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Evaluation of the relationship of land cover, fire and armed conflict in west Iran

Political instability enhances the risk of armed conflicts, which not only pose a great threat to human livelihoods, but are also capable of negatively impacting the environment, hence making it essential to examine their ecological effects. Armed conflict and its influences on ecosystems are compound and challenging to examine due to limiting accessibility to the concerned regions given the danger of active fighting. Thus, remote sensing offers an appropriate measure to assess both direct and indirect impacts of conflict on the ecosystem. One environmental aspect induced by armed conflicts is fire occurrence, through actions such as large population movements away from the violence-affected area, which enhance the susceptibility of nearby vegetated areas. Not only are these ecosystems more susceptible to fires under armed conflict but intended forest fires can also play a crucial part in military strategy.

Nonetheless, the association between armed conflict, fire and land cover in West Iran has not been extensively studied, although previous research in the Middle East have covered Israel, Syria, Lebanon, Turkey, and Iraq. The purpose of this thesis is to help fill the research gap in this region by evaluating how land cover and fire dynamics in west Iran interact with armed conflict through the following hypothesis: Armed conflict leads to elevated fire occurrence that cannot be explained by climate alone. Data surrounding conflict events is acquired from a combination of two geocoded event databases, where one gives insight into armed conflict events that were characterized by at least one fatality and the other includes diverse political acts. Information regarding vegetation fire occurrence was obtained from an active fire dataset. The land cover dataset used was specifically created for Iran and climatic data included temperature and precipitation data on a monthly resolution. Using tools such as spatial GIS analysis, bivariate global- and local Moran's I and Spearman rank correlations, a statistically significant spatial relationship was found between conflict and fire incidents, represented as localized clusters of high conflict and high fire occurrence. These clusters had lower correlations to the climatic variables compared to the provincial level, implying that these fires might indeed originate from the surrounding conflict. In addition, the analysis of the relationship between conflict and land cover showed, that while most conflicts do materialise within cities, around two thirds of these events are of less violent nature compared to the event types that effect croplands.

Hence, research conducted on conflict impact on the ecosystem should not only place an emphasis on the local scale, but also focus on the type of conflict that land systems are exposed to. Given that agricultural systems, especially, had a higher proportion of potentially damaging conflict instances, evaluating the effect of conflict on this environment will be crucial.

Keywords: Physical Geography and Ecosystem analysis, fire dynamics, conflict, land cover, Iran, cropland, climate Global bivariate Moran's I, Local bivariate Moran's I

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