

Nutrient Loss from the Major Ecosystems of Cold Desert of Himachal Pradesh, India

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ABSTRACT: The present investigation was conducted in village Goshal, located in Lahaul and Spiti cold desert district of Himachal Pradesh, India during 2010 to 2013 to assess nutrient status and nutrient flow in two major ecosystems viz; Agro Ecosystem, and Alpine Pasture Ecosystem. In Alpine Pasture Ecosystem of the 70 percent aboveground biomass which is grazed by the animals 50 percent decomposed after penning and returned back to the system, and rest 50% goes to the yard and in the form of FYM goes to the agricultural fields thus removed out of the system. In Agro Ecosystem, Since 90 percent of aboveground biomass is harvested for fodder and winter stall feeding and in the form of FYM it returns back to agricultural fields and 100 percent of belowground and 10 percent of aboveground nutrient remains as such in the field, which get decomposed and the nutrients are returned back to the system.

KEYWORDS: Agro Ecosystem, Alpine Pasture Ecosystem, Cold Desert, Nutrient Flow, Nutrient loss, Himachal Pradesh, Himalaya.

INTRODUCTION

Ecosystem can be defined as a community of living organisms (plants, animals and microbes) in conjunction with the non living components of their environment (air, water, soil minerals, etc.), interacting as a system. These biotic and abiotic components are regarded as linked together through nutrient cycling and energy flow. Some ecosystems are highly fragile and are disturbed by human interferences. Mountain ecosystems are highly fragile as simple degradation of forest cover leads to severe soil erosion and even changes in river courses (Anon, 2003). Cold deserts are the lands at the polar fringes of the Northern Hemisphere continents and the ice covered water of Greenland and Antarctica (Khosla *et al.*, 1993). The cold desert of India is located mainly in two states, viz., Himachal Pradesh and Jammu and Kashmir. The Himalayan region in Himachal Pradesh is very well known for its representative, natural, unique and socioeconomically important plant diversity (Samant *et al.*, 1998). It is designated as one of the Biodiversity Hot Spots. It supports 18 440 species of plants with 25 to 30 per cent of endemics (Samant *et al.*, 1998; Singh and Hajra, 1996). The inhabitants use this rich diversity for their sustenance in these areas. The increase in human population has increased the demand of economically important biodiversity elements. This has caused the over exploitation and habitat degradation of

many economically important biodiversity elements and led the rapid loss of these elements (Bawa, 2000). Lahaul and Spiti a tribal district of Himachal Pradesh falls under the cold desert region. The region is characterized by low precipitation, a short growing season, low primary productivity and high stocking density (Mishra, 2000). Temperatures generally do not exceed 30°C with July and August as the hottest months. January and February are the coldest months, with a mean temperature of -20.00°C (Sinha and Samant, 2006). The growing season in cold deserts is restricted to less than six months in a year. The key to settlement is through the intelligent use of glacial melts. Snow and glaciers are the only sources of water. At first glance, one would think that human survival is impossible in this harsh climate. Yet, the local people have learnt to make judicious and optimal use of their limited resources and have built a glorious civilization in the process. The economy of the district is predominantly agriculture based. More than 80 per cent of the population is engaged in agriculture and its allied activities. During the past few decades with the upcoming of the developmental activities such as education and communication facilities, the area experienced drastic change in the landuse pattern from subsistence to cash crop economy. Regenerative and traditional environment friendly practices were and are still being replaced by modern technology in the Himalayan belt. Our study helps in understanding the importance, utilization and exploitation of the Alpine Pastures and other grazing areas, appropriate use of agriculture residues, limited fuel wood and intricate utilization of nutrients through proper cycling in different Ecosystems of Cold Deserts of India. Thus we carried out our study to support the hypothesis that the developmental activities, land use changes, and overgrazing system has degraded/ affected the natural resources of the area and nutrient balance in major

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