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Can livestock alone be the main source of income from rangelands in poor countries?

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Key words: landholder population, multiple use, livestock grazing, economy

Abstract: In many countries due to the high population of land holders, there is insufficient range area for each land holder to cover all life expenses. In such places, the income of only livestock in rangelands is not enough to cover living expenses of landholders. The ideas in this paper suggest that researchers should create and explore economic models that incorporate the multiple use concept in rangelands and show how multiple uses are compatible with livestock grazing and to sustain the livelihood of rangeland families.

Introduction.

In many areas, landholders have a sufficient area of rangeland to utilize for livestock production to provide enough income for the landholder family. But many countries have insufficient range area to support economic viability of the high number of landholders engaged in pastoralism. This issue was highlighted at Townville in Australia at an IRC meeting Grice and Hodgkinson 1999. It is necessary to consider a multiple use of rangelands concept in such areas to promote the economic and environmental wellbeing of the people who depend on rangelands for a living. The object of this paper is to discuss this concept with reference to Iran.

Materials and methods:

The research was carried out in Larack Rangeland north of Alborz province of Iran. The area is located between 36° 7' 59" to 36° 9' 49" latitude and 51° 12' 1" to 51° 13' 20" longitude with the area of 600 hectares. It is mountainous with moderately depth soil.

On this rangeland, there are no limitations with drinking water for livestock in terms in terms of water quality, the distance between watering points or water quantity. Average annual rainfall is 750 mm. The landholders are nomadic people who belong to the Sangsari group. Maps of topography, geology, soil, water resources, climate and vegetation are available.

Forage production was measured using a double-sampling procedure (Arzani and King 1994) using 10 1.0 m² quadrats along 4,100 m random transects in each main vegetation type. Range condition was assessed in terms of four factors, namely vegetation cover, level of soil erosion, plant composition and vigor, classes suggested by Parker (1969). Production sent to market was calculated, based on grazing capacity consultation with landholders. In terms of grazing management, three factors important factors (forage production, watering resources and sensivity of soil to erosion) were considered

Results:

The total area of the rangelands that was recognized as suitable for livestock grazing was estimated considering forage, water and sensivity of soil to erosion.

Table 1. Grazing capacity of vegetation types for 100 days grazing

AU for 100 days	A.U.M	Available forage [○]	Area hectare	Vegetation type
234	781	190	246.5	<i>Ag.in-Fe.pe-Di.ca</i>
21	70	120	35	<i>Ag.in- As.go</i>
75	248	185	85	<i>Hy.pe-Ac.mi-</i>

				<i>Pe.grass</i>
188	627	200	188	<i>Di.ca - Fe.ov</i>
518	1726	-	554.5	Sum

Table 2. Forage production (kg), available forage (kg), Range condition in vegetation types of larak rangeland

Condition Trend	Range condition	Available F. to All forage	Available forage (kg/ha)	Forage Production (kg/ha)	Vegetation type	No.
Positive	Good	42.22	190	450	<i>Ag.in-Fe.pe-Di.ca</i>	1
Negative	Poor	41.37	120	290	<i>Ag.in- As.go</i>	2
Constant	Fair	46.83	185	395	<i>Hy.pe-Ac.mi-Pe.grass</i>	3
Positive	Good	46.51	200	430	<i>Di.ca - Fe.ov</i>	4

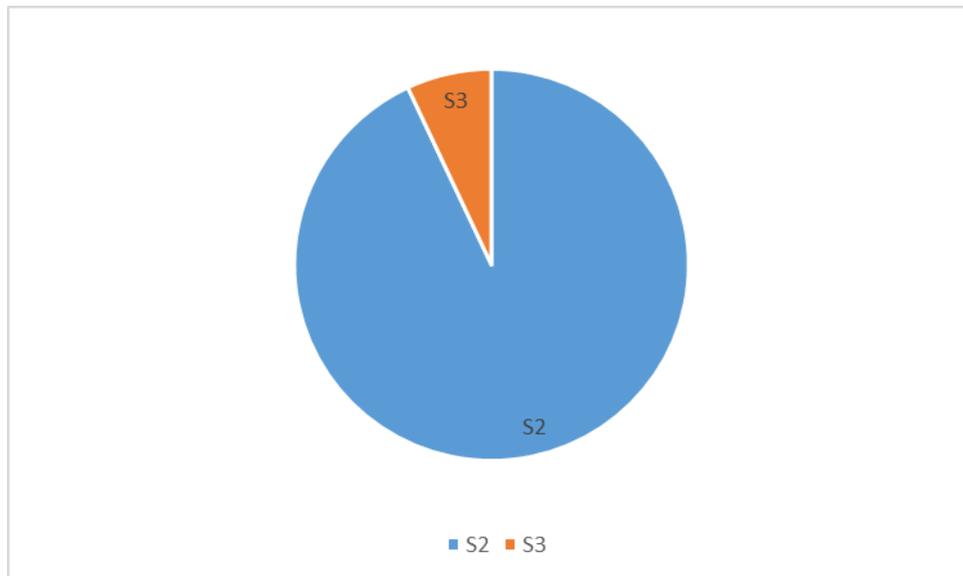


Figure 1. Classification of rangeland suitability for livestock grazing based on FAO 1991 classification

Based on grazing capacity of the rangeland type and interviews with landholders the income and expenses from livestock grazing in the Larak rangeland area are given in Table 4. The income comes from selling livestock and milk products and the costs of keeping animals include medicine, hand feeding, and labour, an average income of 230000000 rials is produced.

Table 4. Income of livestock grazing the Larak rangeland

518	Number of Livestock
Rial 1800000000	Cost of medicine, hand feeding, rancher
Rial 4000000000	Income of meat and milk

Rial 2300000000	Pure income
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Discussion.

According to the results and based on FAO procedures and methods, most parts of Larak rangelands are suitable for livestock grazing. However, that Larak rangeland is not a big area and there are many families that depend on it for a living. So only one kind of land use (grazing) produces insufficient income for the living expenses of each landholder. A possible complementary source of income is bee keeping based on the suitability of the vegetation and the interest of the landholder. As Grice and Hodgkinson (1999) stated, rangeland can also be utilized for multiple use. It can promote landholder income which is important for providing more landlords with a living and the means to conserve the rangeland. This idea also agrees with the report of Holechek et al. (2001). So multiple range utilization is necessary especially where the rangeland units mostly are small. This policy can be a solution for an economic wellbeing of small properties. Arzani et al. (2019) believed that researchers by now would be providing examples of range management with multiple enterprises. with simultaneously different utilization. They should advise their country's Natural Resource agency to publish a manual for landholders at the time of planing range management to consider more than one utilization type. They also believe researchers need to find criteria to benchmark the utilization of each type of rangeland.

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