After sanctions: the urge to upgrade and integrate conservation in Iran

The economic sanctions imposed on Iran by the international community during the past decade were some of the harshest since those enacted in 1979, following the Islamic Revolution. But by the beginning of 2016, the country had entered the post-sanctions era. As a consequence, international collaborations and economic investments are expected to recover (Stone 2015b; Cinelli and Balmer 2016). Easier access to international resources and expertise may improve the efficiency and effectiveness of current practices in conservation and environmental management. However, economic development will likely accelerate under foreign investments; this, coupled with weak existing regulatory capacity and inadequate environmental safeguards, may place the nation's already imperiled biodiversity at even greater risk.

Due to its location between contrasting phytogeographical realms, Iran has a rich diversity of flora and fauna; yet overexploitation of the country's natural resources during recent decades has had serious negative outcomes for organisms and habitats. In particular, many wetlands – once numerous and thriving – have been lost or degraded by extensive groundwater withdrawals, recent construction of hundreds of dams, and climatic changes (Amiraslani and Dragovich 2011; Akhani 2015). Drainage and unsustainable land-use practices have pushed soil erosion to approximately 25 tons per hectare a year, a rate 4.3-fold higher than the world average (Akhani 2015). The areal extent of Iran's particularly diverse forests, which are among the oldest in the northern hemisphere, has been halved during the past 50 years due to extensive logging and urban expansion (Stone 2015a). Notably, the last 50 (or fewer) Asiatic cheetahs (*Acinonyx jubatus venaticus*), a subspecies that once roamed over most of Southwest Asia, are now found only in Iran and are threatened with extinction resulting from conflict with pastoralists, lack of prey, and road kills (Stone 2015a). Finally, most protected areas experience high levels of poaching motivated by subsistence, income generation, hunting traditions, and hostility toward park staff. For example, populations of many native ungulate species within Iran's oldest national park – Golestan – have declined by around 66–89% since the 1970s (Ghoddousi *et al.* in press). Controversially, the establishment of protected areas in Iran largely followed a top-down approach, leading to frequent tensions with local communities. Furthermore, management mainly takes the form of surveillance monitoring, as opposed to identifying and mitigating threats. In general, protected areas in Iran are subject to a lack of personnel, equipment, and funding (Kolahi *et al.* 2012). Therefore, despite large areal increases now exceeding 10% of Iran's land coverage, protected areas have failed to effectively address biodiversity threats (Figure 1).

Since the lifting of sanctions, media coverage on foreign investments and economic deals has rapidly increased, and the ratified deals already total several billion US dollars (Cinelli and Balmer 2016). Numerous international investors are attracted to the country's vast resources of petroleum, natural gas, and minerals; underdeveloped industry, agriculture, and infrastructure; and unexploited markets (Cinelli and Balmer 2016). While the lifting of sanctions may ease some of the adverse environmental consequences driven by substandard development during the years of economic isolation (Soroush and Madani 2014), demand for natural resources and pressure on already heavily disturbed ecosystems will likely increase, due in large part to the aforementioned surge in development and ineffective environmental protection (Rao *et al.* 2013). After suspending large-scale fertilizer and pesticide applications during the embargo (FAO 2015), Iranian agriculture today is largely underperforming and ready for new investments; due to global agricultural demand,

Figure 1. *Croplands adjacent to Golestan National Park, northeastern Iran. Conservation efforts failed to stop agricultural encroachment into protected areas and their surroundings. International investments after the lifting of sanctions may facilitate the expansion of croplands into areas with high biodiversity values, which are often suitable for farming.*

large expanses may be converted to farming and/or intensified (Anseeuw *et al.* 2012). Based on various global cropland datasets (Ramankutty *et al.* 2008; Zabel *et al.* 2014), 41.1% of Iranian reserves and areas of high environmental value (Laurance *et al.* 2014) and their surroundings (≤10 km) are suitable for cropland expansion (see WebPanel 1 for methods). Moreover, croplands within these areas (25.0% of total croplands) only achieved 42.8% of the attainable yield around the year 2000 (Ramankutty *et al.* 2008; Mueller *et al.* 2012). Future investments in numerous other sectors that depend on foreign investments – such as mining (potential reserves worth US$770 billion [Borna 2015]) and infrastructure (eg 537 dams currently planned [IWRMC 2015]; road network expansion [Laurance *et al.* 2014]) – highlight the urgent need for coordination between natural resource management and economic growth.

In light of the challenges of Iran's post-sanctions era, we call for international support to help develop effective domestic policies and strict regulatory frameworks to promote sustainable development as well as environmental protection, improve conservation education in academic institutions and public agencies, and enhance capacity-building in conservation personnel. We also encourage natural resource agencies to include local communities in their decision-making processes. Furthermore, we argue for adopting proven technologies to help reduce adverse environmental impacts associated with activities from various industrial sectors. Implementing these recommendations, while making use of international expertise and funds that was previously out of reach (Soroush and Madani 2014), may lead to better outcomes. Long-term commitments from all relevant stakeholders will be required to reach the proper balance between sustainability and economic development, without further jeopardizing Iran's natural richness.

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