

## 2018 ICM

### Problem E: How does climate change influence regional instability?

问题 E: 气候变化如何影响地区不稳定?

The effects of Climate Change, to include increased droughts, shrinking glaciers, changing animal and plant ranges, and sea level rise, are already being realized and vary from region to region. The Intergovernmental Panel on Climate Change suggests that the net damage costs of climate change are likely to be significant. Many of these effects will alter the way humans live, and may have the potential to cause the weakening and breakdown of social and governmental structures. Consequently, destabilized governments could result in fragile states.

包括增加的干旱，冰川萎缩，动植物种类变化以及海平面上升在内的气候变化的影响已经在实现，并且因地区而异。政府间气候变化专门委员会认为，气候变化的净损害成本可能很大。这些影响中的许多会改变人类的生活方式，并有可能导致社会和政府结构的弱化和崩溃。因此，不稳定的政府可能会导致脆弱的国家。

A fragile state is one where the state government is not able to, or chooses not to, provide the basic essentials to its people. For the purpose of this problem “state” refers to a sovereign state or country. Being a fragile state increases the vulnerability of a country’s population to the impact of such climate shocks as natural disasters, decreasing arable land, unpredictable weather, and increasing temperatures. Non-sustainable environmental practices, migration, and resource shortages, which are common in developing states, may further aggravate states with weak governance (Schwartz and Randall, 2003; Theisen, Gleditsch, and Buhaug, 2013). Arguably, drought in both Syria and Yemen further exacerbated already fragile states. Environmental stress alone does not necessarily trigger violent conflict, but evidence suggests that it enables violent conflict when it combines with weak governance and social fragmentation. This confluence can enhance a spiral of violence, typically along latent ethnic and political divisions (Krakowka, Heimel, and Galgano 2012).

脆弱的国家是州政府无法或不愿意提供基本必需品给它的国家。为了这个问题的目的，“国家”是指一个主权国家或地区国家。脆弱的国家增加了一个国家人口易受诸如自然灾害，减少耕地，不可预测的天气和气温升高等气候冲击的影响。发展中国家普遍存在的不可持续的环境实践，移民和资源短缺可能进一步加剧治理不力的国家（Schwartz and Randall, 2003; Theisen, Gleditsch 和 Buhaug, 2013）。可以说，叙利亚和也门的干旱进一步加剧了已经脆弱的国家。环境压力本身并不一定会引发暴力冲突，但有证据表明，当它与治理薄弱和社会分裂相结合的时候，它就会导致暴力冲突。这种融合可以加剧暴力的螺旋式增长，典型的是潜在的种族和政治分歧（Krakowka, Heimel 和 Galgano, 2012）。

Your tasks are the following:

**Task 1:** Develop a model that determines a country's fragility and simultaneously measures the impact of climate change. Your model should identify when a state is fragile, vulnerable, or stable. It should also identify how climate change increases fragility through direct means or indirectly as it influences other factors and indicators.

**Task 2:** Select one of the top 10 most fragile states as determined by the Fragile State Index (<http://fundforpeace.org/fsi/data/>) and determine how climate change may have increased fragility of that country. Use your model to show in what way(s) the state may be less fragile without these effects.

**Task 3:** Use your model on another state not in the top 10 list to measure its fragility, and see in what way and when climate change may push it to become more fragile. Identify any definitive indicators. How do you define a tipping point and predict when a country may reach it?

**Task 4:** Use your model to show which state driven interventions could mitigate the risk of climate change and prevent a country from becoming a fragile state. Explain the effect of human intervention and predict the total cost of intervention for this country.

任务 1: 建立一个模型, 确定一个国家的脆弱性, 同时衡量气候变化的影响。你的模型应该确定一个状态是脆弱的, 脆弱的还是稳定的。还应该确定气候变化如何通过直接手段增加脆弱性, 或者间接影响其他因素和指标。

任务 2: 根据脆弱国家指数 (<http://fundforpeace.org/fsi/data/>) 确定的十大脆弱国家中的一个, 并确定气候变化如何增加该国的脆弱性。使用你的模型来表明, 如果没有这些效果, 状态可能不那么脆弱。

任务 3: 在另一个不在前十名单的国家使用你的模型来衡量其脆弱性, 看看气候变化如何以及何时推动它变得更加脆弱。确定任何明确的指标。你如何定义一个临界点, 并预测一个国家何时可以达到?

任务 4: 用你的模型来表明哪种状态驱动的干预可以减轻气候变化的风险, 并防止一个国家 变成一个脆弱的国家。解释人为干预的影响, 并预测该国干预的总成本。

**Task 5:** Will your model work on smaller “states” (such as cities) or larger “states” (such as continents)? If not, how would you modify your model?

任务 5：你的模型可以在较小的“州”（比如城市）或者更大的“州”（比如大洲）上工作吗？如果没有，你将如何修改你的模型？

Your submission should consist of:

- One-page Summary Sheet,
- Your solution of no more than 20 pages, for a maximum of 21 pages with your summary.
- Note: Reference list and any appendices do not count toward the 21-page limit and should appear after your completed solution.

您的提交应该包括：

- 一页汇总表，
- 您的解决方案不超过 20 页，最多 21 页，包含摘要。
- 注意：参考列表和任何附录不计入 21 页的限制，应在完成的解决方案后出现。

#### References:

Krakowka, A.R., Heimel, N., and Galgano, F. “Modeling Environmental Security in Sub-Saharan Africa – ProQuest.” *The Geographical Bulletin*, 2012, 53 (1): 21-38.

Schwartz, P. and Randall, D. “An Abrupt Climate Change Scenario and Its Implications for United States National Security”, October 2003.

<http://eesc.columbia.edu/courses/v1003/readings/Pentagon.pdf>

Theisen, O.M., Gleditsch, N.P., and Buhaug, H. “Is climate change a driver of armed conflict?” *Climate Change*, April 2013, V117 (3), 613-625.

#### Helpful Links:

Fragile States Index: <http://fundforpeace.org/fsi/>

The World Bank:

<http://www.worldbank.org/en/topic/fragilityconflictviolence/brief/harmonized-list-of-fragile-situations>