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Thru' the Desk of the Editor

Much of human history has played itself out along the rim of the Indian Ocean. This significant region which stretches across East Africa, the Middle East and the Indian subcontinent to South East Asia and Australia has been the cradle of humanity. Earliest human migration out of Africa and the great cities of Angkor and Vijay Nagar; medieval Arab empires and Chinese 'treasure fleets'; the rivalries of European colonial powers to the present day interconnected & co-operative forces has a fascinating journey. It is therefore, that the Harvard Professor Sugate Bose calls this ocean "Symbol of Universal humanity". Indian and Chinese, Arab and Persian trading arrangements have created a grand network of cross oceanic communal ties in this region.

This region is where the world's great religions burst into life, where Judaism, Christianity, Islam, Buddhism and Hinduism jostled with each other. It is the cauldron where language groups competed, where Indo – European, Semitic and Sino- Tibetan tongues wagged alongside those speaking Altaic, Turkic and Caucasian. This is where great empires rose and fell, where the after-effects of clashes between cultures and rivals were felt thousands of miles away. Standing here opened up new ways to view the past and showed a world that was profoundly interconnected, where what happened on one continent had an impact on another , where the after – shocks of what happened on the steppes of Central Asia could be felt in north Africa, where events in Baghdad resonated in Scandinavia, where discoveries in the Americas altered the prices of goods in China and led to a surge in demand in the horse markets of northern India.

So also, the domain of space, Space has no boundaries. The concept of space is not new to India. India has a long history of space thinking stretching from pre-historic to modern times Some of the earlier roots can be dated to the period of Indus valley civilization Space was later developed as a discipline in vedandga, dating 1500 B.C and then in Yadnyajataka. But , it actually flowered in 5^{th} -6^{th} centaury with Aryabhatta. Later, Indian Space thinking significantly influenced Muslim thinking, Chinese thinking and European thinking. Others thinkers, who later elaborated Aryabhatta was include Brahmagupta, Varahamiliva and Lalla. While Vedas talk about notions of movement and heavenly bodies, Sulabha sutras were dedicated to altar construction and discuss advance mathematics. Vedanga includes details about Sun, Moon, nakshtras and calendar.

Indo-Greek influence on Space Science was visible during Romaka Siddhanta But, it was Aryabhatta in fifth century B.C specifically mentioned that Earth rotates around its axis, Earth was a Sphere containing a circumference of 39967 Km. Aryabhatta also stated that, reflected sunlight was the cause behind shining of the moon. Brahmagupta's was translated into Arabic in 771 and had major impact on Islamic mathematics. He also calculated the instantaneous motion of planet and gave correct equation of parallax and computation of eclipses.

Environment, National Security & Game Theory

When the cold war was at its height, the concept of security revolved around deterrence and the two super powers. One wanted to domesticise the universe, the other to universalize the domestic working class militancy. In the middle of the eighties, a new awareness emerged to questioning the relevance of mindless militancy built up as a means to define national security on a maximum – minimum continuum paradigm. In the US the discontentment of public brewed oven the military expenditure that could be expended on maximizing their domestic imperatives in terms of inordinate consumption, exorbitant lifestyle and production of wealth – in Soviet Union, questioning the logic of military expenditure without providing the minimum needs to its people came to the fore with winding down of its iron curtain.

In case of Environment, the concept of Securitization can be harked back to 1960s, when a number of popular books such as Rachel Carson's 'Silent Spring' caused rethinking of the entire established relations between nature and civilization.

Further, host of books by writers like Paul, Enlirch, Garret Handin, Garry Commoner, Lester Brown erupted a public debate about the issues such as exponential population growth, the tragedy of commons, negative externalities of the production technology and complex global interdependencies of late twentieth century. The creation of World Commission on Environment Development in 1983, chaired by Norway's Brundtland and the release of its report 'Our Common Future' was the result of this.

Environment-conflict linkage expostulated by Homes Dixon and others with an array of case studies share as in Rwanda, Somalia, Pakistan, Philippines unearthed the environment causes of conflict.

According to their studies environmental scarcity of resources has produced many social effects in terms of economic decline, poverty, decrease in agricultural productivity, migration and weakening of state structure which in turn result in violent intra, or inter state conflicts such as scarcity, group identify conflict and insurgencies and relative deprivation conflict. These studies and diagnostic in the sense that, they emphasis environmental causes of conflicts which are independent variables and not subordinate to what conventionally held as primary – practical, social and economic factors.

Despite certain criticism, most influential arguments in the field have concluded that, environmental stress is linked to conflict indirectly but significantly. Emperical case studies an Haity, Chiapas, Gaza, Pakistan and Bangladesh – India have concluded that, environmental scarcity of renewable resources such water, forest, fisheries and cropland give rise to a number of deleterious social efforts including economic decline, social segmentation and human migration-these social effects in interaction with other political, economic and social factors, can generate conflicts and instability. Central to this model was the notion of supply of ingenuity gap or a disparity between the solutions required to cope with environmental scarcity and, thus humen, social and institutional capital that could we mustered to provided these solutions. Thus ingenuity gap essentially undermines human adaptive responses.

Stephen Lebiszwski distinguishes traditional resources wars and environmental causes of conflict in that, the later is caused by human made disrurbance of its normal regeneration rate. Environmental scarcities can result from the overuse of renewable resources or from overstrain of ecosystem's sink capacity.

Realist as argued by Michel Fredrick are of the view that, the unreliability of international institutions, mechanisms and rules, regulations and law to manage environment has recapitulated the states primarily in providing security to its people against the environmental threats e.g. despite existence of over twenty international & regional assents on prevention of massive pollution, each year, tens of millions of tons of waste is dumped into the sea.

Thus, the two issues emerge are,

1. Conflicts on sharing renewable resources.
2. Conflicts due to environmental degradations.

1. Interest in conflicts arising out of renewable resources sharing e.g. water resources conflict resolution has increased over last decades. (Divan 2004), and various qualitative & quantitative methods are suggested for conflict resolution. Interactive computer assisted negotiation support system (Thiessen et al), Graph model for conflict resolution (Kilgour, Hipel), shared vision modeling (Massond), Alternative dispute Resolution (Wolf), Multivariates analysis biplot (Losa) and Fuzzy cognitive maps (Giordano) presents some significant papers & case studies on prevention and resolution of conflicts over water resources.

Game theory provides a framework for studying the strategic actions of individual decision makers to develop more broadly acceptable solutions.

Author here, illustrates the utility of Game theory by discussing basic concepts of Game theory and presenting. Simple two by two water resources games.

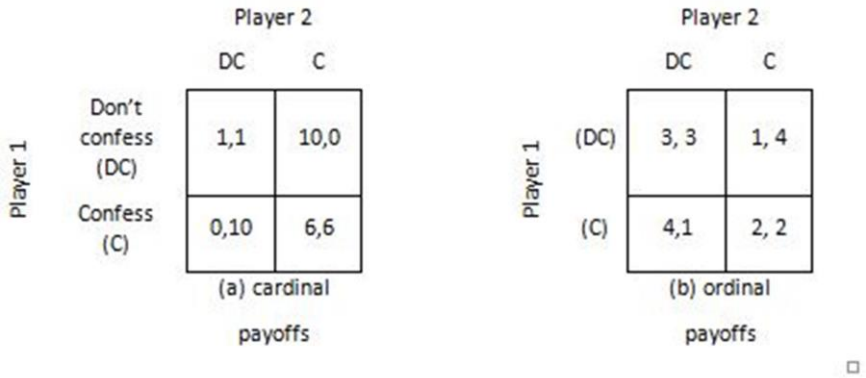
Game theory problems are often multi criteria multi decision maker problems which are converted ultimately to single decision maker problems. In game theory, each decision maker plays a game to optimize his own objective, knowing that, other players decision affects his objective valve & vice versa .

Stable outcomes are not necessarily pareto optimal, though same theory provides more realistic simulation of stake holders' interest based behavior. Often this results into non co-operative behavior, even though, co-operative behaviour is more beneficial to all parties like Prisoner's dilemma.

Carrato et al (2005) believe that many natural resource management issues have the characteristics of Prisoner's Dilemma game. (231-231 K. Madeni)

Carraro et al. (2005) believe that many natural resource management issued have the characteristics of a Prisoner's Dilemma game: players' dominant strategy is not cooperative, and the resulting equilibrium is not Pareto-optimal. Similarly, most papers dealing with sharing natural resources problems have made the same assumption about the game to be the Priosoner's Dilemma. However, all common resource problems might not be Prsoner's Dilemmas (Sandler, 1992).

The conditions of a natural resources sharing problem might favor the possibility of cooperation (Taylor, 1987). Water resources games are not necessarily rival (there might be multiple users and usage by one user does not prevent simultaneous usage by other user). Thus, coordination among the parties might be beneficial to all and can create externalities. However, some water resources games can be treated as anti-coordination games in which the available resources is rival (the resource can only be consumed by one user), sharing the resource comes at a cost to users, and the resource is not excludable (it is not possible to prevent a player who does not pay for the resource from enjoying its benefits). Identifying the structure of water resource games is essential as the results can be misleading if wrong assumptions are made in conflict modeling. For instance, characteristics of an anti-coordination water game cannot be captured if the conflict is modeled as Prisoner's Dilemma. Bardhan (1993) believe that the literature usually jumps to the case of Prisoner's Dilemma in case of free-rid-ers. Sometimes, the player might not be able to reach his objective on his own. Under that condition (Stag-Hunt game) a player cooperates when the other player also cooperates and defect when the other one defects. In some common resource examples consequences of defection might be so bad that a player prefers not to defect if the other player defects (Chicken game) (Bardhan 1993). Here, two non- Prisoner's Dilemma water resource games, useful for understanding water conflicts, are introduced to support the fact that not all water resources games are Prisoner's Dilemmas.



Chicken game

In this game (Fig.4) two drivers, heading towards a narrow bridge from opposite directions, are driving toward each other. The first driver to swerve ("Chicken" out) yields the bridge to the other driver and loses. No driver entering the race wants to be the chicken, but if no driver chicken out, both drivers might suffer from the resulting crash. Being called a "chicken" is better than dying, but worse that winning, for both players do not gain anything and the fight is over protecting their prides. If their prides are more important than their lives to them, they might both die proudly ! The payoff of each player in this game can be the value of the prize at the end of the game or the utility from winning or losing the game. The higher the payoff, the more preferred is the outcome.

The Chicken game has two Nash Equilibria in which one driver loses and one driver wins, (DS, S) or (Win, Lose) and (S, DS) or (Lose, Win), which are also Pareto-optimal. The third Pareto-optimal resolution (S, S) or tie, a socially optimal resolution where the gain of each player exceeds the minimum gain in the other two possible states (3>2= minimum {2, 4}). This socially and Pareto-optimal outcome (S, S) is not a Nash equilibrium and might not occur when players make decision based on self interest.

In the Chicken game the strictly dominant strategy is to play exactly the opposite what the other player does. Similar to the Priosoner's Dilemma game, each player wants to get a free ride and the cooperative or agreeable mutual solution (S, S) in Chicken and (DC, DC) in Priosoner's Dilemma) is not stable since each player is willing to refrain from it. However, these two games differ in that if both players decide to get free ride, the resulting outcome is the worst for both players in Chicken (DS, DS) while the resulting outcome in Priosoner's Dilemma (C, C) is suboptimal, but not the worst for both players.

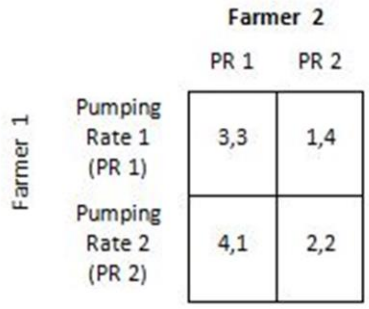


Fig.2. Groundwater exploitation game with ordinal payoffs.

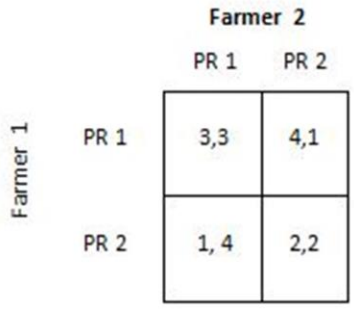


Fig.3. Groundwater game with penalties for defection after starting cooperation.

Chicken games are rare in the water resources literature as most water resources sharing problems have been treated as coordination games and modeled as Prisoner's Dilemma. An example of an anti-coordination water resources game is the Iran-Afghanistan Conflict on Hirmand (Helmand) River at time of the Talliban regime in Afghanistan.

The Hirmand River flows from Afghanistan to Iran and is important for agriculture in both countries as well as the survival of Hamum (Hamoun) Lake, an internationally recognized marshland in Iran's Sistan-va-Balouchestan province. Although there is an allocation agreement between the two countries since 1972, Iran is still struggling to receive its share from the river. The conflict between the two countries has not been resolved and the situation is sometimes exacerbated by droughts and political instability in Afghanistan. When the Taliban were in power in Afghanistan, this regime was unwilling (or could not afford) to pay the operations and maintenance (particularly sediment removal) costs for the Kajaki Reservoir in the Afghan territory. As a result Hrimad River dried up below the dam affecting agriculture and urban water supply in both sides of the border, and Hamoun's Lake and its ecosystem were dying. While the Afghans have responsibility to maintain the reservoir system and secure Iran's share of the river, since the Taliban was not doing so, the Iranians thought of fixing the system on the other side of their border. During this period, the conflict's structure was similar to a Chicken game (Fig.5). Both side could benefit from performing the required maintenance services. Payoffs for each country were equal to their urban, agricultural, and environmental benefits minus the maintenance cost paid. The values shown in Fig.5 are ordinal. Apparently, each side was willing to get a free ride, and spend less (minimize costs) and make more (maximize revenues). The status quo of the game, (DP, DP), in which no party would pay for the maintenance was the worst outcome, due to high urban agricultural, and environmental losses. The two equilibria of this game were (DP, P) and (P, DP) in which one party would pay the maintenance costs. The game is a Chicken game, and although being socially and Pareto-optimal, the cooperative outcome (P, P) is not a Nash Equilibrium. In this conflict, the Iranians chose to chicken out and sent teams to bring the system back to operation. Although, the final result was not ideal for the Iranians (no free ride), the cost of defection (DP) for them was so high, that they preferred not to pay (P) when they found the Afghans were willing to defect (not paying).

A good tactic in a Chicken game is to reduce one's options and feasible outcomes of the game by signaling intention (plans) clearly to the opponent (S) early in the game. The sent signal by a party should be strong, aggressive, and ostentatious to convince the other party that defection (DS or DP) is not the right choice. In the Chicken game one driver pretentiously can handcuff his hands behind his back before entering his car, lock his steering wheel in a straight position before the game starts, or throw the steering wheel out of the window early the game starts, or throw the other player to swerve. Other example of such behavior within a tester who has locked himself to an object, a programmed security system which explodes the property it protects if someone tries to trespass, or a nuclear doomsday device which is programmed to explode in case of invasion ("Doctor Strangelove"). In case of the Iran – Afghanistan Conflict on Hirmand, it was obvious to the Iranians that the Taliban were unwilling or unable to cooperate under any condition. The Shia Muslim Iranians had never recognized the Sunni Muslim Taliban as the legal government of Afghanistan and the two governments had no political relations. The ongoing wars among Afghan parties also made the Taliban Politically and economically unstable. The aggressive behavior of Taliban benefited the Afghans as a clear signal from the Taliban side, and the Iranians preferred to chicken out to pay for maintenance.

Unlike Priosoner's Dilemma in which parties lose together, the Chicken game has one winner and one loser. The Chicken game's structure and payoff values leave no incentive for cooperation. In water resources problems with a Chicken game structure, one might promote cooperation by increasing the penalty for defection (non-cooperation). For instance, for a conflict between two farmers over paying the maintenance costs of the pumps and irrigation channels which they both use (Fig.6a), a higher authority with a superior power (such as a farmers union or an irrigation district) can impose extra charges on farmers who do not pay maintenance costs, and so promote cooperation and prevent defection (Fig.6b). Without penalties (Fig.6a), each farmer prefers to get a free ride and not pay, leading to the system's demise. In that case, each farmer prefers not to defect prefers to cooperate when the other farmer defects (does not cooperate) and to defect when the other farmer does not defect. However, if defection has costs (high enough penalties) (Fig.6b), a player is not interested in getting free ride, cooperation becomes a strictly dominated strategy, and the cooperative resolution (P, P) becomes a dominant strategy (and

Stag-Hunt (assurance) game

In this game (Fig.7) two individuals who are out hunting can choose between hunting a stag together and a hare individually, without knowing the other player's choice. A stag has the highest payoff for both players (half of a stag's value goes to each hunter) but can be hunted only when both players cooperate. Instead, each player can choose to hunt a hare on his own which has a lower payoff. The Worst case for given player occurs when he chooses to hunt a stag (cooperation) and the other player chooses to hunt a hare (defection).

Table 6 reviews the characteristics of the three games introduced so far. Similar to Priosoner's Dilemma, Stage-Hunt is a coordination game and the two games might be confused. In both games the cooperative resolution is Pareto-optimal and the non-cooperative Pareto-inferior resolution is a Nash Equilibrium. However, unlike Priosoner's Dilemma, the Stag-Hunt has no strictly dominant strategy (3>2 but 1<2) and the game has one more Nash equilibrium. Unlike Chicken, in which each player does the opposite of the other player, in the Stag-Hunt, each player's interest is to do exactly as the other player. Although a Stage-Hunt does not look like a dilemma, game theory finds it as a dilemma and predicts that players do not always cooperate to reach the only Pareto-optimal resolution (S, S). In practice, sometimes, player might choose not to cooperate, perhaps due to lack of trust, which results in a Pareto-inferior result (H, H) for the game. So, the game can be also called a "Trust Dilemma (Grim et al., 1999)".

A water resources example with a Stag-structure is shown in Fig. 8. In this game two littoral countries share a lake. Each country has one river flowing into the lake. As a result of high evaporation and reductions in seasonal flows of the two rivers from upstream consumptive use, the lake is drying up, becoming salty, and its ecosystem is deteriorating. For the lake and its ecosystem to survive, both countries must increase water released to the lake by a specific amount (say 40%). Because of high evaporation, an in-crease in flow only by one country solve the problem. The payoff of each country is the environmental benefit from increasing the inflow to the lake minus the revenue lost from decreasing upstream consumptive use (even if calculation of environmental benefits in monetary values is not possible, parties still are able to rank the possible outcomes). If both countries reduce consumptive use upstream and increase release to the lake, the environmental benefits will exceed the revenue losses from reduced upstream consumption. However, if only one country increases its release to the lake, the lake's problem is partially solved, the environmental benefits will be minimal, and that country's payoff will decrease from revenue losses from decreased upstream use. The game has two equilibria, cooperative (I, I) and non-cooperative (DI, DI).

In the Trust Dilemma, if prayers trust each other, there is no risk of failed cooperation and the players will cooperate. However, in practice, non-cooperation is a risk-free strategy, leading to an out come which is not the best, but better than the worst in absence of trust to the other players. Based on this finding within Stag-Hunt structure: the rowers of a boat stop rowing or row slower to minimize their energy loss, when they suspect other rowers are not rowing effectively, although if everyone rows at the same rate, boat speed is higher; stockholders might sell their stocks individually when the company is not performing well and there is a risk of other stockholders selling their shares, although they could do better if they all keep their stocks or sell their shares together; or countries built nuclear weapons when there is a risk that other countries develop nuclear weapons, although they all agree and know that the world would be safer without nuclear weapons.

Generally, there is not tendency to free ride in a Stag-Hunt game as the payoff for non-cooperation is insensitive to what the other player does. Therefore, if one player observes signs of cooperation from the other party, he will cooperate. Similar to a Priosoner's Dilemma, repetition of a Stag-Hunt game can help increase trust among the parties and leading to a Pareto-optimal resolution. In the presented water conflict, however, the parties might not have a change to repeat the game many times to find if other players are trustworthy. Instead, negotiation and clear cooperative signals will be helpful in reaching the Pareto-optima resolution (I, I).

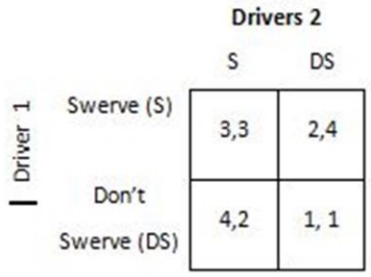


Fig.4. Chicken game with ordinal payoffs

Fig.5. Irfan-Afghanistan conflict on Hirmand (Helmand) River at the time of Taliban regime in Afghanistan.

II. Second part is to illustrate, how externalities like climate change affects the security scenario, climate change reportedly (Nitin Pai, 2008) will have tremendous impact as regional security in the Indian subcontinent. Glacial melt, rising sea level and extreme weather will exacerbate online conflicts and will require India to develop military capabilities to address a range of new strategic scenarios – from supporting International co-operation, to managing a 'hot peace', to outright military conflict.

Impact mechanisms of climate change.

According to the IPCC, the likely range of global average surface warming over the period of this century vary from 0.3^0C to 6.4^0C, depending on the model used for simulation. The corresponding average rise in seal levels ranges from 0.18m to 0.59m, excluding the impact of dynamic changes in the ice flow[2]. In southern Asia, the mean annual increase in temperature by the end of the century is projected to be around 3.8^oC in the Tibetan plateua and 3.3^0C in South Asia and 2.5^0C in South East Asia[3]. While there is still an ongoing debate over the pace at which the temperature is expected to rise over the coming century, potential mechanisms by which the change will affect the region are clear. These are: the changes to subcontinent's river systems that flow from the Tibetan plateau to the Indian Ocean, and, rising sea levels and their impact on river-deltas and low-lying islands[4]. In addition, a third mechanism pertinent to the this study: extreme weather – cyclones, droughts, floods etc., that do not exclusively result from global warming but are both vitiated by it and complicate our response to the disasters it causes.

Glacial recession. The glaciers on the Tibetan plateau are the source of Asia's biggest rivers, including the Brahmaputra, the Indus, the Sutlej and several of the northern tributaries of the Ganges that irrigate the subcontinent. Geopolitically the source of most of these rivers, except the main Ganges, lies in China. The melting of the Himalayan glaciers as a result of the rise in the earth's temperature will first increase the drainage through the major river systems into the ocean, followed by reduction in the their volumes once the glaciers begin to disappear. It is projected that some of the mightiest Himalayan rivers might end up as seasonal, monsoon-fed rivers like those in southern India.

Rising sea levels. The rise in global sea levels- due to the melting of polar ice caps and glaciers around the world-is expected to result in the submergence of low lying areas: including river deltas, coastlines and small islands. This places highly populated regional cities like Karachi, Dhaka, Mumbai, Kochi and Mangalore at risk. The entire country of Maldives could disappear under the Indian Ocean by the middle of the century. In addition, the coastline could advance inland across several heavily populated parts of Bangladesh, Sri Lanka, Myanmar and Pakistan (as indeed, several parts of India).

Extreme weather. In addition, climate change risks worsening the impact of natural disasters like cyclones, floods and droughts that affect the subcontinent. This could take several forms: increasing the intensity of cyclones or floods, changing the geographical area where these occur, occurring at increased frequencies and, in general, complicating adaptation efforts. For instance, a cyclone of record strength striking a river delta that is itself deluged as a result of glacial recession would transform the disaster into a much more complicated one.

Changing the dynamics of conflicts

Global climate change, by its very nature, is a trans-national phenomenon. While its impacts will not respect political frontiers, the source of climate-related problems and the hose at risk from them might well be on different sides of national boundaries. This situation is further complicated when the boundaries themselves are unclear, contested or both. As states react to climate change issues in line with their self-interests, asymmetries in risk perceptions and the existence of unresolved inter-state disputes are likely to complicate ongoing conflicts. The following table interposes the impact mechanisms of climate against the ongoing conflict dynamics in South Asia.

Conflict system/ Impact mechanism	Glacial recession	Rising sea levels	Extreme	Net Assessment
Jammu & Kashmir	High	-	Medium	Risk of war, motivated in part by the quest for water resources.
India-China border	High	-	Medium	Risk of natural disasters in India, worsening India-China relations.
Bangladesh 'ethnic invasion'	High	High	High	Risk of mass migration into India.
Pakistani separatism	High	Medium	Medium	Risk of existential crisis in Pakistan, and of ethnic conflict.
Sri Lankan civil war	-	High	Medium	Risk of mass migration, and of ethnic conflict
Nepali civil war	High	-	High	Risk of natural disasters and mass migration into India due to social unrest.

Impact of climate change on ongoing conflicts in the Indian subcontinent.

In light of Game theory, Global warming situation appears to have some similarities with Prisoner's Dilemma.

The global warming situation appears to have some similarities to the Prisoner's Dilemma game, as suggested by Table IV. For simplicity of argument, the options of states are narrowed figuratively to two strategies: (a) reducing CO_2 emissions and (b) building sea walls. The first option is to minimize the threat by reducing the amount of global Table IV. Ranking of Outcomes of Climate Change Strategies

		Other States	
		Reduce CO_2	Sea Walls
State A	Reduce CO_2	(1) 2,2	(11) 4,1
	Sea Walls	(111) 1,4	(IV) 3,3

warming that takes place; the second is an adaptive response that seeks to limit damage caused by rising sea levels triggered by global warming.

For a typical country, the most advantageous outcome of the four would seem to occur if it invests available resources in self- defense by building sea walls, while all the other parties significantly, reduce their CO_2 emissions in an effort to diminish the threat of global warming by reducing greenhouse gas emissions (Quadrant III). The amount of global warming would be somewhat lessened for that country, which in the meanwhile has enhanced its capacity to adapt to the changes that do occur. Thus, the non-cooperating country becomes a 'free rider' that benefits from the environmental public good of less climate change that is created by other countries.

The least desirable result would occur for a country that invested heavily in cutting CO_2 emissions while all others engaged in a defensive strategy of reducing their vulnerabilities (Quadrant II). The party engaging in self-restraint to the exclusion of adaptive preparations would be highly vulnerable to climate changes caused by the continuing high level of CO_2 emissions of the other states. Moreover, the benefits of its sacrifice would be shared with all the other countries, including those who invested nothing in prevention.

Of the two remaining outcomes, the more preferable would seem to be for all parties to cooperate in taking decisive action to minimize global warming by reducing CO_2 emissions. Cooperating to limit the amount of climate change that takes place (Quadrant I) would appear to be a less costly venture with a higher likelihood of achieving a measure of security than trying to adapt to the greater amount of climate change that would occur if most countries opt for adaptive rather than preventive strategies (Quadrant IV).

The ranking of outcomes for the paired combinations of strategies for coping with global change would thus parallel the priority of preferences for the Prisoner's Dilemma game. The logic of the situation would lead countries to invest what they can in sea walls or other adaptive measures leading to an outcome in which they achieve their third preference, rather than the seemingly more desirable second preference that would result if all parties agreed to reduce emissions of CO_2 and other greenhouse gases, thereby minimizing the amount of global warming that takes place.

A Quadrant I outcome as opposed to a Quadrant IV outcome can be achieved through negotiations, which will succeed only if all parties believe that the others are negotiating in good faith to reach an agreement that is acceptable to all significant parties and, furthermore, that they can be counted upon to follow through on their commitments. The general absence of these conditions in the military realm has been a major obstacle to the achievement of significant arms control during the Cold War.

The Case of Ozone Depletion

The ozone depletion regime initially defined by the 1985 Vienna Convention on the Protection of the Ozone Layer and the supplemental 1987 Montreal Protocol on Substances that Deplete the Ozone Layer is a significant example of the achievement of a Quadrant I solution to an environmental security problem that was achieved through international negotiations. The Protocol, revised in 1990 and 1992, provides for progressively stricter international regulations on the production and use of ozone depleting substances, the most recent of which mandates phasing out most of these substances by 1 January 1996." Why didn't the logic of the Prisoner's Dilemma prevail in this case?

This remarkable diplomatic accomplishment was made possible by several factors which are usually not present in the military context, two of which will be noted here. First, while human beings can take steps to reduce their exposure to an intensifying borage of ultraviolet radiation, there is no apparent defense at any cost against the much larger environmental catastrophe that is a likely consequence of a substantial thinning of the ozone layer. In contrast, armed forces and modern weapons are viewed in many countries as a viable way of enhancing security against would-be aggressor states.

Second, the consequences of a Quadrant II outcome for State A and Quadrant Ill for the other states is not as disadvantageous as in the context of a competitive arms buildup. Threats to State A's security may increase dramatically if it diverts substantial resources from military defense while other states are adding to their arms capabilities. Alternatively, what other countries might do to defend themselves against ultraviolet radiation poses no threat to State A regardless of whether it opts for minimizing or adapting to the problem. Furthermore, restrictions on trade in, ozone depleting substances make it unlikely that other states will derive a competitive advantage from failing to comply with the revised Montreal Protocol.

Table V. Ranking of Outcomes of Responses to the Ozone Depletion Problem

		Other States	
		No CFCs	Sunscreen
State A	No CFCs	(1) 1.1	(11) 3, 2
	Sunscreen	(111) 2, 3	(IV) 4, 4

These two factors alter the priority of outcomes to the pattern suggested by Table V, in which the options have been figuratively simplified to phasing out CFCs, a preventive strategy, and using sunscreen, an adaptive one. Since there is no prospect of an effective defense against the consequences of ozone depletion, Quadrant I is the most desirable outcome for all countries because it minimizes the threat. Quadrant IV is the least desirable result in that nothing is done to limit ozone depletion. Quadrant III is less attractive to State A because of the ineffectiveness of any defensive measures it might take, and Quadrant H is less disadvantageous because there is no added threat. Thus, taking action to limit the threat results in a better outcome regardless of what the other states do. If all parties follow this logic, the outcome of their choices is Quadrant I, which appears to be what actually occurred. [12]

Implications for Negotiations on Climate Change

Negotiations on a strategy for limiting the emission of CO_2 began in February 1991 in the specially constituted Intergovernmental Negotiating Committee and led to adoption of the United Nations Framework Convention on Climate Change at the 1992 Earth Summit in Rio de Janeiro, where it was signed by representatives from 153 countries. The original convention was a disappointment to many for its lack of a specific timetable for reducing emissions of green- house gases. It does, however, call upon the parties to stabilize concentrations of greenhouse gases in the atmosphere at a level that would prevent 'dangerous anthropogenic interference with the climate systems within a time frame sufficient to allow ecosystems to adapt naturally'. Furthermore, it does provide for a process of continuing negotiations on additional national commitments (see Leggett & Hohnen, 1992; Parsons et al., 1992).

There are reasons for caution about the prospects for the achievement of a comprehensive international strategy on limiting global warming. First, the ozone depletion accords were reached on the presumption that substitutes for the controlled substances could be developed and produced at an affordable cost. By contrast, it is widely assumed in policy-making circles that altering energy production and use practices to the extent necessary to keep atmospheric CO_2 concentrations low enough to avert a significant warming would be a very expensive undertaking that would require a massive commitment of resources, substantial economic disruptions, and significant sacrifices in life styles in the highly industrialized countries. Moreover, there is concern in poorer countries that participating in a global assault on climate change would seriously retard their economic development.

Second, whereas discovery of the Antarctic ozone hole by a British scientific team in 1985 provoked a sense of alarm, especially when it was definitively linked to human pollutants, no comparable surprise or crisis has spurred negotiations on global warming.

Moreover, there is continuing skepticism in some scientific and policy-making circles about the warnings of global warming (e.g. Singer, 1992). Moreover, while an effective defense against the consequences of ozone depletion appeared to be impossible, there is a school of thought that practical adaptive steps can be taken, at least by some societies, to cope effectively with global warming that may even be less costly and disruptive than trying to prevent or minimize climate change.

Third, while ozone depletion was generally viewed as global, peril that would have serious adverse effects for all countries, negotiations on preventing climate change have been complicated by the perception that some countries may be far more affected by climate change than others. For example, while rising seas would flood much of the agricultural land of Bangladesh and Egypt, and possibly the entire Maldive Islands, landlocked countries such as Switzerland and Austria would have nothing to fear from higher sea levels, although climate change may affect them in other ways. Moreover, some countries might envision themselves as net gainers from global warming in that the advantages of climate change, such as a longer growing season, might outweigh the costs (Glantz et al., 1990).

Finally, preventing climate change is also likely to be significantly more burdensome for some countries than others. Substantially greater sacrifices may be expected of the countries that are heavy contributors to the problem, such as those that depend heavily on fossil fuels or are economically dependent on the export of tropical hardwoods. The wealthier countries may also factor in the costs of additional economic and technical assistance that developing countries will need to minimize their contributions to global climate change.

The states most likely to adopt a defensive strategy in the pattern of the Prisoner's Dilemma are those that foresee fewer adverse impacts from climate changes, are confident of their capability to adapt to them, and would bear a substantial share of the cost of the global cost of preventing climate change. Conversely, states may be more inclined to support international efforts to minimize the threat of climate change if they believe they have much to lose from climate change, have little adaptive capacity, and would bear a relatively small share of the costs of preventing global warming. The United States, as well as several other highly developed countries and the transitional states of the former Soviet bloc, may fit into the former group; many of the less developed countries into the latter one, at least on the first two variables (Homer-Dixon, 1991, p. 88). Thus, the potential exists for North/South polarization on the climate change issue.

Such a polarization may not be inevitable. The costs of preventing global warming through strategies such as energy conservation may not be nearly as burdensome as is widely assumed, especially when balanced out against the costs of climate change (see Cline, 1992; Romm & Lovins, 1992/93). Moreover, governments of industrialized states may be impressed by the beneficial impacts that reduced energy production and consumption would have for lessening other environmental problems, such as acid deposition. Countries with extensive tropical forests are becoming more aware of the economic benefits of sustainable use as opposed to widespread clearing of them.

Furthermore, if evidence continues to mount on the varied secondary and tertiary impacts of global warming, confidence that adaptive strategies can be successful and affordable is likely to wane. Fewer states will conclude that global climate change will on balance be advantageous to them. In a highly interdependent world, even those that are less affected directly by climate change may be disadvantaged by dislocations that occur in other countries. The commitments of numerous developed countries to stabilizing and eventually reducing CO_2 emissions within the decade, and the apparent receptivity of the Clinton Administration in the United States to such a goal, indicates that this type of thinking is already on the rise. Thus, there is reason for some hope, if not optimism, that the logic of the Prisoner's Dilemma will not prevail and that a global accord can be reached that will substantially limit climate change.

About Prof. Sana Khan

Deterrence Against A Rogue State

Conventional deterrence models from Thomas Schelling (1966) to Frank Zagare (2004), including Robert Axelrod, Robert Jervis are primarily applicable to conventional warfare. Where as in multipolar world Richardsonion model finds its application. Classical deterrence theory emphasizes on, proportionality, reciprocity, coercive capability and rationality. Whether one is nuclear optimist or pessimist, it has worked a long way.

The tremendous gap in the theory and practice that globe faces today, is due to the changing nature of warfare in light of the emergence of rogue states and terrorism as an instrument of state policy.

Typically, the cause for conflict among nations is explained by Charles Doran's power cycle theory, where a revisionist power challenges a status – quo power at an inflection point.

Game theoretic analysis and agent based simulation explains ingroup – outgroup conflict as under-

- Hostility in the intergroup interaction results if the fraction of parochial members of at least one group is sufficiently large.
- The possibility of conflict increases with the difference between the groups, this causes phase transition.
- During peace time, the payoff for tolerant- non altruists is more whereas, during war time, parochial altruists is more, that leads to fitness. This explain the evolutionary root of conflicts.

However, in all such analysis, it is the stronger state, which has a higher possibility of winning, wages war against the weak state. There are situations, where the weak especially rogue state creates conflicts against strong state in different ways. U.S National Security strategy defines rogue state as "These states, brutalize their own people and squander their natural resources for personal gain of ruler, threaten their neighbors, use threats, sponsons terrorism, reject basic human values…"

The author here, addresses this phenomenon as **context as cause** which is neither sufficient nor necessary condition under which weak state wages war against strong state, but makes certain outcomes more or less likely in combination with other factors using.

1. Power Transition Theory, "This is a war initiated by state, that feels more dissatisfied regardless of whether one in defender or challenger. Here, a weaker power would be more dissatisfied with status quo if it is in loss frame.
2. Windows of opportunity Theory. Policy makers decide to choose wars where the conditions are suitable for them, and such conditions world drastically worsen as time lapses. Thus Even a weak state would wage war that is anxious about future. This would be preventive or preemptive war.
3. Diversionary Theory : This is external use of force for internal political purpose or internal compulsions.
4. Rational Choice Theories : Limited goals for military action in asymmetric conflict like better negotiation advantage

To analyses those, the author uses cognitive model, as combination of Game theory and prospect theory combining perceptions of rich and frame effect.

The analysis suggests that,

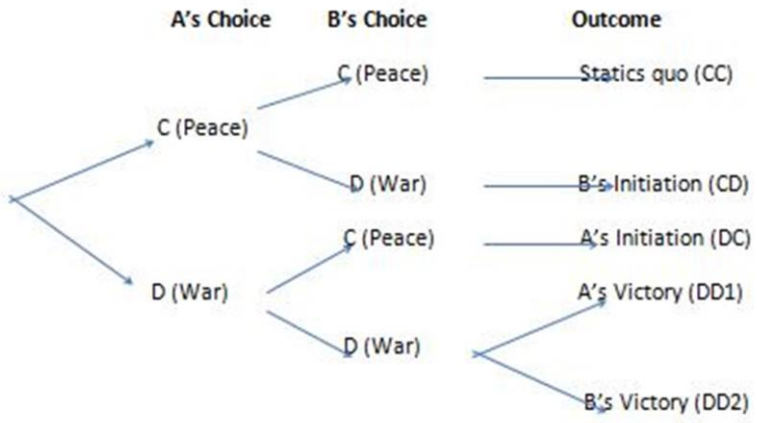
1. While strong states have preference order of prisoners Dilemma, weak states have preference order of chicken Game.
2. If credibility of Punishment is increased, strong state can push weak state thus preventing defection.
3. Decision makers of rogue state in loss frame seek risky choice. Gain frame choose safe choice. Hence strong state should make defection costly.
4. For weak state,
5. In chicken game co-operation is safe choice, defection is risky choice.
6. In prisoners Dilemma, co-operation in risk choice and defection is safe choice

Sang Hun park has given enough imperical evidence to demonstrate this phenomenon U.S. Army War college clearly differentiates between 'deterrence' and 'coercion' and emphasises on capability, credibility and effective imposition of unacceptable costs. Centre for strategic and international studies in such situations recommends deconstructing the network into component parts and deter them independently.

This brings us to a conclusion that, strategically dealing with a weak rogue state requires proactive, credible use of strong incentives and disincentives, so as to make cost of defection high, thus converting the Chicken game into prisoner's Dilemma game.Thus ensuring that the weak rogues state does not gamble and take undue risks threatening the strong state.

Weak State's choice in an asymmetric conflict.

Frame / Game	Chicken Game	Prisoner's Dilemma
Weak State Loss Frame	1. Risky Choice War/ Detections	2. Safe Choice peace co-operation
Weak State Gain Frame	3. Safe Choice Peace, co-operation	4. Risky Choice War / Defection



Strong states Preference Order : DC > CC > DD > CD
(Prisoners Dilemma)

Weak States preference Order : DC > DD2 > CC > CD >DD1
(Chickens Game)

About Dr Rajiv Gupte

Chinese Soft Power, Confucianism and Fault Lines

For most Indian scholars the Chinese culture in general revolve around "Confucianism " and as such, there is a serious lack of appreciation of diversity and dynamism in Chinese ideology.

For over 8000nd years the fundamental spiritual belief in China was in form of Shamanism (Lee and Wang, 2007, Xu 1991,Yuan,1988) which was to connect inner world with the outer world, body with the soul. Out of this Confucianism and Daoism developed, which affected China for over 1000nds of years (Hsu, 1981) during the disintegration of Zhou dynasty (841-256 B.C.) chaotic political and social changes have risen to "Hundred Schools of Thought".

1. **Confucianism** (551-479 BC)

Confucius and Mencius believed in Human goodness, Mencius pointed to human beings natural, instinctive compassion shown to other sufferings and their ability to know right and wrong , follow the moral and social norms and benefit society. This school advocated the ideal Kingship and governance to be Benevolent towards common people and stressed that leaders should rely on education to reinforce, extend and further develop human goodness.

Confucians value hierarchy, obedience and conformity and hence Mutual interests of ruling class and the common people. This explains its existence for 2000nd years.

Although Confucianism was suppressed and abolished by the first emperor of Qin when he unified China (221 BC), it becomes a dominant doctrine during Han dynasty till the fall of Qing dynasty (1911CE).

- **Xunzi (313- 238BC)**

Xunzi incorporated thoughts from Daoism and Legalism. He represented a period when different schools of thoughts emerge, one believing people's inherent inclination to esteem order and comply with rule while another believed in reconstruction of social order on the basis of observed evilness of human nature.

He believed in sedge – Kingship and explicated social and administrative rule to supplement core and soul of Chinese traditional and socio – political ideology (Chao-Chuan Chen, Yueh-Ting Lee, 2008) it is in this sense that Tan Si – Toing concludes that, "Theoretical thinking in the past 2000nd years has been dominated by Xunzi."

- **Daoism**

Lao Tse-is a complex, comprehensive, integrated system of beliefs of role of universe in general human existence.

"There are those who have been living in unity with Tao since ancient times. Thanks to them, the sky is pure and earth is stable, nature is gentle and rivers are full of water, valleys are covered with flowers, all living beings multiply, and the heroes of the spiritual path are paragons of virtue. All this is provided by those who have achieved the unity!

If they did not help, then the sky would cease to be pure and the earth would crack all over nature would cease giving its beauty to all the living, valleys would stop blooming and turn into desert, all living beings would stop multiplying and disappear, and the heroes of the spiritual path would not be paragons of virtue and would be ridiculed and banished…

People are a base for their rulers. Therefore, those earthy rulers who elevate themselves do not have a strong base. This happens because they do not consider people as their base. It is their mistake.

If you disassemble the chariot which you ride, what would you be left with?

Do not regard yourself as precious jasper! Be simple, as common stone!"

- **(Vladimir Antonov,2007)**

There is Clear hierarchy among humans Earth, heaven, nature and the Dao. Thus developing the concept of dialectic Yin and Yan, Daoism believes in developing harmonious relationships between leader and follower or conflict resolution this challenges people to go beyond "Either – or", thinking to achieve "Both – and".

- **Legalism: Hanfei(280-233BC)**

Leadership is constructed around 3 core concepts – Power, Law and Management Technic to manipulate the subordinates. He believed in punishments and enforceability

Fault lines:

1. **Struggle between Confucianism and Legalism**

While Confucianism believes in compassion and benevolence, Legalism believes in Authoritism culture (Kwang – Kuo Hwang 2007)

In order to elucidate the essential nature of the struggle between Confucianism and Legalism, a conceptual scheme to compare five crucial aspects of these two schools of thoughts (Hwang, 1995): value orientations, norms for regulating social behavior, rules for distributing resources, input factors determining the distribution of resources and the authority who makes decisions(as in table). Confucianism advocates a kind of status ethics. It has differing expectations of scholars and ordinary people. For ordinary people, it is enough to practice the ren-yi-li ethical system within the domain of one's family and acquaintances. The guiding principle of their social organization is familism, the social norm for regulating social behavior is Li (politeness), and decision-maker who holds the power of distributing resources within the family is the paterfamilias. When allocating resources to others, the first thing to consider is the blood relation with the recipient. Resources are frequently allocated according to the need rule.

	Confucianism		Legalism
	Ethics for ordinary people	Ethics for scholars	
1. Value orientation	Familism	Collectivism	Individualism
2. Social norm	Particular Li (courtesy)	Universal ren (Benevolence)	Universal law (fa)
3. Distributive rule	Need rule	Equality rule	Equity rule
4. Criteria for distribution	Blood relationship	Membership	Contribution
5. Decision – maker	Paterfamilias	Elite(scholar-official)	Ruler

Source: Adapted from Hwang(1995:26)

Confucianism sets a completely different expectation for scholars. It expects scholars to benefit the world with the Dao, and requires them to extend the domain for practicing rendao from the individual and family to the greater society; the bigger one's domain for practicing rendao, the greater the moral achievement. While the ideal goal of Confucianism is to attain a peaceful, harmonious world, what a scholar can really do is to actualize rendao in a community or social organization larger than family. Therefore the value orientation of scholarly social behavior can be termed collectivism. According to the Confucian ethics for scholars, the norm for social group should be allocated according to the equality rule by morally educated scholars, and every member of the group is entitled to an equal share.

When a Legalist leader is assessing how to allocate rewards and punishments to subordinates, contributions to the accomplishment of organizational goals, rather than blood relationships or groups memberships should be considered. Therefore the guiding rule for their social acts comprises both individualism and collectivism. By recognizing the legitimacy of individual interests and by advocating the universality of legal applications, legalists are individualists.

However, legalists are collectivistic in the sense that they give priority to organizational and national goals rather than to familism and factionism. A delicate combination of parts of both the Confucian and Legalist traditions was created and maintained in the feudalistic society of imperial China for hundreds of years.

1. **Dominant culture** Ching – Chou, Farh 2000 constructed a 42 item paternalistic leadership scale (PLS) based on Chinese cultural nuances.

It did not find a consistent positive correlation between Authoritium leadership and subordinate psychological response. Compliance was uncorrelated with authoritium leadership but significantly correlated with moral leadership. This may prove to be a major fault line.

- **Other observations:**
- The paternalistic leadership culture although is based on traditional authoritarism is undergoing revision to address negative responses to over emphasis on hierarchy where tradition may conflict with practice.
- While paternalistic culture is classic Confucianism the socialist philosophy appears to be anti-Confucian, leading to pro- retaliate leadership.
- Mao appealed to Legalism and Marxism against Confucianism Deng appealed to collectivism rather than Familism, Hu has drawn from Confucianism and proposed his theory of social harmony to address the problems of growing inequality.

Will Lao Tse take care of the environmental issues? **It is in this light that we need to look at the Chinese soft power through the propagation of Confucius school.**

About <u>Prof Anant Amdekar</u>

Trump's Kashmir Test for India-US Relations

US President Donald Trump proclaimed an illusory deliberation notionally implored by Prime Minister Narendra Modi to fix the almost seven-decade Kashmir conflict through mediation, while courting Pakistani PM Imran Khan in the Oval Office on July 22. Trump conveniently disregarded India's definitive policy to settle the Kashmir conflict between India and Pakistan exclusively through bilateral negotiations. Since 1972 Shimla agreement, India deterred several attempts of successive US administrations to mediate, but Trump's reference to a dreamlike Modi's invitation to mediate triggered intense reactions in the Indian parliament, media houses and among the cliques of international policy experts.

However, unruffled at Trump's fanciful mediation claim, Indian External Affairs Ministry spokesperson categorically denied President Trump's remarks within an hour, while External Affairs Minister (EAM) Jaishankar assured the Parliamentarians that PM Modi made no such appeal for mediation at the 2019 G-20 summit held in Osaka, Japan. Indian policy consistently maintains that a firm termination of cross-border terrorism is a sine qua non for India-Pakistan engagement under the framework of the 1972 Shimla Agreement and 1999 Lahore Declaration.

Trump's remarks gain geopolitical significance ahead of the scheduled visit of PM Modi to the US in September to attend the 74th Session of the UN General Assembly (UNGA 74), during which he is liable to meet Trump. In such a backdrop, it is imperative to decipher President Trump's Kashmir claims to alleviate apprehensions among Indian society. The 16th US President Abraham Lincoln's political thought on policy formulation is key to decipher Trump's delusional remarks in principle. In a descriptive note to 23rd Kentucky Governor Thomas Bramlette in 1864, Lincoln says, "I claim not to have controlled events, but confess plainly that events have controlled me" while explaining his extreme policy shift to liberate slavery from his initial non-interference policy with slavery. The developments in the sphere of Afghanistan and Iran, especially ahead of the 2020 Presidential elections, among the other developments in the international sphere, likely appear to be influenced President Trump to proclaim mediation in Kashmir, which emboldens visiting Pakistani PM Khan.

President Trump is univocal in his policy to retreat a significant number of US troops from Afghanistan by the day of US Presidential elections in 2020, who were deployed to "end the endless war" with Al-Qaeda following September 11 attacks in 2001. Likewise, President Obama too proposed to retreat the troops by the end of his second term in 2016. Though both policies resemble similar in their approach, Trump is desperate to retreat the forces to garner voters confidence in the run-up to the second-term Presidential bid. In an eagerness to retreat from the Afghanistan war zone, Trump's administration established a negotiation channel with the Rawalpindi harbored Taliban, unlike his predecessor Obama who considered "Afghan-led, Afghan-owned" model for resolving the Afghanistan crisis, despite lacking indicators of improved governance and self-reliant defense force to safeguard Afghanistan's interests, including Pakistan-based and homegrown terrorist threat. President Trump's tactics appear to embolden Pakistan, which professes "strategic depth" in Afghanistan through Rawalpindi harbored Taliban, to realize peace by negotiating an end to the conflict in Afghanistan. A sudden shift in Trump's Pakistan policy from his January 2018 decision to freeze security assistance signifies that any strains in US-Pakistan relations pose direct implications on the ongoing Afghan peace dialogue between the US and Taliban.

Similarly, a 900-kilometre natural border with Iran serves Pakistan to gain geostrategic leverage against the US, especially as Trump effectuating all strategies to blockade Iran. In May 2018, Trump unilaterally revoked 2015 landmark Iran nuclear deal – Joint Comprehensive Plan of Action (JCPOA) signed between Iran and Germany together with the European Union, and the five permanent members of the United Nations Security Council (UNSC), including China, France, Russia, United Kingdom and the United States. The JCPOA agreement imposes certain restrictions on Iran, including limiting the Uranium enrichment capabilities far below the weapons-grade and discharging 98 per cent of enriched Uranium. Subsequent sanctions on Iran's oil exports, designating Iran's military – Islamic Revolutionary Guard Corps (IRGC)-

as a terrorist organization, and sanctions on state leaders deteriorated the US-Iran bilateral relations and destabilizing the regional order, particularly in the Persian Gulf.

The US State Department's (equivalent to MEA) designation of Baluchistan Liberation Army (BLA) as a terrorist organization for apparently targeting security forces and civilians in Pakistan's restive Baluchistan province on July 2 is a relevant precursor to Trump's conforming approach to embolden Pakistan, which later observed Kashmir mediation remarks. Based on Lincoln's thought, US's gravity for Pakistan's political and strategic reinforcement, which is quintessential for a peace deal with Taliban and intensifying Tehran blockade, motivated Trump to proclaim Kashmir mediation claims. The $125 million (INR 870 Crore) military funding to maintain technical and logistic support for Pakistan's F-16 fighter program is an indication from Trump of certain exceptions in return for Pakistan's assured cooperation. Though, the new support enhances the US to monitor the F-16 fighter jets 24/7 on the ground, which partly serves Indian interests.

Besides, by invoking Kashmir conflict, President Trump appears to gain leverage against India to fast-track the guaranteed defence deals with the US arms industry to serve the Indian armed forces, while India is perceived to be boosting arms deal with Russia, including the $5 billion (INR 35,000 crore) agreement with Russia to purchase S-400 Triumph Missile system. Despite legitimate energy demands, India reduced oil imports from Iran to acknowledge the US sanctions, yet Trump administration's latest policy approach signals trust deficit vis-a-vis India's decision over Iran oil.

Nevertheless, consequent implications on India-US relations stimulated established South Asian experts in the US to reemphasize India's policy on Kashmir conflict for a wider audience in the US, including President Trump and his advisors. An apologia offered by 11-time US Congressman Brad Sherman to Indian Ambassador to the US over President Trump's "delusional remarks" reflects the comprehensive recognition of India's Kashmir policy in the US and alleviates any apprehensions of Indian policymakers. Further, the US State Department reassurance by indicating that India-Pakistan tensions are liable to resolve bilaterally and Pakistan needs to exercise "sustained and irreversible" measures to fight against terrorism underscores the significance of India-US relations for both democratic nations in a complex 21st century.

President Trump's disdain for a coordinated approach to strategy and policy and infighting in Trump's administration over policies endangering core-interests of friendly countries is evident in the recent US posture across Asia. Ahead of PM Modi's visit to the US, Indian foreign ministry officials need a comprehensive strategy with clear goals, objectives and options to realize Indian interests to gain dominance in the Indian Ocean Region and boost coordinated efforts with the US in the immediate neighborhood.

While approving $670 million (INR 4,600 crores) worth of technical and logistical equipment and services for India's C-17 transport planes on July 26, US Defense Security Cooperation Agency (DCSA) emphasized India's crucial role in maintaining "political stability, peace, and economic progress" across Indo-Pacific and South Asia region. India serves as a lynchpin for US Indo-Pacific strategy and Indo-US cooperation is quintessential to balance an assertive China in the Indo-Pacific region. India must aspire to realize a cohesion among the connectivity initiatives in the region, especially with Japan's Asia Africa Growth Corridor (AAGC) and US's Better Utilization of Investments Leading to Development (BUILD) Act to boost connectivity in India's neighborhood to offset China's bolstering Belt and Road Initiative investments, particularly in Nepal, Sri Lanka, Maldives and Bangladesh. India must lead an active role in realizing the Quadrilateral Security Dialogue (QUAD) along with Australia, Japan and the US to serve its security demands in the region with a focus on the Indian Ocean Region.

About Veeresh Kanduri

The Importance of GCC countries in India's Quest for Economic Power House: A Review

Since the economic reforms of 1991, India has emerged as an important nation in world economic order. Currently India is 3rd largest economy in PPP terms with GDP size of USD 10.4 Trillion and 6th largest economy in nominal terms with GDP size of USD 2.69 trillion. It has foreign exchange reserves in the tune of USD 400 billion. The current GDP growth rate estimate for India is more than 7 %. Though these numbers are indicative of India's importance in world economy, yet it has a current account deficit which expected at 2.8 % of GDP, this primarily due to oil imports as India imports over 82 per cent of its crude requirement through imports. The Current Account Deficit (CAD) exerts pressure on Indian Currency INR as it depreciates against USD. The current account deficit is funded through capital flows and one of the important sources of Capital Flows is NRI Remittances. According to the World Bank report India Tops the global remittance amounting to USD 80 billion. The bulk of the Remittance are originates from GCC Countries. In light of such parameters and conditions, this paper explores the Economic linkages of GCC and India and how it will help India for its quest for Economic Power House in the future.

Key Words: Current Account Deficit, NRI Remittances, Oil

1. INTRODUCTION

Since the economic reforms of 1991, India has emerged as one of the Important economy in the world with a GDP size of USD 2.60 Trillion and in Purchasing power parity terms around USD 10.40 Trillion. The Indian GDP growth rate is 7.30 % which is one of the fastest in current times. The Foreign exchange reserves are around USD 400 billion. In spite of these remarkable numbers India has a current account deficit which expected at 2.8 % of GDP, this primarily due to oil imports, as India meets over 82 per cent of its crude requirement by way of imports. The Current Account Deficit (CAD) exerts pressure on Indian Currency INR which depreciated against USD at all time low of INR 74.55 / USD on October 9th , 2018. Same time the International Crude Oil price was hovering around more than USD 80 per barrel. This relationship International Crude Oil and USD / INR pair is very dynamic because India Imports more than 80 % of its oil requirement. In 2017 India has imported Crude oil worth USD 60.20 billion which was 6.90% of the world oil imports.[1]

India's imports from Gulf Cooperation Council (GCC) are 42% of its overall oil imports.The major importers of oil to India are Saudi Arabia, UAE and Qatar. The GCC is India's largest regional-bloc trading partner, which accounted for USD 104 billion. The largest expatriate community in GCC is made of Indians with estimate of 10 million are working and living in the GCC region. According to World Bank, India will receive remittances around USD 80 billion this year, followed by China (USD67 billion), Mexico and the Philippines (USD 34 billion each), and Egypt (USD 26 billion). The majority of the remittances received by India are originated from GCC area. This research paper highlights India's strong linkages with the GCC and explores the further economic tie-up with GCC considering today's dynamic socio-political scenario with keeping in mind that India's quest for becoming economic powerhouse in future.

Table 1: India, GCC and ASEAN at a Glance

Sr. Nos.	Particulars	India	GCC	ASEAN
1	GDP (Nominal) in US $ (2018) Billions	$2.69 Trillion	$1.646 Trillion	$3.00 Trillion
2	Population (estimate) (millions)	1324.17 (2016)	55.89 (2018)	651 (2018)
3	GDP Per Capita	$7,795	$71,317	$4,600
4	HDI	0.64(Medium)	0.84 (High)	0.701(High)
5	India's Trade linkages (2017-18)	-	$ 104 billion	$ 81 billion
6	Membership of the Block	-	6 states	10 states and Two Observer
7	Indian Diaspora[4]	-	10 million	3.80 million

Table 1 clearly explains the importance of GCC block in comparison with ASEAN. The three important factors that give cutting edge to India's relationship with GCC as against ASEAN are

- Oil
- Remittances
- Indian Diaspora in GCC

Looking at the facts presented, it is up most vital that India need to nurture its tie-up with GCC in forthcoming years.

1. ANALYSIS OF INDIA-GCC LINKAGES

As a result of globalization the inter linkages of Indian Economy with trade blocks and financial markets has been significantly increased. Such linkage and interdependence of different regions attracts the attention of policy makers, investors, fund managers and academicians in order to estimate what could be the future of inter-regional equations. This concept paper based upon the secondary data explores the India's would be cooperation with GCC Countries. Such collaboration is significant as India is aiming at a tag of USD 5 Trillion economy in forthcoming years.

There are few studies done earlier about the linkage across India and GCC. It is observed that the GCC investments in India,China and Africa are occurring on an unprecedented scale. These Investments are more comfortable due to diasporic links and cultural ties. (Abdelal et.al 2008).It is not only India has substantial interest in GCC but China also interested in the GCC region due to its oil richness.(Habibi, 2011). China also shown significant interest in recent years in GCC, according to Xuming QIAN & Jonathan FULTON (2017), the China-GCC economic relations can be expected to intensify due to FTA. The FTA will also enhance cooperation opportunities for China and the GCC under the "Belt and Road" Initiative, which will play an important role in expanding China's regional presence. It is also observed that GCC states are altering companies' strategies rather than Wall Street. The India –GCC bilateral export is positively determined by the size of economies, trade openness Common Colony and Diaspora and it is negatively determined by distance between India-GCC and import tariffs. (Alam & Ahmed, 2018). Regarding the increase of import of crude oil by India and steep increase of crude oil price in global market can cause damage to Indian Economy and India's lack of having a credible fuel policy is a matter of high concern (Venkataraman, 2018).

Table 2: India's Imports of Selected PrincipalCommodities - US DOLLAR

(US $ Million)

Commodity / Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
1. Petroleum, Crude & products	**164040.6**	**164770.3**	**138325.5**	**82944.5**	**86963.8**	**108658.6**
2. Pearls, precious & Semi-precious stones	22689.6	23988.4	22598.2	20069.9	23808.6	34278.9
3. Iron & Steel	17693.9	12686.0	16301.3	14977.5	11683.0	14617.5
4. Machinery, electrical & non-electrical	30765.7	27123.6	27979.1	29436.1	28445.8	34258.8
5. Transport equipment	21286.9	19297.5	18345.4	18227.8	22687.7	22732.9
6. Electronic goods	32892.7	32384.7	36857.1	40021.9	41930.4	51541.0
7. Gold	53820.6	28704.7	34407.2	31770.7	27518.0	33657.2

Source: RBI

The Table 2 highlights the weight of Crude Imports in Total Imports. The Changes in International crude prices has a direct impact on India's Current account and overall Balance of Payments.

Table 3: India's overall Balance of Payments (Summary) US Dollar

(US $ million)

Item/Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
	Net	Net	Net	Net	Net	Net
A. Current account						
1. Merchandise	**-195656**	**-147609**	**-144940**	**-130079**	**-112442**	**-160036**
2. Invisibles (a+b+c)	**107493**	**115313**	**118081**	**107928**	**98026**	**111319**
a) Services	64915	73066	76529	69676	68345	77562
b) Transfers	64034	65276	65692	62627	55983	62438
i) Official	-309	-205	-572	-512	-590	-511
ii) Private	64342	65481	66264	63139	56573	62949
c) Income	-21455	-23028	-24140	-24375	-26302	-28681
Total Current account (1+2)	**-88163**	**-32296**	**-26859**	**-22151**	**-14417**	**-48717**
B. Capital account						
1. Foreign investment (a+b)	**46711**	**26386**	**73456**	**31891**	**43224**	**52401**
2. Loans (a+b+c)	**31124**	**7765**	**3184**	**-4634**	**2379**	**16660**
3. Banking capital (a+b)	**16570**	**25449**	**11618**	**10630**	**-16616**	**16190**
4. Rupee debt service	**-58**	**-52**	**-81**	**-73**	**-99**	**-75**
5. Other capital	**-5047**	**-10761**	**1109**	**3315**	**7559**	**6213**
Total capital account (1 to 5)	**89300**	**48787**	**89286**	**41128**	**36447**	**91390**
C. Errors & omissions	**2689**	**-983**	**-1021**	**-1073**	**-480**	**902**
D. Overall balance (A+B+C)	**3826**	**15508**	**61406**	**17905**	**21550**	**43574**

Source : RBI Statistics

The perennial deficit of current account is more to do with the merchandise that too in particular oil imports, which in turn dependent on the global crude prices. The Demand Supply, Geopolitical situation affects the International Crude Prices. India is more vulnerable to this price fluctuation as approximately 64.0 % of her oil need is imported from sensitive and volatile Middle East region. The International Energy Agency predicts China will import 70 percent of its oil from the GCC by 2015 (Teslik,2008)[4]. The China is also a important player to watch regarding the import of crude oil from GCC. The volatility of oil price affects GCC as well as India. Whenever the oil price goes up,India's import bill soars, but if oil price goes down it effects the economy and investment scenario of GCC, which results into less exports from India to GCC and shortfall in remittance to India from the GCC region. Thus India is vulnerable to the oil price volatility. In light of such situation India needs her safety net so that it could manage the impact of Oil price volatility in a better way. The INR priced oil imports and special lines of credit to GCC countries in terms of bilateral trade with India may help in better management of international trade and finance. India with its great experience in Central Banking System .India's Central Bank, RBI was established in 1935, it can guide the GCC countries to formulate their own monetary union so to trade with India and rest of the world. The Merger and Acquisition is on rise in GCC , Indians can help in terms of its vast management talent pool to restructure the existing businesses in GCC area as it fully understand the cultural issues of that region.

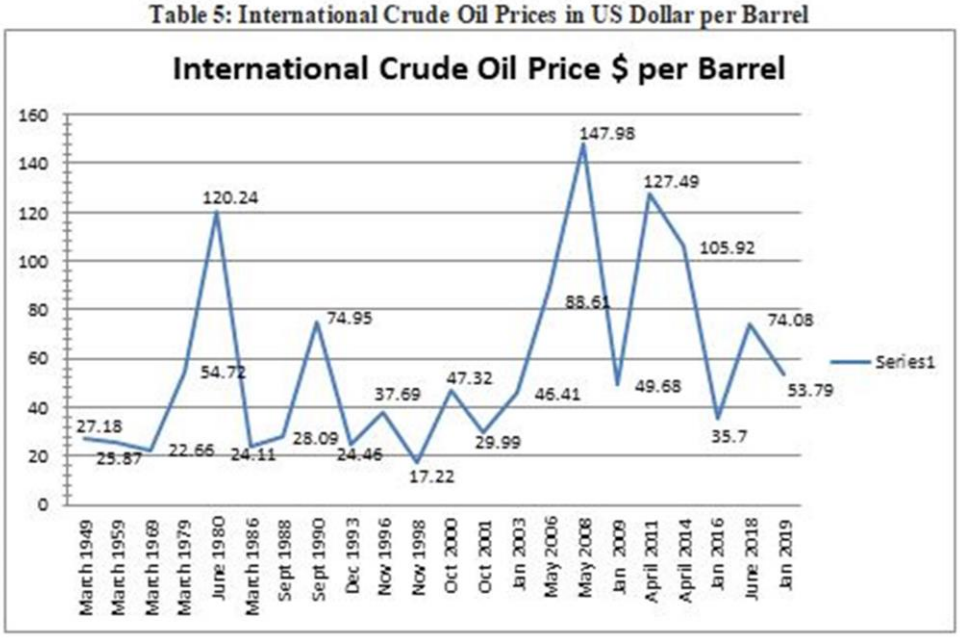
Table 4: India's Export of Selected Commodities to GCC Countries

GCC Countries	Commodities
Bahrain*	Machinery, Electronic Equipment's, Iron & Steel
Kuwait**	Rice, Cereals
Oman*	Mineral Fuel Iron and Steel, Plastic
Qatar***	Food and Food products, iron and steel, aluminum, and transport machines and cars, Shipping and Floating Structure
Saudi Arabia**	Rice, Tobacco, Spices, Cashew, Jute
U.A.E.**	Tea, Rice, Tobacco, Spices, Cashew, Marine Products, Gems and Jewellery, Drugs and Pharmaceuticals, Organic and Inorganic Chemicals, Engineering Goods, Cotton Yarn/Fabrics,

Source: * http://www.indiantradeportal.in/vs.jsp?lang=1&id=0,25,45,132,186
** RBI
***https://www.gulf-times.com/story/607394/India-s-exports-to-Qatar-jump-87-in-2018

The Table 4 expresses the need to correct the imbalances of India's exports to GCC countries as presently it is skewed towards Saudi Arabia and U.A.E.

Table 5: International Crude Oil Prices in US Dollar per Barrel



The Organization of Petroleum Exporting Countries OPEC has a share of 81.89 % (1,214.21 billion barrels) of world crude oil reserves as against 18.11 % (268.56 billion barrels) of non – OPEC Members. The GCC countries has almost 40% share of world's crude oil reserves which make them strategically very important, especially for India.

1. CONCLUSION

Two Decade ago, India's Look East policy was an effort to cultivate extensive economic and strategic relations with the nations of Southeast Asia in order to bolster its standing as a regional power and a counterweight to the strategic influence of the People's Republic of China. It marked a strategic shift in India's perspective of the world. It was developed and enacted during the government of Prime Minister Shri. P.V.Narasimha Rao (1991–1996) and rigorously pursued by the successive administrations of Shri. Atal Bihari Vajpayee (1998–2004) and Dr. Manmohan Singh (2004–2014). Currently Prime Minister Shri.Narendra Modi is taking policy to next level as Act East Policy, with main objective is to promote economic cooperation, cultural ties and develop strategic relationship with countries in the Asia-Pacific Region. This Policy highlights the Importance of North-East of India and put it on priority.

India can contribute to GCC's socio-economic development through

- Global Health Care facility and Job Provider
- Provide Service in terms of IT&ITES, IoT, AI sectors and other Applications
- Travel and Tourism
- Exports of Machinery Equipments, Gems & Jewellary and Food Products
- Enhancing stability and Security in the high Seas of Gulf through participation in Anti-Piracy

The Indian Economy is heading for a USD 5 Trillion with a growth rate of 7 %, she shall have a clear policy with GCC so to cooperate and collaborate with GCC in terms of Trade, Technology Transfer, Defence and Innovation. It is also important that India shall leverage its diaspora of 10 million NRI from the GCC to cement ties further. The Oil and Remittances could be the Key Quantitative elements while the Semiskilled/Unskilled workforce from India, Counter Terrorism, Cyber Security and Anti Piracy could act as Qualitative elements in bonding India's ties further with GCC. In this paper we suggest FOCUS on GIST policy. GIST Means **G**CC and **I**ndia **S**trategic **T**ie-Up. Focus will signify **F**inance & Trade, **O**il, and **C**ollaboration on Innovations, **U**pkeep of Environment and **S**ecurity and Safety measures. Better management of Crude oil from GCC in terms of supply and pricing along with the increased flow of remittances to India from GCC region could have a great impact on Indian trade balance and overall economic development. The Focus on GIST policy will also help in augmenting India's integration with Middle East Region. Look and Act east policy if embedded with **FOCUS on GIST policy**, will stimulate a great thrust for India's Quest for Economic Power House.

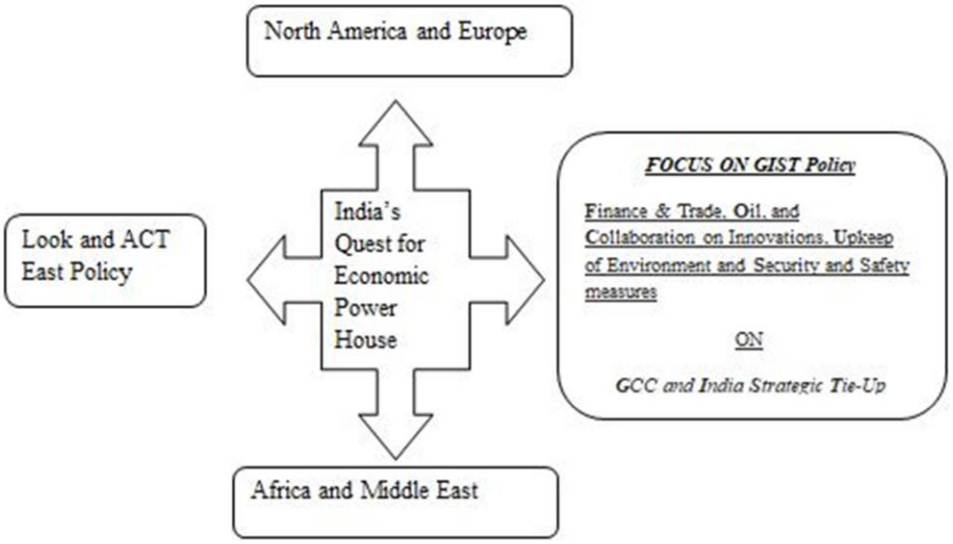


Figure 1: Suggested Theoretical Framework for *Focus on GIST* Policy

NOTES:

[1] see http://www.worldstopexports.com/crude-oil-imports-by-country/date accessed February, 20th, 2019.

[2] see https://www.nriol.com/indiandiaspora/statistics-indians-abroad.asp date accessed February 20th, 2019.

[3] see https://www.chemarc.com/content/article/polymer-potpourri–indias-lack-of-credible-fuel-policy-a-matter-of-high-concern/5a9fbefda64f4346a9d2e4e6 date accessed February 20th, 2019.

[4] see https://www.cfr.org/backgrounder/china-gulf-economic-relations date accessed February 24th, 2019

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