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## Production Comparison of Protected Areas with Their Surrounding Rangelands in Mountainous Regions of Pakistan

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## Production comparison of protected areas with their surrounding rangelands in mountainous regions of Pakistan

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**Key words :** Khujerab National Park , range assessment , rangelands , forage production , cover and composition

**Introduction** As a whole , deterioration trend with low forage production , unpalatable plant species and extensive patches without vegetation can clearly be noticed in rangelands (51.3 m . ha ; ICIMOD , 1998) and Protected Areas (PAs) of Pakistan (9.2 m . ha PAs out of 88.2 m . ha ; Anwar and Shank , 2002) . With addition of accelerated erosion , the same situation is more alarming in mountainous regions (Azad Jammu and Kashmir , North West Frontier Province & Northern Areas) and south & south-west (Baluchistan & Sind provinces) . Even , the protected areas are more deteriorated as compared to their surrounding rangelands located in their respective range ecological zones (REZs) . Basically , this theme has been presented by incorporating the information given in relevant research reviews with the results of rangeland assessment study conducted in Khunjab National Park located on famous silk route near Pakistan-China border .

**Materials and methods** The Study was conducted in 2006 at sample locations (including Tungrij and Karichnai) using "Canopy Coverage Method" with meter-quadrates at 20 points along each 100 meters transect line (sampling 1-5%) . Meter-quadrat was selected because trees and shrubs were rare as compared to the ground vegetation . Within the quadrates ; data on total aerial cover , plant species & cover , surface features (litter , cryptogam , pavement , plant base & bare soil) and reproduction were recorded ; followed by clipping of above ground palatable parts (3 cm above the soil surface in case of grasses and forbs) of available vegetation for the estimation of dry forage production . Average values of cumulative cover , composition and other parameters were finally computed . To cover the representative PAs in mountain regions and their range ecological zones , a review study on three PAs (Hingole National Park-HNP in Baluchistan & Sind , Chitral Gol National Park-CGNP in North West Frontier Province , and Machiara National Park -MNP in Azad Jammu and Kashmir) and relevant reviews have also been benefitted for the incorporation of research based proven facts and figures .

**Results and discussion** Study's results rated the range condition of KNP as "Poor" with 17 points (Poor Condition lies between 10-17 points) . Average percentages and rating points were as (i) Aerial cover 63% secured 3 points , (ii) cumulative cover 89% secured 3 points , (iii) composition of class I & composition of class III 41% & 53% secured 3 points , (iv) soil protection 59% secured 3 points , (v) forage production 179 kg per hectare secured 3 points , and (vi) reproduction of class III secured 2 bonus points . Being the reflection of all other assessment factors , the forage production provided an indication of range and PAs health and served the purpose of comparison between PAs and their REZs . Forage production of KNP (179 kg/ha) and of CGNP (290 kg/ha ; Joyia , 2005) were far below than their Trans-Himalayan REZ (600 kg/ha ; Muhammad , 1989) . Similarly forage productions of MNP and HNP (298 and 181 kg/ha respectively ; Joyia , 2005) were below than forage production of their Himalayan and Suleiman Mountain REZs respectively (600 and 181 kg/ha respectively ; Muhammad , 1989) .

**Conclusions** (i) Although rangelands adjacent to the PAs are comparatively in better condition but facing retrogression . And PAs are still more deteriorated . (ii) Normally PAs are considered healthier than their surrounding rangelands but reverse picture , as painted by this study , has obviated the flaws in implementation of well conceived management plans . (iii) "Trophy Hunting" like interventions , being a mechanism for people's participation in conservation , looks apparently the reason of comparatively better condition of surrounding rangelands . Therefore it is concluded that people's participation be ensured in effective implementation of PAs management plans in addition to other improvement practices based on sustained research efforts .

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