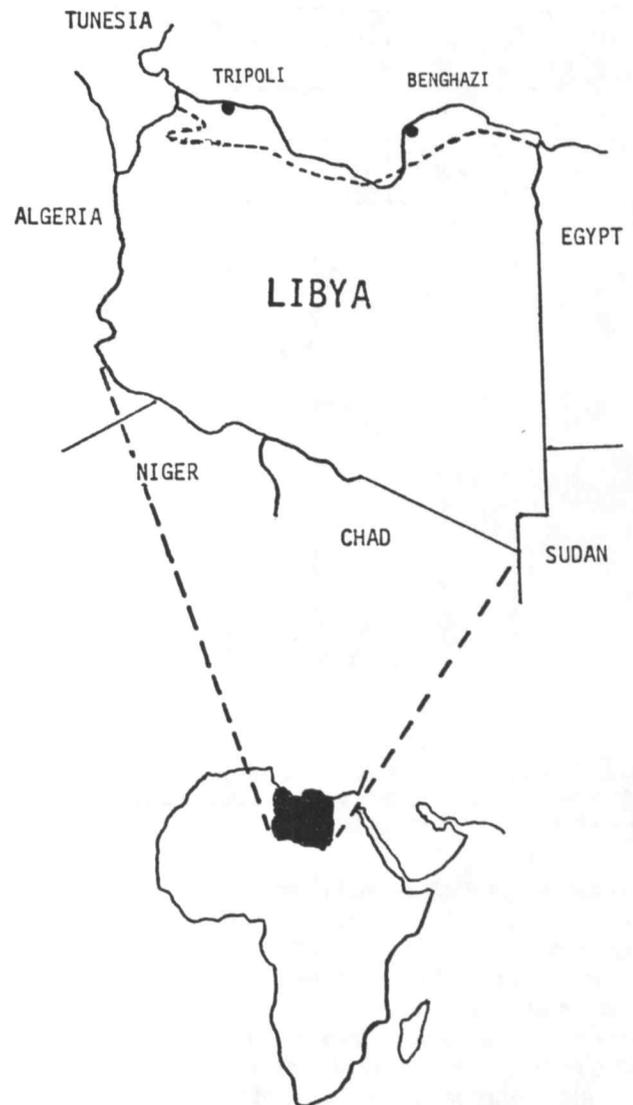


Fig. 1. Location of Libya and principal cities. Approximate location of the 4 inch isohyet (---) is also indicated.

especially grain and red meat, was accepted as a national goal to be accomplished in the shortest possible time.

Col. Muammar Qaddafi's ascent to power in September 1969 and his subsequent success in the formation of OPEC helped produce a tenfold increase in oil revenues during the seventies, which reached 22 billion dollars in 1980. Expenditures for social and economic development were increased at a similar rate and amounted to 4.3 billion dollars in 1977. Dozens of agricultural projects for grain production and range and livestock development, involving hundreds of



**Fig. 2.** Remnants of a pine plantation in the 8-10 inch rainfall zone. Completely unprotected from browsing by sheep and goats during the last two years, the survivors have been browsed to maximum animal reach.

thousands of acres, were initiated during this period. With the collapse of oil prices in 1983, oil revenues declined sharply and were down to 5 billion dollars in 1986. This caused massive reductions in appropriations for agricultural development activities, which with a few exceptions, were terminated.

Libya's form of government is unique and strongly decentralized. All authority is vested in the people, who are self-governing and express themselves through Basic Popular Congresses (local district councils) at the General People's Congress. Decisions made by the General Congress are law. The Secretariat of Agricultural Development and Land Reclamation controls the use, management, and development of the rangeland resources. Its authority, however, is minimal and its function mainly advisory.

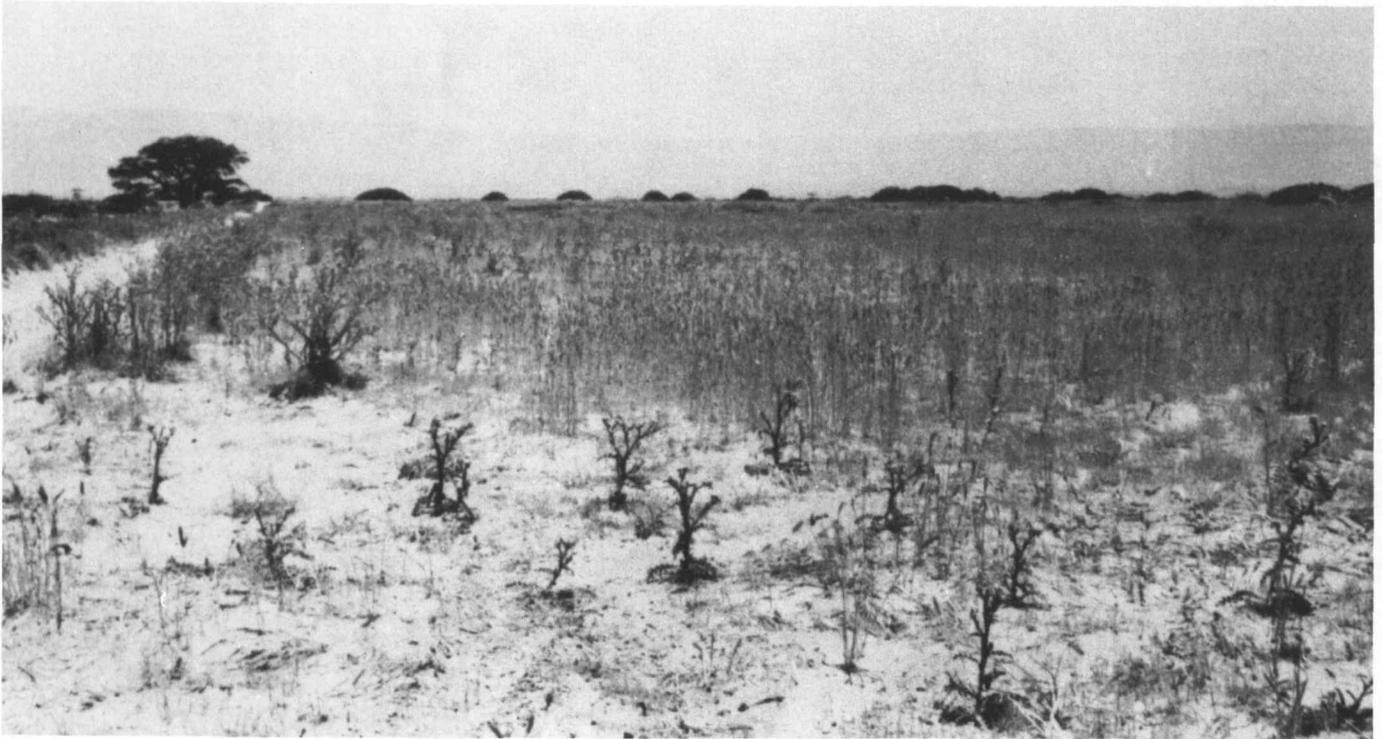
The unprecedented rate of agricultural development of the 70's, followed by an equally dramatic decline in the mid 80's, resulted in serious economic dislocations. These problems were further aggravated by Libya's unique form of government; by a crippling shortage in skilled domestic labor and expertise, by a high and increasing degree of alienation with neighboring nations and the West, on whom Libya depended for labor, expertise, and technology; and by the general unpopularity of Qaddafi's political and economic practices and theories. For example, after the expulsion of Egyptian, Moroccan, and Tunisian nationals employed in all sectors of the economy, many government-operated agricultural projects obtained unskilled and illiterate labor from Niger and

Mali. Under the official doctrine of "Partners not Wage Workers" Libyan families are discouraged from employing other Libyans, for to do so would be "exploitation." Libyans must make any Libyan employee a partner in the family enterprise. Few Libyan families are willing to do this, and as a result farm and livestock owners produce only what the family can manage itself. For these and other reasons, progress in modernizing the agricultural sector and in increasing its productivity did not meet planned targets and expectations.

### The Range and Livestock Sector

Land receiving between 2 and 8 inches of annual rainfall is officially designated as rangeland with livestock production as the most appropriate use. Land receiving more than 8 inches of annual rainfall is designated as potentially suitable for farming (mostly wheat or barley production), tree crops (mostly olive, almond, or apple), or forest plantations (mostly pines, acacias, or eucalypts) (Fig. 2). Land not potentially suitable for any of these uses is also designated as rangeland.

Dryland farming is widespread within the 4 to 10 inch rainfall zone and occurs whenever and wherever a suitable situation presents itself. It is a main cause of the destruction of perennial range vegetation and serious soil erosion. Despite low yields, frequent crop failures, and a national policy against such use of rangeland, the practice persists and continues to expand. The reasons for this are many and include: (1) a long tradition of cultivating marginal sites; (2) the wide availability of tractors and disk plows which were distributed to increase grain production; (3) the financial and



**Fig. 3.** Efforts at dryland farming within the 6-8 inch rainfall zone often fail. This barley field in a range and livestock development project occupies a former acacia woodland of which only some 60 trees remain.

other incentives provided to encourage grain production; and (4) the serious overstocking of rangelands, which has increased the need for supplemental feeding of both concentrates and fiber. Government efforts to eliminate dryland farming from rangelands have been half-hearted and ineffective. It occurs not only on the unclaimed, unallocated rangelands, but also on the government-run range and livestock

development projects, where dryland farming by private citizens is not only tolerated but is practiced by project staff as well (Fig. 3).

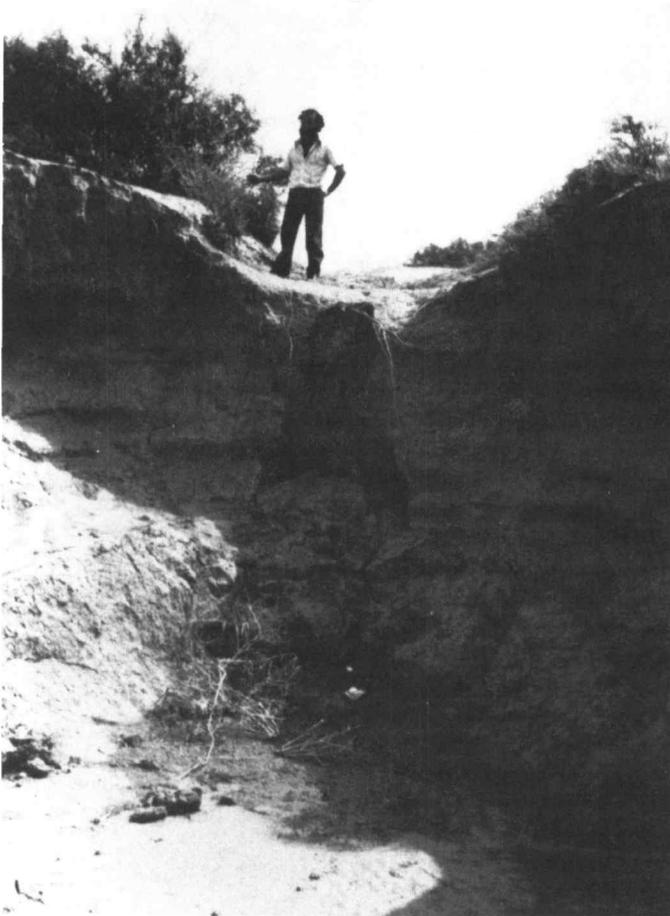
Australian and North American trained range managers believe that Libyan rangelands are overgrazed and extremely degraded. Productivity is very low and by some estimates is only 10 to 33 percent of potential (Le Houerou and Aly 1982;



**Fig. 4.** Unregulated and abusive grazing by camels and sheep encouraged severe wind erosion and desertification. These low, fine sandy dunes moved through the 4-6 inch rainfall zone of a range development project, and left complete desolation in their wake.

Roberts 1984). The production of usable forage on perennial rangelands in western Libya is estimated to range from 15 lbs/ac to 300 lbs/ac. These rangelands are dominated by esparto and other species of needlegrass (genus *Stipa*), white and field sagebrush (genus *Artemisia*), and various species in the chenopod family (notably in the genera *Hamada* and *Salsola*). Annual rainfall ranges between 4 and 8 inches for these vegetation types. Much of the perennial rangeland, particularly in the 2 to 4 inch rainfall zone, is too degraded in terms of both soil fertility and vegetation for natural recovery or even man-assisted improvement within the foreseeable future.

Libya's livestock industry is dominated by sheep and goat production. Le Houerou (1980) provides an estimate of 3.0 million sheep, 1.25 million goats, and 60 thousand camels for 1976. Since then, the number of sheep and goats has sharply increased, while that of camels has declined slightly. In 1982, Le Houerou and Aly estimated that the equivalent of 6.7 million mature sheep used the rangelands. They also estimated that these lands could support no more than the equivalent of 2.8 million mature sheep.



**Fig. 5.** Dryland farming and abusive grazing were responsible for severe water erosion in many range development projects. This active headcut developed on land with 0.5 percent slope and fine silt loam soil.

Most rural families own small flocks of sheep and a few goats (less than 25 head), which are grazed under family supervision within a 3-4 mile radius of the village or settlement. These animals are mostly for private consumption and

financial security, and receive large amounts of grain supplement. Larger flocks of sheep, goats, or mixtures ranging in size from 100 to 500 head, rely more extensively on range vegetation. These flocks are generally semi-nomadic and may travel hundreds of miles. The dwindling nomadic population, a group of well-off village or town people, or a single affluent family, may own one or more of these large flocks. Foreign labor is frequently used for the supervision of large flocks.

In all but a few protected areas, stocking is greatly in excess of the land's capacity to support it, and grazing is uncontrolled. During the affluent 70's and early 80's large amounts of money were invested in the agricultural sector, causing a rapid expansion of livestock numbers. At the same time, the subsidization of locally produced feed grains and the distribution of imported feed grains at prices below cost, allowed for increasingly higher levels of supplemental feeding as range forage became scarcer. The government's active and successful program of settling pastoralists resulted in the disappearance of tribal grazing rights from large tracts of rangeland. Grazing rights to these and most other rangelands belong to the state. Grazing use of these rangelands is free, with no control of either stocking rate or period and season of use.

#### Range and Livestock Development Efforts

Throughout the seventies, major surveys of the land resources were conducted by expatriate firms. These surveys were followed up with proposals and plans for the development of the range and livestock industry. Dozens of projects were quickly started but development was terminated by the mid 80's. The original plans called for improvements in infrastructure, such as roads, fences, and water, and for improvements in vegetation. The improved lands were then to be divided into farms and ranches and distributed among the rural population. This latter phase of the plans was not carried out, possibly because of a lack of development funds, and the state assumed the active management and use of the range development projects.

On most projects, development consisted of the construction of gravel roads and improved trails; many miles of 6-strand barbed wire perimeter and interior fence; and wells, boreholes, or cisterns. In some cases, shearing sheds were also constructed. Vegetation improvements consisted mostly of planting container-grown shrub and tree seedlings and closing project areas to grazing for a variable period of time. Plantations were to serve primarily as feed reserves during periods of drought. The most widely planted tree is blue-leaved acacia (*Acacia cyanophylla*), a native of Australia and well adapted to coastal Libya. It makes a good windbreak, but is not much liked by livestock. The second most planted species is also a native of Australia (*Atriplex nummularia*), which is very palatable and grows vigorously, but does not appear to regenerate under Libyan range conditions. Other widely used species include a native saltbush (*A. halimus*), which is used mostly by camels; fourwing saltbush (*A. canescens*); and spineless cactus (*Opuntia ficus indica*). The cactus has little tolerance of direct grazing, which frequently kills it. The recommended method of use is manual removal of entire pads and off-site feeding. This method of use is successfully employed in neighboring Tunisia and other

countries, but was not adopted in Libya. As a result, entire cactus plantations have been lost.

Le Houerou et al. (1983) report that between 1978 and 1983 over 100,000 acres of rangeland were planted with various tree and shrub fodder species. The sharp decline in oil revenues, which occurred in 1983, greatly reduced funding for all types of range improvement work. Expatriate firms began to wind down their activities and the local district councils assumed the responsibility of managing the project areas. With assistance from the Secretariat of Agricultural Development and Land Reclamation, project staffs were appointed and management plans were drawn up. Unfortunately, the country was ill-prepared for this rapid transition. It lacked a well-trained cadre of resource administrators and range professionals, had no national or regional policy covering type and intensity of permitted land use on public rangelands, and had no effective means of controlling and reducing unregulated and abusive rangeland use. The effects of these shortcomings became quickly apparent and were extremely serious (Fig. 4 and 5). The greatly improved road network, transportation facilities, and water resources opened up vast stretches of rangeland for unregulated grazing and unauthorized dryland farming. This accelerated the abuse of native range and caused the near complete destruction of many tree and shrub plantations. Wherever fences hindered the free movement of man or livestock, they were cut or pulled out. Where dryland farming occurred, disc plows were used for ground preparation, which greatly contributed to soil erosion. In one case, small irrigated farms encroached upon a developed range project. The resulting drop in the ground water table caused some 30 livestock wells to run dry.

Libya's efforts to develop its rangeland resources and achieve self sufficiency in red meat production in the shortest possible time received a major setback from the drop in world oil prices. Insufficient progress in the development of its institutions and natural resource policies has prevented the realization of sustained use objectives on these lands. Lack of control over livestock grazing and land cultivation has prevented the achievement of these objectives and has caused the loss of much time, labor, and capital spent on developing range resources.

Renewed efforts towards achieving lasting range resource development are hampered by the continued rapid increase in population and livestock, declining rainfall in North Africa and the Middle East (Bradley et al. 1987), and low oil prices.

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## How to Best Handle an IRS Audit

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*Editor's Note:* I hope that ranch managers make enough income to pay income tax. I also know that they make innocent mistakes. This article is very informative on what to do if something does go wrong.—Peter V. Jackson, Executive Vice President, SRM

By now we have all seen the significant impact that the 1986 Tax Reform Act has had on the cattle and other livestock industries. The reverberations have affected the industry with such new issues as the Material Participation Test, the elimination of preferential treatment for capital gains, the limitation on losses in limited partnerships and other "passive" investments, and restrictions on the use of the cash method of accounting.

The new tax law underscores the introduction of a "free market" philosophy: Instead of encouraging socially bene-

ficial activities by tax incentives and write-offs, the Act tends to guide people and corporations by the marketplace. "No longer will people invest for tax purposes. They will invest in things that have real value in the marketplace," according to Sen. Bill Bradley (D.-N.J.).

One of the more mystifying aspects of tax reform is how returns are selected for audit by the IRS. Today, each regional office of the IRS conducts a computerized screening of all returns on the basis of programmed selection criteria, called Discriminant Function System (DIF). This method measures the probability of tax error in each return. Substantial claims for deductions, often the case in the cattle industry, will often result in selection for an audit. However, the number of returns selected for audit always exceeds the audit capability of the IRS, and each district appoints expe-

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