NATIONAL APPROACHES TO NUCLEAR CIVIL DEFENCE: AN ASSESSMENT

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Since the advent of the Nuclear Age, everything has changed save our modes of thinking, and we, thus, drift towards unparalleled catastrophe.

Albert Einstein

INTRODUCTION

A large-scale nuclear attack on a modern industrial nation would typically cause a scale of damage that would be beyond a self-repair point. It is quantitatively and qualitatively distinct from a conventional conflict. The damage caused to a modern country would be widespread and extensive, disrupting many dimensions, destroying vast regions and making many more unlivable. Communications and essential services would be degraded and interrupted, putting governments out of action, partly or wholly. Damage to power and water supplies would affect industrial production and commerce, stopping the regular and complex interflow of goods and supplies. Severe problems with food stocks and housing would arise. Health impacts would be on an unimaginable scale. Factually, it would be a humanitarian disaster.

No one can deny that there is no complete protection against a nuclear attack and at ground zero, all life and property would be destroyed. Many survivors will be in the damaged outer ring and beyond, and their plight will

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During the Cold War, the superpowers were in an unhealthy relationship and feared a nuclear attack. Due to this fear, they resorted to civil preparedness programmes to mitigate life and property loss. Despite these, however, they could not find complete answers, easy answers or even rational answers for protection against a possible nuclear attack. depend upon the distance, and the degree of protection. The outcome of the attack would be unevenly spread. Some stretches might escape the blast and thermal damage, but all would be in the lethal radioactive fallout danger zone. In such circumstances, measures such as fallout shelters, refuge, education and civil defence may reduce the fatal numbers. During the Cold War, the superpowers were in an unhealthy relationship and feared a nuclear attack. Due to this fear, they resorted to civil preparedness programmes to mitigate life and property loss. Despite these, however, they could not find complete answers, easy

answers or even rational answers for protection against a possible nuclear attack. This paper examines some such measures taken by countries to give their people a fair, reasonable chance to survive and recover from a nuclear attack. The paper's primary aim is to study these steps and analyse their success rate with the final goal of deciding what is needed in the Indian situation.

UNDERSTANDING THE ATTRIBUTES OF A NUCLEAR ATTACK

Impact At, and Close to, Ground Zero: The first level in planning for protection against a possible nuclear war is to be aware of the grave dangers that people could face if an attack should come. The main effects of nuclear weapons are intense light, heat, blast, and radiation. Their intensity depends on many variable determinants: the size and weapon type; the distance from ground zero; weather conditions (sunny or rainy, windy or still); the terrain (flat ground or hilly); and the burst height (high in the air or near the ground). The impact on people after a nuclear attack would depend on their proximity to a nuclear explosion. People close to the blast would be killed or injured by the immediate effects such as from the blast, initial radiation, heat, fire, and fallout. They would need shelters durable enough to resist

the blast pressure; and heat and fire-resistant shelters made from thick materials to shield against initial radiation and fallout. Protection from blast and heat, and focussing on ways to prevent fallout penetration will save lives. Shelters protecting from the blast, heat, and fire will also give adequate protection from the fallout. For people located away from the target and for survivors in an area of lighter damage, the radioactive fallout would be the principal threat.

Fallout Impact: The fallout spread after a nuclear explosion will depend on wind and

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other weather conditions present at that time. There are no means of predicting where the fallout will hit and how quickly the particles will settle back to the Earth at a particular place. Some spaces may receive a high fallout, while others, even those in the same general stretch, may receive little or none. Cities close to a nuclear explosion may endure fallout in fifteen to thirty minutes. It takes five to ten hours or longer for the particles to drift down on a region 150-300 km away. After the fallout starts to settle, the first twenty-four hours are the most dangerous. The larger particles falling during that time will still be radioactive and emit intense rays. The smallest, dust-like lighter particles may not fall back to the Earth for months or years. Their presence in the atmosphere will lead to higher radiation. No clothing can protect people against gamma radiation, and no individual drugs or chemicals can prevent massive radiative doses from causing damage to body cells.¹

Long-term Impact on the Environment, Economy and Health: Fires from even a 'limited' war would result in enough soot in the atmosphere to block sunlight and lower temperatures. The temperature drop would be unevenly spread, with huge declines occurring in continental interiors which have mostly agricultural land. The temperature change would also subdue and disrupt precipitation as well. To make matters worse, soot

^{1. &}quot;Is It Possible to Survive a Nuclear Attack?" http://www.family-survival-planning.com/ nuclear-attack.html. Accessed on October 25, 2017.

in the upper atmosphere will deplete the planet's ozone layer, further harming plant growth and human health. The combined decreases in average temperature, precipitation, sunlight and stratospheric ozone would result in shorter growing seasons. This will decrease agricultural produce for several years leading to widespread food scarcity. Damage to roads, railways, bridges and inland waterways, together with the failure in electricity supply and communication networks, will result in public stress, leading to heightened fears among the people. Extensive damage to the public water supply, sewerage disposal system and the inability to collect and dispose of refuse will create severe health problems. The spread of many diseases can be prevented if urgent steps are taken. The emotional impacts of a nuclear attack vary. Some will survive the post-traumatic chronic stress and fear, while others, who have been exposed will worry about delayed radiation health impacts. Clean-up, restoring, and replacing lost property and provisioning goods and services could cost crores of rupees. Heightened spending could affect the economy. The available resources will be insufficient to meet the needs of the survivors. The economic impact will continue if people are slow to return to the affected area even after the site has been cleaned up. How the attack unfolds, and its aftermath is handled, may result in loss of confidence among the people.

Monitoring and Clean-up of Affected Cities: Officials are expected to put in place plans to monitor, and control the affected areas; impose quarantines to prevent further exposure; remove contamination from neighbourhoods where people might stay on; and keep residents apprised. Public health officials should be able to recognise contaminated food and water, such as milk and produce, and replace them with clean food from outside the region. Sites tainted with long-lasting active radioactive isotopes will need clean-up exercises. Most radioactivity will dissipate after undertaking the clean-up exercise. It may take from a few weeks to months to remove the contamination. Water treatment and collecting soil from contaminated sites are huge problems. It involves using fixative sprays such as flour and water mixtures, oil, or water to wet ground facades. The above measures enable fixing the radioactive materials in place and stopping its spread. The accident at the Fukushima Daiichi nuclear power station resulted in significant challenges for clean-up. These issues include treating contaminated water, debris, soil, secondary wastes, damaged spent fuel within the reactor, spent fuel pools, and damaged fuel and debris within the reactors.

PRINCIPLES OF PROTECTION²

The Hiroshima and Nagasaki nuclear bombings collectively led to an estimated 2,37,000 deaths. Most deaths and injuries occurred in burning houses or were caused by debris. To protect from the heat and blast fires is a challenging task. Evacuating or sheltering people is possible if adequate warning time is available. Time, distance, and shielding offer the best protective means for people far away from neighbourhoods threatened by the blast and fire. They essentially need protection from the fallout. The radiation level can be reduced by controlling the length of time of the exposure to it. Further, increasing the distance from the fallout particles and protecting with some absorbing or shielding materials can enhance the chances of survival.³

- Time: The danger from the fallout lessens with time. Radioactive decay is rapid at first and then gets slower and slower. The dose rate (the radiation amount received per hour) decreases with time. The fallout loses its intensity rapidly; it poses the most significant threat during the initial two weeks, after which time it diminishes to 1 percent of its initial level. Thus, limiting or minimising the exposure time decreases the dose from the source. Within two weeks after an attack, the inhabitants can stop using shelters and can work outside for an increasing number of hours. However, dense fallout regions such as those downwind from important targets such as missile sites and vast cities, would be exceptions
- **Distance:** The farther one is from ground zero, the greater will be the chances of survival. Like the heat from a fire is less intense the farther

 [&]quot;Nuclear Attack: Communicating in a Crisis", https://www.dhs.gov/sites/default/files/ publications/prep_nuclear_fact_sheet.pdf. Accessed on October 25, 2017.

^{3. &}quot;Planning Guidance for Response to a Nuclear Detonation", https://www.fema.gov/medialibrary-data/20130726-1821-25045-3023/planning_guidance_for_response_to_a_nuclear_ detonation___2nd_edition_final.pdf. Accessed on October 25, 2017.

An enemy attack on the country would be preceded by a period of growing international tension or crisis. This crisis period would alert citizens to a possible attack and should be used to prepare for the emergency. away one is, the intensity and the radiative dose also decrease as the distance increases from the source. One good survival strategy is to be far from cities that could represent potential targets. Moving as far away as possible from harbours, military complexes, or other strategic facilities can also help to keep one safe from nuclear dangers. If one is in a fallout zone and is not sheltered, doubling the length from the radiative source will result in reducing the receiving dose by a factor of 4.

• **Shielding:** Thicker and denser materials like thick walls, concrete, bricks, and earth can afford significant shielding from radiation. One way to lessen exposure is to move to a place that renders a protection factor of at least 100.⁴ An underground space such as a home or office building basement protects more than the building on the first floor. The apartment basement or office building presents a protection factor of 200 and can bring radiation levels down to two-hundredth of the outdoor dose. A single-storey building provides a protection factor of 2 (the fallout reduces by 50 percent).⁵

MEASURES FOR PROTECTION

Early Warning: An enemy attack on the country would be preceded by a period of growing international tension or crisis. This crisis period would alert citizens to a possible attack and should be used to prepare for the emergency. Regardless of whether civil defence planning relies on a system of shelters or mass evacuation, the population will need timely warning that they are in danger and that the government is implementing its civil defence measures. Traditionally, during the Cold War period, there were two kinds of alarms:

^{4.} The radiative intensity in the shelter is one hundredth or less than outside. Eighteen inches of earth or twelve inches of concrete can bring the levels down to one- hundredth of the outdoor dose.

 [&]quot;In a Nuclear Attack, There's no Avoiding the Brutal Math", https://www.sciencenews.org/ blog/gory-details/nuclear-attack-there%E2%80%99s-no-avoiding-brutal-math. Accessed on December 20, 2017.

short-term warning, timed in minutes, that a nuclear attack was imminent; and a longer-term warning, of hours or days, to the effect that an attack may take place. The radio or television, or the outdoor warning system installed in a city or town will give warnings. One needs to keep abreast of the news through the media: emergency information being broadcast or printed in the newspaper. Many communities have outdoor warning systems that use sirens, whistles, loudspeakers, or other devices to warn or alert citizens about natural disasters and other peace-time

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emergencies. The same can be adapted to indicate alert and attack in the community. Recently, the Chinese state media shared concerns over North Korea's nuclear and missile programme and advised its readers on "how to survive a nuclear attack".⁶

Early Warning Challenges: The nature of the warning will define what actions are practical. Before developing the intercontinental ballistic missiles, the US and the Soviet Union believed that there would be several hours of warning of an attack that was underway. With missiles, however, this warning time reduced to less than 30 minutes, depending on the missile flight time from one country to the other. The warning times are further reduced for nuclear missiles fired from submarines, which could come close to the coast. In the latter case, there is no possibility of starting and completing evacuation. In a situation when it appears that the crisis may worsen with the nuclear weapons use, it is important to undertake evacuation plans within a few days. Also, there is the risk of misinterpreting a crisis due to ambiguous or false warnings. In some cases, warnings could make the crisis worse and create panic among the public.

 [&]quot;Chinese State Media Tells Readers How to Survive a Nuclear Attack", https://www.reuters. com/article/us-northkorea-missiles-china/chinese-state-media-tells-readers-how-to-survivea-nuclear-attack-idUSKBN1E00EF. Accessed on January 9, 2018.

Fallout Shelter: A shelter can be the basement or inner corridor of any prominent building. It can also be a basement of a private house, a subway or a tunnel, or even a backyard trench, with shielding material. There are two kinds of shelters: blast and fallout. Depending on its strength, a blast shelter protects against blast pressure, initial radiation, heat and fire. Most civil defence plans have focussed on shelters against fallout rather than against the blast, since the fallout is likely to travel much farther from the explosion and endanger far more people. Fallout shelters are meant to protect people who have survived the initial blast, from heat and initial radiation effects. A fallout shelter does not need to be a special building or an underground bunker. It can be any place, provided the walls and roof are thick or heavy enough to absorb the radiation of the fallout particles outside. The first few days after an attack would be the most dangerous time. How long people should stay in a shelter would depend on how much fallout has been deposited in their region. In most cases, the radiation levels outside the shelter will drop sufficiently to permit people to leave the shelter in a few days. Even in regions that receive a heavy fallout, people may soon leave their shelters for a few minutes or even a few hours at a time to perform emergency tasks. The need for full-time sheltered occupancy will not be for more than a week or two. Information from trained personnel specialising in monitoring radiation using special devices to detect and measure the fallout intensity, and supported by analysis from the local authority scientific advisors, would be used to inform people when it is safe to leave the shelter⁷.

Shelter Management Challenges: A blast shelter will not withstand a direct hit and will be of no aid to people caught in the fireball; they will have no chance of survival. So, people living in or near possible targets, or high-risk areas may wish to move to safer neighbourhoods and seek fallout shelters, if the period of international tension allows time to relocate before a nuclear strike. Besides protecting people from fallout radiation, most fallout shelters will also render a limited shield against the heat and blast effects of a nuclear explosion even if not nearby. Shelters are of little use in massive fallout areas unless the occupants have enough life support equipment. Most shelters would

 [&]quot;In Time of Emergency", http://www.beyondweird.com/survival/intimeof.html. Accessed on October 26, 2017.

be crowded; except in cold weather, most would need a ventilating pump to remove warm air and bring in cooler outdoor air to maintain survivable temperature-humidity conditions. Fallout radiation does not contaminate food and water in dust-tight containers. Peeling fruits and vegetables removes the fallout from them. So does removing the uppermost several inches of stored grain onto which fallout particles have fallen. If fallout particles do not mix with the food, no harm is done. Water is not affected by radiation, and it becomes dangerous only if the radioactive particles themselves get into the water. There are efficient ways to decontaminate water containing radioactive particles. A simple filtering process can remove the particles, using paper or cloth, or by filtering it through clay soil. Garbage is kept in sealed containers and piling of garbage is not allowed inside the shelter for fire and hygiene reasons. Further, one needs to dispose of the waste outside the shelter when it is safe to do so, and if feasible, to bury it.

Evacuation: In the early Cold War years, before the arrival of long-range ballistic missiles, both the US and the Soviet Union planned to take advantage of the large, sparsely populated areas available in their countries by evacuating civilians from the large cities in case of a nuclear crisis event. Evacuation involves moving people from high-risk zones8 to low-risk zones9. If one is in a high-risk neighbourhood, one may be exposed to the direct blast, heat, and radiation effects of a nuclear explosion. By relocating to a safer region, the risk exposure is restricted to the fallout. The chances of combating only the fallout hazard are much higher than enduring the direct nuclear weapon effects. Further providing or improvising fallout protection in various buildings is much simpler and more manageable than coping with the direct nuclear forces. The central/state and local governments need to plan for the orderly relocation of people during periods of international tension. It calls for relocating people from high-risk to low-risk host states for improving and devising fallout protection in the host areas. These plans could be practised not only under an intimidating nuclear attack but also during other crises like

^{8.} High-risk zones are metropolitan centres of 50,000 or more population, and spaces near military, industrial, or economic areas of importance.

^{9.} Safe regions are areas where nuclear weapons are not likely to be targeted. These are the surrounding small towns and rural expanses and will become the host centres in the event of an emergency relocation to high-risk zones.

Regardless of whether evacuation is preceded, or followed, by an attack, such plans are seen as unrealistic. It is hard to imagine or plan in detail for the chaos presented by such mass movements of people in difficult circumstances or to mobilise the policing resources to make evacuation manageable. floods, earthquake, etc. Local authorities are competent for carrying out such planning because they are familiar with the local circumstances affecting evacuation.

Evacuation Management Challenges: Regardless of whether evacuation is preceded, or followed, by an attack, such plans are seen as unrealistic. It is hard to imagine or plan in detail for the chaos presented by such mass movements of people in difficult circumstances or to mobilise the policing resources to make evacuation manageable. Rural citizens will be strained to absorb this high influx of refugees, many of whom will

be without adequate food or shelter. Feeding and caring for large numbers of displaced individuals in remote districts with insufficient infrastructure requires a phenomenal effort. High efficiency and improvisation would be required from the host communities, and from the evacuees, a high degree of cooperation. If a person does not move when asked to do so, he/she may become subservient to strictly enforced curfews. Movement within the section may be restricted to protect property, and it is possible that most facilities or services ordinarily available will not be provided during the relocation period. Supply to the relocated people will need much of the available goods and provisions. The best existing public shelters will be reserved for the essential workers, who will remain to carry on vital industries, and for the hospitalised people who cannot be relocated.

Education: Civil defence relies on widespread participation and support from the people. Sharing information with the people about what to do in case of a nuclear attack, helps in building confidence and trust in government plans. Information booklets and study materials are used to educate the public. These inform about the effects of nuclear weapon and the actions needed in implementing the nuclear civil defence plans. If people do not know, or are unaware of, how to protect themselves from the fallout, the whole plan is pointless and may even be counter-productive. At school, children are taught to hide under their desks in case of a nuclear attack. They even have practice drills. Children's songs have been conceived that have a message about nuclear preparedness. Many videos on shelters have been produced and exhibited to the public as well, and the most famous one was a movie for children called "Duck and Cover"¹⁰.

Education Management Challenges: During the Cold War, the civil defence education did create an adverse effect in the minds of the American public. If a nuclear attack is in the offing, it will naturally create tension and make the public fearful. President Eisenhower recognised the harmful effects of nuclear fear on Americans and cautioned the people, "We do not have to be hysterical. We can be vigilant."

MAJOR POWERS' APPROACH TO NUCLEAR CIVIL DEFENCE

Civil defence may be described as the fundamental urge for self-survival. With the nuclear weapons arrival, civil defence took on a different perspective from that held during World Wars I and II. The Soviets exploding their first atomic weapon in August 1949, marked not only the commencement of the nuclear arms race but also heightened the possibility of a nuclear war and increased emphasis on a stepped-up civil defence programme. Civil defence was discussed much more during the Cold War, when the nuclear attack spectre shaped the popular culture and was prevalent in politics. The most well-known instances are from the US and UK, both because of their more open societies and the anti-nuclear movements challenging such civil defence plans in these countries.¹¹ Limited specific information is available about the erstwhile USSR's efforts, and still less about other nuclear weapon countries. Most Western European countries, as members of the North Atlantic Treaty Organisation (NATO), had some limited civil defence plans, while Sweden

^{10.} Duck and Cover, directed by Thomas Craven (New York: Archer Productions, 1952).

^{11.} A notable example of this was the British government-issued civil defence pamphlet "Protect and Survive" that led anti-nuclear activists there to produce the famous response *Protest and Survive*; E P Thompson and Dan Smith, eds., *Protest and Survive* (London: Penguin, 1980).

Civil defence was discussed much more during the Cold War, when the nuclear attack spectre shaped the popular culture and was prevalent in politics. The most well-known instances are from the US and UK, both because of their more open societies and the anti-nuclear movements challenging such civil defence plans in these countries. and Switzerland had more extensive plans.¹² For a proper understanding of civil defence issues, it is necessary to have a brief look at the civil defence history.

Nuclear Civil Defence in the US: During the Cold War, the US began a shelter identification programme, during which the government marked (with yellow and black radiation signs) more than a quarter of a million basements, corridors and caves that were supposed to protect from nuclear fallout. Some were stocked with water, food and medical equipment, but many lacked adequate ventilation and sanitary facilities to enable people to live in these shelters for long periods. In the US, a national warning

system operated on a 24-hour basis, transmitting warnings to over 1,200 federal, state and local monitoring points. Further, the local warning points used sirens and other means to alert the public. It was estimated that about only half the US population would be in regions where such warnings could be received within 15 minutes of a national alert. The public response among those who heard such sirens was by no means reliable: sirens that went off in 1955 in Oakland, California, were identified as an attack warning but were nonetheless ignored by 80 percent of the residents.¹³ The US intended to construct special bunkers for its federal and government leaders but did not seek a programme of building blast shelters for the citizens. In the early 1960s, President Kennedy made a strong appeal for civil defence: "In the event of an attack, the lives of those families which are not hit in a nuclear blast and fire can still be saved if they can be warned to take shelter and if that shelter is available. We owe that kind of insurance to our families, and to our country"¹⁴. The period from 1961 to 1965

^{12.} Civil defence stratagems in the US, USSR, UK, Sweden and Switzerland are represented in "London Under Attack", from which the analysis draws heavily.

^{13.} Ibid., n. 12.

^{14.} Thomas T Kerr, Civil Defense In The United States: Bandaid For A Holocaust? (Boulder, Colorado, Westview Press, 1983).

marked the most significant progress achieved in identifying and establishing procedures for a nationwide fallout shelter system. But, these successes were soon replaced with the Vietnam War costs, as well as a growing reluctance to support extra civil defence funding. Throughout the Sixties and into the Seventies, appropriations for civil defence funding showed a steady decline. From a 55 percent high of the total Department of Defence (DoD) budget in 1962, the civil defence budget declined to only 10 percent in 1970, ending the shelter programme. Only the shelter signs on some buildings remained¹⁵. In 1983, Ronald Reagan announced the Crisis Relocation Plan that would allow for evacuation from the cities to the rural expanses. It planned for saving 80 percent of the population wherein 145 million Americans in high-risk zones would be evacuated to the rural domains using private vehicles and would be lodged in schools, churches, etc. The US national highways were part of making this plan more feasible, and the plan cost was \$10 billion. People were expected to bring their food supplies with them as part of the evacuation and to build fallout shelters for themselves in the areas to which they were moved. Under the most optimistic assumptions, this plan was anticipated to take many days to execute. The programme created a storm and protests much like the ones stirred up when Kennedy had advocated a large increase in civil defence funding 20 years earlier. US government studies admitted, for example, that "evacuation from the populated Boston to Washington and Sacramento to San Diego corridors, with millions of people and limited relocation areas, may prove impossible"¹⁶. Recognising these problems, many community groups throughout the country demanded that their local governments and state government, refuse to take part in the programme. The situation was aggravated by some federal government arms questioning the programme's feasibility, and Congress eventually cut the requested funding from \$252 million to \$152.3 million, and led to the 'crisis relocation plan' being abandoned. These events have combined to once again leave the future US civil defence programme in limbo¹⁷.

Nuclear Civil Defence in the UK: The UK made plans in the 1950s to evacuate 45 percent of its densely populated cities, which, after several years

^{15.} n. 12, p. 279 and 266.

^{16.} Ibid., p. 52.

^{17.} Ibid., p. 268.

Along with communicating the warning, the UK Warning and Monitoring Organisation had the added responsibility of managing 870 stations networks to take radioactivity readings after an attack and predict fallout patterns. But it was not clear how the communication and monitoring system would itself withstand the effects of a nuclear war. of debate became downgraded to an option to move just women and children from the major cities. This too gave way by the early 1970s, as the British government civil defence plans urged people to "stay at home" because the government would "not help you with accommodation or food or other essentials"18. Britain had an extensive warning system to warn the public about an incoming nuclear attack and fallout patterns after the explosion. The warning would be transmitted to major police stations that would sound sirens to warn the public to take cover. Some 8,000 sirens were in use; although again, the public response was far from certain – it is reported that the response of most people in

Coventry to a 1984 early morning siren was to turn over and go back to sleep¹⁹. Along with communicating the warning, the UK Warning and Monitoring Organisation had the added responsibility of managing 870 stations networks to take radioactivity readings after an attack and predict fallout patterns. But it was not clear how the communication and monitoring system would itself withstand the effects of a nuclear war. Because of the enhanced fear of a nuclear attack during the Cold War and recognising that people rarely live close to where the buildings that had been marked as shelters might be, the UK government distributed information and materials on how individual families could construct fallout shelters at home. These shelters were meant to protect people from the fallout radiation in the event of a nuclear attack²⁰. The most famous civil defence education effort may well be Britain's 1980 brochure, "Protect and Survive". The brochure noted, "If the country were

^{18. &#}x27;Project and Survive' cited in n. 12, p. 263.

^{19.} n. 12, p. 28.

^{20.} Cresson H Kearny, Nuclear War Survival Skills (Coos Bay: NWS Research Bureau, 1980), pp.154-204

ever faced with an immediate nuclear threat, a copy of this booklet would be distributed to every household as part of a public information campaign which would include announcements on television and radio and in the press"21. Its goal was to tell people "how to make your home and family as safe as possible under a nuclear attack" by informing them of the steps to take to protect themselves from the blast and the fallout. After a quick explanation of the nuclear weapons' effects, the brochure included guidance on what to do on hearing an attack warning siren, an all-clear siren or a fallout warning siren. A checklist was given with each pamphlet so that families could know whether they had the necessary elements for a survival kit, including foodstuff and water for drinking and washing for 14 days, along with a portable radio and spare batteries, and utensils²². The family, with its survival kit, was to take shelter in the fallout room that the brochure gave instructions on how to construct. The "Protect and Survive" report was met with derision. It served only to fuel a massive anti-nuclear movement in Britain that called for unilateral nuclear disarmament, arguing that the more specific defence against a nuclear attack was for Britain not to have nuclear weapons²³.

Nuclear Civil Defence in the USSR: The former Soviet Union took a different approach from the US to the role of blast and fallout shelters in civil defence. The Soviet Union endeavoured to provide blast shelters for both its leadership and up to a quarter of its workforce in critical industries²⁴. But, it was clear that even the Soviet Union did not attempt to protect more than a fraction of its entire population. Also, people needed to remain inside the shelters for up to two weeks or longer to allow time for the radiation to decline. At the same time, it was unclear how secure the shelters that were constructed would, in fact, have been. Soviet plans suggested using a bicycle connected to a fan to ventilate the shelters. It was such self-help measures that in part made the nuclear civil defence plans open to ridicule. Soviet evacuation plans were massive, involving

^{21. &}quot;Protect and Survive" http://cybertn.demon.co.uk/atomic/main.htm. Accessed on January 4, 2018.

^{22.} The list also included, among other things, a clock, bedding, portable stove, fuel and cooking pots, torches with extra batteries and bulbs, candles and matches, changes of clothing, toiletries, first aid supplies, notebook and pencils, cleaning supplies

^{23.} Thompson and Smith n.11.

^{24.} n. 12, p. 273.

Soviet Union did not attempt to protect more than a fraction of its entire population. Also, people needed to remain inside the shelters for up to two weeks or longer to allow time for the radiation to decline. At the same time, it was unclear how secure the shelters that were constructed would, in fact, have been. moving out 100 million people or more from cities believed to be at risk of a nuclear attack. But, there were questions about the viability of such plans also. It was estimated that there were only about 10 million vehicles in the country and a sparse road network, while the railway lines would not be able to cope with the demands of such traffic. It was no surprise that there were reports of "widespread apathy or outright mockery" among Soviet citizens of such civil defence ambitions²⁵.

Nuclear Civil Defence in Sweden: In the case of Sweden, its geographical position and historical background have played a crucial role in determining the course of the

civil defence organisation. Sweden attaches extraordinary importance to civil defence measures such as the construction of bomb-proof shelters, evacuation planning, hardening of potential targets and building up of well-trained and efficient cadre of civil defence workers. Sweden's civil defence plans involved large blast shelters for the public. During the Cold War, to protect the Swedish population from the potential nuclear threat, the government established over 65,000 shelters. The goal in the 1980s was to shelter five million of Sweden's over eight million people and to offer shelter to the whole population, both at work and at home²⁶. The Swedish government granted subsidies of several hundred dollars per person sheltered. The money was not intended to pay for building the shelter but only to meet the cost of converting existing buildings (in schools and health clinics, etc.) so that they could serve as shelters, if required. From the beginning, the Swedes have been great believers in the shelters' policy and their efforts have attracted worldwide attention. Sweden is, thus, looked upon as the 'envy of the world' in civil defence matters. According to recent reports, nuclear war shelters are being readied in Sweden to prepare for a

^{25.} Ibid., p. 271.

^{26.} Ibid., p. 276.

surprise attack²⁷. Sweden also made detailed plans for evacuating its cities in the 1950s and has made it a part of its national plan, but, over time, has moved towards reliance on a system of shelters and more limited evacuation. Sweden did plan for the evacuation of many towns and small target areas out into the safer countryside.

Nuclear Civil Defence in Switzerland: In Switzerland, civil defence is given the status of a service. The Swiss made great strides in civil defence in the post-World War II era and made it obligatory for all males between the ages of 15 and 65 to serve in civil defence for 146 days each year. Women, whose services were not compulsory, could volunteer if they liked. In Switzerland, almost every building has a protective blast shelter system in the form of a reinforced concrete basement. Switzerland has built an extensive fallout shelter network during the Cold War, including the Sonnenberg tunnel and has airraid and nuclear-raid sirens in every village. The book Nuclear War Survival Skills by Cresson H Kearny declared that, as of 1986, "Switzerland has the best civil defence system, one that already includes blast shelters for over 85 percent of all its citizens"28. The government has encouraged building shelters as part of its civil defence plans in all seriousness and has contributed immensely to it. As per 1980 estimates, average government contribution to building shelters per person was almost a thousand dollars. On an average, the Swiss federal government reimburses 20 to 25 percent of the cost of shelter construction to the local governments. The Swiss have ensured a very high degree of protection due to the government's policy of shelter construction on a national scale and maintenance of trained civil defence workers²⁹. The shelters were meant to be occupied for an extended period, reflecting the understanding that the population needed to be protected from the fallout resulting from a nuclear war involving the superpowers in Europe. Switzerland seems to have had little, if any, sustained faith in the feasibility of mass evacuation and did not consider evacuation at all, choosing to rely instead on its shelter programme.

 [&]quot;Sweden Updates Hundreds of Nuclear Bunkers | Norad Shelter", https://noradshelters. com/sweden-updates-hundreds-nuclear-bunkers-amid-fears-new-cold-war-russia/. Accessed on January 3, 2018.

^{28.} Kearny, n. 20, pp. 6-10.

^{29.} n. 12, p. 279.

CONCLUSION

The more one knows about the dangers of nuclear weapons and the strengths and weaknesses of humans, the better the chances of survival. In the Western countries, strong civil defence plans were at odds with the principle of "Mutual Assured Destruction" (MAD) and were not rightly accomplished. Further, full-fledged, total defence required extensive funds. It seems that neither the people nor the government believed that any real protection against nuclear attack was possible and saw efforts at civil defence as impractical against the powerful destructive nuclear weapons forces, and, hence, a waste of time and money. Governments in most Western countries, except Switzerland, decided to underfund the civil defence due to its ineffectiveness. The civil defence measures against a nuclear attack were implemented in the face of widespread apathy and doubt. After the Soviet Union's downfall and the end of the Cold War, civil defence fell into neglect. Since then, there has been limited focus on nuclear war and more attention has been given to natural disasters, climate change and defence against a terrorist attack involving chemical or biological weapons.

India must learn the right lessons from the experiences of the major powers of the Cold War period. While preparing for civil defence seemed politically desirable, it was economically burdensome and not security engendering in real terms. It is worth noting that while these countries did succeed in safeguarding a handful of top military, bureaucratic and political leaders against a nuclear attack, each country eventually ended up relinquishing the goal of large-scale civilian protection from a direct nuclear attack, and all abandoned focus on such measures. India faces, overtime, a challenging nuclearised environment in the neighbourhood. It seeks to protect itself against the possibility of use of nuclear weapons by an effective deterrent strategy. Civil defence measures for a population of India's size appear unfeasible without expending a large amount of financial resources, a commodity in short supply at the best of times. India must focus its energies on buttressing the credibility of its nuclear deterrent. It is imperative that we make a nuclear attack on our nation less attractive by assuring that we are capable of avenging any possible nuclear attack, thereby removing any incentive for such an attack by the adversary.