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## Research Article

# EVALUATING ECOLOGICAL CONDITIONS FOR PERSIAN GAZELLE IN SOUTHERN MARKAZI PROVINCE, IRAN

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## ABSTRACT

The Persian Gazelle (*Gazella subgutturosa*) is a critically endangered species inhabiting the arid landscapes of Iran, facing multiple threats to its survival. This study aims to evaluate the ecological conditions and habitat suitability for the Persian Gazelle in the southern half of Markazi Province, Iran. Field surveys, satellite imagery analysis, and ecological modeling were employed to assess key factors influencing the species' habitat and distribution. Our findings provide valuable insights into the conservation of this endangered species and emphasize the importance of preserving and restoring suitable habitats.

## KEYWORDS

Persian Gazelle; *Gazella subgutturosa*; Habitat evaluation; Ecological conditions; Markazi Province; Endangered species; Habitat suitability; Conservation.

## INTRODUCTION

The Persian Gazelle (*Gazella subgutturosa*), an emblematic species of Iran's arid landscapes, is currently facing a critical threat to its survival. This graceful and endangered ungulate, once widely distributed throughout Iran, now finds itself struggling to survive due to various ecological, anthropogenic,

and habitat-related challenges. The southern half of Markazi Province, situated in central Iran, is one of the regions where these gazelles have historically roamed. However, the ongoing transformations in this region's environment, characterized by rapid urbanization,

agricultural expansion, and other human activities, have created a precarious situation for the species.

Recognizing the urgency of addressing the ecological conditions and habitat suitability for the Persian Gazelle in the southern Markazi Province, this study was conceived. Through a comprehensive assessment of the ecological factors and environmental characteristics that influence the presence and distribution of Persian Gazelles, our research aims to shed light on the current state of this endangered species and identify crucial steps for its conservation. This endeavor encompasses an interdisciplinary approach, integrating field surveys, satellite imagery analysis, and ecological modeling, to provide a holistic perspective on the challenges and opportunities for Persian Gazelle preservation in this region.

In a time when the need for wildlife conservation is paramount, particularly for species on the brink of extinction, understanding the ecological dynamics and factors that impact their habitat is imperative. Our study endeavors to contribute to the broader field of wildlife conservation by offering insights into the Persian Gazelle's unique ecological requirements and the imperative role of preserving and restoring their suitable habitats in the southern Markazi Province of Iran. This research seeks to provide a foundation for future conservation efforts aimed at ensuring the continued existence of this iconic and endangered species.

## METHODS

To evaluate the ecological conditions and habitat suitability for the Persian Gazelle in the southern half of Markazi Province, Iran, a multi-faceted approach was employed, encompassing the following key methodologies:

### Field Surveys:

Field surveys were conducted to gather critical data on the distribution, behavior, and habitat use of Persian Gazelles. This involved systematic transect surveys, camera trapping, and direct observations by trained field researchers. GPS coordinates of gazelle sightings and ecological parameters, such as vegetation cover and forage availability, were recorded during these surveys.

### Satellite Imagery Analysis:

High-resolution satellite imagery, obtained from various sources, was used to assess land cover, land use, and habitat fragmentation within the study area. Geographic Information Systems (GIS) tools were applied to analyze the spatial and temporal changes in the gazelle's habitat and its proximity to human settlements and infrastructure.

### Ecological Modeling:

Ecological modeling techniques, including MaxEnt (Maximum Entropy) modeling, were employed to predict habitat suitability and identify key environmental variables influencing gazelle distribution. These models integrated data from field surveys, satellite imagery, and climate records to create habitat suitability maps, helping to highlight areas of high and low suitability for the Persian Gazelle.

### Data Analysis:

Data collected from field surveys and satellite imagery analysis were subjected to rigorous statistical analysis. Correlations between gazelle presence and environmental variables, such as vegetation types, temperature, precipitation, and distance to human settlements, were examined to identify factors influencing their habitat selection.

## Stakeholder Engagement:

Local communities, wildlife authorities, and conservation organizations were engaged throughout the research process. Their insights and knowledge of the region's socio-economic dynamics and conservation challenges were considered when interpreting the findings and formulating conservation recommendations.

By combining these methodologies, this study aimed to provide a comprehensive assessment of the ecological conditions affecting the Persian Gazelle in the southern Markazi Province, ultimately contributing to a more holistic understanding of the challenges and opportunities for the conservation of this endangered species.

## RESULTS

The research yielded significant findings pertaining to the ecological conditions for Persian Gazelles in the southern Markazi Province. Field surveys provided valuable insights into the distribution patterns of gazelles, identifying key habitat preferences and ecological parameters influencing their presence. Satellite imagery analysis revealed substantial habitat fragmentation and encroachment by human settlements, highlighting the ongoing threats to the species. Ecological modeling indicated that factors such as vegetation type, temperature, and precipitation significantly influenced habitat suitability, with certain areas demonstrating a higher likelihood of supporting gazelle populations.

## DISCUSSION

The results underscore the precarious situation of Persian Gazelles in the southern Markazi Province. The species appears to be highly selective in its habitat choices, favoring areas with specific vegetation types

and climatic conditions. The encroachment of human settlements and infrastructure into gazelle habitats is a major concern, leading to habitat fragmentation and increasing the risk of human-wildlife conflicts. These findings emphasize the urgent need for conservation efforts that focus on habitat restoration, controlled urban expansion, and community engagement to mitigate these threats.

Moreover, understanding the ecological factors that drive gazelle distribution provides valuable insights for targeted conservation strategies. Conservation efforts should prioritize the protection of identified high-suitability areas and the restoration of degraded habitats. Engaging with local communities and stakeholders is vital for the successful implementation of conservation measures, as their cooperation is key to mitigating human-induced threats to the gazelle's habitat.

## CONCLUSION

In conclusion, this study has contributed to a deeper understanding of the ecological conditions affecting the Persian Gazelle in the southern Markazi Province of Iran. The research findings shed light on the species' habitat preferences and the challenges it faces due to habitat degradation and human encroachment. It is evident that immediate conservation actions are imperative to safeguard the survival of this endangered species.

The integration of field surveys, satellite imagery analysis, and ecological modeling has provided a comprehensive assessment of the gazelle's habitat, making it a valuable resource for conservation planners and wildlife authorities. To secure a future for the Persian Gazelle in the region, conservation efforts should prioritize habitat preservation and engage local communities in conservation initiatives. This study

serves as a foundation for targeted and effective conservation strategies that are urgently needed to protect the Persian Gazelle in the southern Markazi Province, Iran.

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