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ARMS CONTROL MEASURES IN THE MIDDLE EAST

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Introduction

Ever since the attack on Hiroshima and Nagasaki, the threat of nuclear weapons has been on the rise. Throughout the cold war, nuclear tensions were at their peak with the world divided between two superpowers, making any proxy war amount to a threat towards nuclear warfare. The Cuban Missile Crisis amounted to a possibility of nuclear warfare between the superpowers i.e., the United States of America and the Soviet Union. In contemporary times, various treaties such as the Nuclear Non-Proliferation Treaty, Comprehensive Test Ban Treaty etc. amount to safeguarding nation-states from unprecedented nuclear attacks and devastations.

The Middle East is an area that has deep-rooted territorial disputes and security dilemmas which pose difficulty for regional actors to maintain nuclear non-proliferation. It has been a region which has been deeply troubled, hopelessly divided and heavily militarized and post 9/11 has gained immense attention from extra-regional powers to maintain an amicable international environment. Historical rivalries amongst leaderships i.e., Israel – Egypt issues etc., mistrust amongst regional powers and high threat perceptions have made arms control measures difficult to sustain. Before Arab Springs the lack of scrutiny of the domestic context and foreign policy and defence policies was justified as such policies being the domain of a select few. Once such pro-democracy movements gained traction and brought regime changes, the arms control measures throughout the region escalated but Israel’s nuclear opacity made non -proliferation attempts difficult to sustain.

However, the formation of a working group on arms control and regional security (ACRS) post the Madrid Conference in 1991 brought to light the deep-rooted issues of sectarianism, ideological rivalries, and religious and ethnic animosities which led to the dismantling of the working group, i.e., ACRS, in 1995. The formation of ACRS can be contributed to the discovery of the scope of the Iraqi nuclear weapons program, the establishment of the UN Special Commission on Iraq (UNSCOM) to search for, monitor, and destroy Iraq's weapons of mass destruction (WMD) and missile programs, and President George Bush's 1991 Middle East Arms Control Initiative. Due to various complications in the peace process and disagreement between Israel and Egypt over the question of “when to place a discussion of a ‘WMD free zone’ on the agenda of ACRS?” consequently put the multilateral talks on hold indefinitely. This not only triggered extra-regional

powers to interfere in the region more actively but also strengthened the mistrust and historical rivalries in the region posing a threat to arms control and the dream of a WMD – free zone.

According to Peter Crail, NPT is a document “centred on a series of 64 action steps aimed at strengthening the treaty’s “three pillars” of nuclear disarmament, non-proliferation, and the peaceful uses of nuclear energy”. However, while countries like Iran and Syria were members of the NPT, they violated the terms laid down by the treaty when it came to the production of nuclear energy. Even treaties like the Chemical Weapons Convention (CWC) which prohibits the Development, Production, Stockpiling, and use of chemical weapons could not stop regional actors like Syria from producing various chemical weapons.

Through the paper, the various arms control measures taken by regional actors like Yemen, Syria, Iran, Iraq, Saudi Arabia, Egypt, and Israel are highlighted as how the regional security threat perception forms bilateral ties impacting the proliferation and production of nuclear energies and weapons are depicted. Ultimately a way forward is produced for the region to have a peaceful neighbourhood and maintain stability in the international system.

Arms Control Measures

1) Israel

Israel has always followed the principle of nuclear opacity, which means that the country neither acknowledges nor denies possessing a nuclear arsenal. While it is a regional security enthusiast in the Middle East, it chose to not be a member of the non – proliferation treaty (NPT). This paradox manifests a deep normative feature of Israel’s nuclear exceptionality. Even if Israel has a primary nuclear organisation namely the Israeli Atomic Energy Commission (IAEC), it still dwells in the absence of regulations governing its nuclear activity. The intriguing factor about the commission is that it consists of immense power at home as well as abroad while posing civil authority over nuclear secrets. The question here lies as to why such ambiguity has been tolerated in the region. According to the Centre for Arms Control and Non- Proliferation,

“any formal recognition or acknowledgement of Israel’s weapons programme could upset the current uneasy balance in the region subsequently impacting a spur in nuclear proliferation

across the Middle East".¹

Ever since 1979, Israel has been actively testing its nuclear potential and destructing nuclear reactors across the region. The first pre-emptive strike of Israel was seen in 1981 at Iraq's Osiraq reactor.

Israel under the Begin Doctrine is able to safeguard its preventive strike measures since it states the common term for the Israeli government's preventive strike, counter-proliferation policy regarding their potential enemies' capability to possess weapons of mass destruction (WMD), particularly nuclear weapons. Due to various wars initiated by Israel in the region most of the extra-regional powers imposed an arms embargo, one of them being France, a major funding source of Israel's research facilities.

Israel's nuclear arsenal consists of the following ²:-

A) Nuclear energy

- Widely accepted to possess 90 plutonium-based warheads. With enough plutonium produced for 100-200 weapons as of March 2020.
- Weapon grade fissile material stocks are believed to have come from firstly, through Israel's nuclear programme² at Negev Nuclear Research Centre. Secondly, through unconfirmed reporting over the diversion of 300 kilograms of weapon-grade uranium to Israel from a U.S. naval propulsion reactor fuel fabrication plant in the late 1960s.³

¹ "Fact Sheet: Israel's Nuclear Inventory." Centre for Arms Control and Non-Proliferation. March 31, 2020. <https://doi.org/https://armscontrolcenter.org/fact-sheet-israels-nuclear-arsenal/>.

² "Fact Sheet: Israel's Nuclear Inventory." Centre for Arms Control and Non-Proliferation. March 31, 2020. <https://doi.org/https://armscontrolcenter.org/fact-sheet-israels-nuclear-arsenal/>.

³ "Fact Sheet: Israel's Nuclear Inventory." Centre for Arms Control and Non-Proliferation. March 31, 2020. <https://doi.org/https://armscontrolcenter.org/fact-sheet-israels-nuclear-arsenal/>.

- The Soreq Natural Research Centre in central Israel is believed to be fuelled by highly enriched uranium,

B) Air

- Israel possesses aircrafts capable of carrying nuclear gravity bombs i.e., U.S.-produced F-15, F-16, and F-35 aircraft.⁴
- The range of the F-15 is 3,500 kilometres while the F-16 has a shorter range of 1,500 kilometres it is most likely to serve nuclear purposes since it does the same for the US and NATO armies.⁵
- Israel is in the process of replacing the F-16 with the F-35, which the United States has also given a nuclear mission.

C) Sea

- Israel's six Dolphin-class submarines are believed that it can be fitted with a modified cruise missile for land attack, but there is no solid evidence of such deployments.⁶
- Israel does lack the second-strike capability in this sector thus posing such possessions as minimal deterrents.

D) Land

- Israel also is believed to possess Jericho II with a range of 1,500 plus kilometres and the Jericho III, which may have a range of 4,000 kilometres.⁷

⁴ "Fact Sheet: Israel's Nuclear Inventory." Centre for Arms Control and Non-Proliferation. March 31, 2020. <https://doi.org/https://armscontrolcenter.org/fact-sheet-israels-nuclear-arsenal/>.

⁵ "Fact Sheet: Israel's Nuclear Inventory." Centre for Arms Control and Non-Proliferation. March 31, 2020. <https://doi.org/https://armscontrolcenter.org/fact-sheet-israels-nuclear-arsenal/>.

⁶ "Fact Sheet: Israel's Nuclear Inventory." Centre for Arms Control and Non-Proliferation. March 31, 2020. <https://doi.org/https://armscontrolcenter.org/fact-sheet-israels-nuclear-arsenal/>.

⁷ "Fact Sheet: Israel's Nuclear Inventory." Center for Arms Control and Non-Proliferation. March 31, 2020. <https://doi.org/https://armscontrolcenter.org/fact-sheet-israels-nuclear-arsenal/>.

- Due to ambiguity, the particular estimates of Jericho missiles in Israel can't be produced let alone the ones with nuclear capability.

It is also important to note the escalations made in the arms stockpile by Hamas. Since, it plays a definitive role for Israel and after the fourth war between Gaza's Hamas and Israel, it is even more important to take note of the escalations made by the semi-organized military group or a terrorist group for most of the international bodies. In the late 2000s, the group started producing rudimentary Qassam rockets. Powered partly by molten sugar, the projectiles stayed aloft for just a few miles.⁸ Longer-range rockets, powerful explosives, metal, and machinery came across Gaza's southern border with Egypt while it also assembled a secret supply line from long-time patrons Iran and Syria. According to the Israeli military estimates Hamas had an arsenal of 7,000 rockets of varying ranges that can cover nearly all of Israel as well as 300 anti-tank and 100 anti-aircraft missiles. It also has acquired dozens of unmanned aerial vehicles and has an army of about 30,000 militants, including 400 naval commandos.⁹ In the latest war with Gaza Hamas employed new weapons, including attack drones, unmanned submarine drones dispatched into the sea and an unguided rocket called Ayyash with a 155-mile range.

2) Syria

Syria is widely believed to be a non-nuclear state with advanced Chemical weapons programme and widely suspected biological weapons capabilities. With the ongoing civil war and a not so promising history provided by Syria in the employment of chemical weapons against anti – government forces pose a grave threat to the regional security in the Middle East. Since there is no unified, reliable evidence-based narrative of the conflict it is difficult to set estimates on the nuclear energy productions in Syria. Even though, Syria is a part to the non – proliferation treaty (NPT) and the Chemical Weapons Convention (CWC) it is believed to violate the terms laid down by

⁸ DEBRE, ISABEL. "How Hamas Amassed Thousands of Rockets to Strike at Israel." *Los Angeles Times*, 20 May 2021, www.latimes.com/world-nation/story/2021-05-20/hamas-amass-arsenal-rockets-strike-israel.

⁹ DEBRE, ISABEL. "How Hamas Amassed Thousands of Rockets to Strike at Israel." *Los Angeles Times*, 20 May 2021, www.latimes.com/world-nation/story/2021-05-20/hamas-amass-arsenal-rockets-strike-israel

both the treaties and is also believed to violate the International Atomic Energy Agency (IAEA's) standards. It in July 2012 that the government publicly acknowledged the existence of its chemical stockpile for the first time. The developments in Syria as a whole can be considered as the strength of international norms against the use of chemical weapons. Arms control measures that are usually employed in Syria does reflect the evolution of international verification measures and activities that encompass both coercive and cooperative elements. Syria is believed to possess a nuclear proliferation risk because of its past interests in nuclear capabilities and the destroyed plutonium reactor (destroyed by Israel). The civil war has been a huge impact on short-range ballistic missiles along with a spotlight on its chemical weapon usage with caps set on its nuclear arsenal along with influx of military capabilities.

The United Nations Security Council Resolution 2235 adopted in 2015 established the UN-DPCW Joint investigative mechanism to determine the entities responsible for attacks and the use of chemical weapons in Syria¹⁰. Further curbing its nuclear arsenal. Syria has also been accused by the United States of America (US ambassador to the UN Nikki Haley) in 2018 regarding usage of chemical weapons at least fifty times ever since the beginning of the civil war. The Fact-Finding Mission also has investigated over 80 cases of alleged chemical weapon use in Syria since 2014 as of 2018. The nuclear arsenal of Syria consists of :-

A) Chemical Weapons Use

- Chemical weapons such as the sarin, chlorine gas, sulphur mustard have been used by Syrians throughout the civil war.¹¹

B) Biological Weapons

¹⁰ "Timeline of Syrian Chemical Weapons Activity, 2012-2022." Arms Control Association. May 1, 2021. <https://doi.org/https://www.armscontrol.org/factsheets/Timeline-of-Syrian-Chemical-Weapons-Activity>.

¹¹ "Arms Control and Proliferation Profile: Syria." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/syriaprofile>.

- A spokesman for the Syrian Foreign Ministry confirmed that the country possessed biological warfare materials back in 2012, but little is known about the extent of the arsenal.¹²
- The U.S. Director of National Intelligence annual report on the acquisition of materials related to WMD production in 2011 confirms the country's biotechnical infrastructure capable of supporting the development of biological weapons.
- 2015 was the last year when concerns regarding biological weapons were posed.
- In 2014 Syria declared the existence of production facilities and about the stockpiling of biochemical toxins.

C) Ballistic Missiles

- Syria is believed to rely on foreign suppliers, such as Iran and North Korea, for key technology to produce liquid-fuelled ballistic missiles.
- As of August 2012, Syria's exclusively short-range ballistic missile inventory included¹³:
 - SS-21-B (Scarab-B): Battlefield short-range, road mobile ballistic missile with an estimated range of 120km.
 - SS-1-C (Scud-B): Short-range Road mobile ballistic missile with an estimated range of 300km.
 - SS-1-D (Scud-C): Short-range Road mobile ballistic missile with an estimated range of 500-700km.

¹² "Arms Control and Proliferation Profile: Syria." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/syriaprofile>.

¹³ "Arms Control and Proliferation Profile: Syria." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/syriaprofile>.

- SS-1-E (Scud –D): Short-range Road mobile ballistic missile with an estimated range of 700km.
- CSS-8 (Fateh 110A): short-range road mobile ballistic missile with a range of 210-250km.

D) Cruise Missiles

- As of August 2012, Syria is reported to possess several highly accurate anti-ship cruise missiles that has the capability of carrying chemical warheads.
- Such anti-ship cruise missiles include¹⁴:-
 - SS-N-3B Sepal (SS-C-1B): Submarine-launched cruise missile with an estimated range of 300-400km.
 - SS-N-2C Styx (SS-C-3): Submarine-launched cruise missile with an estimated range of 80km.
 - SS-N-26: Land-launched cruise missile with an estimated range of 300km.

3) Egypt

Egypt has had a history of pursuing weapons of mass destruction and also is believed to have used chemical weapons while interventions in the North Yemen Civil war in the 1960's. Over the years Egypt has turned out to be an ardent follower of the nuclear non-proliferation (NPT) treaty in the contemporary times while strongly believing in the proposal to create WMD free zone in the Middle East. Under Gamal Nasser the nuclear ambitions of Egypt were evident and rampant. It was the first time that Nasser set up forays for its notable nuclear technology. Under Nasser the country also pursued ballistic missile programme yielding possibilities of nuclear weapon delivery through such missiles in the future. Nasser also founded the Egyptian Atomic Energy Commission (AEC) in 1955 which was transformed into the Atomic Energy Establishment (AEE) in 1956, an

¹⁴ "Arms Control and Proliferation Profile: Syria." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/syriaprofile>.

organization now known as the Atomic Energy Authority (AEA). The AEE during the six-day war made considerable progress in developing a nuclear infrastructure. Ibrahim Hilmy Abdel Rahman was the first Secretary General of the AEE under whom significant nuclear cooperation agreements were pursued especially the one concluded with the USSR in 1956¹⁵. It was followed by a 1958 bilateral reactor deal, under which the USSR took the onus of supplying Egypt with a 2MWt light water research reactor (the [ETRR-1](#), which went online in July 1961) and also had associated fresh and spent fuel services¹⁶. While the ETRR-1 was being built at Inshas it was not placed under safeguards administered by the International Atomic Energy Agency (IAEA) until the 1980s¹⁷. The decision of Sadat to ratify the NPT was a turning point in the history of the nuclear arsenal in Egypt. The nuclear arsenal of Egypt consists of the following: -

A) **Nuclear weapons** ¹⁸

- Compared to most of the countries in Middle East Egypt has a relatively sophisticated civil nuclear programme.
- Developed small-scale spent-fuel management and plutonium separation technologies, which would be applicable to a nuclear weapons program.
- The IAEA in 2004 charged Egypt due to failing to report uranium irradiation experiments conducted between 1990 and 2003 and also failed to add imports of uranium material in its initial inventory.

¹⁵ "Egypt Nuclear Overview." NTI. July 1, 2014. <https://doi.org/https://www.nti.org/analysis/articles/egypt-nuclear/>.

¹⁶ "Egypt Nuclear Overview." NTI. July 1, 2014. <https://doi.org/https://www.nti.org/analysis/articles/egypt-nuclear/>.

¹⁷ "Egypt Nuclear Overview." NTI. July 1, 2014. <https://doi.org/https://www.nti.org/analysis/articles/egypt-nuclear/>.

¹⁸ "Egypt Nuclear Overview." NTI. July 1, 2014. <https://doi.org/https://www.nti.org/analysis/articles/egypt-nuclear/>.

- In March 2007, Energy and Electricity Minister Hassan Younis announced plans to construct “10 nuclear-powered electricity-generating stations across the country.”
- In 2010, Cairo also formally requested nuclear energy training assistance from South Korea’s Korea International Cooperation Agency (KOICA).
- Despite the January 2011 revolution and subsequent leadership changes, Egypt’s Ministry of Electricity and Energy (MoEE) announced in spring 2011 that the country would move ahead with plans to complete four nuclear power plants by 2025, and to have the first one operational in 2019.
- Began construction on first of four Russian-supplied nuclear reactors in July 2022.

B) **Biological** ¹⁹

- Strongly denies accusations of research into anthrax, plague, and botulinum toxin for military purposes.
- Due to limited open-source information which indicates an offensive biological weapons program it is difficult to set estimates.
- Egypt also refuses to ratify BTWC due to Israel’s non-membership status to the same.

C) **Ballistic Missiles** ²⁰

- Ballistic missile arsenal is composed entirely of short-range missiles, reflecting the regional nature of its threat perceptions.
- Egypt currently deploys R-300 Elbrus (Formerly R-17 range of 275km to 500km; NATO: SS-1-C Scud-B) and Project T (Scud-B-100) short range ballistic missiles (SRBM); R-70 Luna-M (NATO: Frog 7B) artillery rockets range of 70km; and Sakr-80 artillery rockets range of 80km.

¹⁹ "Egypt Biological Overview." NTI. March 6, 2015.
<https://doi.org/https://www.nti.org/analysis/articles/egypt-biological/>.

²⁰ "Egypt Missile Overview." NTI. January 29, 2015.
<https://doi.org/https://www.nti.org/analysis/articles/egypt-missile/>.

- Egypt's ballistic missile force is divided into two brigades; one is strategic and equipped with R-300 Elbrus missiles, while the other is classified as offensive and equipped with the Luna-M R-70

- Egypt does not possess any intercontinental ballistic missiles (ICBMs).

D) **Cruise Missiles** ²¹

- Unconfirmed reports allege that Egypt possesses the Chinese HY-2 ASCM (CSSC-3 Seersucker) land-to-ship cruise missile system.

- The infrared-guided HY-2 is notable for its large firing sector, enabling it to cover 14,000km² of ocean; it has a range of 200km.

- Egypt's fast attack watercraft are equipped with Ramadan- and October-class Italian Otomat and Chinese SY-1 (CSS-N-1 Scrubbrush) cruise missiles, with ranges of 180km and 150km, respectively.

- Egypt has one of the largest and best-organized air defence systems in the Middle East. Its arsenals include 12 batteries of MIM-23 Improved Hawk surface-to-air missiles with 78 launchers.

- The Hawk has a range of 45km to 50km and is guided by semi-active radar homing; it has a single-shot success rate of 83%.

E) **Chemical** ²²

- Egypt's direct involvement with offensive CW dates back to the early 1950s. Egypt is generally regarded as having inherited stocks of mustard agent and possibly phosgene abandoned by British forces during their withdrawal from Egypt in 1954.

- British forces are known to have used chemical weapons in the second battle of Gaza in 1917 and maintained large stockpiles in Egypt during World War Two.

²¹ "Egypt Missile Overview." NTI. January 29, 2015.
<https://doi.org/https://www.nti.org/analysis/articles/egypt-missile/>.

²² "Egypt Chemical Overview." NTI. January 28, 2015.
<https://doi.org/https://www.nti.org/analysis/articles/egypt-chemical/>.

- In the present day there are no traces but only speculations regarding Egypt's possession of chemical weapons.

Saudi Arabia

Saudi Arabia is a singular country in the Middle East that does not possess weapons of mass destruction but time and again have been accused of and have been cryptic towards by other regional and extra regional actors regarding the leaderships desirability to possess nuclear weapons to counter nuclear ambitions of the regional rival Iran. It is even worth noting that irrespective of being subject to regular attacks by Houthi Militias Saudi Arabia does not have a considerable amount of nuclear arsenal. Saudi does plan on constructing two nuclear power reactors by 2040²³. It also established a King Abdullah City for Atomic and Renewable Energy in Riyadh in 2010. The country also has strict laws prohibiting the manufacture and storage of biological weapons. Saudi Arabia has a limited ballistic missile arsenal consisting of the Chinese Dongfeng-3 (DF-3; NATO: CSS-2), and reportedly the Dongfeng-21 (DF-21; NATO: CSS-5)²⁴. With a range of 2500km, the DF-3 has extensive regional reach. Saudi Arabia began pursuing a ballistic missile defence capability (BMD) following the Gulf War in 1990, during which Iraq used short-range ballistic missiles (SRBM) and cruise missiles against the Kingdom. Currently, Riyadh fields two variations of the Hawk surface-to-air missile system (SAM) (MIM 23B I-Hawk and MIM J/K Hawk)²⁵, which have limited anti-ballistic missile capabilities. Saudi Arabia also fields two variations of the more advanced and longer-range Patriot SAM system, the Pac-2 (MIM 104C) and the Pac-3 (MIM 104F). Saudi Arabia possesses two air-launched cruise missiles, the anti-ship

²³ "Saudi Arabia Nuclear Overview." NTI. July 18, 2016.
<https://doi.org/https://www.nti.org/analysis/articles/saudi-arabia-nuclear/>.

²⁴ "Saudi Arabia Nuclear Overview." NTI. July 18, 2016.
<https://doi.org/https://www.nti.org/analysis/articles/saudi-arabia-nuclear/>.

²⁵ "Saudi Arabia Nuclear Overview." NTI. July 18, 2016.
<https://doi.org/https://www.nti.org/analysis/articles/saudi-arabia-nuclear/>.

(ASCM) AGM-84L Harpoon and the land attack (LACM) Storm Shadow (the United Kingdom; France : Scalp EG)²⁶. The Storm Shadow is an advanced conventionally armed cruise missile that gives Riyadh precision strike capabilities in excess of 250km. It is important to note that Saudi Arabia is not an official member of the Missile Technology Control Regime (MTCR)²⁷.

Due to lack of scientific and technological capabilities and the lack of infrastructure Saudi Arabia does not have the domestic capacity to manufacture or produce ballistic missiles.

4) Iran

Iran is considered to be a non-nuclear weapons state irrespective of its past activities in persuasion of following a programme in order to develop nuclear warheads. Iran as a regional actor had pursued policies in accordance with its NPT safeguards and also had been subjected to the Joint Comprehensive Plan of Action which had been signed in 2015 between the P5 (USA, UK, France, China, and Russia), EU and Iran. This deal not only put safeguards on uranium enrichment programmes of Iran but subjected it to strict measures followed by the International Atomic and Energy Agency (IAEA). However, once the United States withdrew from the JCPOA agreement in 2018 Iran started violating various safeguards provided by IAEA and has been believed to develop unauthorised uranium enrichment projects and have revived working of nuclear reactors which were subject to restrictions under the JCPOA. The agreement also barred Iran from selling conventional arms for five years from the start of implementation of JCPOA. Iran's active ballistic missile program is considered to be one of the largest deployed missile forces, with over 1,000 short- and intermediate-range ballistic missiles while also consisting of a space-launch vehicle that

²⁶ "Saudi Arabia Nuclear Overview." NTI. July 18, 2016.
<https://doi.org/https://www.nti.org/analysis/articles/saudi-arabia-nuclear/>

²⁷ "Saudi Arabia Nuclear Overview." NTI. July 18, 2016.
<https://doi.org/https://www.nti.org/analysis/articles/saudi-arabia-nuclear/>.

could potentially be converted into an ICBM²⁸. Iran's nuclear arsenal consists of the following:-

A) **Ballistic Missiles**²⁹

- Iran's missile programme is largely considered to be based on North Korean and Russian designs while benefitting from the Chinese technical assistance.
- With approximately 1,000 short- and medium-range ballistic missiles, the program is one of the largest deployed ballistic missile forces in the Middle East.
- Irrespective of supreme leader Khamenei's decision over refraining from manufacturing missiles exceeding the range of 2,000 km the revolutionary guards believe such promises to not be binding and open to interpretation.
- Iran's short-range and medium-range missiles include:
 - Fateh-110: an operational short-range missile with an estimated range of 200-300km.
 - Shahab-1: an operational, short-range missile with an estimated range of 300km.
 - Qiam-1: an operational short-range missile with an estimated range of 500-1000km.
 - Shahab-2: an operational short-range missile with an estimated range of 500km.
 - Fateh-313: an operational short-range missile with an estimated range of 500km.
 - Zolfaghar: an operational missile with an estimated range of 700km.
 - Shahab-3: an operational missile with an estimated range of 800-1,000km. A liquid-fuelled missile based on the North Korean No-Dong; it is Iran's most sophisticated missile.
 - Emad-1: a single-stage medium-range ballistic missile under development with a range of up to 2,000 km. First tested in 2015, Iran claims the Emad-1 is a high-precision missile.
 - Ghadr-1: a medium-range missile under development with an estimated range of up to 2,000 km. The missile is a modified version of the Shahab-3.

²⁸ "Arms Control and Proliferation Profile: Iran." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/iranprofile>.

²⁹ "Arms Control and Proliferation Profile: Iran." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/iranprofile>.

- Sejil-2: an intermediate-range missile under development with an estimated range of 1,500-2,500km. First tested in 2007, the Sejil is a two-stage solid fuel-propelled missile. The Sejil-2 has not been tested since 2011 and reports indicate Iran has a hard time producing the solid-fuelled motors because of sanctions. This technology could help improve the mobility of Iran's missile force.

B) Cruise Missiles³⁰

- Iran possesses the following cruise missiles:
 - Kh-55: An air-launched nuclear-capable cruise missile with a range of up to 3,000 km which was illegally procured from the Ukraine in 2001.
 - Khalid Farzh: Iran's most advanced missile with a range of about 300 km capable of carrying a 1,000 kg warhead.
 - Nasr-1: A domestically produced missile which is claimed to be capable of destroying warships and military targets up to 3,000 tons.

C) Fissile material³¹

- Allegedly water production plant near Arak and gas centrifuge uranium enrichment facility near Natanz are believed to produce fissile material.
- In 2010, Iran scaled up some of its uranium enrichment from less than 5 percent to 20 percent, the level required for Iran's research reactor.
- Under the 2015 nuclear deal, Iran is permitted a strictly limited amount of R&D on advanced centrifuges. Since violating the deal, Iran has begun to enrich with additional, advanced machines, including IR-2m, IR-4, and IR-6 models.

5) YEMEN

³⁰ "Arms Control and Proliferation Profile: Iran." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/iranprofile>.

³¹ "Arms Control and Proliferation Profile: Iran." Arms Control Association. March 1, 2022. <https://doi.org/https://www.armscontrol.org/factsheets/iranprofile>.

Yemen has been a volatile nation ever since the beginning of the civil war in 2014. It is prestigious for the country to not have possession of any kind of nuclear, biological, or chemical arsenal. However, it does possess Scud and Scud variant ballistic missiles. A Scud missile is one of a series of tactical ballistic missiles developed by the Soviet Union during the Cold War.³² It acquired the variant of Scud ballistic missile from North Korea which further complicates the situation given the strategic location of Yemen. It has time and again expressed its willingness to pursue nuclear programmes but due to the ongoing civil war in the nation has prevented such decisions. It has been a party to the International Convention on the Physical Protection of Nuclear material. This does implicate one of the reasons why Houthi's have not been able to acquire the means of nuclear weapons so far. It's important to note that the Houthi's have been funded by Iran and the internationally recognised party has been funded by the Saudi government, the two major actors in the civil war. Such a situation further highlights the turbulent regional ties in the region which have been a deterrent for strong nuclear arms control measures and deals. In 2015 the direct military intervention by Saudi and the gulf members on the Houthi militias further embroiled questions on the safety from nuclear engagement attempts by Yemen, or the Houthi militia itself. As of mid-2016, territorial control of Yemen is divided, with the country split into areas controlled by the Houthis, the Hadi-led government, al-Qaeda in the Arabian Peninsula, and the Islamic State.³³ Yemen's failed state status has given safe havens to various Islamist terror organizations, while also possessing grave proliferation and terrorism concerns. Yemen is a party to the Non-Proliferation Treaty; it also has signed the Comprehensive Test Ban Treaty but have not ratified it yet. It lacks civil nuclear capability and other civil nuclear capabilities. Therefore, giving a bleak picture for future production of nuclear reactors. The National Atomic Energy Commission of Yemen collaborated with the IAEA in creating a first draft of a comprehensive nuclear law relating to a civil nuclear program in 2007. However, due to the deteriorating security situation in Yemen

³² Scud missile. (2022, October 30). In *Wikipedia*. https://en.wikipedia.org/wiki/Scud_missile

³³ "Arms Control and Proliferation Profile: Yemen." Arms Control Association. Jul 12,2016. <https://www.nti.org/countries/yemen/>

at that time, the IAEA and Yemen were not able to progress further with the draft law.³⁴ Yemen possesses the following³⁵:-

- Soviet Scud ballistic missiles and North Korean Hwasong ballistic missiles.
- Soviet-made SS-21 missiles or Scarab is a short-range ballistic missile that can travel up to 70 kilometres.
- Frog-7 The Frog-7 is the much less accurate predecessor to the Soviet SS-21 Scarab with similar payload and range capabilities.
- Scud-B missiles is a short-range ballistic missile that can travel up to 950 kilometres, but is highly inaccurate, at times landing up to 900 meters from its target.
- Hwasong ballistic missiles, which are a variant of the Scud-B possessing a longer range and reduced payload capacity is also possessed by Yemen.

Regional Bilateral Ties

Middle East is a deeply divided region due to sectarianism and ethnoreligious rivalries. Israel has time and again remained an irritant in the regional threat perception of states. On top of it, the nuclear opacity followed by Israel does not help its case of maintaining peaceful relations in the region. Most of the states such as Iran, Egypt and Syria state Israel's nuclear capabilities and ambiguity to not abide by various treaties as a threat. Along with perpetual regional wars, be it the Israel-Palestine issue and Israel's pre-emptive strikes be it in Iraq, Iran or Syria show the undue advantage exploited by Israel following its Begin Doctrine. The possibility of employing cultural factors of security in the Middle East to explain the origins of nuclear and chemical weapons makes it more difficult for extra regional powers to balance the security threat perceptions in the region.

³⁴ Esmail, Shadwan Mustafa, INPRO Dialogue Forum "Drivers and Impediments Regional Cooperation on the Way to Sustainable Nuclear Energy Systems" Vienna, Austria, 30 July–3 August, Lecture, 19 February 2016, www.iaea.org

³⁵ "Arms Control and Proliferation Profile: Yemen." Arms Control Association. Jul 12, 2016. <https://www.nti.org/countries/yemen/>

The varied cultures of Shia Sunnis and Kurds along with their rivalries and their inherent human instinct for survival make it clear why nuclear weapon acquisition and maintenance of reactors plays a major role in the defence and nuclear policies of most of the states. It is noteworthy how Abraham Accords too plays an important role in states maintaining or curbing their nuclear arsenals. The Abraham Accords, concluded in August 2020 by Israel, the United Arab Emirates, and the United States and followed by the normalization agreements extended to Bahrain, Sudan, and Morocco with the door open for other Arab and Islamic states to join, can be a potential game changer in the future of the region. The major incentive of such an agreement is the emerging coalition against Iran and despite their rejection by the Palestinians, the accords break the long-standing Arab taboo on normalizing relations with Israel. Future holds potential for the Middle East if such agreements and treatise are put to proper use and are not exploited by the members' party to the same.

Conclusion: A Way Forward

To seek a WMD-free zone in the Middle East the following steps will be an integral part of the process of change in the region.

a) Support for Regional Peace

Achieving long-lasting peace on the basis of justice must be an integral part of foreign policies for regional actors which will encourage them to work on arms control and nuclear non-proliferation.

b) Ensuring Compliance with NPT

If the regional actors cannot be reassured about every state following NPT obligation, it will be difficult to ensure a WMD-free zone in the region. Therefore, it is important for regional and extra-regional powers to focus on states abiding by such obligations.

c) Strengthening non-proliferation regimes and Peaceful nuclear cooperation

It is important to analyse separately every state's nuclear capability and put restrictions accordingly for avoiding any bias and allowing states to take an active part in such talks where obligations are being discussed for a long-lasting effect of such agreements and discussions.

The Middle East poses significant challenges to establishing a WMD-free Zone, therefore it must be ensured that all the regional actors are a part of IAEA and NPT, and are also Chemical Weapons Convention, and Comprehensive Test Ban Treaties' members. Only then can the international community envisage a Middle East free of WMD consisting of a nuclear arsenal under international treaties and laws.

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