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Ecological and Socioeconomic importance of Seabuckthorn in Ladakh of Jammu and Kashmir

[*1]Ruyida Mushtaq & [2]Dr. Harmeet Singh

[1]*Research scholar, Department of Geography and Regional Development at university of Kashmir, J&K(India)*
[2]*Assistant professor, Department of Geography and Regional Development at university of Kashmir, J&K(India)*

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[*]**Corresponding Author**
Email:ruyidakhan611[at]gmail.com

ABSTRACT

Seabuckthorn is found in Ladakh region of Jammu And Kashmir State. It is a trans-himalayan shrub. Pollination is carried by wind. The fruit is yellow or orange berries. The berries have nitrogen fixing ability. Therefore, they increase soil fertility. Berries along with leaves, branches, root and thorns are traditionally used as medicine, food, fodder, fuel, and fence and improving afforestation. Hence it ensures sustainable development of the region. Thus we see that seabuckthorn plant is very important as far as ecology and economics is concerned. Hence seabuckthorn is popularly known as wonderful plant or Gold Mine of Ladakh. In this paper, we study the trend of berry harvest from 2004 and projected income generation upto 2040 in Leh Ladakh.

1. Introduction

Seabuckthorn is commonly known as “cold desert gold” because of its multifarious uses. The uses are such as increasing of soil fertility, prevention of soil erosion, due to its extensive subterranean rooting system with strong soil holding capacity which is useful for stabilization of soil, controlling riverbanks and retains water (TISC, 2001). It serves as a measure to conserve biodiversity, soil conservation, medicines, nutritious food, fodder and fuel wood. It is a deciduous willow like plant having thorns found in the cold regions of himalayas. Seabuckthorn berry has a nitrogen fixing ability and is a rich source of vitamins. It has 190 bioactivity substances. They possess unique medicinal properties (Maertz, 2006). That is why it is called as wonder plant (Lu, 1992) .The area under seabuckthorn in Leh is 11500 hectares. This indicates a great potential for its growth in Ladakh region. “Seabuckthorn Plantations grow in varied climatic conditions in the temperature ranges of -43℃ to 40℃ (Lu, 1992; Sankhyan, 2005) and mean annual rainfall varying between 250 and 800mm (Lu, 1992)”. The physical properties of the habitat play a vital role in seabuckthorn growth. It prefers sandy soils, but also grows in clayey, loamy or rocky soils (Orwa etal, 2009) with an optimum pH of 6 - 9.5 (Lu, 1992; Orwa et al., 2009). It can also grow in acidic soil (Orwa, 2009). Thus we see that it offers opportunity for farmers living in mountains to maintain a sustainable livelihood providing nutritious foods, different types of medicines and reduces soil erosion (Lu, 1992; Ansari, 2003). The use of seabuckthorn shows that how low investment cost and judicious planning can yield long term benefits.

2. Study area

Ladakh has a geographical area of 45,112 sq.km and is the largest district of India. Topographically, Ladakh is most complex comprising lofty mountain ranges, high elevation, highly rugged, very cold and dry weather. The river valleys are deep and narrow. The region lies in the leeward side of the Himalayas which receives meagre precipitation. Soil fertility and water holding capacity in cold desert of Ladakh is low. Seabuckthorn vegetation can withstand severe and harsh conditions. Area under wild seabuckthorn is 9267 ha. Area under natural seabuckthorn exceeds 70% of the total area (13000 ha) in the country. Approximately 500 tons of berries are harvested annually. Over 90%of harvested raw material is sold outside the market. Currently the demand exceeds the supply. The population of Leh district directly benefitted from berry collection in 2017 is 3.3%, Rs 2.6 crores income was generated in the same year as per individual collection was 437.2 kg.

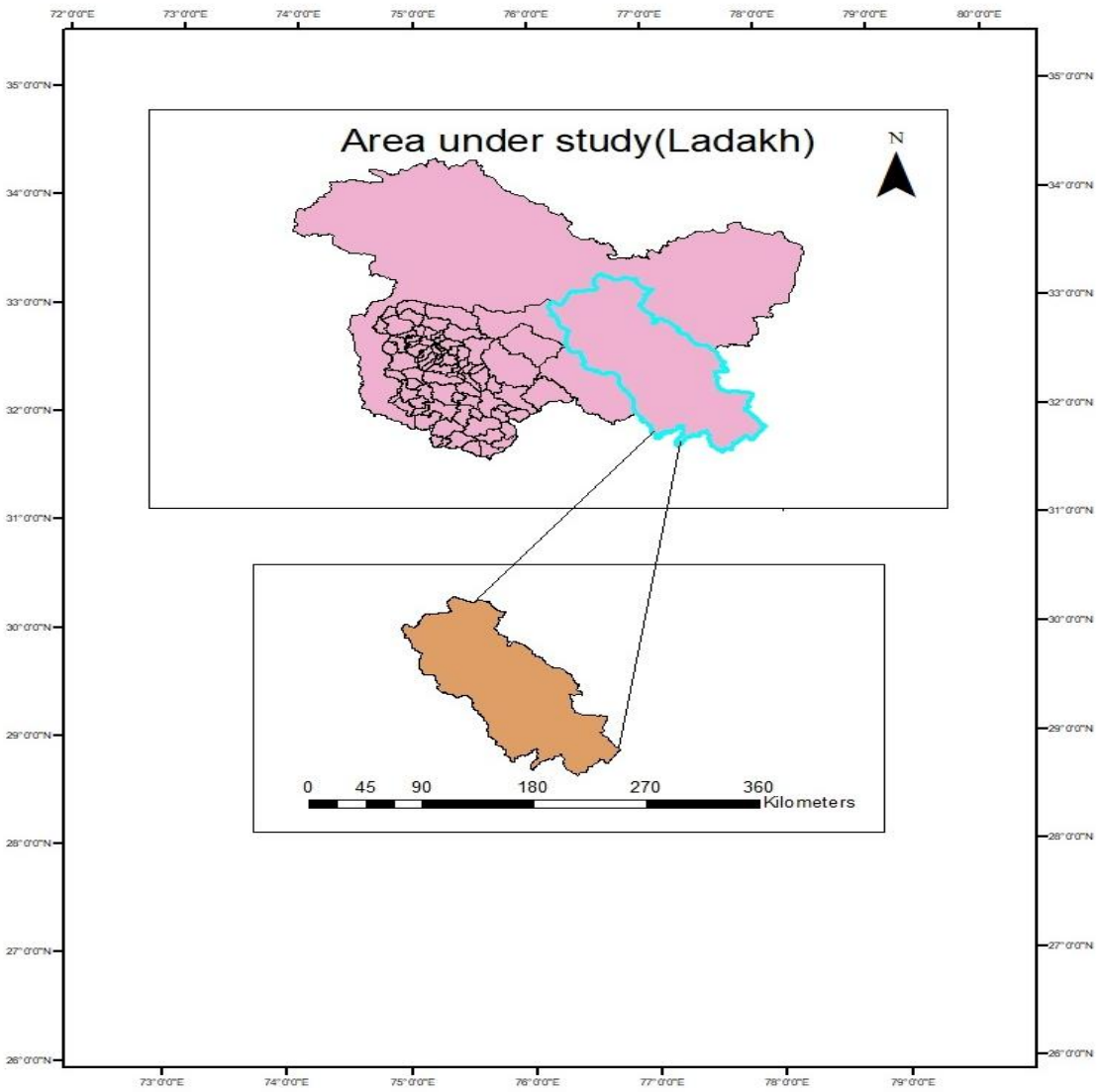


Fig 1.0: Location map of study area

3. Research methods

The data for the study was retrieved from reliable secondary sources. The present study is mainly based on secondary data from published reports, journals, periodicals, newspapers, books, magazines and other published literature. This study aims to explain ecological and socioeconomic characteristics of seabuckthorn. In order to make comprehensive and more analytical, suitable statistical tools have been adopted in this research paper.

4. Ecological characteristics of seabuckthorn

- Seabuckthorn maintains ecological balance of Himalayas. It conserves and prevents soil erosion due to its extensive subterranean root system with nitrogen fixing abilities.
- Seabuckthorn prevents land degradation and conserve water resources and balances economic use with ecological maintenance.
- Seabuckthorn provides habitat for wildlife and is a protective home for fauna and flora.

5. Socio-Economic characteristics of seabuckthorn

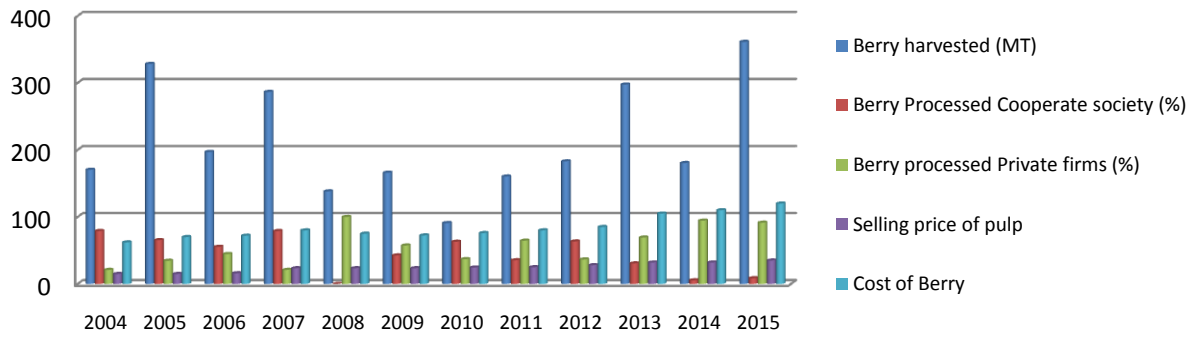
- Seabuckthorn stem and branches provide firewood for the people during winter months to keep their homes warm.
- A large number of food products can be obtained from seabuckthorn berries which have nutritional values such as juices, jams and jellies, yogurt and tea powders.
- Seabuckthorn berries contain vitamin rich compounds such as proteins, unsaturated fatty acids, antioxidants, organic acids, carotenoids, flavonoids and phenols.
- The berries play an important role in preventing effects against, cardiovascular diseases, mucosa injuries, skin problems, cancer and immune system support and managing diabetes.

Ladakh food limited in 2001 processed and pulped berries to produce a product named as Leh Berry and hence the plant was known in the market by Leh Berry. This has created an awareness for cultivation of seabuckthorn and generated

employment opportunities and provides additional income to the poor farmers of the region. State administrations in collaboration with agro-industries and scientific communities are conducting various training and demonstration programs to make local population aware of opportunities of economic upliftment by seabuckthorn due to its multifarious uses. Due to its rapid growing ability, forests of seabuckthorn are being grown to meet the fuel wood requirements in China (Gao and Xu, 1991).

Fig 1.2: Seabuckthorn berries

Figure 1.3 : Year-wise collection and processing of fresh Seabuckthorn berry in Trans-Himalayan Leh, Ladakh (2004-2015)



Source: Reports from value chain analysis of seabuckthorn in Ladakh (2017)

Interpretations:

The fig 1.3 shows the trend of berry harvest from 2004 to 2015. The figure indicates that there is not any significant increase in the seabuckthorn resource in the region. Further, the percentage increase of berry processed is more in the private firms than cooperate society. We must try to harvest more and more seabuckthorn resource to exploit it economically.

Table 1.1: Increase in berry harvest and projected income generation from 2016-2040 in Leh Ladakh.

Year	Berry harvest(MT)	Cost of berry(Rs/kg)	Selling price of pulp(Rs/kg)	Gross income (Rs in crore)	Total cost incurred (Rs in crore)	Net income (Rs in crore)
2004	170.4	15.0	62.0	0.6	0.1	0.5
2005	328.4	15.0	70.0	1.4	0.3	1.1
2006	196.9	16.0	72.0	0.9	0.2	0.7
2007	286.6	23.5	80.0	1.4	0.3	1.1
2008	138.2	23.5	75.0	0.6	0.1	0.5
2009	166.0	23.5	72.5	0.7	0.1	0.6
2010	90.9	24.5	76.0	0.4	0.1	0.3
2011	160.4	25.0	80.0	0.8	0.2	0.6
2012	183.0	28.0	85.0	0.9	0.2	0.7

2013	297.6	32.0	105.0	1.9	0.4	1.5
2014	180.5	32.0	110.0	1.2	0.2	1.0
2015	361.3	35.0	110.0	2.4	0.5	1.9
2016	397.43	38.5	116.952	2.64	0.6	2.62
2017	437.17	42.35	124.34	2.81	0.66	3.61
2018	480.89	46.58	136.78	3.09	0.73	4.97
2019	528.98	51.24	150.45	3.40	0.80	6.86
2020	581.88	56.37	165.50	3.74	0.88	9.45
2021	640.06	62.00	182.05	4.11	0.97	13.03
2022	704.07	68.20	200.26	4.52	1.06	17.95
2023	774.48	75.03	220.28	4.97	1.17	24.74
2024	851.93	82.53	242.31	5.47	1.29	34.11
2025	937.12	90.78	266.54	6.02	1.41	47.01
2026	1030.83	99.86	293.19	6.618	1.56	64.79
2027	1133.91	109.84	322.51	7.28	1.71	89.30
2028	1247.31	120.83	354.77	8.01	1.88	123.09
2029	1372.03	132.91	390.24	8.81	2.071	169.65
2030	1509.24	146.20	429.27	9.69	2.28	233.83
2031	1660.16	160.82	472.19	10.66	2.51	322.29
2032	1826.18	176.91	519.41	11.72	2.76	444.21
2033	2008.80	194.60	571.35	12.90	3.03	612.27
2034	2209.68	214.06	628.49	14.19	3.34	843.89
2035	2430.65	235.46	691.34	15.61	3.67	1163.13
2036	2673.71	259.01	760.47	17.17	4.04	1603.14
2037	2941.08	284.91	836.52	18.88	4.44	2209.61
2038	3235.19	313.40	920.17	20.77	4.88	3045.51
2039	3558.71	344.74	1012.19	22.85	5.37	4197.63
2040	3914.58	379.21	1113.41	25.13	5.91	5785.59

Interpretations:

The Table 1.1 shows that income generation is increasing from existing seabuckthorn resource in Ladakh region. The Forecasted values are obtained from 2016- 2040 on the basis of the available data. It shows that Berry harvest would reach 3914.58 MT in 2040 and net income generated would be 5785.5 crores, if there is no major climatic change, natural or manmade disaster.

6. Conclusion

Seabuckthorn not only greens the cold regions but also can be used to produce beverages, nutraceutical pharmaceutical and cosmoceutical products for human wellbeing. Seabuckthorn has immense potential in improving cold arid fragile ecology and socioeconomic development of the Ladakh region. Further research in this regard would lead to the production of more products from this value cold desert gold.

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