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Demographic Structural Theory (DST) provides a framework for explaining instability in Egypt which led to intrastate conflict and the 2011 Egyptian Revolution. DST does not consider environmental factors, but they too may have played a role, and future developments of DST may choose to account for these factors. DST considers the interplay of population growth, resource constraints, inter-elite factionalization due to scarce resources, and the state's efforts to address these strains through increased taxes and an increase in the state's coercive apparatus. Ultimately, under this scenario the situation becomes unsustainable, social conflict often erupts, which can lead to regime collapse. DST does not consider environmental degradation, which generates stress on society and government, this in turn can contribute to internal conflict due to the constrained resources. Water is the key environmental resource at issue in Egypt, and continues to increase the potential for social turmoil. Egypt's 2011 Revolution can be explained by DST; however analysis of environmental factors, specifically water scarcity, should also be examined.

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**MASTER OF MILITARY STUDIES**

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**DEMOGRAPHIC STRUCTURAL THEORY APPLIED TO THE 2011 EGYPTIAN  
REVOLUTION**

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF MILITARY STUDIES

**Christopher D. Booth**

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## EXECUTIVE SUMMARY

**Title:** Applying Demographic Structural Theory to the 2011 Egyptian Revolution

**Author:** Christopher D. Booth

**Thesis:** Demographic Structural Theory (DST) provides a framework for explaining instability in Egypt which led to intrastate conflict and the 2011 Egyptian Revolution. DST does not consider environmental factors, but they too may have played a role, and future developments of DST may choose to account for these factors.

**Discussion:** DST considers the interplay of population growth, resource constraints, inter-elite factionalization due to scarce resources, and the state's efforts to address these strains through increased taxes and an increase in the state's coercive apparatus. Ultimately, under this scenario the situation becomes unsustainable, social conflict often erupts, which can lead to regime collapse.

DST does not consider environmental degradation, which generates stress on society and government, this in turn can contribute to internal conflict due to the constrained resources. Water is the key environmental resource at issue in Egypt, and continues to increase the potential for social turmoil. Egypt's 2011 Revolution can be explained by DST; however analysis of environmental factors, specifically water scarcity, should also be examined.

**Conclusion:** US military officers, US governmental officials, and US policy-makers can use DST to analyze social conflict and the potential for intra-state instability. This theoretical framework can be used to analyze the potential for regime collapse and violence in many countries, particularly those that are subject to high population growth.

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## **PREFACE AND ACKNOWLEDGMENTS**

While I have worked in the Middle East my experience ends at the border of North Africa. Nevertheless, I have been interested in the nexus of North Africa and the Central Arabian Peninsula as these regions merge with the cross flows of history and culture between Eritrea, Ethiopia, Djibouti, and Somalia on one side, and the Bab-el-Mendeb - Yemen, Saudi Arabia and the rest of the Peninsula on the other. Learning about the massive Grand Ethiopian Renaissance Dam (GERD) that is nearing completion, I wondered about its impact on Egypt, which has been dependent on the Nile since the time of the Pharos. As a Gray Scholar focusing on social and political conflict at Command and Staff College, we have explored explanations for intra-state conflict and revolution. I thought about water scarcity generated by the dam, and considered, whether there might be less obvious structural factors that led to the 2011 Revolution in Egypt. Alternative analyses were drowned out by simpler explanations offered by observers writing about the so-called “Arab Spring.” While posted in the region at that time, my regular interlocutors rejected the term referring to it instead as the “Period of Regional Turmoil.” Jack Goldstone (and later Peter Turchin’s) Demographic Structural Theory, as well as Colin Kahl’s elucidation of Demographic and Environmental Stress Analysis (which I tangentially touch upon in evaluating DST) seem to offer a better sub-rosa or subterranean explanation at the aquifer level of what caused the overthrow of Hosni Mubarak and the protests in Tahrir Square, and I hope I do their research justice in how I apply it in this paper.

I would like to thank my faculty advisor Dr. Claire Metelits, as well as the other Gray Scholar instructors, Dr. Craig Hayden and Dr. Lon Strauss for their assistance, guidance, and mentoring throughout the MMS process as well as the structured guidance provided in our Gray lectures. Thank you all.

# **DEMOGRAPHIC STRUCTURAL THEORY APPLIED TO THE 2011 EGYPTIAN REVOLUTION**

## **INTRODUCTION**

Understanding the factors that lead to state instability and intrastate conflict is of interest not only to academics, but also to government policy makers, international NGOs, business investors, and others as they evaluate state stability in a country and region. Demographic Structural Theory (DST) provides a framework for understanding past civil strife, disorder, and revolution, and can help identify countries at greater risk for civil conflict. DST suggests that a country passes through phases that lead to instability and conflict. By reviewing Egypt through the DST lens in the years leading up to the 2011 Revolution, observers can further understand the causes of instability in this country. This paper examines these stages in order and will evaluate the utility of DST as a model. This paper also considers an element that DST does not account for, namely the impact of water scarcity on the events of 2011. Finally, it will argue that DST successfully explains the 2011 Revolution, and that reviewing Egypt against the DST model, the same factors that caused intrastate conflict and the 2011 Revolution appear to still be present, thus setting the stage for continued instability.

This paper first reviews the literature on DST and explain the background to the theory. Thereafter, population growth and attendant economic issues in Egypt are examined, beginning with a discussion of the impact of a youth bulge. Next, intra-elite competition is addressed, with specific attention paid to the Egyptian Armed Forces (EAF), which have been assessed as being the key element in the elite responsible for maintaining President Hosni Mubarak in power. Subsequently, the state's growing inability to effectively employ coercion is reviewed. The paper considers DST's utility and analyzes a factor not included in DST analysis - the impact of water



scarcity and the state of water during the revolution. The paper concludes with an assessment of the current situation in Egypt as seen through DST analysis.

### **DEMOGRAPHIC STRUCTURAL THEORY**

Jack Goldstone's DST highlights the significance of population growth in the build-up to revolutions. In a study of revolutions between 1500 and 1900, he finds that the single largest predictor of upheaval is significant population growth – generally creating a “youth bubble” - in the years leading up to revolution. According to Goldstone, “revolutions [occur] when population pressures [overwhelm] intransigent political, economic, and state institutions.”<sup>1</sup> Goldstone directs attention to the pressures that result from a youth bulge (those aged 15-25) that can lead to instability generated by the mismatch between jobs and the labor force. Among other things, this creates resentment among those who are over-educated for the jobs available.<sup>2</sup> This youth cohort raises the cost of many items in society given they increase demand which in turn generates inflation and additionally this cohort puts pressure on the labor market to employ them. Governments seek to respond by raising larger armies, which furthers the strains placed upon state finances and drives the regime to search for additional revenues. Historically, elites fight over dwindling agricultural resources as a “larger population consumed more of the available agricultural output.”<sup>3</sup> Elites and the masses resist the state's efforts to obtain additional funds. Urbanization results as the excess population seeks jobs in cities, making the organization of mass mobilization easier.<sup>4</sup>

DST has evolved over time. Peter Turchin, a scholar of ecology and complex population dynamics<sup>5</sup> further refined DST for determining if a society it is going through the stages of increasing instability that lead to intrastate conflict. Turchin's work helps illustrate a boom and bust cycle of population in which the pressures caused by a burgeoning population influence

“socio-political instability, historical events, and the ebb and flow of state power.”<sup>6</sup> He claims that population growth in excess of productivity gains negatively affects social institutions in several ways.<sup>7</sup> First, population growth leads to a “youth bulge,” which provides a cohort capable of mobilizing against the state.<sup>8</sup> Population growth also drives price inflation, causing rural poverty and leading to urbanization, thereafter increasingly leading to food and wage protests.<sup>9</sup> Second, rapid population growth leads to intra-elite competition over too few resources, resulting in intra-elite factionalism.<sup>10</sup> Third, in response to population growth the state increases its army and bureaucracy to provide social outlets for surplus population as well as increasing the size of its security apparatus to control the citizenry.<sup>11</sup> Regimes increase taxes to fund this growth despite public and elite resistance;<sup>12</sup> nevertheless, they are unable to generate sufficient revenue to offset expenses. Finally, fiscal crisis results in popular uprisings, factions in the elite aligning with the populace to turn against the regime, which ultimately leads to the state’s loss of military control.<sup>13</sup>

One factor that DST does not analyze nor consider is the impact of environmental degradation and attendant scarcity. Goldstone himself investigated the nexus between increasing populations and the increased demand for natural resources after developing DST. Goldstone called this Demographic and Environmental Stress analysis (DES),<sup>14</sup> which looks at how population growth may lead to environmental degradation and can lead to internal conflict.<sup>15</sup> Other scholars have added to these insights and considered the effect of DES factors on intrastate conflict.<sup>16</sup>

In examining Egypt, the relevant natural resource that is finite and most likely to generate conflict is water. Jason Morrissette and Douglas Borer explicitly state in their research that “water is the key environmental variable” and will increasingly be a major factor in challenges to

Middle Eastern governments.<sup>17</sup> They cite Homer-Dixon's argument that environmental scarcity is tied to domestic unrest challenging state legitimacy, which may lead to inter or intrastate conflict.<sup>18</sup> Water plays an important role in environmental stress and has the potential to cause instability. Populations can tolerate many things, but hydration is essential to survival. Continued reduction to access of this critical resource generates a hydraulic pressure on vulnerable groups until it is somehow released. DST's failure to address this environmental and resource scarcity factor is a blind-spot in its utility.

### **Population Growth and Attendant Economic Issues**

The first phase analyzed in DST focuses on whether a state is undergoing a significant increase in its population that in turn generates a large enough "youth bulge." Such an excess of this population age group can become a substantial burden on the state, particularly when it lacks the ability to properly provide education, jobs, and other tools to direct individuals in socially useful tasks. Upon identifying the existence of this potential pool of dissatisfied youth providing a potential threat to mobilize against the state, DST then considers whether evidence exists that this growth in population has progressed to the point where it is causing price inflation, leading to rural poverty. The increase in urbanization is one means for assessing whether immiserated farmers and agricultural laborers are heading to the cities to find work due to these negative economic effects. Finally, DST posits that these adverse conditions, typically generate food and wage protests as the poor react to their increasingly difficult economic situation. An examination of Egypt in the period leading up to the 2011 Revolution demonstrates that it passed through all of these stages and exhibited the demographic and economic issues predicted by DST.

#### ***Youth Bulge***

Egypt's population entered a period of rapid growth in 1952 (doubling from 21,200,000

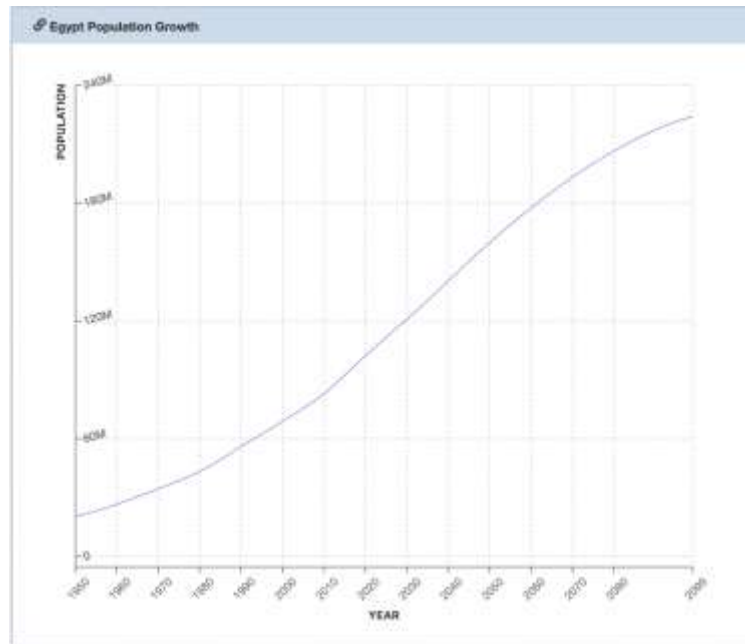
to 42,600,000 in 1980),<sup>19</sup> and accelerated precipitously in the early to mid-1970s when Anwar Sadat's regime launched a series of economic reforms that reduced malnutrition and increased food quantities for the population.<sup>20</sup> After Sadat's assassination, Mubarak's regime recognized the danger of the "Malthusian Trap" whereby a population outraces its resources after improvements in health lead to a declining death rate and a high birthrate. The Egyptian government, with strong support from USAID programs, sought to reduce the birthrate. By 1992, the fertility rate dropped from five to four children per Egyptian female.<sup>21</sup> Nevertheless, the absolute population growth rate hit the maximum between 1985-1989, which led to a large cohort of those aged 21-25 in 2011 at the time of the first protests in Tahrir Square.<sup>22</sup> Even with the steps the regime took to reduce the birthrate, as of 2013 Egypt continued to add 1 million citizens every nine months.<sup>23</sup>

Egypt's government insufficiently invested in the educational system leaving many graduates ill-prepared for the workforce.<sup>24</sup> The efforts the government made directed the most talented students into Science Technology Engineering and Math (STEM) studies, neglecting humanities and the social studies. Unfortunately, there were not as many STEM jobs as graduates, which frustrated some of the best students (who could have succeeded in other tracks but were pushed towards STEM training). This created a gap between those with skills developed in the university and job opportunities.<sup>25</sup>

In 2011, on a global scale Egypt's nine percent unemployment was not remarkably bad (approx. 2.5 million Egyptians), however, those aged 20-24 made up more than one million people out of work.<sup>26</sup> For Egyptian college graduates, 40% of men and 50% of women were unemployed.<sup>27</sup> It was tech-savvy youth who harnessed social media to publicize the protests against the regime.<sup>28</sup> Fifteen million Egyptians joined protests against Mubarak in January 2011,

eclipsing the largest previous anti-government demonstrations staged by the Poles in 1989.<sup>29</sup> Thus, it appears evident that the cohort of frustrated and unemployed young Egyptians substantially contributed to the revolution.

*Figure 1: Egyptian Population Growth Rate Chart<sup>30</sup>*

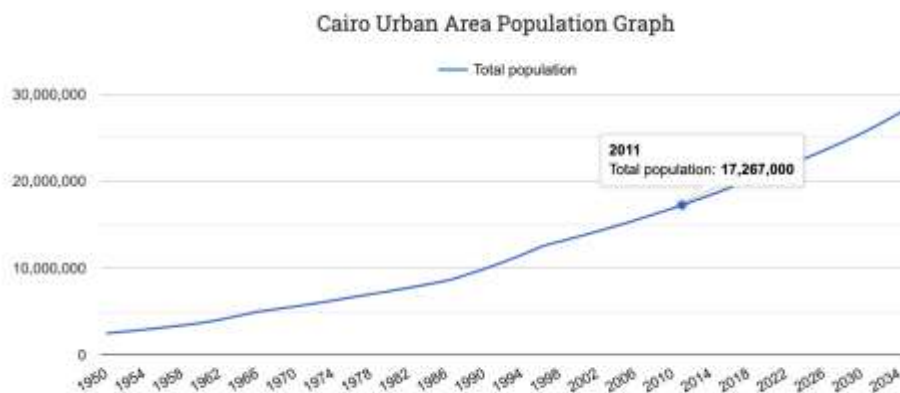


### ***Urbanization***

Historically, Egypt has benefitted from a society with a safety-valve where excess workers are employed outside the country in the wealthy Gulf states - particularly in the oil-fields.<sup>31</sup> This led to a decrease in the urbanization rate in the 1970s and 1980s; however, by mid-1980s the Arab “Oil Boom” had ended and outward Egyptian migration was significantly reduced.<sup>32</sup> In line with the predictions of DST, urbanization inexorably increased in Egypt. Egypt is unusual in that only half of its rural areas are involved in agriculture. Given this fact, instead of following the pattern of most countries in which the largest cities receive most of the rural immigrants, in Egypt rural towns have become the largest area of urbanization in the country.<sup>33</sup>

Most of Egypt's 84 million citizens occupy only four percent of the land, generally along the Nile river.<sup>34</sup> Cairo itself demonstrates the attributes of a rapid growth megacity, suffering from poor infrastructure and a sizeable population ready to mobilize over grievances. At the end of 2010, Cairo had nearly 17 million inhabitants.<sup>35</sup> It has grown from 2.4 million in 1950 to these massive population numbers at a 700% growth rate.<sup>36</sup>

*Figure 2: Cairo Urban Area Population Growth Chart<sup>37</sup>*



### ***Inflation/Poverty/Food and Wage Protests***

Turchin's DST model anticipates growing inflation, increased poverty, and food and wage protests as a country accelerates toward intrastate conflict. Egypt explicitly fits this model. While the 2011 protesters had a variety of grievances against the regime, the majority of their demands were economic.<sup>38</sup> In 2005, 44.4% of the population was living in extreme poverty, poor, or near poor (barely able to meet their needs).<sup>39</sup> At the time of the Revolution, nearly 40% of the country lived "on less than two dollars a day."<sup>40</sup> Egypt was not immune to the global economic downturn that shook countries' economies around the world in 2007-2008, but the population was already striking over economic conditions prior to that disruption. The official Egyptian growth rate for the five years from 2006-2011 was six percent, however, there was little to no "trickle down" to the vast majority of Egyptians.<sup>41</sup> Furthermore, government statistics

showed that poverty (especially rural) increased in 2008.<sup>42</sup> “Rampant inflation and currency devaluation meant that already low wages could not meet basic needs.”<sup>43</sup> The economy appeared to benefit only state cronies, while the poor, working, and middle class suffered and resented the disparity between their circumstances and the benefits accruing to the wealthy.<sup>44</sup>

December 2006 saw major protests among textile workers in Mahalla al-Kubra on the Nile Delta; picketing continued periodically until 2008 when the regime tried to shut-down the protest, resulting in a major riot instead.<sup>45</sup> Protests also erupted over the privatization of water and increased residential water rates in northern Cairo in 2005. Marchers blocked the coastal road in the Delta in 2007 when the regional water company shifted water from farming and fishing communities to wealthy gated enclaves and country clubs instead.<sup>46</sup> Strikes protesting economic conditions became a regular feature in Egypt between after 2006 until the revolution.<sup>47</sup> Rising food prices<sup>48</sup> throughout the region were a trigger for the Arab Spring.<sup>49</sup> In 2008 and 2011, there were food and fuel crises as global commodity prices for these resources reached historical highs.<sup>50</sup>

Protesters in Tahrir Square declared they were protesting corruption, lack of government services, and lack of opportunity.<sup>51</sup> They felt they could no longer endure a system that benefited a narrow elite, and one in which the leadership took all the economic benefits.<sup>1</sup> The evidence appears compelling that the relationship between inflation, poverty, and inequality led to food and work protests in Egypt, which likely contributed to a population primed to support a revolution in 2011.

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<sup>1</sup> Mubarak had apparently accumulated a personal fortune of \$70 billion at the time of his downfall. Acemoglu & Robinson, *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*, 3.

### **Intra-elite Competition**

DST analysis predicts intra-elite infighting in its later stages in societies nearing social upheaval. Again Egypt was no exception in the years preceding its revolution. Since the Nasser regime came to power in 1952, the Egyptian elite consisted of elements involved in patronage networks, rent seeking, and state spoils orbiting the presidency,<sup>52</sup> and they structured the economy for their own benefit. As an example, while small businesses make up 95% of the country's enterprises, they lack political access; trade, labor, and energy policies have historically been directed to benefit large companies and at the same time the elite.<sup>53</sup> Cronyism appeared to accelerate in the 1990s and 2000s, fueling a dangerous resentment in the run-up to the 2011 revolution.<sup>54</sup> This misalignment of resources weakened state power, caused the larger population to resent the leadership class, and drove intra-elite fighting as factions competed for access to rent streams based on client-patron networks and relationships.

### *Foreign Aid*

Access to foreign aid has long served as a driver of turmoil. In Egypt, aid distorted institutions in the decades preceding the Revolution. Some of the most significant revenue streams that the elite competed over were foreign rents. Egypt received extensive foreign aid from the U.S., Gulf Arab monarchies, other major donor countries such as Japan,<sup>55</sup> and various international organizations including the International Monetary Fund (IMF). Historically, Egypt accepted some of the largest sums of foreign aid in the world, with an average \$5.5 billion annually.<sup>56</sup> The U.S. alone provided \$70 billion in aid between 1979 and 2013.<sup>57</sup> Additionally, under the "Global War on Terror," Egypt became one of the top four recipients of US counterterrorism aid alongside Afghanistan, Iraq, and Jordan.<sup>58</sup> Despite the goals and intentions of donors, foreign aid often served as a "free resource" and reduces "pressure for regime



modernization,” and decreased incentives for the development of accountability mechanisms.<sup>59</sup>

### *“Fat Cats”*

Private businessmen and influential families amassed significant economic and political clout, and were publicly derided as “fat cats.” Powerful private companies monopolized entire economic sectors including steel, dairy, and cars.<sup>60</sup> In 2008, more than 30% of the entire market capitalization of the Egyptian Exchange was controlled by a mere eleven wealthy families; and in 2011 there were 490 families with net assets exceeding \$65 billion.<sup>61</sup> The “crony capitalist” private sector, whose most influential elements included land developers and builders largely depended on state-created rents.<sup>62</sup> President Anwar Sadat had allowed the Muslim Brotherhood (the Islamically-based opposition that challenged the legitimacy of the secular state) to unofficially re-enter society and operate brotherhood-affiliated businesses as part of a parallel elite structure.

### *The Political Class*

In contrast to his predecessors, Mubarak chose to allow a more vibrant electoral system in Egypt to serve as a tool to distribute rents to the Egyptian elite including businessmen, powerful families, and party apparatchiks.<sup>63</sup> Parliamentary seats became so valuable that not only did candidates spend millions in advertising, they also participated in direct vote-buying. As legislators, members could obtain state resources through official as well as informal channels.<sup>64</sup> Vast opportunities for money-making included the selling of appointments and jobs, the issuance of permits, and the solicitation of bribes for access to ministers who could provide services to districts.<sup>65</sup> Over time an especially attractive benefit was criminal immunity, which parliamentarians used to allow themselves to engage in corruption with no threat of prosecution.<sup>66</sup> Thus the political class also became a competing elite element.

### *Security Services*

Egypt has been described by some as a “Securitocracy” where power is held by a system of security elites (representing the intelligence and security services, military, and police forces), with a figurehead head-of-state and the security elements holding the real power.<sup>67</sup> Egyptians typically do not differentiate between types of security services, as all are referred to as the *Mukhabarat* (intelligence service in Arabic).<sup>68</sup> As of 2010, Egypt’s security services were considered to be “the oldest, largest and most effective in the Arab world,”<sup>69</sup> as well as “one of the most brutal.”<sup>70</sup>

The security services were active during the revolution and even participated in intra-elite in-fighting. In one instance, the military lashed out against the *Mukhabarat* during the Revolution. In late January 2011, Mubarak attempted to calm the demonstrations by appointing his Chief of Intelligence, Omar Suleiman, to be Vice President with the implication that he would assume the role of president after Mubarak. On February 4th, Suleiman’s car was attacked, resulting in the death of one of his bodyguards. Many saw this as a “covert asymmetric” attack by the EAF against an elite competitor.<sup>71</sup> Furthermore, in March 2011, the military allowed the public to sack the main headquarters of the State Security Investigations Service (SSIS were the internal security secret police), where the SSIS maintained “*STASI*-like files” on everyone.<sup>72</sup> Soldiers ensured that sensitive material relating to the EAF was “either captured or destroyed.”<sup>73</sup>

### *The Egyptian Armed Forces*

Understanding the military’s economic interests as well as how it perceives threats to these interests helps explain its behavior during the 2011 revolution. The military has been the most significant player in Egypt since Nasser and his fellow officers took power in the 1952

coup. Under Nasser the EAF drove the economy and politics of Egypt, engaging in public infrastructure and engineering projects, with senior officers taking over management of civilian factories, and ever more state-owned enterprises controlled by the military.<sup>74</sup> The military's economic activity may account for somewhere between 20-40% of Egypt's GDP (estimated at 30-40%)<sup>75</sup> and stretches into every economic sector.<sup>76</sup> Sadat became concerned about the extent to which the EAF dominated the economy and therefore reduced the EAF's role and directed that it focus its involvement more towards defense-related industries.<sup>77</sup>

Upon taking over after Sadat's assassination in 1981, Hosni Mubarak took steps to cut public spending, but allowed the Army to expand its businesses in an attempt to "coup-proof" his regime.<sup>78</sup> Military officers established patron-client relationships with favored businesses.<sup>79</sup> The EAF's businesses received numerous state benefits including subsidized fuel, conscript labor, preferential access to government contracts, and oversight on a variety of industries ranging from tourism to petrochemicals.<sup>80</sup> Mubarak sought to "depoliticize the officer corps in the 1980s," but instead it continued to develop a parallel economy including its own social-welfare institutions, the goals of which were the EAF's aggrandizement.<sup>81</sup>

Learning from his predecessors - who often had to contend with threats to their rule from the officer corps - Mubarak instituted policies wherein exchange for officer loyalty to the regime; they could expect monetary reward and a post-retirement career. Rewards included lucrative appointments to senior positions in state bureaucracy where officers could dispense patronage. By 2011, 63 of 156 governors were former officers appointed by Mubarak. The ability to loot the public treasury is demonstrated in a few examples, such as when Major General Sa'd Khalil as governor of Matruh severely underpriced coastal land in a real estate deal costing the government \$167 million. Similarly, retired Major General Samir Farag undersold a stadium

costing the public \$51 million.<sup>82</sup> Perhaps most blatantly, Mubarak redirected the annual budget allocated for disaster management and emergency response to cash payments to the military and police known as a “loyalty allowance.” These funds came to \$2.75 billion in 2005-2006, accounting for nine percent of the entire budget.<sup>83</sup>

Over time the patronage system failed Mubarak as military appointments became institutionalized, with assignments routinely leading to others, thus taking away any personal influence from the President in the careers of most officers.<sup>84</sup> Furthermore, most officers in the Supreme Council of the Armed Forces (the Egyptian equivalent of the US Joint Chiefs of Staff) were at least 20 years younger than Mubarak and of a different generation - one with a different outlook, having never fought against Israel. This new generation entered the military after Egypt was aligned with the US instead of the Soviet-bloc.<sup>85</sup> Finally, EAF officers were chosen for the military through a meritocratic system and most originated from the lower-middle classes.<sup>86</sup> They felt little in common with Mubarak and his son and designated successor, Gamal Mubarak – a former bank manager – whose entourage was made up of upper-class business cronies, and were seen by many military officers as out-of-touch with Egyptian society.<sup>87</sup>

Despite the EAF’s efforts in the years prior to the 2011 Revolution, the Egyptian state’s economic role declined in comparison to private investors and international lenders, which reduced the funds available to be handed out as largess, negatively impacting the established ways in which the EAF supported its economic activities and provided jobs to its personnel.<sup>88</sup> Given its concern with its perceived economic decline, the EAF was primed to move to protect its own prerogatives and enhance its own interests at the time of the revolution. Many officers were resentful of the growth in power and influence of the “fat cats” and worried they would gradually be marginalized in the power structure system.<sup>89</sup> Additionally, large numbers of

officers were upset to see private actors' power growing seemingly without any public objection at the same time that their own economic activities were increasingly criticized in the media.<sup>90</sup> Thus, as Mubarak teetered in February 2011, instead of reinforcing the regime, the focus of many senior officers was on negotiating with foreign defense firms for joint production agreements. Days before Mubarak was swept from power, EAF generals put the finishing touches on a multi-million-dollar deal with a US company to involve an Egyptian naval shipyard in the assembly and production of patrol craft.<sup>91</sup> Demonstrating their economic self-interest, during the revolution the EAF deployed troops to protect the property of corporate partners rather than government facilities.<sup>92</sup> It also deployed troops to EAF-run industries, or to those in which it had direct investment, including Petro-chemical plants, export zones, and multinational manufacturing, while neglecting those of its rivals including Muslim Brotherhood-associated businesses.<sup>93</sup> Some have gone so far as to argue that the military even encouraged the revolution out of concern that the regime intended to expropriate their assets, including a massive water-bottling company.<sup>94</sup>

### **Government Security and the Failure of Coercion**

Attempting to accommodate and grapple with a swelling population reduces revenue to states, diminishing its ability to exercise coercive power at the same time the state faces a burgeoning population. This increases demands on the state and can overburden the administrative capacity of a government, further weakening a state's authority and legitimacy. This happened in Egypt. The regime was not in a position to effectively respond to the protests because it had become corrupt, bloated, and sclerotic. With soaring inflation (17.1% in 2008) public debt reached 100% of GDP, and Egypt's trade deficit reached \$60.8 billion.<sup>95</sup> In 2006, Transparency International ranked Egypt seventh-worst out of 163 countries measured in

corruption.<sup>96</sup>

The Egyptian government had become a “Lame Leviathan.”<sup>97</sup> Contributing to this was the inability to directly tax the population since 1952. Given how brittle it was, the state sought to project its sovereignty visually. One observer described Cairo’s “elaborate security apparatus created to protect the capital from its inhabitants.”<sup>98</sup> The regime also sought to buy-off the population with government jobs, and by 2011 nearly half of Cairo’s labor force was made up of state employees.<sup>99</sup> The public sector was so inflated that some 5.5 million Egyptians were civil servants at the end of 2010.<sup>100</sup> The governments after Mubarak have not been able to cull the numbers, and in 2015 government employees still accounted for 35% of the budget and consumed 8% of Egypt’s GDP; there was one civil servant for every 13 Egyptians.<sup>101</sup> To create enough positions, the government paid low salaries, and 89% of bureaucrats surveyed admitted to having second jobs as an economic necessity.<sup>102</sup> The administration of government services suffered as a result. Like other regimes before his, Mubarak’s administration sought to bribe those other elements of the population that did not receive benefits as elite or state employees, and provided significant subsidies for energy, transportation, and other essential items.<sup>103</sup>

During the mid-1960s, combined inflation and increased housing costs drove Egyptians to skirt the “financially exhausted state” by building unlicensed and unapproved neighborhoods outside the historic Cairo center.<sup>104</sup> These slums lacked administrative oversight and infrastructure, and by 2011 nearly two-thirds of all of Cairo’s citizens lived in these communities.<sup>105</sup> Many community-built roads were too narrow for emergency traffic, and not only lacked sewage but even running water.<sup>106</sup> As of 2009, a significant portion of the city managed itself independent of the government.<sup>107</sup> Potentially, Cairo was reaching the state of “feral city,” as defined by a metropolis over a million people which continues to function despite

the absence of an effective government.<sup>108</sup> The regime lacked the ability to perform basic services for a large percentage of the population. Ultimately, when pushed, the teetering state collapsed.

### *Utility of the DST Model*

As noted throughout this analysis, DST provides a useful framework for analyzing the factors that contributed to instability in Egypt, which resulted in the 2011 revolution. Utilizing DST to examine a country to determine if it exhibits these factors and whether it is moving through the stages that lead to intrastate conflict, provides a useful model to foresee instability in states. One element that DST does not address, however, is the effect of resource scarcity on instability. Goldstone seems to recognize the importance of environmental issues for stability in his Demographic Environmental Stress analysis (DES). DES considers three interrelated strains on a state: (1) Demographic Shifts, (2) Resource Scarcity, and (3) Economic Marginalization. These tensions generate increased demands on regimes, which can result in decreased administrative capability and the erosion of state authority and legitimacy. In common with DST, DES also notes that these burdens can reduce revenue flows to a state, undermining the coercive power of a government, which at a time of increasing population but decreasing funds for security, can cause instability.<sup>109</sup>

### *Water Scarcity*

People require 100 cubic meters (m<sup>3</sup>) of water annually for drinking and personal needs, while another 1,000m<sup>3</sup> is required to grow food to feed that person for a year.<sup>110</sup> Earlier this paper discussed protests over commodity prices as predicted by Turchin, including protests over increased water prices in 2005. Similarly, it was noted that riot police were frequently called to break-up demonstrations against the redirection of water flow from agriculture and less affluent

communities to wealthy enclaves and resorts in 2007-2008. DST fails to address the fact that resource scarcity may also be a factor in generating intrastate conflict, or at least an additional element that should be considered when considering rising food and commodity prices and attendant protests. In fact, reviewing the situation in Egypt in the years leading up to the revolution there is strong evidence that resource scarcity, in particular water, is responsible for generating significant resentment of the regime and fueled much of the anger that moved residents of the Cairo slums to protest.

At the time of the demonstrations in Tahrir Square, Egypt was already in a “water crisis;” water availability had fallen below the global standard for “water poverty” (1,000 m<sup>3</sup>/person a year)<sup>111</sup> to 700 m.<sup>3</sup> The water scarcity caused an increase in grocery bills because of the increased cost for inputs in agriculture.<sup>112</sup> This increase in foodstuff prices resulting from the region’s freshwater crisis is seen by several observers as an under-appreciated trigger of the Arab Spring.<sup>113</sup> Egypt suffered from a Malthusian quandary of fixed water supplies, increasing population, and an increased demand for water from various users.<sup>114</sup> A significant percentage of that increased demand was generated by lavish gated-communities, resorts, and golf courses built in the desert for an elite clientele with state rents.<sup>115</sup> In contrast the one-million residents of “Garbage City,” (a slum in Cairo), lived in an area of four-and-a-half square miles without adequate infrastructure where 75% of the water tested failed to meet minimum standards for drinking.<sup>116</sup> Some analysts of the 2011 uprising call it the “Revolution of the Thirsty.”<sup>117</sup> While the immaculate lawns in the wealthy enclaves stayed emerald, 40% of Cairo’s population had no more than three-hours-a-day of running water, and four districts received no drinking water at all.<sup>118</sup> As has been mentioned, sizeable protests erupted in 2007 and 2008 throughout the Nile Delta over reductions in water, and even massive deployments of riot police were unable to stop



protesters from blocking highways and railroads.<sup>119</sup>

If not the sole factor in sparking the Revolution, the frustrations with the difficulty in obtaining sanitary water helped prime millions of Egyptians' outrage and to turnout into the streets against the Mubarak regime. Given that tensions over natural resources are likely to be exacerbated by continued population growth leading to increase demand for finite resources, and the expected impact of climate change on water through increased salinity, decreased arable land, etc., it is logical that DST should be revised or further developed to consider resource scarcity as one of the attendant economic factors associated with population growth.

### **CONCLUSION**

In many ways, the current political and economic situation in Egypt resembles the end of 2010. The government has not made substantial reforms, and the economic situation for most Egyptians has not improved; the factors that generated protest in 2011 have not been substantially addressed. The latter part of 2019 saw a series of protests despite repressive efforts by the government. In September, more than 2,000 people were arrested after two days of protests against government corruption, which spread over five provinces.<sup>120</sup> Egypt seems to have become a paradox: it is a haven for investors in emerging markets, yet 60% of the population "is either poor or vulnerable."<sup>121</sup> If they government chose to increase social spending to alleviate social pressure against the government (something it has not indicated an interest in doing), its ability to do so is hampered by the fact that it The government spends 58% of its budget to pay off loans and interest on its debt.<sup>122</sup> The regime has cracked down on the political opposition, jailed people for refusing to allow security forces to check their phones, and arrested more than 3,600 including children in roughly a month period between September and October.<sup>123</sup> Many Islamists and supporters of the Muslim Brotherhood are angry with the regime

of Abdel Fattah al-Sisi for the military coup against Mohamed Morsi, and the government faces a continuing insurgency and terrorism from ISIS in the Sinai.<sup>124</sup> By late October 2019 more than 4,300 people had been arrested. In an effort to stop the protests against declining living standards and political repression, reports surfaced of detainees being “stripped, beaten, strangled and burned with cigarettes.”<sup>125</sup>

DST provides an explanation for factors that contributed to political instability and revolution in 2011 Egypt. The country continues to face unaddressed and significant demographic pressures. (As noted above, DST does not account for the environmental impact of water scarcity, but this too may be a factor in the near and mid-term, which can generate additional intra-national turbulence.)<sup>2</sup> Absent significant efforts to address economic inequality, corruption, and a system that to many appears stacked in favor of the elite, the outlook for the Sisi regime – predicted by DST – is not that different from the outcome experienced by Mubarak and his coterie in 2011.

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<sup>2</sup> Water may continue to be a factor in potential instability in Egypt as the population continues to grow and water demand increases. Sowers, “Institutional Change in Authoritarian Regimes: Water and the State in Egypt,” 237. Climate change and population growth will further increase water scarcity. Sea-level rise and increasing salinity may affect 10 percent of the population and ruin 12-15% of Egypt’s agriculture. Sowers, Jeannie, Avner Vengosh, and Erika Weinthal, “Climate Change, water resources, and the politics of adaptation in the Middle East and North Africa,” *Climatic Change*, 104 (2011), 608.

In April 2011, Ethiopia announced its plan to construct the Grand Ethiopian Renaissance Dam (GERD), a \$5 billion-dollar project – largely funded by China - to build one of the largest dams in the world. See [internationalrivers.org](http://internationalrivers.org). The period in which the GERD’s reservoir is filled has the largest potential to adversely impact Egypt’s agriculture and hydro-electric power generation. Mohammed El-Said, “We did not decide the GERD’s timeframe for filling the reservoir yet, Irrigation Ministry,” *Daily News Egypt*, [www.dailynewsegypt.com](http://www.dailynewsegypt.com) (November 18, 2019).

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<sup>1</sup> Elizabeth J. Perry, Review of *Revolution and Rebellion in the Early Modern World*, by Jack A. Goldstone, *American Political Science Review*, Vol. 86, No. 3 (September 1992), 827.

<sup>2</sup> Goldstone, "Population and Security: How Demographic Change Can Lead to Violent Conflict," 10.

<sup>3</sup> Jack A. Goldstone, "Demographic Structural Theory: 25 Years On," *Cliodynamics: The Journal of Quantitative History and Cultural Evolution*, 8 (2017), 89.

<sup>4</sup> Goldstone, "Demographic Structural Theory: 25 Years On," 89.

<sup>5</sup> *Ibid.*, 98 (citing Peter Turchin, *Historical Dynamics: Why States Rise and Fall*, (Princeton: Princeton University Press, (2003)).

<sup>6</sup> Peter Turchin, *Historical Dynamics: Why States Rise and Fall*, (Princeton: Princeton University Press 2003); *War and Peace and War: The Life Cycles of Imperial Nations* (New York: Pi Press, 2006); with Sergey Nefedov, *Secular Cycles*, (Princeton: Princeton University Press, 2009); cited by David C. Baker, "The Roman Dominate from the Perspective of Demographic-Structural Theory," *Cliodynamics: The Journal of Theoretical and Mathematical History*, Vol. 2, Issue 2 (2011), 217.

<sup>7</sup> Peter Turchin, "Dynamics of political instability in the United States, 1780-2010," *Journal of Peace Research*, 49:4 (2012), 579.

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<sup>11</sup> Turchin, "Dynamics of political instability in the United States," 579.

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<sup>13</sup> Turchin, "Dynamics of political instability in the United States," 579.

<sup>14</sup> Jack A. Goldstone, "Population and Security: How Demographic Change Can Lead to Violent Conflict," *Journal of International Affairs*, vol. 56, no. 1 (Fall 2002), 1-21

<sup>15</sup> Thomas Homer-Dixon, is also recognized for his influential role in the development of DES, and frequently credited alongside Goldstone for this theory.

<sup>16</sup> Colin Kahl's articulation of DES focuses on the impact of demographic pressures generated through population growth in combination with the "degradation, depletion, and maldistribution of natural resources." DES analyzes three interrelated strains on a state: (1) Demographic Shifts, (2) Resource Scarcity, and (3) Economic Marginalization. These tensions generate increased demands on states, which can result in decreased administrative capability and the erosion of state authority and legitimacy. In common with DST, DES also notes that these burdens can reduce revenue flows to a state, undermining the coercive power of a government, which at a time of increasing population but decreasing funds for security, can cause instability. Neo-Malthusians argue that while DES increases incentives toward civil strife, an explosive reaction against the regime only occurs once a state is sufficiently weakened. Colin Kahl, "Demographic Change, Natural Resources and Violence: The Current Debate," *Journal of International Affairs*, vol. 56, no. 1 (Fall 2002), 258-263. Colin Kahl, "Demographic Change, Natural Resources and Violence: The Current Debate," *Journal of International Affairs*, vol. 56, no. 1 (Fall 2002), 258-282.

<sup>17</sup> Jason J. Morrisette and Douglas A. Borer, "Where Oil and Water Do Mix: Environmental Scarcity and Future Conflict in the Middle East and North Africa," *Parameters*, 34, 4 (Winter 2004/2005), 87.

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- <sup>18</sup> There are three causes of this resource scarcity: (1) Supply-Induced Scarcity – a resource is degraded or depleted; (2) Demand-Induced Scarcity – caused by increased consumption or population growth, and (3) Structural Scarcity in which resources are inequitably distributed. Jason J. Morrisette and Douglas A. Borer, “Where Oil and Water Do Mix: Environmental Scarcity and Future Conflict in the Middle East and North Africa,” *Parameters*, 34, 4 (Winter 2004/2005), 89-90.
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- <sup>31</sup> Zinkina & Korotayev, “Urbanization Dynamics in Egypt: Factors, Trends, Perspectives,” 33.
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- <sup>35</sup> Populationstat.com, <https://populationstat.com/egypt/cairo>
- <sup>36</sup> Populationstat.com, <https://populationstat.com/egypt/cairo>
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