

## *Non-State-Actors and the Subterranean Dimension*

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### **Introduction**

This study offers new insights about non-state-actors (NSAs) through the utilisation of the subterranean dimension in conflicts between states and the NSAs. Staniland defines an insurgent organisation as “a group of individuals claiming to be a collective organisation that uses a name to designate itself, it is made up of formal structures of command and control, and intends to seize political power using violence.” This study prefers the non-biased term, NSA.<sup>1</sup> The subterranean dimension refers to natural and artificial underground spaces that are part of a military conflict.<sup>2</sup>

Reviewing the history of rebellions, we learn that NSAs have used the subterranean dimension in many different permutations. Recent wars between states and NSAs in the Middle East that feature intensive use of the subterranean dimension by NSAs ( Hamas, Hezbollah, and ISIS) reflect the need to revisit this subject. The present study argues that the main factors that have shaped the use of the subterranean dimension by militant NSAs across time and place include the terrain and human

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<sup>1</sup> Paul Staniland, *Networks of Rebellion: Explaining Insurgent Cohesion and Collapse* (Ithaca: Cornell University Press, 2014), p. 5.

<sup>2</sup> Gideon. S. Golany, *Earth-Sheltered Dwellings in Tunisia: Ancient Lessons for Modern Design* (Cranbury, NJ: University of Delaware Press, 1988), p. 19.

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environment, the operational plans of the NSAs and their ability to implement them, and the exploitation of new technologies, as well as NSAs' relationship with the civilian population, cultural influences, and counter measures conducted by governments.<sup>3</sup> This study believes that after arming activity, funding efforts, structure, command and control apparatus, and other elements, the subterranean dimension is an additional medium for analysing NSAs.<sup>4</sup>

Van Creveld argues that "there have always been groups of people who, few in number and lacking the means to engage in open warfare against those whom they regarded as their conquerors and oppressors, engaged in smaller, but still politically motivated, acts of violence instead."<sup>5</sup> The subterranean dimension can improve NSAs' operational readiness and resilience against a superior enemy, in firepower, intelligence, and manpower, because it offers better defence than above ground, especially against bombardment. Tracking militants below ground is very challenging because of factors such as slow movement in tunnels, breathing problems, and risk of tunnel collapse.<sup>6</sup> Still, construction of subterranean facilities is risky and costly.<sup>7</sup>

Military history demonstrates that in antiquity NSAs faced superior armies on land and sea.<sup>8</sup> In the twentieth century, with the deployment of aircraft, the military advantage of states escalated. Air supremacy resulted in conflicts between states and NSAs that are more unbalanced than ever before.<sup>9</sup> In such circumstances, NSAs were encouraged to intensify the use of the subterranean dimension for both defensive, especially subterranean military and civilian bomb-shelters, factories, and logistic bases,

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<sup>3</sup> Walter Laqueur, *Guerrilla Warfare: A Historical and Critical Study* (Boston: Little, Brown and Company, 1976), pp. 382–404.

<sup>4</sup> Martin van Creveld, *The Changing Face of War: Combat from the Marne to Iraq* (New York: Ballantine, 2008), pp. 213, 219–28; Staniland, *Networks of Rebellion*, p. 3–4.

<sup>5</sup> Van Creveld, *Changing Face of War*, p. 213.

<sup>6</sup> Aral Segal, "A Subterranean Arm," *Maarahot* 389 (May 2003): pp. 44.

<sup>7</sup> MEMRI, " Hamas's Tunnels: Preparation for the Next Conflict with Israel," 20 July 2016, Catalog No. 6393, <https://www.memri.org/reports/hamass-tunnels-preparation-next-conflict-israel> (accessed 19 December 2021).

<sup>8</sup> II Macc. 6:11, 10:7; David Kempe, *Living Underground: A History of Cave and Cliff Dwelling* (London: Herbert, 1988), pp. 193–95, 248.

<sup>9</sup> Van Creveld, *Changing Face of War*, pp. 222–27.

and offensive purposes, especially explosive tunnels dug under enemy positions, but also infiltration tunnels that bypass enemy defensive positions.<sup>10</sup>

Mao Tse-Tung's guerrilla doctrine helps us understand the link between NSAs and the subterranean dimension. Mao viewed guerrilla warfare as "a weapon that a nation inferior in arms and military equipment may employ against a more powerful aggressor nation."<sup>11</sup> Guerrilla forces seek longstanding conflict to secure their existence while exhausting the enemy, thereby undermining its superiority. Borrowing from Mao's terminology, the subterranean dimension facilitates protracted war since even though NSAs are still weak, favourable factors have compensated for their weakness, although not yet to a degree sufficient to transform their inferiority.<sup>12</sup> More than other courses of action, the subterranean dimension allows NSAs to avoid direct and long clashes with a stronger army, while focusing on its continuous harassment and long-term demoralisation, and thus undermining its military advantage.<sup>13</sup>

Mao argues that effective guerrilla warfare is based, among other things, on initiative and flexibility. The subterranean dimension, primarily offensive tunnels, allows NSAs to be mobile and maintain the initiative. NSAs' concealed activity below ground encourages the use of surprise attacks.<sup>14</sup> Mao maintains that flexible employment of armed forces—such as shifting between offense and defence, advance and retreat, and more—is the central task in directing a war.<sup>15</sup> And, indeed, highly flexible NSAs shift between above-ground and below-ground operations. Their ability to use the subterranean dimension results in sustainability.<sup>16</sup>

Against the background of military scholars who address the idea of new types of wars and overemphasise the impact of technology on conflicts, this study follows

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<sup>10</sup> Martin van Creveld, *The Transformation of War: The Most Radical Reinterpretation of Armed Conflict since Clausewitz* (New York: The Free Press, 1991), p. 31.

<sup>11</sup> Mao Tse-Tung, *On Guerrilla Warfare* (Champaign, IL: University of Illinois Press, 2000), p. 42.

<sup>12</sup> Mao Tse-Tung, *Selected Military Writings of Mao Tse-Tung* (Peking: Foreign Language Press, 1966), p. 209; Yehoshafat Harkabi, *On Guerrilla* (Tel Aviv: Ministry of Defense, 1971), p. 14.

<sup>13</sup> Martin van Creveld, *Technology and War: From 2000 B.C. to the Present* (New York: The Free Press, 1989), 300; Yitzhak Aitan, "Belowground," *Maarahot* 422 (December 2008): p. 19.

<sup>14</sup> *Ibid.*, pp. 19, 27; Tse-Tung, *On Guerrilla Warfare*, pp. 96, 98, 100, 102.

<sup>15</sup> Tse-Tung, *Selected Military Writings*, p. 241.

<sup>16</sup> Israel Security Agency, "A Smuggling System through the Kerem Shalom Passage Was Exposed," 1 March 2015, <https://www.shabak.gov.il/publications/Pages/study/Skira260715.aspx> (accessed 19 December 2021).

Laqueur's approach that highlights the connection between past and present NSAs.<sup>17</sup> Laqueur warns against incomprehensible theories that seek to explain the rise of NSAs and to compare between NSAs that operate in very different environments.<sup>18</sup> The current study does not offer a grand theory of NSAs, but an insight through their use of the subterranean dimension. The subterranean dimension is an analytical tool to better understand NSAs' course of actions, their advantages and disadvantages and their relations with other actors.

Richemond-Barak offers a comprehensive and current review of "underground warfare" practised by both states and NSAs. But her work focuses on the legal aspects of counter-tunnelling policies adopted by states rather than on military issues and factors that influence NSAs' activities. Richemond-Barak's historical account is partial in that it overlooks episodes when NSAs used the subterranean dimension and were defeated.<sup>19</sup> Echoing the approach regarding a new type of war, Richemond-Barak argues that "historically (tunnels) had little to do with civilians," and recently there is "a growing proximity between tunnels and civilians."<sup>20</sup> Yet ancient and medieval NSAs constructed subterranean structures both in rural and urban areas.<sup>21</sup> "Underground warfare" never distanced itself from civilians and was never "confined to the military world."<sup>22</sup> Richemond-Barak proclaims that it is too early to call underground warfare "a new dimension of war," and what she does (as well as what contemporary military and political leaders do) is label underground warfare a "global security threat" as if it were

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<sup>17</sup> See, for example, Rupert Smith, *The Utility of Force: The Art of War in the Modern World* (London: Penguin Books, 2005); Walter Laqueur, *Guerrilla Warfare: A Historical and Critical Study*. With new introduction (New Brunswick, NJ: Transaction Publishers, 1998), p. 285.

<sup>18</sup> Laqueur, *Guerrilla Warfare*, pp. 287–90.

<sup>19</sup> Daphne Richemond-Barak, *Underground Warfare* (New York: Oxford University Press, 2018), pp. 116, 134, 142, 157. For example, Golany, *Earth-Sheltered Dwellings in Tunisia*, pp. 31–35; Patricia B. Ebrey, *Emperor Huizong* (Cambridge: Harvard University Press, 2014), pp. 395–400; John S. Curtiss, *The Russian Army under Nicholas I, 1825-1855* (Durham: Duke University Press, 1965), pp. 162–66.

<sup>20</sup> Richemond-Barak, *Underground Warfare*, pp. 215, 248.

<sup>21</sup> See, for example, Michael J. Day, "Military Campaigns in Tropical Karst: The Maroon Wars of Jamaica," in *Studies in Military Geography and Geology*, edited by Douglas R. Caldwell, Judy Ehlen, and Russell S. Harmon (Dordrecht: Kluwer Academic Publishers, 2007), pp. 79–88; Rupert Furneaux, *Abdel Krim, Emir of the Rif* (London: Secker and Warburg, 1967), pp. 65–66; Robert D. Jones, *Insurgency and Social Disorder in Guizhou: The 'Miao' Rebellion 1854-1873* (Honolulu: University of Hawaii Press, 1994), p. 106; I Sam. 22:2; I Macc., 1: 53; II Macc., 6:11, 10:7; Cassius Dio, *Roman History*, vol. VII, book LXIX: p. 12; Havi Dreifuss, *Warsaw Ghetto – The End: April 1942 – June 1943* (Jerusalem: Yad Vashem, 2017), pp. 532–33.

<sup>22</sup> Richemond-Barak, *Underground Warfare*, pp. 215, 251; Curtiss, *The Russian Army under Nicholas I*, 162–66; Euclides Da Cunha, *Revolt in the Backlands* (London: Victor Gollancz, 1967), pp. 287–92.

a nuclear bomb or a 9/11 terrorist attack.<sup>23</sup> This study will demonstrate that the subterranean dimension does not stand by itself. It is affected by local conditions and reflects strategic forces.

Professional books on caves and tunnels focus on geological and geographic aspects rather than the users.<sup>24</sup> Former works on the subterranean dimension mostly discuss single regions and episodes and single subterranean structures, such as tunnels, sewers, and caves.<sup>25</sup> This study employs a comprehensive and holistic approach to NSAs and their use of the subterranean dimension. Based on major source books on terror, insurgency, and guerrilla warfare, this research has recorded multiple instances of use of below-ground structures by NSAs. Each case study was analysed thoroughly using primary and secondary sources.<sup>26</sup> In addition, the author visited underground sites that served modern militants and resisters in Thailand, Vietnam, and Poland and a few ancient underground sites in Israel that were utilised by Jewish rebels.

The present work discusses the following questions: What are the factors that encourage and discourage the use of the subterranean dimension by NSAs? What can be learned about NSAs via study of the subterranean dimension? Will new counter-tunnelling technology put an end to the utilisation of this dimension? Following a short typology section, this study addresses major factors that have shaped the use of the subterranean dimension by NSAs. The final part of the work highlights a few insights about the role of the subterranean dimension in today's conflicts between states and NSAs.

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<sup>23</sup> Richemond-Barak, *Underground Warfare*, pp. 53, 251; The State Comptroller, "Operation Protective Edge. Special Report," 28 February 2017, pp. 80, 94.

<sup>24</sup> For instance, Kempe, *Living Underground*, pp. 193–95, 248.

<sup>25</sup> For example, Tom Mangold and John Pencyate, *The Tunnels of Cu Chi* (London: Hodder and Stoughton, 1985); Yinon Shvitiel, *Rock Shelters and Hiding Complexes in the Galilee during the Early Roman Period* (Tel Aviv: Hakibbutz Hameuchad, 2014); Mir Bahmanyar, *Afghanistan Cave Complexes 1979–2004: Mountain Strongholds of the Mujahideen, Taliban and Al Qaeda* (London: Bloomsbury, 2012).

<sup>26</sup> The research uses major historical textbooks on guerrilla warfare and insurgency: Robert B. Asprey, *The Guerrilla in History* (Garden City, NY: Doubleday & Company, 1975); Laqueur, *Guerrilla Warfare*; Martin van Creveld, *The Encyclopaedia of Revolutions and Revolutionaries: From Anarchism to Zhou Enlai* (New York: Facts on File, 1996). These books provide the database of armed NSAs from antiquity. Data on more recent NSAs has been collected from general books about insurgency: Sean K. Anderson and Stephen Sloan, *The Historical Dictionary of Terrorism* (Lanham, MD: Scarecrow, 2009); Cindy C. Combs and Martin W. Slamm, *Encyclopaedia of Terrorism* (New York: Facts on File, 2009) and the annual United States State Department's Country Report on Terrorism.

### Categorisation of the Subterranean Dimension

Similar to Hecht, this study offers categorisation of types of underground structures that have been employed by rebellious NSAs.<sup>27</sup> As Figure 1 demonstrates, these structures differ in their purpose and the level of security they offer. A bunker is a man-made fortified room with a firing position that offers protection against enemy fire. A shelter is a subterranean fortified structure that defends its users against enemy fire and lacks fighting capabilities. A natural or manmade hideout is a subterranean space that conceals its users, but does not necessarily protect them against enemy fire.<sup>28</sup> Very few NSAs, mostly those well-supported by external powers, constructed underground bunkers.<sup>29</sup> In most cases, NSAs utilised natural caves as they were and built defenceless hideouts.<sup>30</sup>

Offensive tunnels are constructed in order to enable the NSA to hit enemy forces with a variety of methods. In Mao's terminology, offensive tunnels enable NSAs—which are strategically weaker than the states and lack manpower and weapons—to execute tactical attacks when conditions on the ground are favourable. Booby-trapped tunnels planted with explosives run under enemy facilities. Combat tunnels move forces behind enemy lines.<sup>31</sup> Escape tunnels are a special sub-type of offensive tunnel and their goal is to enable the release of militants from prisons and detention camps. They feature a one-time operation and therefore construction investment may be limited. They are usually constructed by the inmates themselves, and the challenge is

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<sup>27</sup> Eado Hecht, *Underground Warfare*, Power Point Presentation, 2017, slides 4, 62, 79–80.

<sup>28</sup> Eran Zohar, "Jewish Subterranean Operations in Major East European Ghettos," *Holocaust Studies* 26, no. 1 (2020): p. 5.

<sup>29</sup> Amos Harel and Avi Issacharoff, p. 34 *Days: Israel, Hezbollah, and the War in Lebanon* (New York: Palgrave Macmillan, 2008), p. 47; The Mair Amit Intelligence and Terrorism Information Centre (MAITIC), "Hezbollah's Use of Lebanese Civilians as Human Shields," 5 December 2006, pp. 86, 98.

<sup>30</sup> Shiraz Durrani, *Never Be Silent: Publishing & Imperialism in Kenya 1884–1963* (Nairobi: Vita Books, 2006), pp. 33, 221; Anabbel Skinner, *Tanzania and Zanzibar* (London: Cadogan Guides, 2005), pp. 209–10; Jens Finke, *Tanzania* (London: Rough Guides, 2003), pp. 165–66.

<sup>31</sup> Yiftach Shapir and Gal Perel, "Subterranean Warfare: A New Old Challenge," in *The Lessons of Operation Protective Edge*, ed. Anat Kurz and Shlomo Brom (Tel Aviv: Institute for National Security Studies, 2014), pp. 51–53; Shaul Shay, "The Islamic State (ISIS) and Subterranean Warfare," IPS Publication, IDC Herzliya, December 2015, <https://www.idc.ac.il/he/research/ips/documents/publication/5/isisshay2015a.pdf> (accessed 24 November 2021), p. 1.

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significant since prisoners are under close supervision and usually possess only simple digging tools.<sup>32</sup>

Defensive tunnels offer refuge from superior firepower, especially airstrikes. Defensive tunnels serve as headquarters, and as weapons and equipment storages. NSAs' tunnels that serve offensive activities, such as firing at and kidnapping enemy troops who invade the NSAs' territory, are considered defensive because their goal is to defend the NSA against intruders. Tunnels that are located near enemy lines can, at times, be called offensive. An offensive tunnel always crosses enemy lines.<sup>33</sup>

Sewers are systems used to supply water to human communities and/or to dispose of their wastewater. Ancient urban communities in the Middle East had already equipped themselves with the early modern sanitation systems.<sup>34</sup> Due to the harsh conditions that exist in sewers, such as breathing problems, mobility difficulties, the danger of drowning on rainy days, darkness, and rat communities, NSAs are reluctant to use them and do so only in extreme situations, such as under siege or in the face of extinction.<sup>35</sup>

This work discovered that subterranean structures are rarely independent, with tunnels, hideouts, and even sewers integrating into an elaborate underground site, primarily manmade. Mario Bunge defines such a system as 'conceived of a complex object, concrete or abstract, composed of interrelated items, and (that) possesses some systemic or emergent properties absent from its constituents.'<sup>36</sup> Subterranean structures may contain sets of chambers connected by tunnels, running along multiple kilometres. The combination of many parts turns this subterranean system into a more resilient one,

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<sup>32</sup> Jennifer S. Holmes, *Terrorism and Democratic Stability* (Manchester: Manchester University Press, 2001), p. 7.

<sup>33</sup> Shapir and Perel, "Subterranean Warfare," pp. 51–53; Shay, *The Islamic State (ISIS) and the Subterranean Warfare*, p. 1.

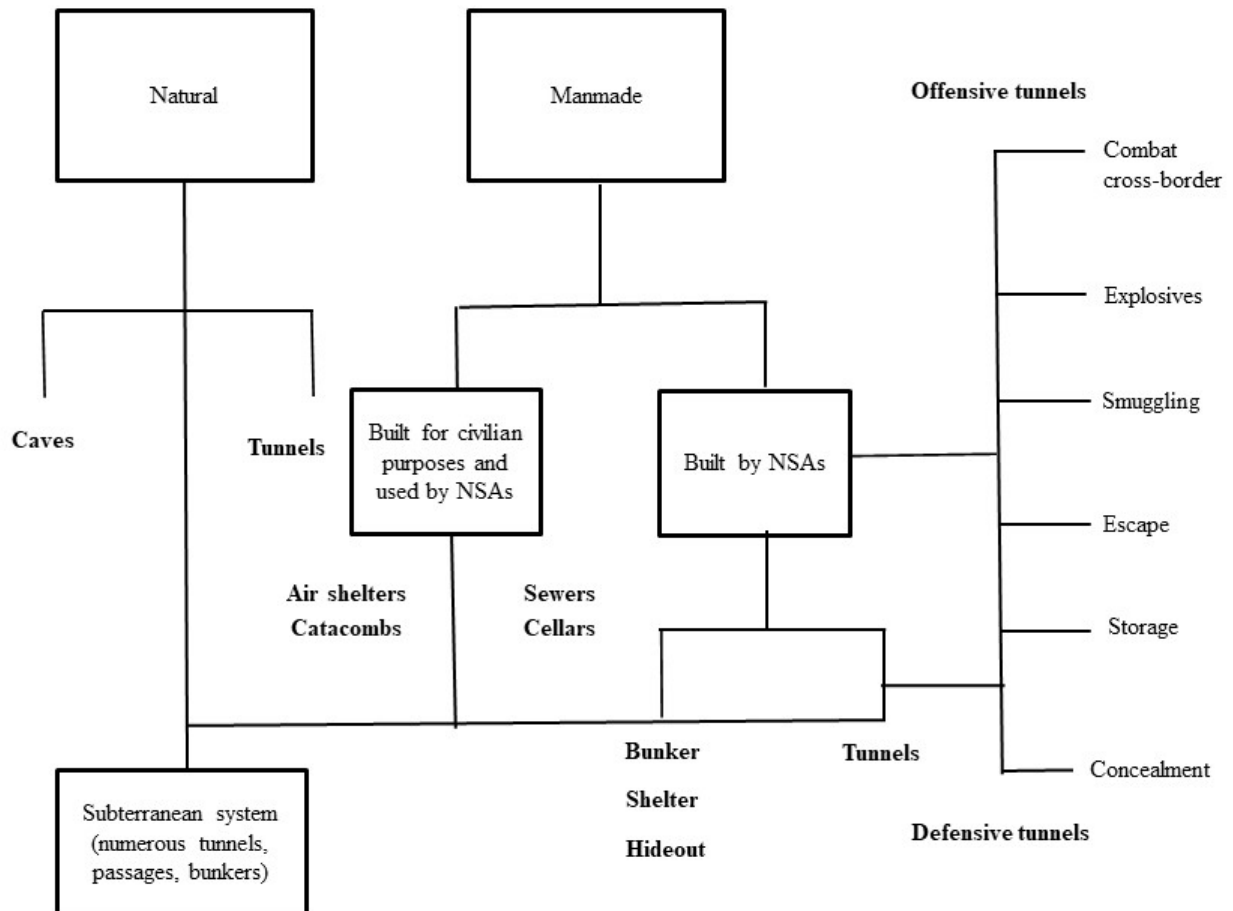
<sup>34</sup> Stephen Halliday, *An Underground Guide to Sewers* (Cambridge, MA: MIT, 2019), p. 29.

<sup>35</sup> *Ibid.*, p. 39.

<sup>36</sup> Mario Bunge, "A Systemic Perspective on Crime," in *The Explanation of Crime: Context Mechanisms, and Development*, edited by Per-Olof H. Wikstrom and Robert J. Sampson (New York: Cambridge University Press, 2006), p. 10.

as were the Viet Cong’s tunnels in the Cu Chi region, and Grozny’s sewer system which served the Chechen militants in the Second Chechen War (1999–2000).<sup>37</sup>

**Figure 1: NSAs and the Subterranean Dimension**



<sup>37</sup> Anthony J. Joes, *Urban Guerrilla Warfare* (Lexington: The University Press of Kentucky, 2007), pp. 131–40; Mangold and Penycate, pp. 33, 69–70, 100; Richard H. Shultz and Andrea J. Dew, *Insurgents, Terrorists and Militias: The Warriors of Contemporary Combat* (New York: Columbia University Press, 2006), pp. 138–41.



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## Factors that Shape the Employment of the Subterranean Dimension

The history of rebellion and insurgency contains numerous cases across time and place of NSAs that employed the subterranean dimension against stronger enemies, although these conflicts rarely resulted in strategic victories. The current study uncovers factors that have shaped the utilisation of underground structures by NSAs.

### *Geographical and Geological Features*

Harkabi argues that guerrilla warfare pays attention to the geographical and social landscape because the minute details of any environment and community are more important than abstract theories.<sup>38</sup> This study revealed that the terrain influences the operational approach and tactics of NSAs. The aim of the subterranean dimension is to increase the combat capabilities of these NSAs and the terrain can encourage or discourage the implementation of such an objective.<sup>39</sup> As the following case studies show, NSAs utilise existing subterranean structures as they are or, when necessary, change the terrain to serve their needs—by widening older tunnels, breaking through cellar walls and carving subterranean spaces through public buildings, wells, and storages, thereby disrupting their original functions.<sup>40</sup> The most challenging course of action is the building of new structures below ground, due to the need for money and manpower, and security risks. In urban areas, NSAs use sewers and basements, whereas in the countryside and in desert areas they exploit caves and tunnels.

The simple use of the subterranean dimension can be illustrated in the Caste War in Mexico (1847–1901), when native Yucatec Indians rose up against the white-creole and ladino ruling class, temporarily driving them back to Mexico City, and proclaimed an independent Mayan state. The militants used the subterranean Loltun Caves of their ancestors as a refuge.<sup>41</sup> Visitors in these caves view the steep slope which comes to the

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<sup>38</sup> Harkabi, *On Guerrilla*, p. 12.

<sup>39</sup> “Construction of Underground Tunnels in Combat Villages and Hamlets,” Captured Documents (CDEC): Unknown Interrogation Source, Log Number 09-2421-67, 09/24/1967, CTZ 2, hu Yan Province, 26 January 1968, Reel 0325, Vietnam Archive Collection, The Vietnam Centre and Archive, Texas Tech University, <http://www.vietnam.ttu.edu/virtualarchive/items.php?item=F03460325122>, p. 4.

<sup>40</sup> Shvitiel, *Rock Shelters and Hiding Complexes*, p. 227.

<sup>41</sup> Vivien Loughheed, *Yucatan – Chetumal, Merida & Campeche* (Edison, NJ: Hunter, 2011), p. 1634; Nick Rider, *Yucatan and Mayan Mexico* (London: New Holland, 2005), p. 296.

surface via a staircase carved into the stone. The Mayan resisters lived in the natural caves and built barricades. They might have also used these caves to build up their forces.<sup>42</sup>

The Warsaw uprising against the German occupation (August–September 1944) was led by the Armia Krajowa (AK) which expected that the Red Army would advance to Warsaw, which Stalin chose not to do. The AK demonstrates a resistance organisation that operated in an urban environment and exploited existing underground tunnels, the Warsaw sewer system, which was designed by the British engineer William Lindley at the end of the nineteenth century.<sup>43</sup> The AK utilised the sewer canals intensively, primarily for evacuation and communication, due to their extreme military weakness: the Germans controlled the ground and had laid siege to the AK and the people of Warsaw.<sup>44</sup> In his memoirs, General Bor Komorowski, the AK commander, reflected on the sewers' role. Units of women moving along the sewers, known as *Kanalarki* (sewer), proved to be of immense help in improving the traffic, carrying messages and orders, reconnoitring new passages, and removing obstacles.<sup>45</sup> The decentralised character of the uprising made the sewer system crucial for coordinating and communicating between the separate districts. Sewer tunnels were generally high enough to permit people to freely travel through them. The AK sent messages, moved units, and conducted resupply operations throughout Warsaw, and also laid a telephone line through the sewer to connect its headquarters in the city centre to the Old Town, though it was destroyed later by the Germans.<sup>46</sup>

Miron Bialoszewski, who witnessed the uprising as a young man and assisted the AK, noted that Warsaw consisted of three levels: the first was on the surface, where militants sneaked through passages and courtyards; the second level was the city of shelters, with a system of connections serving civilians and insurgents; the third level

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<sup>42</sup> "The Mysteries of the Loltún Grottoes," 25 August 2021, <https://www.theyucatanimes.com/2021/08/the-mysteries-of-the-loltun-grottoes-reveal-the-lifestyle-of-the-maya-10000-years-ago/> (12 July 2022).

<sup>43</sup> Halliday, *Underground Guide to Sewers*, p. 160.

<sup>44</sup> Tadeusz Bor-Komorowski, *The Secret Army* (New York: Macmillan, 1951), pp. 268, 300–08; Miron Bialoszewski, *A Memoir of the Warsaw Uprising* (New York: NYRB, 2014), p. 45.

<sup>45</sup> Bor-Komorowski, *The Secret Army*, p. 300.

<sup>46</sup> John Antal, *City Fights: Selected Histories of Urban Combat from World War II to Vietnam* (New York: Random House, 2007), p. 112; Robert Forczyk, *Warsaw 1944: Poland's Bid for Freedom* (Oxford: Osprey, 2009), pp. 60–1.

was subterranean Warsaw with “traffic, rules and signs.”<sup>47</sup> Forczyk noted that in spite of substantial military inferiority, the AK maintained their struggle against the Germans mainly because they kept slipping away through Warsaw’s sewers to other districts, evading engagement with the enemy in open spaces.<sup>48</sup>

Demonstrating a dynamic subterranean dimension activity in high-intensity war, the AK troops, after losing their hold in the Wola and Ochota districts, managed to connect between tunnels that had been dug to nearby sewer canals and reached the city centre. When the Germans cut off the city in early August 1944, the sewers became the only possible link with other districts for the AK.<sup>49</sup> Between August 10 and 14, facing increasing loss of civilian life and urban destruction, about five thousand AK soldiers evacuated the Old Town via the 1.7 km-long sewer route to the city centre and Zoliborz districts. They even managed to bring one hundred German POWs with them. In late September, AK troops used the sewer system to evacuate from Mokotow to the city centre where they surrendered on October 4, 1944. Though the AK controlled the entrances to the sewers, civilians and seriously wounded soldiers were left behind and massacred by the advancing Nazi troops.<sup>50</sup> This example demonstrates that in cases of huge military imbalance and states without moral limits, the subterranean realm cannot prevent the NSA defeat, but can postpone it.

The current study offers many examples of NSAs that used their environment after having made some changes in it in order for it to serve their operational requirements. Two of these are described here. First was the Great Jewish revolt in 66–73 CE, and mainly the Bar Kokhba revolt of 132–136 CE against the Roman Empire. The Bible records Jews who lived in the mountainous areas of Land of Israel and exploited nearby caves and tunnels, both natural and manmade, for numerous purposes such as accommodation, livestock, mining, burial place, rituals, and storage.<sup>51</sup> In the face of

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<sup>47</sup> Bialoszewski, *Memoir of the Warsaw Uprising*, p. 142.

<sup>48</sup> Jerzy Zapadko, “Mirski,” *Parasol Battalion. Sixteen Hours*,” *Quarterly Review* 26, no 3 (July–Sept. 1974): <http://www.warsawuprising.com/witness/mirski1.htm> (accessed 19 December 2021).

<sup>49</sup> Forczyk, *Warsaw 1944*, pp. 59, 67, 69, 84.

<sup>50</sup> Waclaw Micuta, “From Old Town to Zoliborz,” in Andrzej M. Kobos, ed., *Kanaly w Powstaniu Warszawskim. Zeszyty Historyczne*, no. 109 (Paris: Instytut Literacki, 1994), <http://www.warsawuprising.com/witness/micuta1.htm> (19 December 2021); Bialoszewski, *Memoir of the Warsaw Uprising*, p. 142.

<sup>51</sup> Menasheh Harel, “Caves and Burrows and Their Uses in the Biblical Time,” *Maarahot* 389 (May 2003): pp. 50–51; Mordechai Gichon, *A Star out of Jacob: Bar Kokhba and His Time* (Ben Shemen: Modan, 2016), pp. 138–39.

invasions, ancient Jews used to find shelter in their close environment both underground and above ground, e.g., “And Midyan attacked Israel, and because of Midyan the children of Israel created the tunnels in the hills and the caves and the fortresses.”<sup>52</sup> Because of the geological characteristics of the mountains and of the Judean Plain, they had numerous hiding places for emergencies. The limestone rock that is dominant in the Galilee mountains and the softer chalk rock in the Judean hills facilitated fortification efforts by Jewish militants in anticipation of the upcoming Roman expedition.<sup>53</sup> The softer chalk encouraged the digging of longer and more elaborate underground tunnels in the plain than in the mountains.<sup>54</sup> Josephus recorded:

It was really not easy to restrain people who had made brigandage a habit and had no other means of making a living, since they had neither city nor field of their own but only underground shelters and caves, where they lived together with their cattle. They had also managed to collect supplies of water and of food beforehand, and so they were able to hold out for a very long time in their hidden retreat.<sup>55</sup>

Demonstrating efficient exploitation of the environment, these militants invested immense effort in building subterranean hiding complexes based on natural caves. Subterranean installations were mainly quarried in the Judean Plain and in the Galilee.<sup>56</sup> Columbariums, quarrying sites, burial complexes, water sources, ritual baths, and agricultural facilities were redesigned to transform them into guerrilla bases from which Bar Kokhba’s soldiers attacked Romans targets. Militants used other hideouts to store weapons, equipment, and food, and they probably conducted training in the large subterranean rooms.

Quarried narrow tunnels linked pre-existing concealed subterranean complexes, some of which were connected to a water source. Features of these ancient tunnels

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<sup>52</sup> Judges 6:2.

<sup>53</sup> Harel Eshel and Boaz Zissu, *The Bar Kokhba Revolt: The Archaeological Evidence* (Jerusalem: Israel Exploration Society, 2015), pp. 53–55; Shvitiel, *Rock Shelters and Hiding Complexes*, pp. 226–28.

<sup>54</sup> Dvir Raviv, “Updating the Geographical Distribution of the Hiding Complexes in the Toparchy of Timnah,” in *The Highland’s Depth 4*, edited by Ephraim Range and Binyamin Research (Ariel: Talmon, 2014), p. 43.

<sup>55</sup> Josephus Flavius, *Jewish Antiquities* (Cambridge, MA: Harvard University Press, 1963), pp. VIII: XV, 346–47.

<sup>56</sup> Eshel and Zissu, *Rock Shelters and Hiding Complexes*, pp. 42–55; author’s visit to the Herodium Park, December 2020.

resemble current tunnels such as multi-levels, zig-zag shapes, and traps (deep pits).<sup>57</sup> Construction activity served operational requirements: militants closed subterranean entrances and passages with heavy boulders; they constructed pits to collect water and secure air supply; and they prepared emergency openings. Construction activity was dynamic, and the militants extended subterranean hideouts during the revolt.<sup>58</sup>

**Figure 2:** Tunnel of the Bar Kokhba rebels in the Herodium palace-fortress, up to 2 m high.



Source: Author's photograph, October 2020.

<sup>57</sup> Gichon, *A Star Out of Jacob*, pp. 137, 244; Shivtiel, *Rock Shelters and Hiding Complexes*, pp. 226–28.

<sup>58</sup> Gichon, *A Star out of Jacob*, p. 138.

Figure 3 : Underground hideout of Bar Kokhba rebels in Ayn Arub, Judea.



Eshel and Zissu assume that during the Bar Kokhba revolt, a few hundred refuge complexes were built in more than one hundred Jewish settlements, hosting between a few dozen and a few hundred people each. This was a pre-planned, collectively directed project that allowed Jewish militants to prolong the revolt against the superior Roman Army. It was strongly linked to the social-economic character and quarrying tradition of the local population (see Figs. 2, 3).<sup>59</sup> The above examples emphasise that the study of militant NSAs requires analysis of the geographical landscape. Due to their military weakness, NSAs exploit the subterranean dimension that balances their inferiority.

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<sup>59</sup> Eshel and Zissu, *The Bar Kokhba Revolt*, pp. 53–55; Shivtiel, *Rock Shelters and Hiding Complexes*, pp. 142, 198, 210, 226–28.

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The second case study refers to the Algerian National Liberation Front (FLN) which fought for independence against France in 1954–1961.<sup>60</sup> In August 1956, the FLN leaders decided to change track and replace the failed rural guerrilla activity by a campaign of indiscriminate terrorism in Algiers. The base area of the urban FLN was the old Muslim quarter of Algiers, the *casbah* (fortress), about 1 square km in area with approximately 80,000 inhabitants. The casbah's special architecture, featuring cellars, sewers, and tunnels, facilitated the FLN's urban guerrilla activity of assassinations and bombings, which was overwhelmingly aimed at civilians, including Muslim civilians.<sup>61</sup> Evans notes that the FLN transformed the topography of the casbah, creating an elaborate subterranean world of secret passages, safe houses, concealed rooms, and hidden bomb-making factories. These facilities served for storing weapons and hiding escaping insurgents during French army search operations. The casbah became the centre of the FLN in Algeria.<sup>62</sup>

However, employing the Tenth Paratrooper Division under its skillful commander, General Jacques Massu, and using operational intelligence and brutal methods such as systematic torture and killing of prisoners), the French captured the FLN leaders and by October 1957 the organisation's urban networks had been dismantled.<sup>63</sup> Through the FLN's war of independence, this research addresses the idea that NSAs take advantage of the environment, including the subterranean dimension, to maintain armed resistance. Still, political factors shape the outcomes of conflicts between states and NSAs rather than tunnels and hideouts.

NSAs are familiar with their theatres of operations, which offers them an initial comparative advantage over their invaders, or at least postpones their inevitable defeat. For example, in 1897, in the final stage of the general uprising of the black population in Southern Rhodesia (the Ndebele and Mashona) against the abusive regime of the British South Africa Company and the white settlers, the withdrawing Mashona fighters and

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<sup>60</sup> Laqueur, *Guerrilla Warfare*, pp. 222–24.

<sup>61</sup> Louis A. DiMarco, *Concrete Hell: Urban Warfare from Stalingrad to Iraq* (Oxford: Osprey, 2012), pp. 106–12; Joes, *Urban Guerrilla Warfare*, p. 57.

<sup>62</sup> Martin Evans, *Algeria: France's Undeclared War* (Oxford: Oxford University Press, 2012), pp. 202–08.

<sup>63</sup> Martin Evans and John Phillip, *Algeria: Anger of the Disposed* (New Haven: Yale University Press, 2007), pp. 60–61; DiMarco, *Concrete Hell*, pp. 106–12; Joes, *Urban Guerrilla Warfare*, p. 68.

their families retreated into the caves which ran under their kraals.<sup>64</sup> The Mashona enlarged these subterranean caves, which offered them also plenty of food and water, to protect themselves against their attackers. Reluctant to move into the caves, company soldiers, using smoke and artillery fire, attempted unsuccessfully to dislodge the besieged from the caves. Eventually, they brutally dynamited the Mashona out of their caves, killing many of them.<sup>65</sup> Thus, in the case of a huge military imbalance, often the subterranean dimension only delays the eventual defeat of the NSA.<sup>66</sup>

The study of NSAs should focus on the interaction between militants and the landscape rather than dealing with overly sophisticated theories. For example, the geological landscape, combined with climate conditions, both play an important role in the number of resources (time, money, and expertise) NSAs need to invest in creating useful below-ground sites. The soft clay, sandstone, and limestone soil in South Vietnam is a case in point, since it is extremely suitable for digging. The Viet Cong found it relatively easy to excavate their large, permanent subterranean dwellings in it, especially since it was also stable enough to support these dwellings.<sup>67</sup> The harder laterite soil that is also common in South Vietnam was difficult to dig through, but provided good support for tunnels and bunker pits.<sup>68</sup> The Viet Cong dug tunnels “to provide technical assistance for combat villages and hamlets.” A Vietnamese manual argues that digging tunnels in mountains often requires more time, manpower, and materials due to the great number of rocks and tree roots to be removed. But the tunnels in these areas are strong, few supporting poles are needed, and water is more easily drained.<sup>69</sup>

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<sup>64</sup> Eliakim M. Sibanda, *The Zimbabwe African People's Union, 1961–87: A Political History of Insurgency in Southern Rhodesia* (Asmara: African World Press, 2005), pp. 22–25; Terence Ranger, “Caves in Black and White: The Case of Zimbabwe,” in *Sacred Darkness: A Global Perspective on the Ritual Use of Caves*, edited by Holley Moyes (Boulder: University Press of Colorado, 2012), pp. 312–13.

<sup>65</sup> Ranger, “Caves in Black and White,” pp. 312–13; Terence O. Ranger, *Revolt in Southern Rhodesia 1896–67: A Study in African Resistance* (London: Heinemann, 1967), pp. 272–78.

<sup>66</sup> Ranger, “Caves in Black and White: the Case of Zimbabwe,” pp. 312–13; Ranger, *Revolt in Southern Rhodesia*, pp. 272–78.

<sup>67</sup> Miezian van Zyl, *The Vietnam War: The Definitive Illustrated History* (London: Dorling Kindersley, 2017), p. 134.

<sup>68</sup> Gordon L. Rottman, *Viet Cong and NVA Tunnels and Fortification of the Vietnam War* (London: Bloomsbury, 2012), p. 18.

<sup>69</sup> “Construction of Underground Tunnels,” pp. 2, 3.



Soil with special characteristics poses unique challenges to operatives. The sandy soil of the Gaza Strip facilitates Hamas tunnelling activity on the one hand, but, on the other hand digging tunnels in hollow soil such as sandstone and mudstone requires ongoing maintenance to prevent the tunnels from collapsing after heavy rain. Therefore, Hamas needs to use concrete to strengthen its tunnels. In December 2013, following extreme winter storms, the sandy ground in the Rafah area collapsed, resulting in sinkholes, some of which reached as deep as 6m, and in the collapse of tunnels and of the houses above them, thus exposing Hamas's tunnel network.<sup>70</sup>

### *Warfare Operational Approach and Its Implementation*

NSAs' operational approach refers to the military activity necessary to achieve a strategic goal, such as the establishment of an independent state or regime change. The operational campaign is shaped by the NSAs' strategic goal versus their limited resources.<sup>71</sup> According to the Vietnamese tunnel manual, the subterranean dimension is useful as long as it improves troops' combat capabilities rather than secures their lives.<sup>72</sup> The operational doctrine of both Hezbollah and Hamas focuses on maintaining an ongoing theatre of operations against the Israel Defense Forces (IDF) in order to irritate the IDF and demoralise the Israeli population, exploiting its sensitivity to human loss. The subterranean dimension facilitates such an approach on both the offensive and defensive levels: Hezbollah and Hamas maintain their operational activity by primarily continuing to fire rockets against Israel while avoiding high casualties. Using the subterranean dimension, Hezbollah and Hamas undermine the IDF's strengths in terms of firepower and ground manoeuvres.<sup>73</sup>

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<sup>70</sup> Hana Salah, "Israel Uses Storm to Locate Gaza Tunnels," *Al Monitor*, 27 December 2013, <https://www.al-monitor.com/pulse/originals/2013/12/israel-gaza-winter-storm-locate-tunnels.html> (accessed 19 December 2021).

<sup>71</sup> Eado Hecht, *Introduction to the Art of Conducting War* (Ramat Gan: Private Publication, 2020), pp. 69–71.

<sup>72</sup> "Construction of Underground Tunnels," p. 4; Roi Porat, Rachel Chachy, and Yakov Kalman, "'The Camp that Sits at Herodis': Mount Herodium as a Guerrilla-Warfare Centre during the Bar-Kokhba Revolt," in *New Studies in the Archaeology of Jerusalem and Its Region*, edited by G. D. Stiebel, Joseph (Joe) Uziel, Katia Cytryn Silverman, Amit Re'em, and Yuval Gadot (Jerusalem: The Hebrew University, 2015), pp. 9, 282–83.

<sup>73</sup> Yehuda Bachar, "Coping with the Tunnels' Threat," *The State Comptroller*, February 2015, pp. 6, 5–8.

In 2006, Hezbollah exploited what the IDF termed “nature reserves,” integrating creative thinking, technological development, and state sponsorship.<sup>74</sup> Exploiting Israel’s withdrawal from South Lebanon in 2000, followed by six quiet years along the international border, and assisted by the Iranian Quds Force, Hezbollah constructed subterranean bunkers for its main command in southern Beirut, and for its regional commands in the Beqaa Valley and South Lebanon.<sup>75</sup> South of the Litani River, Hezbollah deliberately stored weapons and ammunition in bunkers beneath civilian residences with the unconcealed objective of protecting these weapon arsenals in the event of an Israeli air strike. Hezbollah also secretly built a remarkable system of subterranean bunkers, 30–50m in depth, in remote wadis and hillsides near the international border (the previously mentioned “nature reserves”).<sup>76</sup>

According to Hezbollah’s operational planning, the nature reserves were part of a defence effort to secure the activity of the short-range rockets apparatus and to undermine IDF ground manoeuvres. The IDF’s Military Intelligence had only a partial picture of Hezbollah’s subterranean infrastructure, which was not shared with combat units for security reasons. During the initial stages of fighting in the Second Lebanon War in 2006, the IDF’s General Headquarters and its Northern Command were hesitant to operate in the “nature reserves,” fearing heavy losses, and especially since the IDF’s operational strategy overly relied on Israel’s air supremacy.<sup>77</sup>

Military technology upgraded the operational readiness of Hezbollah’s subterranean asset. Of 4,000 rockets that Hezbollah fired on Israeli population centres during the 2006 war, one third were fired from dozens of nature reserves. In the open countryside, Hezbollah teams operated short-range rocket launchers (mainly standard and upgraded 122 mm launchers), which they secured to electric-powered platforms that could be raised or lowered from deep holes in the ground. They dug inside thick natural groves or agricultural plantations, making them virtually invisible to air

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<sup>74</sup> Winograd Commission of Inquiry of the Lebanon Campaign 2006 – Interim Report, April 2007, p. 41, <http://www.vaadatwino.gov.il/pdf/%D7%93%D7%95%D7%97%20%D7%97%D7%9C%D7%A7%D7%99.pdf> (accessed 19 December 2021).

<sup>75</sup> Harel and Issacharoff, *34 Days*, pp. 45–48.

<sup>76</sup> *Ibid.*, p. 47; MAITIC, “Hezbollah’s Use of Lebanese Civilians as Human Shields,” pp. 86, 98.

<sup>77</sup> Winograd Commission of Inquiry 2006, p. 41; Harel and Issacharoff, *34 Days*, pp. 132–33; Gal Hirsch, *War Story Love Story* (Tel Aviv: Lamiscal, 2009), pp. 270, 329–30; Amir Rapaport, “The IDF and the Lessons of the Second Lebanon War,” *Mideast Security and Policy Studies* 85 (October 2010): p. 28.

surveillance. Hezbollah operatives fired rockets by means of a remote-control box located in a nearby house. An Israeli rocket expert described this as a clever and innovative method of combining stealth with effective concentration of fire.<sup>78</sup> During their limited ground manoeuvre in South Lebanon, IDF troops uncovered and destroyed only some of the “nature reserves” and rocket firing positions. Hence, Hezbollah’s subterranean installations proved effective in preventing unnecessary losses and also helped the organisation to conduct continuous fire against Israel.<sup>79</sup>

Reviewing the long-time conflicts between Israel and Hamas and Hezbollah, the current study argues that the subterranean dimension reflects the learning processes that dynamic NSAs undergo, consequently affecting their operational plans. Based on prior clashes with the IDF, both Hezbollah and Hamas regard cross-border tunnels as a means to shift the battle into Israeli territory without engaging the stronger IDF above ground:<sup>80</sup>

- During Operation Northern Shield (December 2018–January 2019), the IDF exposed and destroyed six tunnels that, from 2014, the Lebanese Hezbollah had dug into Israel under the northern border with Lebanon. These tunnels were not yet operational. Hezbollah had probably planned to use the tunnels to surprise Israel by launching a ground attack that would include infiltration of Israeli villages and military camps, accompanied by the main threat of massive rocket fire on the Israeli home front.<sup>81</sup> On the tactical level, Hezbollah’s combat tunnels correspond directly with the Mao perception that surprise, planning, and initiative enable an inferior force to break away from its relative strategic inferiority and gain local superiority over a stronger foe. However, Hezbollah constructed tunnels in an area that was under its control while Mao discusses operations in areas that were the subject of armed conflict between Japan and

<sup>78</sup> Winograd Commission of Inquiry 2006, p. 31; Nicholas Blanford, *Warriors of God: Inside Hezbollah’s Thirty-Year Struggle against Israel* (New York: Random House, 2011), pp. 339–41; Uzi Rabin, “The Rocket Campaign against Israel during the 2006 Lebanon War,” *BESA* (June 2007): pp. 8–9.

<sup>79</sup> Winograd Commission of Inquiry 2006, pp. 95, 166; Blanford, *Warriors of God*, pp. 329–36.

<sup>80</sup> State Comptroller, “Operation Protective Edge,” 28 February 2017, p. 94; Bahmanyar, *Afghanistan Cave Complexes*, p. 15.

<sup>81</sup> Orna Mizrahi, “Operation Northern Shield: Interim Assessment,” *INSS Insight* 1127 (8 January 2019), p. 1.

Chinese guerrilla fighters.<sup>82</sup> Hezbollah tunnels are 1–2.4 m wide and 2–3 m high, indicating that Hezbollah planned to send large numbers of fighters into Israel (see Fig.4).<sup>83</sup> Mizrahi notes that had Hezbollah’s plan succeeded, it would have had only a small impact on the overall war. Nevertheless, the IDF would have had to invest resources to address the challenge, which would also have had a psychological effect and allowed Hezbollah to boast a dramatic victory.<sup>84</sup> Brun and Shapira argue that alongside other elements, Hezbollah’s use of combat tunnels is part of a fundamental change from a doctrine based on attrition of the Israeli population to a different doctrine that also seeks to damage Israeli national infrastructure and essential military capabilities in order to throw the Israeli military system off balance. Still, it is not clear how tactical tunnels risk Israel strategic assets.<sup>85</sup>

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<sup>82</sup> Tse-Tung, *Military Writings*, p. 237; Alexandra Lukash and Moran Azoulay, “I Warned about Hezbollah Tunnels, the Army Boycotted Me and Evicted Me,” *Ynet*, 4 December 2018, <https://www.ynet.co.il/articles/0,7340,L-5419736,00.html> (accessed December 19, 2021).

<sup>83</sup> Yoav Zeitun, “Documentation from Hezbollah’s “Flagship Tunnel” at a Depth of 80 m,” *Ynet*, 29 May 2019, <https://www.ynet.co.il/articles/0,7340,L-5517396,00.html> (accessed 19 December 2021).

<sup>84</sup> Mizrahi, “Operation Northern Shield,” p. 1.

<sup>85</sup> Itai Brun and Itai Shapira, “The Operational Environment: New Capabilities of the Radical Shiite Axis,” in *Strategic Survey for Israel 2019–2020* (Tel Aviv: The Institute for National Security Studies, 2020), p. 3.

Figure 4: Drilling machine used by Hezbollah in cross-border tunnel that was exposed by the IDF.



Source: The IDF Spokesman, January 2019.

Hamas views the outcome of the June 2006 kidnapping of the Israeli soldier Gilad Shalit through a cross-border tunnel as a strategic success. In October 2011, Israel exchanged 1,027 Palestinian prisoners in return for one Israeli soldier. Hamas was thus encouraged to conduct similar operations and prioritised the digging of offensive tunnels.<sup>86</sup> The ability of Hamas artillery to reach Israeli towns and villages was eventually crippled by the new Israeli anti-rocket technology (the Iron Dome missile defense system). As a consequence, Hamas sharply escalated its investment in offensive tunnels.<sup>87</sup> Despite the destruction by Israeli forces of Hamas's offensive tunnels and also a portion of their defensive

<sup>86</sup> Amad.ps, "Ahmad Al-Ja'bari – From Fatah To The 'Izz Al-Din Al-Qassam Brigades," 15 November 2012, MEMRI, <https://www.memri.org/reports/ahmad-al-jabari-%E2%80%93-fatah-izz-al-din-al-qassam-brigades> (accessed 19 December 2021).

<sup>87</sup> Elior Levy, "Hamas Reconstructing Terror Tunnels Using Israeli Materials," *Ynet*, 19 December 2014, <https://www.ynetnews.com/articles/0,7340,L-4605504,00.html> (accessed 19 December 2021).

tunnels, during the summer 2014 war between Israel and Gaza, Operation Protective Edge, the advantages of the subterranean dimension was a central lesson learned by Hamas and the other Palestinian military organisations in Gaza. Consequently, they intensified their investment in this dimension.<sup>88</sup> A member of the Hamas tunnels unit elaborated about combat tunnels:

The Al-Qassam Brigades use the tunnels for a number of military missions, such as: firing rockets on Israeli cities, firing massive barrages of hundreds of mortar shells on the settlements around the Gaza Strip and carrying out quality operations behind enemy lines that have resulted in the killing and capture of soldiers and terrorised millions of Israelis.<sup>89</sup>

The offensive tunnels would have enabled Hamas operatives to penetrate up to 1 km inside Israel.<sup>90</sup> Israel responded by building an underground wall to block tunnelling and improving tunnel-locating sensors. Table 1 presents nine of the twenty-plus Hamas (and Hezbollah) offensive tunnels that the IDF exposed and attacked in the past five years. During Operation Guardian of the Walls in May 2021, Hamas failed to use offensive tunnels against Israel. However, throughout this operation, defensive tunnels allowed Hamas to keep firing rockets against Israel's home front almost undisturbed, 4,360 rockets in total.<sup>91</sup>

A few militant NSAs have adopted the subterranean dimension to such a level that it has become dominant in their operational approaches and required significantly larger investments. These NSAs fight their enemies via the subterranean dimension inclusively rather than employing the subterranean dimension ad hoc.<sup>92</sup> To illustrate this point, for the Uruguayan left-wing Tupamaros activity in the sewers in the 1960s

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<sup>88</sup> Al Quds TV, "TV Report on Hamas Tunnel-Digging Unit in Gaza," 17 March 2018, Catalog no. 6478, MEMRI, <https://www.memri.org/tv/report-hamas-tunnel-digging-unit-gaza-resistance-like-blood-through-their-veins> (accessed 19 December 2021).

<sup>89</sup> Al-Risalah, "Hamas' Construction of Gaza Tunnels Continues," 23 October 2014, MEMRI, <https://www.memri.org/reports/hamas-construction-gaza-tunnels-continues> (accessed 19 December 2021).

<sup>90</sup> Al Quds TV, "TV Report on Hamas Tunnel-Digging Unit in Gaza."

<sup>91</sup> Itai Brun, "Operation Guardian of the Walls: Two Parallel Dimensions and Three Stark Surprises," *INSS Insight* 1469 (23 May 2021), <https://www.inss.org.il/publication/war-in-two-dimensions/> (accessed 19 December 2021).

<sup>92</sup> The State Comptroller, "Operation Protective Edge," p. 92.

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was not a onetime tactical move, but an operational doctrine. According to Mallin, the Tupamaros used Montevideo's sewer system to move around the city, stealing maps of the system from a municipal department in order to be thoroughly familiar with it.<sup>93</sup> They booby-trapped sewer hatches to intimidate searchers and to provide warnings when the authorities were entering the sewers. The Tupamaros dug out dozens of subterranean rooms in various parts of the city which served them as hospitals, printing offices, arms depots, and jails for kidnapped victims. From these subterranean guerrilla bases, Tupamaros operatives launched their terror attacks, which included political assassinations, kidnapping of foreign diplomats and prominent Uruguayans, and bank and casino robberies.<sup>94</sup> Mallin explained how the Tupamaros developed their subterranean system:

They would rent a house and build their hideout underneath, cleverly concealing the entrance to it. From the hideout they would then sometimes burrow to a nearby sewer to provide a new entrance, then close the original entrance and abandon the house. Innocent people would then rent it, unaware that the Tupamaros were operating beneath their home.<sup>95</sup>

The Tupamaros exemplified, for a short time, militant NSAs that adopted an operational approach that did not fit their military capabilities and endangered their campaign. The Tupamaros adopted an operational approach that did not equate with their capabilities. Tupamaros leaders were attentive to Castro's and Guevara's advocating of rural guerrilla warfare, and in the late 1960s they planned to move into the countryside, and even built underground bunkers.<sup>96</sup> However, the geography of Uruguay—a plain country lacking mountainous zones, with eighty-four percent of the population living in the cities—and the failure to generate help from the peasantry encouraged the Tupamaros to refocus their activity in Montevideo. The effective operational and logistic uses of the sewer system enabled the Tupamaros to maintain

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<sup>93</sup> Laqueur, *Guerrilla Warfare*, pp. 350–52.

<sup>94</sup> Jay Mallin, "A Counter-Terror Campaign by Uruguay's Armed Forces against the Tupamaros Proved to Be Remarkably Effective," *Terrorism: Hearings before the Committee on Internal Security, House of Representatives, Ninety-third Congress, second session, 30 May 1974*, pp. 3282–86; Laqueur, *Guerrilla Warfare*, pp. 350–52; "Walls that Speak," *LaLadaria*, 4 November 2014, <http://ladiaria.com.uy/articulo/2014/11/paredes-que-hablan/> (accessed 19 December 2021).

<sup>95</sup> Mallin, "A Counter-Terror Campaign by Uruguay's Armed Forces," p. 3286.

<sup>96</sup> *Ibid.*

their urban stronghold to the level of almost an alternative government, in contrast to most Latin America NSAs which were rural-oriented.<sup>97</sup>

Eventually, the decision of the Uruguayan leadership to put the army in charge of the battle against the Tupamaros, rather than the weak police force, and the valuable intelligence the security forces acquired from Tupamaros detainees, facilitated the exposure of the insurgents' subterranean infrastructures, including caches of arms and supplies, leading to arrests of many leaders and operatives. By late 1972, the Uruguayan dictatorship had defeated the Tupamaros.<sup>98</sup> Guillen argues that the Tupamaros' seemingly successful use of the subterranean dimension led instead to a strategic disaster. The underground "prison of the people," as they called it, did more harm than benefit to the cause of national liberation, as people viewed it as another system of repression.<sup>99</sup>

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<sup>97</sup> Ibid., pp. 3284–86; Carlos Lopez Matteo, *Generals and Tupamaros: The Struggle for Power in Uruguay 1969–1973* (London: Latin America Review of Books, 1974), pp. 46–48.

<sup>98</sup> Laqueur, *Guerrilla Warfare*, p. 352; Mallin, "Counter-Terror Campaign by Uruguay's Armed Forces," pp. 3287–3288; Mallin, *Generals and Tupamaros*, pp. 44–46.

<sup>99</sup> Abraham Guillen, "Urban Guerrilla Strategy," in *The Guerrilla Reader: A Historical Anthology*, Walter Laqueur (Philadelphia: Temple University Press, 1977), p. 234.



**Table 1.** Hamas PIJ (Palestinian Islamic Jihad) and Hezbollah's Combat Tunnels

	Date of discovery by the IDF	Organisation	Total length (in km)	Tunnel's length inside Israel (in m)	Depth (in m)	Tunnels' entry points
1.	4/2016	Hamas	1	Dozens	30	Central part of Gaza Strip
2.	10/2017	Hamas & PIJ			26	Southern part of Gaza Strip
3.	12/2017	Hamas		Hundreds		Southern part of Gaza Strip
4.	1/2018	Hamas	1.5	180	28	Kerem Shalom border passage
5.	4/2018	Hamas	a few	20	a few	Northern part of Gaza Strip
6.	5/2018	Hamas	2.9	900		Kerem Shalom border passage
7.	12/2018	Hezbollah	0.2	40	25	Kfarkela, South Lebanon
8.	1/2019	Hezbollah	1	77	80	Ramyeh, South Lebanon
9.	10/2020	Hamas	1	Dozens	Dozens	Southern part of Gaza Strip

Source: This table is based mainly on the IDF Spokesman's statements.

The present research has recorded cases in which a change in the operational approach of an NSA led to a change in the scope or nature of the utilisation of the subterranean dimension. For example, in the first years of the civil war in Syria and during the ISIS expansion in Iraq, ISIS and Syrian opposition groups had limited interest in the subterranean dimension, as they practiced conventional warfare and launched offensive campaigns. In the face of a stalemate in battle, they started digging explosive-filled offensive tunnels to destroy enemy strategic and tactical sites.<sup>100</sup> From 2015, militant NSAs in Syria and Iraq escalated the utilisation of the subterranean

<sup>100</sup> Shay, "The Islamic State and the Subterranean Warfare," pp. 2–4.

dimension in the framework of defensive campaigns practiced against their numerous enemies. They dug defensive systems to find refuge from the superior firepower, especially aerial, of their enemies (Syria, Russia, and the United States).<sup>101</sup> Combating advancing enemy troops, ISIS and other opposition groups exploited tunnels also to execute guerrilla attacks.<sup>102</sup>

### *Guerrilla Bases*

The operational approach of NSAs includes a sub-subject that deserves separate discussion, specifically, guerrilla bases and control over territory. Mao defined a guerrilla base as ‘an area, strategically located, in which the guerrillas can carry out their duties of training, self-preservation and development,’ meaning that to prevail, a guerrilla movement must hold base areas.<sup>103</sup> Van Creveld notes that NSAs establish guerrilla bases in remote and hard to access parts of the country.<sup>104</sup> This study has recorded subterranean facilities that are critical for operational planning and force build-up in many guerrilla bases. For instance, in the 1970s the pro-Syrian Popular Front for the Liberation of Palestine (PFLP-GC) constructed a below-ground camp in the Al Na’amah Hills south of Beirut. Using the military engineering background of the former PFLP-GC secretary-general Ahmed Jibril, and exploiting Palestinian and Syrian control over a large part of Lebanon, the PFLP-GC constructed a remarkable facility in natural caves and in artificial subterranean tunnels sunk into mountainsides. The Al Na’amah camp served as the headquarters, as Jibril’s personal living quarters, as a training base, and as an arms storage facility. It was located near Syrian forces in a staging area from which the PFLP-GC conducted spectacular terror attacks in northern Israel.

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<sup>101</sup> Ibid., pp. 4, 6.

<sup>102</sup> Ahmed Rasheed, Saif Hameed, and Isabel Coles, “Iraqi Troops Pull out from Mosul Hospital after Fierce Battle,” *Reuters*, 6 December 2016, <https://www.reuters.com/article/us-mideast-crisis-iraq-idUSKBN13X1EI> (accessed 19 December 2021); Elad Bartov and Gidon Shereb, “What ISIS Can Teach Hamas and What the IDF Can Learn from Both of Them,” *The Battles Series*, 7 July 2020, <https://www.buzzsprout.com/936223/4468424-4> (accessed 19 December 2021).

<sup>103</sup> Tse-Tung, *On Guerrilla Warfare*, p. 107.

<sup>104</sup> Van Creveld, *Changing Face of War*, p. 213.

Protected by tons of earth, the camp withstood constant Israeli air strikes.<sup>105</sup> Therefore, in December 1988, an Israeli infantry unit raided the PFLP-GC subterranean base killing dozens of militants and inflicting damage, but they failed to access Jibril's bunker and the commander of the Israeli team was killed.<sup>106</sup> While the Al Na'amah base protected its occupants from aerial fire and the camp still exists, the PFLP-GC in Lebanon has very limited operational capabilities and is politically irrelevant.<sup>107</sup> The Al Na'amah tunnels put into perspective the role of the subterranean dimension. By themselves tunnels and bunkers cannot promise the NSAs victory as political elements overshadow the conflict between states and NSAs.

During the Cold War, NSAs built guerrilla bases in neighbouring countries that openly supported their struggles or turned a blind eye. Often these bases were located near the border with the enemy state and contained below-ground structures that served as shelter against air bombardments and as weapons storages. In 1976, the Communist Party of Malaya (CPM), which struggled to overthrow the Malaysian government, constructed a guerrilla base deep in the tropical rain forest near the Thailand-Malaysia border (today, the Khao Nam Khang National Park, see Fig. 5).<sup>108</sup> This base featured a large facility beneath the ground. Some two hundred CPM members excavated a three-level tunnel, each level measuring 2 m in height and 1.5 m in width. It has a total length of about 1 km with sixteen entrances. It included a conference room, a telegraph room, a medical operating theatre, a typing room, a shooting range, a kitchen, sleeping berths, and motorcycle paths.<sup>109</sup> This underground base protected CPM members against the Malaysian air force and artillery.

The remarkable design of this shelter raises the possibility that the Vietnamese shared knowledge with the CPM. Yet, lacking Chinese help and public support in

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<sup>105</sup> Samuel M. Katz, *Israel Versus Jibril: The Thirty-Year War against a Master Terrorist* (New York: Paragon House, 1993), pp. 166–67; Blanford, *Warriors of God*, p. 335.

<sup>106</sup> Katz, *Israel Versus Jibril*, pp. 167–183; Michael Bar-Zohar and Nissim Mishal, *Great IDF Operations* (Tel Aviv: Miskal, 2013), pp. 204–10.

<sup>107</sup> Radwan Aqil, "An Nahar Visits PFLP-GC Positions Recently Struck by Israel," *Al Nahar*, 2 January 2006, <http://lists.mcgill.ca/scripts/wa.exe?A2=ind0601a&L=fofognet&T=0&F=P&S=&P=299> (accessed 19 December 2021); Peter Shadbolt, "Israel Launches Rocket Attack on Lebanon," *CNN*, 23 August 2013, <http://edition.cnn.com/2013/08/22/world/meast/israel-lebanon-airstrike/> (accessed 19 December 2021).

<sup>108</sup> Khao Nam Khang Tunnel, Written by Former CPM Comrade (the Khao Nam Khang National Park, 2000).

<sup>109</sup> Author's visit to the Khao Nam Khang National Park, July 2016; Khao Nam Khang Tunnel.

Malaysia, and having split into three fractions, the CPM had no future. In 1989, following the signing of a peace agreement with the Malaysian and Thai governments, the communist guerrillas left the Khao Nam Khang base.<sup>110</sup> The story of the CPM demonstrates that underground shelters by themselves cannot guarantee NSAs' strategic victory.

Figure 5: Meeting room in the Khao Nam Khang tunnels constructed by the Malaysian communist party in south Thailand.



Source: Author's photograph (July 2016).

### *Technology*

Van Creveld argues that the longer the war the greater the role of military activities other than conventional fighting, and the greater the role of technologies that impinge on these activities or govern them. The use of the subterranean dimension by

<sup>110</sup> Sudkir T. Vadaketh, *Floating on a Malayan Breeze in Malaysia and Singapore* (Hong Kong: Hong Kong University Press, 2012), p. 23.

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militant NSAs demonstrates this argument.<sup>111</sup> Technology has shaped the connection between militant NSAs and the subterranean dimension in various ways: current NSAs have better access to the subterranean dimension and enjoy more courses of action because of new knowledge in geology and innovative mining technologies such as drilling tools and techniques, and better safety and health measures, as well as subterranean transportation. Tunnels have become a more lethal tool due to the employment of new weapons systems as well as of new communication and electronic developments.<sup>112</sup>

The history of conflicts between states and NSAs indicates that in antiquity and in the Middle Ages militant groups working with hoe blades and bamboo shovels utilised natural caves and tunnels and occasionally redesigned them to make them more operational.<sup>113</sup> Nowadays, especially from the Cold War era onward, a small number of militant NSAs, which enjoyed foreign aid in terms of money, experts, and equipment and acquired engineering machines, have built remarkable subterranean facilities that have significantly improved their operational readiness.<sup>114</sup>

Table 2 compares between contemporary combat tunnels and a major Vietnamese combat tunnel. Technology may be the main reason Hezbollah and Hamas tunnels are deeper and larger than the Vietnamese tunnel, however, for intruders the Vietnamese tunnel is more lethal because of its shape and structure.

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<sup>111</sup> Van Creveld, *Technology and War*, p. 312.

<sup>112</sup> Shaul Shay, "The Subterranean Warfare," *Maarahot* 389 (May 2003): p. 36; National Research Council, *Evolutionary and Revolutionary Technologies for Mining* (Washington, DC: National Academy Press, 2002), pp. 23–28.

<sup>113</sup> David Nicolle, *The Armies of Islam 7th-11th Centuries* (London: Osprey, 1982), pp. 18–20.

<sup>114</sup> Hamas, "'End of Discussion.' Video Clips Released by Izz Al Din Al Qassam Brigades," Catalog no. 5058, 26 August 2014, MEMRI, <https://www.memri.org/tv/video-clip-presents-footage-hamass-tunnel-digging-unit> (accessed 19 December 2021); Mizrahi, "Operation Northern Shield," p. 1.

**Table 2.** Combat Tunnels in Vietnam and Present-Day Tunnels

	Features	Viet Cong An Thoi (Tay Ninh Province)	Hamas & PIJ in Gaza Strip	Hezbollah in South Lebanon	ISIS in Iraq (IR) & in Syria (SY)
1.	Soil	Limestone, clay	Sandstone	Dolomite	Limestone
2.	Support	Poles	Concrete plates	Concrete plates	Concrete plates in some tunnels
3.	Height in m	1.2–1.5	1.8	2–3	2 (IR) 3.5 (SY)
4.	Width in m	0.8–1	1	1–2.4	3 (SY)
5.	Depth in m	3–4	30	80	7(SY)
6.	Levels	1	1	1	1
7.	Passages’ shape	Zig-zag	Straight	Straight	
8.	Traps inside and outside the tunnel	+	-	-	+
9.	Tunnel entrance	Bushy area, private houses	Private houses & public buildings	Private houses	Private houses
10.	Function	Combat	Attack targets in Israel	Attack targets in Israel	Shelter, guerrilla attacks
11.	Builders	Villagers & Viet Cong	Paid workers & operatives	Operatives	Enslaved workers

Modern technologies encourage NSAs to renovate old underground structures, making them more useful and lethal. The Al Zhawar subterranean base has become a symbol for the Afghan Mujahedin war against the Soviet occupation and for the rise of the Al Qaeda terror group. In 1981, the Mujahedin established this base in a deep canyon in the rugged terrain near Khost, 4 km from the Pakistani border, along the major supply line from Pakistan. They used this base for shelter from Soviet artillery

and airstrikes from Kabul and for storing arms shipments coming from Pakistan.<sup>115</sup> In late 1985, the CIA and the Pakistani Inter-Services Intelligence (ISI) helped the Afghan Mujahedin, including the Gulbuddin Hekmatyar group and Jalaluddin Haqqani, to renovate this base with greater attention to defensive details. Al Zhawar was now the largest and best-defended secret guerrilla base of the Afghan Mujahedin, in which the ISI was also strongly involved.<sup>116</sup>

In early 1986, a combined Soviet and Afghan communist force of 12,000 soldiers attacked the camp, using close air support and concentrated artillery. The attackers captured Al Zhawar and blew up a number of caves and some equipment, but after a few hours they withdrew to their garrisons due to insufficient numbers and military priorities elsewhere. The Mujahedin were soon back to operate the base again.<sup>117</sup> Following another Soviet attack in 1987, and using his resources and engineering skill, Osama bin Laden helped in the reconstruction of the camp and several nearby facilities. Bin Laden brought bulldozers and explosives from Pakistan in order to dig at least eleven major tunnels with an overall length of 500 m.

The expanded Al Zhawar base contained a training area and sleeping quarters, and inhabited a few hundred al Qaeda and Taliban personnel.<sup>118</sup> The base had ordnance stores, a machine workshop, a mosque, a hospital, a radio station, a library, and even a bakery, and a hotel for foreign visitors.<sup>119</sup> Al Zhawar was a product of Afghanistan's unique landscape and of Al Qaeda's competence in exploiting modern technology to improve its operational readiness.

Technology is also connected to the illegal trade that often succours the development of subterranean capabilities by militant NSAs. The Hamas military command has invested significant effort to acquire cement, concrete (they reinforce

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<sup>115</sup> Bahmanyar, *Afghanistan Cave Complexes*, p. 51.

<sup>116</sup> Scott Gates and Roy Kaushik, *War and State-Building in Afghanistan: Historical and Modern Perspectives* (London: Bloomsbury, 2014), p. 140; Robert Johnson, *The Afghan Way of War: How and Why They Fight* (Oxford: Oxford University Press, 2011), pp. 210–19.

<sup>117</sup> Bruce Riedel, *What We Won: America's Secret War in Afghanistan, 1979–89* (Washington, DC: Brookings Institute, 2014), pp. 52–54; Ali S. Mahmud, *US-China Cold War Collaboration, 1971–1989* (Abingdon: Routledge, 2005), p. 185; Mir Bahmanyar, *SEALs: The US Navy's Elite Fighting Force* (Oxford: Osprey, 2009), p. 120.

<sup>118</sup> Bahmanyar, *Afghanistan Cave Complexes*, pp. 14, 51.

<sup>119</sup> Bahmanyar, *SEALs: The US Navy*, pp. 120–34; Gates and Kaushik, *War and State-Building in Afghanistan*, p. 140; Johnson, *Afghan Way of War*, pp. 210–19.

tunnels with concrete plates), and iron, as well as engineering machines such as bulldozers and jackhammers to rebuild remarkable new tunnels and subterranean bunkers.<sup>120</sup> Exploiting its control over the Gaza Strip from 2007, Hamas has seized a large portion of the construction materials (i.e., cement, iron, and wood) that international aid organisations had sent for the reconstruction of the Gaza Strip, primarily following IDF's Operation Protective Edge in July–August 2014.<sup>121</sup> Based on numerous sources, the Israel Security Agency argues that Hamas has appropriated tons of iron and wood from civilian iron and wood storages. Using the black market, Hamas purchases cement and at the same time, using violent means, Hamas seizes cement supplies that are allowed into the Gaza Strip for reconstruction and aid for the civilian population. Hamas exploits these materials to construct new combat and concealment tunnels and bunkers and to restore others. Modern technology has facilitated Hamas's utilisation of the subterranean dimension and its efforts to build up military force.<sup>122</sup>

Modern technologies offer NSAs more opportunities to utilise the subterranean dimension for both military and civilian purposes. Hamas, for example, employs smuggling networks of Gaza-based merchants who are allowed to visit Israel, and of traders and transporters who are citizens of Israel. In early 2015, for example, the Israeli Security Agency exposed a Palestinian-Israeli association that smuggled tons of raw materials and equipment worth millions of dollars from Israel and abroad into the Gaza Strip. They smuggled tons of iron, cement, engines, compressors, drills, steel cables, and communication cables for the build-up of the Hamas military force, including the construction of tunnels. Hamas facilitators stored the contraband in Israel and transported them into Gaza Strip via the Kerem Shalom Passage.<sup>123</sup> In August 2020, the IDF spokesman noted that the Israeli Air Force had attacked a concrete production

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<sup>120</sup> Gabi Siboni and A.G., "Will Hamas Be Better Prepared during Its Next Confrontation with Israel? Insights on Hamas' Lessons from Operation Protective Edge," *Military and Strategic Affairs* 7, no. 2 (September 2015): pp. 82–84.

<sup>121</sup> Hertzi Halevy, Head of the IDF Military Intelligence Directorate, "Intelligence Review and Assessment," (Lecture at the 17th Herzliya Conference, 22 June 2017); Levy, "Hamas Reconstructing Terror Tunnels."

<sup>122</sup> Israel Security Agency, "Massive Unlawful Military Buildup Effort by Hamas."

<sup>123</sup> Israel Security Agency, "A Smuggling System through the Kerem Shalom Passage Was Exposed,"



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facility in the Gaza Strip, which may indicate that Hamas is attempting to become self-sufficient in the acquisition of concrete.<sup>124</sup>

As in the past, militant NSAs also plunder equipment to construct subterranean facilities. In 2012, in the rugged Tigharghar Mountain chain in northeast Mali, along its Algerian border, Al Qaeda in the Islamic Maghreb (AQIM) used bulldozers, earth movers, and a Caterpillar machine left behind by fleeing French construction crews in order to dig an elaborate network of tunnels, trenches, shafts, and ramparts. The integration between the hostile nature of the terrain and heavy engineering tools facilitated the establishment of this AQIM sanctuary.<sup>125</sup>

Offensive tunnels reflect the connection between new military technology and the subterranean dimension. Technology makes the subterranean dimension a more lethal weapon serving NSA operations. Improvised Explosive Devices (IEDs) are explosive charges that are not made in an official factory, implying, for instance, lower safety standards and usually less explosive energy per weight of bomb. The weapons most commonly employed by NSAs around the globe continue to be small arms and light weapons, but the use of remote-controlled booby-traps and suicide-activated explosive charges by NSAs is perhaps the most important development in the nature of the armaments of NSAs in modernity.<sup>126</sup> IEDs are a means by which NSAs can counter-balance their military inferiority against national armies. While armies were already using tunnel mining intensively in World War One, NSAs employ booby-trapped tunnels against their enemies in methods that were not accessible before, and these tunnels have become an effective guerrilla tactic, with NSAs detonating tunnels from a safe place.<sup>127</sup> For example, one of the favourite tactics of the Maoist Naxal, which launched guerrilla warfare against the Indian security forces in east and central India, was booby-trapped tunnels. In April 2016, the Naxal killed seven Indian security forces operatives by detonating a 40–50 kg explosive device 1.8 m beneath a road, destroying a

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p. <sup>124</sup>. Yoav Zeitun, "IDF Spokesman: We Attacked Concrete Production Site," *Ynet*, 20 August 2020, <https://www.ynet.co.il/Ext/Comp/ArticleLayout/CdaArticlePrintPreview/0,2506,L-5784923,00.html> (accessed 19 December 2021).

<sup>125</sup> Rukmini Callimachi, "Al-Qaida Carves out Own Country in Mali, Prepares to Defend It," *AP*, 15 January 2013, <https://www.citynews1130.com/2013/01/15/al-qaida-carves-out-own-country-in-mali-prepares-to-defend-it/> (accessed 19 December 2021).

<sup>126</sup> David Capie, *Small Arms Production and Transfers in Southeast Asia* (Canberra: Australian National University, 2002), p. 188.

<sup>127</sup> Paul Wilkinson, ed., *Technology and Terrorism* (New York: Taylor and Francis, 2012), p. 2.

police vehicle. The tunnel was dug from a nearby culvert, and the IED was triggered from 94 m away.<sup>128</sup>

These examples illustrate that militant groups exploit modern engineering and military technologies to improve their operational and logistic capabilities.

### *Relationship between NSAs and the Civilian Population*

Lawrence argues that a militant group must embed in a friendly population, not necessarily actively friendly, but sympathetic to the point of not betraying the militant movement to the enemy.<sup>129</sup> The present study reveals that in many historical cases, such as in the face of extinction and deportation, the use of the subterranean dimension by militant NSAs was part of a national effort, and both militants and non-activists cooperated. Rarely, militants, insurgents, and terrorists built below-ground structures with their own resources. The subterranean dimension reflects different types of relations between militant NSAs and the civilian population.<sup>130</sup> People committed to the cause supported the construction and maintenance of subterranean facilities, while others were mobilised and even enslaved to dig tunnels. The Vietnamese tunnel manual, for example, argues that “the task of digging underground tunnels depended mainly upon the ability of the people in local areas.”<sup>131</sup> At the same time, in a hostile environment, subterranean sites can be the target of locals who reject the resistance.<sup>132</sup> Table 2 provides details about builders of different combat tunnels. Differences between these builders illustrate diverse types of relations between militants and civilians.

The study of NSAs should focus on their relations with the local people because the support of the people compensates to some extent for NSAs’ military weakness.

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<sup>128</sup> “Dantewada Blast: Naxals Put Up Deliberate Ambush; Shot 3 Men,” *Deccan Herald*, 1 April 2016, <https://www.deccanherald.com/content/537956/dantewada-blast-naxals-put-uhtml> (accessed 19 December 2021).

<sup>129</sup> Thomas E. Lawrence, “The Lessons of Arabia,” in Laqueur, *Guerrilla Reader*, p. 138.

<sup>130</sup> Shvitiel, *Rocks Shelters and Hiding Complexes*, p. 227; Dreifuss, *Warsaw Ghetto*, pp. 520–25.

<sup>131</sup> “Construction of Underground Tunnels in Combat Villages and Hamlets,” p. 2.

<sup>132</sup> Amanda Erickson, “The Islamic State Has Tunnels Everywhere. It’s Making ISIS Much Harder to Defeat,” *The Washington Post*, 14 April 2017, <https://www.washingtonpost.com/news/worldviews/wp/2017/04/14/the-islamic-state-has-tunnels-everywhere-its-making-them-much-harder-to-defeat/> (accessed 19 December 2021); Ernesto Che Guevara, *The Diary of Che Guevara. Bolivia: November 7, 1966–October 7, 1967* (New York: Bantam Books, 1968), pp. 27–28, 157.

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Mao argues that “political mobilisation” of the people is the most fundamental factor in winning a protracted war against a powerful invader. The civilian population can provide soldiers, food, supplies, shelter, and intelligence to the militant NSAs.<sup>133</sup> In the Sino-Japanese War (1937–1945), the old Chinese cave-dwelling culture was used by a well-disciplined NSA in order to mobilise the civilian population into resisting the occupying force by using the subterranean dimension. Golani notes that Chinese cave-dwelling, distributed over the northern and north-western parts of the country, dates to earlier than 2000 BCE and may have preceded the appearance of above-ground housing.<sup>134</sup> Against this background, in October 1935, at the end of the Long March, Mao Zedong turned Yan’an—a city with a long history of man-made subterranean structures—into his own headquarters and the headquarters of the Chinese Communist Party (CCP) until 1947. Japanese bomber air raids and the influx of war refugees escalated the construction of below-ground shelters in Yan’an. Exploiting the loess soil in the region, the CCP dug 30,000 caves for dwelling and offices and constructed an extensive network of connecting tunnels.<sup>135</sup>

From 1938, directed by the CCP, the 115th Division of the Eight Road Army organised anti-Japanese resistance by local villagers in northeast China. The Hebei Plain is a good case in point. Central Hebei, the heart of the plain, provided operatives with little cover in case the Japanese army entered the region. Therefore, local villagers dug tunnels that originated in areas close to Japanese strongholds in the form of caves and cellars, intended for hiding and for storing ammunition and food. The tunnels became increasingly elaborate and extensive, connecting first several families and then whole villages.<sup>136</sup> A system of tunnels linked hundreds of villages in the Central Hebei Military Region, making it a model for an anti-Japanese base area behind enemy lines. According to one report the tunnels were big enough to house the people together with their livestock and their provisions (primarily the Boaing Ranzkuang tunnel).

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<sup>133</sup> Tse-Tung, *Selected Military Writings*, p. 228.

<sup>134</sup> Gideon S. Golany, *Chinese Earth-Sheltered Dwellings: Indigenous Lessons for Modern Urban Design* (Honolulu: University of Hawaii Press, 1992), pp. 2–10, 41, 52–53.

<sup>135</sup> *Ibid.*; Michael Lynch, *Mao* (London: Routledge, 2004), pp. 107–08.

<sup>136</sup> Gatu Dagfinn, *Village China at War: The Impact of Resistance to Japan 1937–1945* (Copenhagen: Nias, 2006), p. 37; Yuwu Song, ed., *Biographical Dictionary of the People’s Republic of China* (Jefferson, NC: McFarland, 2013), p. 227; Edward Friedman, Paul G. Pickowicz, and Mark Selden, *Chinese Village, Socialist State* (New Haven: Yale University Press, 1991), pp. 38–39.

In May 1942, the Japanese seized the communist guerrilla base, forcing the Eight Road Army to retreat from central Hebei. Marshal Nie Rongzhen, the commander of the Shanxi-Qahar-Hebei Military Area, recalled that “digging tunnels and building hollow walls at home, the villagers had tried every possible means to hide our wounded soldiers.”<sup>137</sup> The tunnels facilitated guerrilla operations against the much stronger and better equipped Japanese army, but could not withstand a ruthless enemy free and willing to apply even the most inhuman measures.<sup>138</sup>

Contemporary writing about the Warsaw ghetto uprising (April–May 1943) against the Germans emphasises the impact of the Jewish civilian population alongside the two Jewish resistance groups, the Jewish Fighting Organisation (ZOB) and the Jewish Military Organisation (ZZW).<sup>139</sup> More than in other ghettos, in Warsaw Jews were committed to resist the German atrocities, and the subterranean dimension reflects their role. Following the great deportation of 270,000 Jews from the ghetto to Treblinka death camp in July–September 1942, many of the 40,000 remaining Jews regarded the subterranean dimension as their last hope. Jewish engineers and technicians designed hundreds of bunkers and shelters; wealthy people built larger and better furnished bunkers and acquired weapons to defend themselves.<sup>140</sup>

The ZOB leadership did not regard bunkers as an encouragement to its members to fight to the end. Jewish resisters used “civilian” bunkers for shelter, and they turned cellars into bunkers interlinking them via passages, using them effectively as an integral part of urban guerrilla warfare.<sup>141</sup> Gutman recalled that the ZOB commander, Mordechai Anielewicz, asked him to make sure that the ZOB could use a bunker in the central ghetto that Gutman had constructed with his neighbours, intending its use for

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<sup>137</sup> Nie Rongzhen, *Inside the Red Star: The Memoirs of Marshal Nie Rongzhen* (Beijing: New World Express, 1988), p. 462.

<sup>138</sup> Friedman et al., *Chinese Village*, pp. 44–47; Laqueur, *Guerrilla Warfare*, p. 263.

<sup>139</sup> Barbara Engelking and Jacek Leociak, *The Warsaw Ghetto: A Guide to the Perished City* (New Haven, CT: Yale University Press, 2009), pp. 796–800; Dreifuss, *Warsaw Ghetto*, pp. 532–33.

<sup>140</sup> Emanuel Ringelblum, *Annihilation – Day by Day* (Warsaw: Karta Centre, 2008), p. 67; Dreifuss, *Warsaw Ghetto*, p. 67.

<sup>141</sup> Jürgen Stroop, *Stroop Report: The Jewish Quarter of Warsaw Is No More* (New York: Pantheon Books, 1978), pp. 6–7; Yitzhak Zuckerman, *A Surplus of Memory: Chronicle of the Warsaw Ghetto Uprising* (Berkeley: University of California Press, 1993), pp. 219–20, 337–38, 360–64; Yisrael Gutman, *The Jews of Warsaw, 1939–1943: Ghetto, Underground, Revolt* (Bloomington: Indiana University Press, 1989), p. 390.

medical services.<sup>142</sup> Other ZOB veterans recalled that before the uprising broke out they approached bunker owners asking to use them for their operations. One of them claimed that the ZOB had made a list of private bunkers in the ghetto that were put under its command once the uprising started.<sup>143</sup> The ghetto residents disregarded German calls to leave their underground hideouts since they believed that there was a chance to survive via the subterranean dimension. As a result, it took the Germans longer to take control over the ghetto.<sup>144</sup>

In late April, the ZOB relocated its command to an almost luxurious bunker on 18 Mila Street that housed 300 fighters and civilians.<sup>145</sup> On May 8, through informants, the SS discovered the ZOB bunker and ordered the occupants out. Most of the civilians obeyed, but one hundred and twenty of the ZOB members, including Anielewicz, sought to engage the Germans inside the bunker. The Germans introduced poisonous gas into the bunker killing most of the ZOB fighters, while other members committed suicide.<sup>146</sup> These ill-armed, ill-trained, and outnumbered Jewish fighters, engaged in fierce combat against the mighty German Army, joined in the revolt by the ghetto occupants who had assisted the militants by sharing with them their last dwellings.<sup>147</sup>

## Culture and Myths

The study of NSAs through their use of the subterranean dimension should address the bond between militant NSAs and their longstanding traditions.<sup>148</sup> In the first century BCE, the Roman historian Tacitus noted that Germanic tribes:

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<sup>142</sup> Ibid., p. 390.

<sup>143</sup> Masha Putermilch Testimony, April 1963, Catalog No. 2269, Ghetto Fighters' House Archives.

<sup>144</sup> Dreifuss, *Warsaw Ghetto*, p. 524.

<sup>145</sup> Yisrael Gutman, *Revolt of the Besieged: Mordechai Anilevitch and the Uprising of the Warsaw Ghetto* (Jerusalem: Yad Vashem / Tel Aviv: Moreshet, 1963), pp. 365–67; Helea Rufeisen Schüpper, *Farewell to Mila 18: A Courier's Story* (Tel Aviv: Ghetto Fighters' House, 1990), pp. 109–19.

<sup>146</sup> Mark Edelman, *The Ghetto Fights* (New York: American Representation of General Jewish Workers' Union of Poland, 1946), pp. 18, 213–14; Gutman, *The Jews of Warsaw*, p. 396.

<sup>147</sup> Zivia Lubetkin, *In the Days of Destruction and Revolt* (Tel Aviv: Hakibbutz Hameuchad, 1981), pp. 232–33; Dreifuss, *Warsaw Ghetto*, p. 524.

<sup>148</sup> Michael Brett, "North Africa State and Society: 1056-1659," in *A Companion to the History of the Middle East*, edited by Youssef M. Choueiri (Hoboken, NJ: John Wiley, 2008), pp. 175–76.

dig subterranean caves and cover them over with a great quantity of dung. These they use as winter-retreats, and granaries; for they preserve a moderate temperature; and upon an invasion, when the open country is plundered, these recesses remain unviolated, either because the enemy is ignorant of them, or because he will not trouble himself with the search.<sup>149</sup>

The following examples demonstrate that NSAs interpret the subterranean dimension differently depending on their beliefs and interests. The Pashtun tribes in Afghanistan, for example, have a long history of resisting superior foreign invaders. Pashtun military history is linked to their rural traditions. The Afghanistan natural fortresses have been instrumental in the survival of Afghan fighters. Local residents have used caves and tunnels for shelter against foreign intruders, for habitation, for mineral extraction, and for religious purposes. They dug wells and tunnels to transfer water from the mountains for drinking as well as for watering their crops, and those tunnels also served them well in times of war. In the face of the invasion by the Mongols in the thirteenth century, Pashtun nomadic tribes hid in caves and irrigation tunnels.<sup>150</sup> In modern times, they drove the British imperial army (1838–1843, 1878–1880) and the Soviet army (1978–1989) out of Afghanistan, with the subterranean tunnels allowing them to move between shelters and arms storages that they had built in the mountains.

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At the beginning of Operation Enduring Freedom in late 2001, the Coalition forces led by the United States Army removed the Taliban regime and destroyed the Al Qaeda infrastructure in Afghanistan. But after twenty years of war, during which the most sophisticated and best supplied army could barely contain the Taliban organisation, the Americans hastily withdrew from Afghanistan and the Taliban easily took control of this country.<sup>152</sup> The Taliban's operational activity corresponds well with the legacy of their ancestors. They have used the massive mountain ranges in the south and in the east of Afghanistan, which feature natural and manmade caves and tunnels,

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<sup>149</sup> Tacitus, *The Germany and the Agricola of Tacitus*, by Tacitus (Oxford: Oxford University Press, 2013), Book 6.

<sup>150</sup> Shaista Wahab and Barry Youngerman, *A Brief History of Afghanistan* (New York: Infobase, 2007), p. 61. pp. A. Z. Hilali, *US-Pakistan Relationship: Soviet Invasion of Afghanistan* (Aldershot: Ashgate, 2005), 117–18, 155–56, 165–70; Christopher M. Wyatt, *Afghanistan and the Defense of Empire: Diplomacy and Strategy during the Great Game* (London: I. B. Tawris, 2012), pp. 87–90; Bahmanyar, *Afghanistan Cave Complexes*, pp. 14, 39; Shay, "The Subterranean Warfare," p. 40.

<sup>152</sup> Bahmanyar, *Afghanistan Cave Complexes*, pp. 3–4.

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for conducting guerrilla warfare against the Coalition forces. Some sites contain complex mazes of tunnels, while others are simple overhanging cliffs.<sup>153</sup>

Similarly, one cannot understand the Viet Cong tunnel warfare against the United States Army without exploring the local culture. An officer in the Vietnamese army explained to Mangold and Penycate the strong bond that existed between the Vietnamese traditional peasant and “his earth,” where he resided with his family and where his ancestors had lived for generations and had grown rice. His soul stayed in the village even when he moved off his land. Digging tunnels and living beneath the ground was more than a military tactic – it was a method to hold onto the land and the Viet Cong exploited that bond to maintain a war of attrition against the United States.<sup>154</sup>

The current study also addresses subterranean facilities that have become national myths. The leadership of the Palestinian Hamas encourages the digital propagation of an image of Hamas warriors in the tunnels.<sup>155</sup> The subterranean dimension is an integral part of the Hamas resistance ethos. Shaked argues that the Israeli-Palestinian conflict has a psycho-socio-cultural level that contains an ethos of conflict. The ethos of the Hamas smuggling and combat tunnels uses images, myths, and collective patriotic memoirs, glorifying tunnel builders and users.<sup>156</sup> In January 2016, following the deaths of seven Hamas operatives inside a collapsed tunnel, Hamas propaganda portrayed them glowingly as martyrs who had sacrificed their lives in preparation for the war against Israel.<sup>157</sup> They described the construction of the tunnel as *jihad* (holy war), waged proudly by these fighters, with the aim of reaching Paradise. The families of the dead operatives received bottles of sand from the tunnels in which their relatives had been killed.<sup>158</sup> Ismail Haniya, director of the Hamas political bureau, declared:

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<sup>153</sup>. Ibid., pp. 3–4, 27.

<sup>154</sup>. Mangold and Penycate, *The Tunnels of Cu Chi*, pp. 54–55.

<sup>155</sup>. Al Quds TV, “TV Report on Hamas Tunnel-Digging Unit in Gaza.”

<sup>156</sup> Roni Shaked, “Ethos of Conflict of the Palestinian Society,” in *A Social Psychology Perspective on the Israeli-Palestinian Conflict: Celebrating the Legacy of Daniel Bar-Tal*, edited by Keren Sharvit and Eran Halperin (New York: Springer, 2016), pp. 2, 33.

<sup>157</sup>. MATIC, News of Terrorism and the Israeli Palestinian Conflict (3–9 February 2016), [https://www.terrorism-info.org.il/Data/articles/Art\\_20953/E\\_030\\_16\\_1647675614.pdf](https://www.terrorism-info.org.il/Data/articles/Art_20953/E_030_16_1647675614.pdf) (accessed 19 December 2021), pp. 8–9.

<sup>158</sup>. MEMRI, “Hamas’s Tunnels,” pp. 4, 6.

Gaza bids farewell to the martyrs of the preparations for any conflict with the Israeli occupation that may come. Gaza has constructed twice as many tunnels as there were in Vietnam. The Al-Qassam Brigades (the Hamas military wing) have dug tunnels around Gaza in order to defend the people and liberate Al-Aqsa and the holy places... This weapon, the weapon of the tunnels, has played a crucial role in bringing about our victory.<sup>159</sup>

During annual youth camps that the Hamas military wing organised, Palestinian children practised warfare in tunnels and were allowed to visit tunnels with their parents. Regardless of the actual military importance of Hamas tunnels, they are a useful tactic to sustain the war against Israel and an opportunity to provide material for propaganda campaigns.<sup>160</sup>

Culture and tradition can also discourage the use of the subterranean dimension. In the 1960s, the effective use of tunnels by the Vietnamese against the Americans became a role model for revolutionary NSAs around the globe. These groups tried to imitate the Vietnamese, sometimes unsuccessfully due to cultural reasons.<sup>161</sup> In a newspaper interview from April 1968, the commander of the People's Movement for the Liberation of Angola (MPLA), which fought for independence against Portugal, explained their difficulties in waging a Vietnam-style tunnel warfare:

Our people have not yet tried to build tunnels. But we ourselves, the guerrillas, we have already tried to make subterranean houses and shelters. The people are now beginning to see how a man can live underground. But they are not used to it. They say: 'We cannot live without our houses, we will die underground'... They are still doubting – but they will follow our example when they see that we have developed this tactic... But you must know that we have troubles with these tunnels.

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<sup>159</sup> Ibid., p. 4.

<sup>160</sup> Kan 11 TV, "Hamas and Jihad's Summer Camps," 28 July 2019, <https://www.youtube.com/watch?v=UpObPfkH9-o> (accessed 19 December 2021).

<sup>161</sup> Guevara, *Diary of Che Guevara*, pp. 27–28, 157.



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Our ground here in the Eastern Region is very sandy; it is not solid soil, just sand. And during the rainy season it gets flooded.<sup>162</sup>

### *Counter Measures*

Counter measures inflicted by states against the subterranean dimension reveal NSAs' ability to prevail. Counter measures against NSAs that exploit the subterranean dimension are as old as the use of the subterranean dimension.<sup>163</sup> Historical reviews teach us that in many cases the destruction of subterranean assets and the killing of their occupants such as in Sri Lanka, Colombia, and Syria indeed signalled the suppression of the NSAs' resistance.<sup>164</sup> Other NSAs recovered from the loss of their subterranean assets, either because they possessed a strong backup or because they had skilful leaderships that adopted alternative courses of actions, or else their enemy could not exercise its full military power and had strategic weaknesses.<sup>165</sup>

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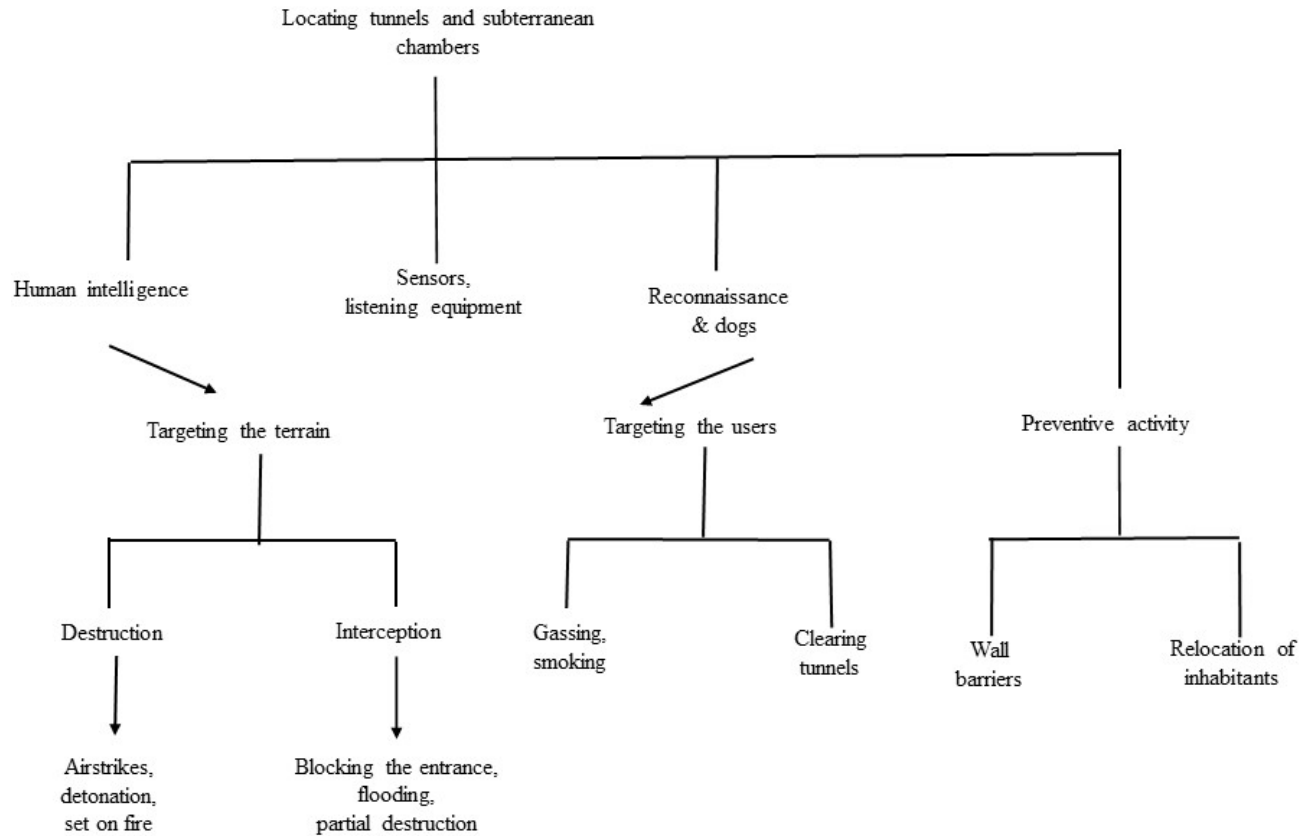
<sup>162</sup> Don Barnett and Roy Harvey, *The Revolution in Angola: MPLA, Life Histories and Documents* (Indianapolis: Bobbs-Merrill, 1972), pp. 15–16.

<sup>163</sup> MAITIC, "End of Operation Northern Shield to expose and neutralize Hezbollah tunnels on Israel's northern border," 17 January 2019, <https://www.terrorism-info.org.il/en/end-operation-northern-shield-expose-neutralize-hezbollah-tunnels-israels-northern-border/> (accessed 5 December 2020).

<sup>164</sup> Patrick Markey, "Colombia Kills top FARC Rebel Commander in Raid," *Reuters*, 24 September 2010, <https://www.reuters.com/article/us-colombia-rebels/colombia-kills-top-farc-rebel-commander-in-raid-idUSTRE68M5T920100923>; "LTTE Chief Prabhakaran Lived in the Lap of Luxury," *The Times of India*, 4 February 2009; Adeesha Dayananda, "Prabhakaran Bunker Complex," *You Tube*, 3 August 2012, [https://www.youtube.com/results?search\\_query=Prabhakaran+Bunker+Complex](https://www.youtube.com/results?search_query=Prabhakaran+Bunker+Complex) (accessed 24 January 2022).

<sup>165</sup> Eric McGeer, *Sowing the Dragon's Teeth: Byzantine Warfare in the Tenth Century* (Washington D.C.: Dumbarton Oaks Research, 2008), p. 161.

Figure 6: Counter measures against the use of the subterranean domain by rebellious NSAs



State armies have employed, as can be seen in Figure 6, multiple methods to fight the use of the subterranean dimension by militant NSAs. This diversity reflects longstanding and often unsuccessful efforts to challenge the unseen subterranean dimension. Counter measures differ in their effectiveness, their technology, the resources that they require, the risks that they pose for their users, and the environmental damage they cause. Counter methods are divided between those that destroy or neutralise the subterranean facilities and those that target the occupants of such facilities, while leaving the facilities untouched. NSAs may also employ multiple methods.

New technology appears to pose a great challenge to the use of the subterranean dimension by militant NSAs. In the past few years, the IDF have manifested operational, intelligence and technological achievements by employing ground sensors that uncovered approximately twenty Hamas combat tunnels that crossed the border

with the Gaza Strip into Israel and six Hezbollah tunnels along the border with Lebanon (during Operation Northern Shield). These sensors use seismic and acoustic devices that alert to any tunnels that are being dug close to the border.<sup>166</sup> The sensors are part of a 64 km subterranean concrete barrier that Israel constructed (dozens of meters deep in the ground) along the border with the Gaza Strip, to disrupt any cross-border tunnels.<sup>167</sup>

Following the exposure of Hezbollah tunnels, the IDF employed mapping and demolishing technologies to destroy them, including sending robots into tunnels and pouring liquid concrete into them to demolish them without creating collateral damage to the Lebanese villages above them. It is too early to declare that Israel's new counter-tunnelling system has suppressed Hamas' and Hezbollah's subterranean capabilities. Hamas and Hezbollah hold complex subterranean facilities in the rear zone of Lebanon and the Gaza Strip. It is not clear whether the IDF is sufficiently prepared to overcome these subterranean challenges that require ground manoeuvres.<sup>168</sup>

Preventive measures are most dangerous for militant NSAs since they involve redesigning the environment to discourage NSAs from digging tunnels rather than targeting specific tunnels. From 2013, under the new regime of President Abdel Fattah al-Sisi the Egyptian army has launched a massive campaign against the smuggling activity between Sinai and the Gaza Strip, focusing on the destruction of tunnels.<sup>169</sup> Salafist jihadist groups were exploiting Hamas tunnels to smuggle terrorists and weapons into Egypt. In the face of the growing terror activity in Sinai and in the mainland, the Egyptian regime viewed Hamas's tunnels as a threat to Egyptian national security and employed an aggressive policy. Egyptian military authorities imposed a

<sup>166</sup> Omer Dostri, "The Buildup of Forces for IDF Underground Warfare," 9 January 2019, the Jerusalem Institute for Strategy and Security (JISS), <https://jiss.org.il/en/dostri-idf-underground-warfare/> (accessed 1 December 2020); Yoav Ziton, "IDF Places 'Tunnel-Buster' Sensors along northern Border," *Ynet*, 15 January 2020, <https://www.ynetnews.com/article/SJzKBq11bL> (accessed 1 December 2020).

<sup>167</sup> Nir Dbori, "The Barrier that Destroys Hamas Terror Tunnels' Project," *Channel 12 News*, 21 October 2020, [https://www.mako.co.il/news-columns/2020\\_q4/Article-fd574fccbe94571026.htm](https://www.mako.co.il/news-columns/2020_q4/Article-fd574fccbe94571026.htm) (accessed 1 December 2020); Reuters, "Israel Uncovers Tunnel from Gaza, Military Says Holds Hamas Responsible," 20 October 2020, <https://uk.reuters.com/article/uk-israel-palestinians-gaza-tunnel-idUKKBN2752FL> (accessed 1 December 2020).

<sup>168</sup> Dostri, "The Buildup of Forces for IDF Underground Warfare," p. 6.

<sup>169</sup> Ofir Winter and Bar Loopo, "A Decade since Hamas's Takeover of Gaza," Institute for National Security Studies, January 2018, pp. 128–30, [https://www.inss.org.il/wp-content/uploads/2018/01/GazaCrisis\\_ENG-129-140.pdf](https://www.inss.org.il/wp-content/uploads/2018/01/GazaCrisis_ENG-129-140.pdf).

wide buffer zone on the border with the Gaza Strip, demolishing residential homes near the border and enforcing displacement of Egyptian residents.<sup>170</sup> The Egyptians built deep-water basins on the Egyptian side of the Gaza border as well as a concrete wall, and a second newly constructed wall along the border with Gaza that will be equipped with electronic sensors and thermographic cameras. Hamas lost its main arms smuggling channel though it apparently preserved some smuggling capabilities. In addition to investing more efforts in the self-production of weapons, Hamas developed alternative above-ground smuggling routes with partial success.<sup>171</sup> But the closure of the tunnels between Gaza and Egypt had devastating economic results for the civilian population in Gaza.<sup>172</sup>

The deadliest method to suppress the use of the subterranean dimension is total destruction of the environment. During the Second Chechen War (1999–2000) the Russian Army failed to counter Chechen militants' urban warfare that was efficiently exploited the Grozny sewer canals and basements.<sup>173</sup> As a result, in early 2000, the Russians indiscriminately bombed and shelled Grozny destroying it almost completely. The Putin regime was able to claim victory. Compelled to operate out of Grozny and abandoning their subterranean asset, the weaker and divided Chechen armed groups escalated the use of spectacular terror attacks, primarily in Russia's rear, alongside the old guerrilla warfare in the remote highlands. In face of a powerful, uncontrolled enemy, a NSA's resistance could not prevail.<sup>174</sup>

Bombardments of tunnels and bunkers reflect firepower, high technology, and occasionally less sensitivity to civilian loss. As of today, despite some successes by the

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<sup>170</sup> Entsar Abu Jahal, "Why is Egypt building more walls around Gaza," *Al Monitor*, 14 May 2020, <https://www.al-monitor.com/pulse/originals/2020/05/egypt-wall-tunnels-gaza-hamas-siege-border-security.html#ixzz6fHkEWsS7> (accessed 30 November 2020).

<sup>171</sup> Adnan Abu Amar, "Hamas opens up on arms, missile. Supplies from Iran," 24 September 2020, *Al Monitor*, <https://adnanabuamer.com/post/5218/hamas-opens-up-on-arms-missile-supplies-from-iran> (accessed 30 November 2020); *Al Monitor*, "Egypt's army destroys Sinai homes to expand Gaza buffer," 11 October 2017, historical <https://www.al-monitor.com/pulse/originals/2017/10/egypt-army-destruction-houses-sinai-terrorism.html#ixzz5zA0kM7T5> (accessed 30 November 2020); "Hamas Military Build-up Efforts," Israeli Security Agency.

<sup>172</sup> UNRWA, "Gaza Situation Report p. 147," 12 June 2016, <https://www.unrwa.org/newsroom/emergency-reports/gaza-situation-report-147> (accessed 30 November 2020).

<sup>173</sup> Joes, *Urban Guerrilla Warfare*, pp. 143–44; Shultz and Dew, *Insurgents, Terrorists and Militias*, pp. 140–41.

<sup>174</sup> James Hughes, *Chechnya from Nationalism to Jihad* (Philadelphia: University of Pennsylvania Press, 2007), pp. 112–17, 159.

Israeli air force in Gaza,<sup>175</sup> air-strikes cannot totally destroy deep, elaborated, subterranean bunkers and tunnels. Army engineering units are required to demolish tunnels and bunkers and this involves boots on the ground.<sup>176</sup> For example, using human intelligence (Viet Cong deserters and prisoners), the Americans invested a lot of efforts in locating and destroying tunnels, with partial successes. B-52 bombers dropped heavy bombs, hoping the tunnels would collapse, and United States ground forces were employed in suspected tunnel areas. Once located, the Americans would use smoke, flame-throwers, riot gas grenades and water, trying to force the Viet Cong out of their hideouts. They also attempted to destroy tunnels using demolition charges, but with limited success.<sup>177</sup> Being long, multi-levelled, well-ventilated and with many entrances, Vietnamese tunnels resisted artillery shells and bomb blasts. The United States Army improved its counter tunnelling skills (such as forming a special counter tunnelling unit, the “tunnels rats”) but operations were ad-hoc. Scattered American forces could not safeguard the tunnels and fled the area, encouraging the Viet Cong to redeploy.<sup>178</sup>

The United States Army possesses better firepower to combat tunnels than ever before. In April 2017, the Americans dropped the nearly 22,000-pound Massive Ordnance Air Blast bomb (nicknamed the Mother of All Bombs) on an ISIS tunnel-and-cave complex in eastern Afghanistan.<sup>179</sup> Yet, strategic counter tunnelling activity by the United States Army had limited impact on the war in Afghanistan. The case studies of Vietnam and Afghanistan demonstrate that counter measures may be useless without the support of political processes and realistic military strategy.

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<sup>175</sup> Sharon Wrobel, "Israel Destroys Over 60 Miles of Hamas Underground Tunnel Infrastructure in Gaza", *The Algemeiner*, 19 May 2021, <https://www.algemeiner.com/2021/05/19/israel-destroys-over-60-miles-of-hamas-underground-tunnel-infrastructure-in-gaza/>.

<sup>176</sup> The State Comptroller, "Operation Protective Edge," pp. 20–21; Bahmanyar, *Afghanistan Cave Complexes 1979–2004*, p. 15.

<sup>177</sup> Mangold and Penycate, *Tunnels of Cu Chi*, p. 78; "Operational Report – Lessons Learned, Headquarters, 25th Infantry Division, period ending 31 July 1969," 18 December 1969, Catalog No. 168300010477, Vietnam Archive Collection, The Vietnam Center and Archive, Texas Tech University, p. 144.

<sup>178</sup> Tal Tovy, *Like Eating Soup with a Knife* (Tel Aviv: Maarchot, 2006), pp. 140–50, 182–3; Vo Nguyen Giap, *People's War People's Army* (Hanoi: Foreign Language Publishing House, 1969), p. 118; Mangold and Penycate, *Tunnels of Cu Chi*, pp. 33–40, 98–106.

<sup>179</sup> Helene Cooper and Mujib Mashal, "United States Drops 'Mother of All Bombs' on ISIS Caves in Afghanistan," *New York Times*, 13 April 2017, <https://www.nytimes.com/2017/04/13/world/asia/moab-mother-of-all-bombs-afghanistan.html> (accessed 29 November 2020).

## Conclusion

The current research contributes to the evolving scholarship about NSAs. Alongside funding, command and control, and arms smuggling, the subterranean dimension is a useful dimension to better understand NSAs, their doctrine, operational readiness, strengths, and weaknesses. This research argues that across time and place, militant NSAs have utilised the subterranean dimension on different scales. Recent wars between states and NSAs, such as in Iraq, Lebanon, and in Israel and the Gaza Strip, have emphasised the importance of this dimension more than ever before. The use of the subterranean dimension allows militant NSAs to surprise superior enemies while preserving their strength. However, this study reveals that the subterranean dimension prolongs wars between states and NSAs, but cannot ultimately change strategic military imbalances. Many NSAs have not used the subterranean dimension at all because it might undermine their mobility and due to the great investment and security risks involved. When employed, the subterranean dimension has not proved to protect NSAs from defeat.

The current study's main argument is that militant NSAs utilised the subterranean dimension due to a combination of operational plans, the challenges and opportunities that the environment introduced, and available technology that helped operatives change the environment in order to implement their operational plans. Relationships between NSAs and the civilian population, local traditions, and the enemy's counter measures have been significant to the effectiveness of the use of the subterranean dimension. Large-scale employment of the subterranean dimension by NSAs is usually linked to a high level of control and discipline and to the NSAs' organisation capability, and also to the level of popular support for the NSAs' actions.<sup>180</sup>

This study, which has focused on NSAs, believes that the role of the subterranean dimension should not be overemphasised. In 2013, while he was head of the Intelligence Division of the IDF, Lieut.-Gen. Aviv Kochavi, the current chief of the IDF General Staff, stated that the subterranean dimension should be regarded as an independent dimension rather than a military capability.<sup>181</sup> The subterranean dimension has a unique character, similar to the uniqueness of fighting in a jungle or in snowy

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<sup>180</sup> Staniland, *Networks of Rebellion*, p. 4.

<sup>181</sup> The State Comptroller, "Operation Protective Edge," p. 92.

mountains. But these theatres of operations are not independent dimensions, they are all subordinate to the aboveground fighting realm. Moreover, low-intensity war, which characterises many recent conflicts between states and NSAs, empowers the subterranean dimension, which, ultimately, is a military tactic rather than an existential threat. In this context, William Laurie, who served as an intelligence analyst at the United States embassy in Ho Chi Minh City, recorded:

You have to say that they were an incredibly ingenious, tactical device (the Cu Chi tunnels). I say tactical because it was not a strategy to tunnel all of South Vietnam. Aside from that, you have to conclude that this is really grossly exaggerated as a strategic, an actual real strategic factor in the war. The problem you have is that people are attracted to this romantic image of these mysterious people that tunnel and they have hospitals... The fact of the matter is, the Cu Chi tunnels operate in such a miniscule portion of the overall land area of South Vietnam.<sup>182</sup>

The current work reveals the link between the NSAs' command and control apparatus and the intensive use of the subterranean dimension. NSAs such as Hamas, Hezbollah, and ISIS, which have escalated the use of the subterranean dimension, have all adopted military patterns: they have military units, a hierarchical structure, a centralised command, and massive weapons systems. This development refutes theories that claim new types of wars, in which states fight formless, ill-armed NSAs that are hard to target, allegedly because they operate among a civilian population for an indefinite period of time.<sup>183</sup> Hamas and Hezbollah control territory, a fact which facilitates the building of remarkable tunnels, and this has nothing to do with a "changing face of war."<sup>184</sup>

The historical reviews teach us that in many cases the destruction of subterranean assets and the killing of their occupants signalled the suppression of the NSAs' resistance.<sup>185</sup> Other NSAs recovered from the loss of their subterranean assets,

<sup>182</sup> Interview with William Laurie, 20 January 2004, Catalog No. OH0342, Oral History Project, The Vietnam Centre and Archive, Texas Tech University, pp. 123–24.

<sup>183</sup> Smith, *The Utility of Force*, p. 17.

<sup>184</sup> Van Creveld, *Changing Face of War*, p. IX.

<sup>185</sup> Patrick Markey, "Colombia Kills Top FARC Rebel Commander in Raid," *Reuters*, 24 September 2010, <https://www.reuters.com/article/us-colombia-rebels/colombia-kills-top-farc-rebel-commander-in-raid-idUSTRE68M5T920100923> (accessed 19 December 2021); "LTTE Chief Prabhakaran Lived in the Lap of Luxury," *Times of India*, 4 February 2009; Adeesha Dayananda, "Prabhakaran Bunker Complex," 3 August

either because they possessed a strong backup, because they had skillful leaderships that adopted alternative courses of actions, or because their enemy could not exercise its full military power and had strategic weaknesses.<sup>186</sup>

The introduction of new counter-tunnelling technology may decrease the utilisation of the subterranean dimension. But wars between states and NSAs have been shaped by more important strategic factors. The new Israeli system for uncovering tunnels is a state-of-the-art technological achievement as is the 'Iron Dome' missile defence system. These technologies allow the IDF to disrupt hostile operational plans without the risk of escalation that may encourage Hamas and Hezbollah to attack Israel's rear zone.<sup>187</sup> Israel's contained measures reflect Staniland's argument, i.e., that states and NSAs may share passive cooperation that involves live-and-let-live bargains structured around norms of acceptable violence and the creation of "red lines" by states and NSAs below which each side is willing to restrain violence.<sup>188</sup> Still, Van Creveld argues that war, far from being an exercise in technology, is primarily a contest between two human belligerents. War is not an extension of technology, and nothing is less conducive to victory in war than to wage it on technological principles.<sup>189</sup> Operation Guardian of the Walls (10-21 May 2021) demonstrates that when combating the use of the subterranean dimension by its NSA foes, the IDF is overly dependent on technology and the Israel Air Force, while neglecting the ground forces and appearing to lose the will to defeat the enemy.

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2012, [https://www.youtube.com/results?search\\_query=Prabhakaran+Bunker+Complex](https://www.youtube.com/results?search_query=Prabhakaran+Bunker+Complex) (accessed 12 December 2021).

<sup>186</sup> Eric McGeer, *Sowing the Dragon's Teeth*, p. 161.

<sup>187</sup> Omer Dostri, "The Buildup of Forces for IDF Underground Warfare," *Jerusalem Institute for Strategy and Security* (January 2019), p. 8 <https://jiss.org.il/en/dostri-idf-underground-warfare> (accessed 19 December 2021).

<sup>188</sup> Paul Staniland, "States Insurgents and Wartime Political Orders," *Perspectives on Politics* 10, no. 2 (June 2012): p. 248.

<sup>189</sup> Van Creveld, *Technology and War*, p. 319.



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