

## Achieving Sustainable Livelihood in Cold Arid Regions of India through Multienterprise Options

R.K. Bhatt, M.S. Raghuvanshi and Rajwant K. Kalia\*

ICAR-Central Arid Zone Research Institute, Jodhpur 342003, India

**Abstract:** The cold arid zone of India being located in the rain shadow of Himalayas is one of the driest regions in the world. The area remains inaccessible to the outside world for nearly six months in a year due to heavy snowfall. This fragile ecosystem with limited availability of natural resources is a growing attraction for tourists. Multi-enterprise option needs to be strengthened for the upliftment of the socio-economic status of the region. Integrated farming systems combining fruit and fodder trees with medicinal plants into the cropping system can address the problems of conservation of medicinal plants as well as can ensure assured income to the farmers. Organic farming, protected cultivation, off season vegetable production, value addition and development of better storability methods for vegetables and fruits will be remunerative to the farmers of this region. Animal husbandry is another important component of subsistence agriculture. The Ladakhis raise cattle, sheep, goats and Dzo (cross between yak and cow), as primary source of milk, wool, other byproducts and for agricultural operation. Mostly sheep and goats are reared for wool, milk and meat purpose. Pashmina and Changthangi goats are reared for fine grade Pashmina wool. Cold water fish production has emerged as an additional source of income generation in the region. Tourism is also emerging as an important source of economy providing jobs to thousands of people. Strengthening of all such enterprises can ensure livelihood security to the local population of cold arid region in addition to conservation of this unique ecosystem and cultural heritage.

**Keywords:** Cold arid, Ladakh, livelihood, multienterprise.

Indian cold arid region in the trans-Himalayan zone, constitute about 7.1 Mha and is confined to Ladakh (J&K), Lahaul and Spiti (HP) and small pockets in Uttrakhand (Niti and Mana) states. Ladakh (*Land of high passes*), comprises Kargil and Leh districts covering geographical area of 96,701 km<sup>2</sup> accounting 87.4 % of the cold-arid region of India (Sharma, 2000). Leh district is geographically located between 32°N to 36°N latitude and 75°E to 80°E longitude at an altitude ranging from 2900 to 5900 m above mean sea level (Ali *et al.*, 2012). The cold arid part of Ladakh is characterized by huge seasonal fluctuations in temperature ranging from +30°C to -30°C with maximum sun shine days. It is one of the driest regions in the world with low rainfall, however, maximum precipitation is received in the form of snow which becomes the major source of water for livelihood support in the region. Intensive sunlight, high evaporation rate, strong winds and fluctuating temperature, characterize the general climatic conditions. The area is inaccessible to the outside world for nearly six months in a year (Angchuk

and Singh, 2006). It is a fragile ecosystem with a complex variability in climatic and geomorphological processes with limited availability of natural resources impacting livelihoods of indigenous communities. The soil and the climatic conditions allow a very short growing period which extends from May to September in general. The soil having sand and gravel is not very productive, having low water holding capacity and poor nutrient status. Water resources are minimal with glacier-fed streams being the only source of irrigation. The unique pasture lands of Changthang, Zanskar, Suru, Drass and Nubra valleys of the region are used for grazing of sheep, pashmina goats and yak. The region is usually sparsely inhabited. Main sources of income include rearing of goats, sheep, yak and traditional agriculture. Tourism in the form of camping, tracking, rafting and culture is presently the main focus of the people of this region. Multi-enterprise option needs to be strengthened for the holistic development and improvement of the socio-economic status of the local population in this region and to minimize the movement of people to lesser harsh environments for better economic

\*E-mail: rajwant.kalia@icar.gov.in