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Opinion



The Comprehensive Regeneration Approach as a Framework for Sustainable Development and Biodiversity

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Abstract

Several national and international frameworks have been developed to halt and reverse biodiversity loss by 2030 and help address the ongoing climate and biodiversity crises. These frameworks provide the targets against which locally applicable action plans can be created. The Royal Commission for AlUla and the IUCN have developed Comprehensive Regeneration as the framework of nature-positive initiatives and as a model for the responsible development of AlUla County in the Kingdom of Saudi Arabia.

Introduction

The decline of biodiversity is accelerating at an unprecedented pace [1]. If the current trajectory continues, the world risks losing around 1 million animal and plant species by the middle of the century [2]. New approaches to putting nature-positive frameworks into practice are urgently required, especially those that bring together governments, the private sector, and civil society for integrated action to halt and reverse the loss of nature. Concerted efforts are needed to translate the calls for holistic approaches to safeguard, conserve, and restore biodiversity in global frameworks, such as the Sustainable Development Goals (SDGs) [3] and Kunming-Montreal Global Biodiversity Framework [4,5], into action at the local level, under the Saudi Green Initiative [6].

The Royal Commission for AlUla (RCU), with its partner IUCN (International Union for Conservation of Nature), has developed the Comprehensive Regeneration approach as a framework for the sustainable development of AlUla County. Comprehensive Regeneration prioritizes conserving and revitalizing biodiversity in harmony with cultural heritage, economic development, and the local community [7].

The principles of Comprehensive Regeneration can be summarised as follows:

1. Environment and Heritage Safeguarding
2. Sustainable settlement patterns

3. Development, growth, and activation

4. Resilient infrastructure.

Background

Comprehensive Regeneration demonstrates an integrated approach to localizing and realizing multiple SDGs, viz., 7, 8, 11, 13 & 15 [8]. Moreover, our efforts under principles one and two of Comprehensive Regeneration (environment and heritage safeguarding; sustainable settlement patterns) align with achieving the long-term goals set out in the Kunming-Montreal Global Biodiversity Framework.

RCU was founded in 2017 with the mandate to reinvigorate the extraordinary natural and cultural significance of AlUla County as part of Saudi Arabia's Vision 2030 [9]. AlUla County is located in northwest Saudi Arabia, encompassing AlUla and the oasis towns of Khaybar and Tayma. Over 50% of the 22,000 square kilometer County is designated as a nature reserve and undergoing restoration efforts, surpassing the 30% target set out in the Global Biodiversity Framework.

Components of Comprehensive Regeneration

Regreening and rewilding AlUla: As part of the commitment to safeguard the environment and heritage under principle one of Comprehensive Regeneration, RCU is undertaking a vast regreening and rewilding program. Over the next 12 years, more than thirty million native trees and plants representing 56 indigenous species will

be planted, transforming the landscape. This year, almost 1,000 animals from four species — Arabian gazelle (*Gazella arabica*), sand gazelle (*Gazella marica*), Arabian oryx (*Oryx leucoryx*), and Nubian ibex (*Capra nubiana*) — were released, helping rebuild populations that dwindled due to environmental factors and people's encroachment.

These efforts to revitalize the biodiversity of AlUla are not siloed from AlUla's increasing urbanization and emergence as a global cultural destination. Rather, Comprehensive Regeneration ensures an approach that integrates all principles simultaneously, restoring natural habitats with thriving ecosystems, celebrating and conserving our heritage, and carefully delivering new infrastructure and sustainable economic opportunities for the local community.

In practical terms, this means greening efforts go beyond the nature reserves. Local 'nature-scaping' efforts in urban spaces, parks, and even hotel gardens and offices have been supported by identifying suitable native plant species and providing seedlings.

Safeguarding plant genetics: One of the main challenges of arid ecosystem restoration is to secure plants of suitable genetic stock that are needed for restoring the ecosystem to its pristine condition [10]. To overcome the lack of native seeds and material from native plants for revegetation, restoration, and greening programs, RCU established the AlUla native plant nursery and seed bank in 2020. Since then, the AlUla nursery and seed bank has collected native seeds and cuttings of 119 plant species and produced more than 675,000 native plant seedlings from 80 plant species.

As per Goal C of the Global Biodiversity Framework, we are undertaking work on plant genetic resources in close coordination with the local community, utilizing and enhancing local knowledge and capturing this information in a recently produced book [11]. The nursery and seed bank provide horticultural training and employment opportunities for the local community, demonstrating how ecological restoration efforts can both safeguard the environment and promote socioeconomic benefits, thereby fulfilling principles one and three of the Comprehensive Regeneration approach.

Community-centric conservation: In alignment with the Global Biodiversity Framework's long-term goal to sustainably use and manage biodiversity and value, maintain, and enhance nature's contributions to people, RCU has prioritized re-engaging the union between our community and our environment in several ways.

Most notably through the training of AlUla residents to become wildlife rangers, demonstrating that conservation can have tangible socioeconomic benefits for the local

community. A desirable and highly skilled career in a new field of work, with over 150 wildlife rangers already trained. As the rangers patrol and protect AlUla's nature reserves, they educate people about the importance of sharing the landscape with wildlife. Connecting conservation with socio-economic benefits is essential to implementing principles one and three of Comprehensive Regeneration.

Community engagement is especially critical as we work to conserve, and eventually, reintroduce the Arabian Leopard (*Panthera pardus nimr*) to its native home of AlUla [12]. The critically endangered species has been pushed to the brink in recent years due to habitat destruction and human-leopard conflict [13].

As the Global Biodiversity Framework states, efforts to enhance biodiversity must protect and encourage customary sustainable use by indigenous peoples and local communities. With less than 120 leopards in the wild? increasing support for the Arabian Leopard (*Panthera pardus nimr*) and sustainably reintroducing it to prevent and mitigate conflict with the local community is essential [14].

The cultural significance of the Arabian Leopard in AlUla has been renewed through efforts such as school education programs, the Catmosphere Catwalk [15] and workshops. In recognition of the need to conserve this vital species, the United Nations has declared 10 February 2024 as the first annual International Arabian Leopard Day [16].

The Arabian Leopard population appears to have reached such a critically low level that the species may not survive in the wild without the support of a reintroduction program using captive-bred animals. RCU established the Conservation Breeding Programme in 2020 to save the species from its critically endangered status. We have overseen the successful births of seven Arabian Leopard cubs so far in 2023, taking the total number to 27 Arabian Leopards at the center. This is nearly double the original 14 Arabian Leopards present when the program began.

Prioritising the intersection of agriculture and conservation: The ongoing revitalization of the AlUla Cultural Oasis - the agricultural center of AlUla is a demonstration of the opportunity to simultaneously advance sustainable economic growth, enhance resilient infrastructure, and safeguard the environment.

Due to a decline in the water table and poor agro-economic practices, the natural ecosystems of the Oasis had been eroded over time. To regenerate the environment and reconnect the community with the agricultural promise of the land, RCU has undertaken comprehensive efforts.

The RCU agriculture team has embarked on a strategy

to transform agricultural irrigation in AlUla County. The strategy applies innovative technologies and practices to achieve maximum efficiency in on-farm water management and will move to a collective supply and distribution system that is more efficient than on-farm wells

RCU is working with farmers to introduce efficient agricultural practices, with yields of dates already increasing by 2 to 2.5 times and quality improving. Through rejuvenated local markets and community events such as the citrus and dates festivals, the demand and price of crops.

Conclusion

From the ongoing work in AlUla, it is clear that achieving a net positive impact on biodiversity relies on adopting a truly holistic strategy that ensures culture, nature, and development are equally prioritized and integrated. Fair and considered consultation must be applied to multiple issues to build important checks for nature and wildlife into all aspects of development. Through the adoption of the Comprehensive Regeneration approach and utilization of the key principles in decision-making processes, governments and organizations can effectively make progress against global goals, protecting and restoring biodiversity.

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