

Received December 2023 Accepted and published January 2024

DOI: 10.53555/ks.v12i1.3464

Leveraging Muslim Legal Philosophy To Climate Science: An Opportunity Of Scientific Developments For Muslim World

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Abstract

Scientific approach and developments have been, indeed, of paramount importance in any society, nation or civilization. Contemporary global order cannot be sustained without the adoption of healthy scientific environment. Even though anthropogenic global climate change attributed to a great deal of disasters in every sphere of life and beyond, yet, environmental management or climate science have been developed the methodology to address the global climate change as well as sustainable development for all nations.

On the other hand, religious and revelational-entrenched societies and muslim academic world have its own profound system of legal philosophy (al maqasid al-shariah) that derives its authority from Islamic holy scriptures through inductive reason of rationalism. Muslim legal philosophy is based upon the concept of maslahah—the interest of mankind—that preserve five essentials of divine law: religion; life; reason; progeny and resources.

Muslim civilization has been carrying a theological enriched heritage of interest-based legal philosophy that only need a practical spark of leverage through engaging in the methodology of climate science.

In this article, it has been tried to connect the roads of two different approaches, in which muslim legal philosophy can be leveraged to methodology of climate science.

Keywords: Objectives of Islamic Law, Climate Science, Leveraging, Maslahah, Methodology, CRDPs.

1.Introduction

This study is required understanding the meanings of Islamic legal philosophy, global climate change and environmental science. A brief introduction to all of these three concepts is as follows.

1.1 Introduction to the Islamic Legal Philosophy

It is worthy to know that the term 'Islamic Law' is used in literature for the Arabic term of shariah and fiqh. The real term for this subject is referred to maqasid (objectives) that—is linguistically plural from the maqad—is meant to purpose, principle, goal, intent, aim (al-hadf) and objective. Maqasid in Islamic legal philosophy, determine the objectives behind the Islamic injunctions.¹ According to Imam Al-Haramain Al-Juwayni, al-maqasid (objectives) and al-masalih al-amma (public interests) are the two faces of the same coin and are used interchangeably.² According to Imam Al-Ghazali, maqasid are only discussed in the field of 'unrestricted interests' or 'legislation for public good' (masalih al-mursalah or istislah).³ Even his student, Qazi abu Bakar al-Malki ibn al-Arabi in his Mahsool followed the teacher's footstep in the area of aforementioned terminology of maqasid.⁴ Similarly, Najm al-Din al-Tufi chose the term of maslahah (interest) as to what completes the objective of the Legislator (Shari/Lord Almighty).⁵ Shihab-al-Din al-Qarafi discovered a new relation within maqasid and maslahah and stated it in the following fundamental rule: an objective (maqad) is invalid unless it brings about some complementary good (maslahah) or prevention from harms (mafsadah).⁶ Now the question is that what is maslahah? According to Tufi, maslahah is literally something that has a perfect condition in a way that is intended to be the same as much is made for. Such as: a pen requires a perfect 'good' condition to be written from it. Similarly, sword has a perfect 'good' condition to do battle with it.⁷

According to Imam Ghazali, technical meaning of maslahah is as follows: Maslahah is originally interpreted as the attainment of benefits and prevention from harms. But we do not intend to mean it, for the attainment of benefits and prevention from harms are the objectives of creation and the interest in creation is with the achievement in their objectives. We actually intend to maslahah to the preservation of shariah's objectives. The objective of shariah in relation to creation are five: that has to preserve their religion, life, reason, progeny and resource. According to Imam Shatibi, definition of maslahah (interest) is as ⁸ follows: I mean by 'interests' (masalih) what is concerned to the extant of mankind life (daruriyyah); sustainable development

(hajjiyyah); and the acquisition of what its emotional and intellectual qualities require of it in an absolute sense so that it (mankind life) should be blessed with them in an absolute sense (tahsiniyya).⁹ The first category of *maslahah/maqsad* is referred to the preservation of shariah's objectives with regard to creation. Imam Ghazali divided this category of *maqsad/maslahah* with regard to its internal strength. These objectives or interests (*maqasid* or *masalih*) are of three kinds. First, *daruriyyah* (objectives that are essentials). Second, *hajjiyyah* (objectives that are needed). Third, *tahsiniyyah* (objectives that are related to complimentary norms). This is a traditional classification of shariah's objectives in which level of necessities or preference are categorized with regard to their internal strength. The first level of necessity has further divided into five kinds of preservation: preservation of the *deen* (religion); *nfs* (life); *nasl* (progeny); *mal* (resources) and *aql* (reason).¹⁰ Imam Shatibi said that these five interests/objectives are preserved and protected by each nation of the world.¹¹ We can deduce that environmental science has a direct connection with the preservation of five essential interests of mankind. To answer the questions of contemporary environmental, social and religious affairs, every school of Islamic law, has been deploying the same strategy of rationalism for the day one, albeit utilizing the name of different kind of tactics. This is just a contention of words (*al-naza al-lafzi*) among four Islamic schools of law about the terminologies of '*al-Ihtisn bil qiyas al Khafi*' (hidden analogical reasoning) '*maslahah mursalah*' (unrestricted interests) and '*mulaim munasibah*' (compatible conformity). They actually are the same things in its objectivity. In other words, Hanafi to which something calls a house (*Istihsan*), Maliki and Hanbali insist that this is a home (*maslahah mursalah*). Shafi, on the other hand, propagates it as an abode (*mulaim munasibah*). Yet all these relative tools of shariah manifest the legislation that is based on the inductive reasoning and behavioural psychology of Quran and Sunnah (*tasarrufat al-shara*). There is no doubt that the term '*maslahah*' (interest)—that was initiated by Imam Malik—has now been popularized to express the objectives of Islamic law that are based in toto on the interest of mankind.

1.2 Introduction to Global Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC), climate change "refers to any change in climate over time, whether due to natural variability or as a result of human activity."¹² The phrase 'climate change' is often used interchangeably with 'global warming', yet climate change consists of a larger range of effects beyond just rising temperature. The terms "exceedance of planetary boundaries" and 'environmental change' have many similarities with the term global climate change. While the term 'global change' is the most inclusive term to encompass all the aforementioned terms. When we describe consequences of human activities especially the burning of fossil fuels, we normally talk about at that time "climate change" or "global warming". When we discuss consequences of human activities especially the industrial capitalism, we use the terms of "exceedance of planetary boundaries;" 'global change' 'environmental change' and 'global climate change'. Global climate change is basically caused by human activities, such as combustion of fossil fuels, and deforestation etc., which release large amounts of greenhouse gases (GHGs) into the atmosphere. These gases trap heat and cause the Earth's atmosphere to warm, leading to alterations in climate patterns across all over the world. These gases stay for a very long time in the atmosphere as well. Geologists suggested that this is a 'human-dominated geological epoch' better known in the term of 'Anthropocene', coined by Crutzen owing to the massive scale of alterations in nature by human activities. Global climate change has severe impacts on human life, ecosystems, societies and economies. This man-made global climate change is going to alter each and every sphere of human life. There are a number of gases in the atmosphere such as methane, carbon dioxide and ozone etc. These gases have a vital role to warm the planet earth in order to sustain life. Thus, they are called greenhouse gases. Greenery, flora and fauna, and life on Earth are existed just because of these gases. But industrial capitalism—historically driven and nourished by rationalistic and Enlightenment thoughts and ideas—caused a large number of emissions through combustion of fossil fuels. Eventually, the amount of carbon dioxide and other GHGs has been increasing since industrial revolution, in the atmosphere and average global temperature has been increased to about 1.1°C from the pre-industrial level as 51 billion tons of GHGs are added every year in the atmosphere and 40 billion tons of carbon dioxide is emitted every year in the atmosphere. And in 2030, according to the IPCC—an authority on the issue of climate change—the average global temperature would be increased to 1.5 degree Celsius from the pre-industrial level. Which would unfold a new wave of disasters and deteriorate the magnitude of catastrophes all over the world especially to poor countries.¹³

1.3 Introduction to the Climate Change Science

Productive and healthy social systems, economies and environments are the foundations of sustainable development and the welfare of the mankind. To achieve these objectives, management sciences of the environmental and socio-economic issues study present condition of the system; its good practices and evaluating the mistakes of the past. But this study alone is not sufficient to achieve that goal. There is a dire need to address the future management of the risk in order to avoid the damages and establish the sustainability. There are two fundamental tools of management science of global climate change: Vulnerability (Consequences) and Resilience (Responses). Things are identified from their opposites. Vulnerability cannot be understood until the concept of resilience does not emerge. They are conceptually conjoined with each other. In the objectives of Islamic Law, the concept of *dar'a al-mafasid* (prevention from harms) and *tahqiq al-masalih* (attainment of benefits) has significantly meaningful contrast with 'vulnerability' and 'resilience'.

Vulnerability as a basic concept is further extended to modern risk management and its three components: hazards; exposure and vulnerability. While the resilience in the modern science is classified into four tools, also known as Climate Resilient Development:

- i. Adaptation and mitigation
- ii. Innovation
- iii. Resources and engagement
- iv. Transformation.

Adaptation and mitigation are the most important resilient tools. While the other three pathways of Climate Resilient Development (CRD) are the constituents of sustainable development.¹⁴

2. Maslahah-based Islamic Law

2.1 Significance of Maslahah in the Scriptures

The sense of 'maslahah'(interest) can be noticed in these following Quranic verses: "Messengers who gave good news as well as warning, that mankind, after (the coming) of the Messengers, should have no plea against Allah: for Allah is Exalted in Power, Wise."¹⁵ "He it is Who created the heavens and the Earth in six days—and His throne was over the waters—that He might try you, which of you is best in conduct."¹⁶ "We sent you not, but as a Mercy for all creatures."¹⁷ "I have only created jinns and men, that they may serve Me."¹⁸ "He who created death and life, that He may try which of you is best indeed: and He is the Exalted in Might, Oft-Forgiving."¹⁹

The sense of maslahah can also be noticed in several Ahadith to which some of them are as follows:

One must not be married to a woman along her paternal aunt, or a woman along her maternal aunt at the same time. If you do that, you will cut off your ties of kinship.²⁰ Another example of maslahah oriented narration is as follows.

Prophet PBUH said: Do not negate the purchases of one another. City-man must not buy from the villager (for his ignorance about market conditions might lead to financially harm him through the buyer).²¹

2.2 Maslahah as an attainment of benefits and prevention of harms

Maslahah by its very definition as an attainment of benefits and prevention from harms is indicated in the scriptures. Allah SWT said: "Allah intends every facility for you; He does not want to put you to difficulties."²² Allah SWT said: "Allah do wish to lighten your (difficulties): for men was created weak (in flesh)."²³ "...Allah do not wish to place you in a difficulty..."²⁴ Allah SWT said: "He has chosen you, and has imposed no difficulties on you in religion."²⁵ Prophet Muhammad PBUH said: Religion is easy. The one who chooses difficulty in religion, it will certainly overcome him.²⁶ Prophet PBUH said: I have been sent to the pure religion which has the attribute of forgiveness.²⁷ Prophet PBUH said: Great in peril are those who act to excess.²⁸

2.3 Maslahah-based Islamic Law preserve five essentials

2.3.1 Preservation of Religion

It is essential to note that the only code of life that is acceptable in the Grace of Allah is Islam.²⁹

This code of life has a legacy of revelational and Semitic tradition from Adam to Muhammad PBUH.³⁰

Regarding articles of faith that are present in this code of life have been verified by all the prophets.³¹

Whereas its deeds and actions have been witnessed in the Prophet Muhammad's Quran and Sunnah. So, adherence to this code of life, till the Day of Judgement, is the only way to salvation for mankind.³²

Mankind, on the contrary, is not so interested to seek this salvation as man-made global climate change is the epitome of the negation of the essence of deen (religion), mankind purposes on planet Earth and Allah's commandments to mankind about surrounded creatures.³³

It is equally important to note that the basis of Islam is based on the concept of One True Allah (Tawheed).³⁴ He is the Creator and Master of this universe. The absolute sovereignty over the planet Earth belongs to Almighty Allah. Thus, fundamentals of shariah and its objectives are directly concerned with the global climate—whether it is belonged to animate or inanimate world or to mindful and mindless beings—everything prostrates themselves to Almighty Allah and declare His Glory and Praises. Allah SWT said: The seven heavens, the earth, and all those in them glorify Him. There is not a single thing that does not glorify His praises—but you simply cannot comprehend their glorification. He is indeed Most Forbearing, All-Forgiving!³⁵ He said: Whatever is in the heavens and on earth, do declare the Praises and Glory of God: to Him belongs Dominion, and to Him belongs Praise: and He has power over all things.³⁶ Another place He said: Whatever beings there are in the heavens and the earth do prostrate themselves to God with good-will or in spite of themselves : so do their shadows in the mornings and evenings.³⁷ To waging a war against nature and subdue the earth by corrupting it and relentlessly exploiting its resources are also the negation of stewardship of planet Earth that had been bestowed upon mankind by Allah SWT in order to conduct on the Earth according to His will. Allah SWT said about stewardship: We did indeed offer the Trust to the heavens and the Earth and the mountains ; but they refused to undertake it, being afraid thereof : but man undertook it ; he was indeed unjust and foolish ;³⁸ He described the history of stewardship: Behold your Lord said to the angels: "I will create a vicegerent on earth." They said "Will you place therein one who will make mischief therein and shed blood? Whilst we do celebrate your praises and glorify your holy (name)?" He said: "I know what you know not."³⁹ He said about good conduct: Say: "O you My servants who believe! Fear your Lord. Good is (the reward) for those who do good in this world"⁴⁰ Prophet Muhammad PBUH said about good conduct on planet Earth: Planet Earth is green and beautiful and Allah has appointed you His steward over it so that He could evaluate your deeds. Allah prohibited bad conduct: And do no mischief on the earth after it has been set in order: that will be best for you if you have faith.⁴¹ He said another place: Mischief has appeared on land and sea because of (the meed) that the hands of men have earned, That (God) may give them a taste of some of their deeds: in order that they may turn back (from Evil).⁴² In the end, Allah SWT said: That Home of the Hereafter We shall give to those who intend not high-handedness or mischief on earth: and the end is (best) for the righteous.⁴³

2.3.2 Preservation of Life

Allah SWT said in the Quran: "On that account: We ordained for the Children of Israel that if anyone slew a person unless it be for murder or for spreading mischief in the land it would be as if he slew the whole people: and if anyone saved a life it

would be as if he saved the life of the whole people. Then although there came to them Our apostles with clear Signs yet even after that many of them continued to commit excesses in the land.” Ergo, suicide is not allowed in Islamic law.⁴⁴ Allah SWT said: “Nor kill (or destroy) yourselves: for verily God has been to you Most Merciful.”⁴⁵ About this heinous crime, Prophet Muhammad PBUH said: “Whoever to kill himself by anything, he would be punished by that in the Day of Judgement.”⁴⁶

2.3.3 Preservation of Reason

There is an Islamic law to manage the faculty of reason to be damage. Allah SWT said in the Quran: “O you who believe! intoxicants and gambling (dedication of) stones and (divination by) arrows are an abomination of Satan’s handiwork: eschew such (abomination) that you may prosper. Satan’s plan is (but) to excite enmity and hatred between you with intoxicants and gambling and hinder you from the remembrance of God and from prayer: will you not then abstain?”⁴⁷

2.3.4 Preservation of Progeny

Islamic law manages disorders among interactions and relationships. Prophet Muhammad PBUH: Everyone among you is a guardian as well as responsible for its subjects (or wards). The ruler is a guardian. The husband is a guardian for his family. The wife is a guardian for her husband’s house and his children. So, everyone among you is a guardian as well as responsible for its subjects.⁴⁸

2.3.5 Preservation of Resources

Maslahah-based Islamic law manages economic and finance for the sustenance of people.

He SWT does not allow to eating up other properties:

“O you who believe! Eat not up your property among yourselves in vanities: But let there be amongst you traffic and trade by mutual good-will.”⁴⁹ He SWT dislikes acts of wasting and spendthrift:

“O children of Adam! wear your beautiful apparel at every time and place of prayer: eat and drink: but waste not by excess for God loves not the wasters.”⁵⁰ He SWT said: “And render to the kindred their due rights, as (also) to those in want, and to the wayfarer: but squander not (your wealth) in the manner of a spendthrift. Verily spendthrifts are brothers of the Evil Ones; and the Evil One is to his Lord (Himself) ungrateful.”⁵¹ The last Prophet Muhammad PBUH said: Indeed, Allah SWT does not like for you to beat about the bush, asking too many questions and wasting of resources.⁵²

Similarly, earning the money through prescribed means is very important to preserve the fifth essential (resources) of shariah’s objectives. Allah SWT said: “Those who devour usury will not stand except as stand one whom the Evil one by his touch has driven to madness. That is because they say: ‘Trade is like usury,’ but Allah has permitted trade and forbidden usury.”⁵³

2.4 Sadd al-Zarai—a Maslahah-Based Islamic Law

2.4.1 Introduction

Sadd al-zarai are primarily beneficial means that are consequentially met to the harmful end.⁵⁴

There are four types of ‘means’ regarding to their consequences. The very first kind is of an action that leads towards a definitive harm (al-fasaad qati). Such as digging a well on a public way.⁵⁵ This kind of act is prohibited in all schools of Islamic law.

2.4.2 Application

Mankind is primarily injecting 51 billion tons of GHGs into the atmosphere every year. This large amount of emission is also the result of the production of synthetic chemicals, plastic, fertilizers, steel, cement, electricity as well as cutting of the forests. These all activities of combustion of fossil fuels and releasing CO₂ in the atmosphere through ripping the trees have scientifically and theologically proved to be extremely fatal for the religion, life, reason, progeny and resources.

2.4.3 Solution

To preserve the daruri (essential) objectives of shariah, hajiyyah (needed) objectives of shariah demand here——by applying the principle of sadd al-zarai——to decisively and effectively cut down the global emissions of GHGs in the atmosphere to the level of certain ratio in which the loss of preservation of five essential of shariah’s objectives must not be higher than the consequences of not acting upon it.

2.5 Maslahah-based tool about Negative Feedback Loop and Principle of Kafalah

2.5.1 Negative Feedback Loop of Global Climate Change

Negative feedback loop of global climate change was generated, in its classic example, in COVID 19, in which global emissions dropped 17 percent at the lockdown in April, 2020, compared to the subsequent year. This data also proved the conclusion of William F. Ruddiman about the correlation between pandemics and drops in atmospheric CO₂.⁵⁶ Negative feedback loop recovered the nature to some extent from the darksome of pollution. The air was pure and clean. Wild animals and birds were roaming across free and fearlessly. Chemical-drenched world once again tried to come back to rather its original majesty. But in May, 2020, negative feedback loop was switched off and positive feedback loop turned on to get rise the CO₂ levels sharply about 417.7 ppm.⁵⁷ It is worthy to note that negative feedback loop is a needed (haji) objective of shariah instead of positive feedback loop and is required in most of the fields of mankind.

2.5.2 Kafalah/guarantee

i. Definition: The following verse of the Quran is indicated to the validity of surety/guarantee:

“They said : We miss the great beaker of the king ; for him who produces it, is (the reward of) a camel load ; I will be bound by it.”⁵⁸

The definition of kafalah, according to the Islamic jurists, is as follows:

It is referred to associate the guarantor's responsibility with the guaranteed resources and lives at the time of demand.⁵⁹

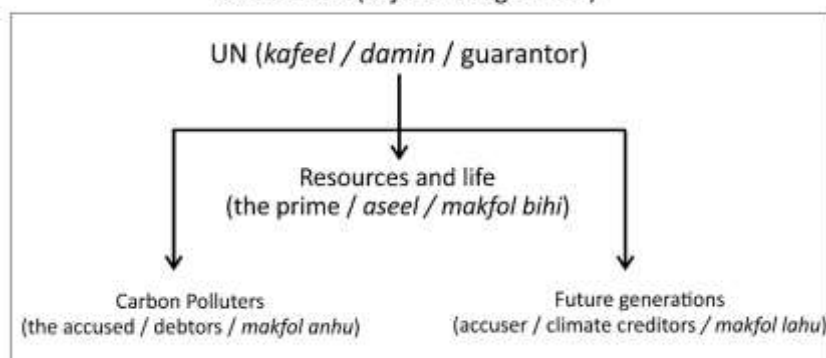
ii. Classification: There are two types of kafalah: Kafalah bin nafs (surety for the person) Kafalah bil mal (surety for the resources) Jurists relied on kafalah due to the following prophet's hadith:

Guarantor is liable for the loss...⁶⁰

Kafalah, hamalah, demanah and za'amah are used interchangeably. It is worthy to know that surety of the imprisoned and absent one is valid in the sight of all Islamic jurists except Abu Hanifa.⁶¹

iii. Kafalah for Future Generations (a) Carbon-polluters must pay the damages and liabilities for recklessly and relentlessly extracting, mining, and exploitation of fossil fuels and other shares of resources that belong to the future generations. Carbon-polluters from the global north ethically and statistically are in a great debt of the resources and lives of the future generations of the world. (b) It has been sensed to an infinitesimal extent from the side of UN Human Rights Council on Friday, 8th Oct., 2021, in Geneva, in which the access of clean and healthy environment as a fundamental mankind right was declared necessary for all mankind.⁶² (c) Global climate change was physically started from the onset of the industrial capitalism. Now the question is that 'who' is in debt of the future generations and 'when' did actually they fully realized the consequences of their actions!? Industrialized and capitalist countries of global north are accountable and accused for the debt of future generations of the global south. They fully realized, according to my research, in 1965, from a publishing report: 'Restoring the Quality of our Environment.' This report had been published on a governmental level as a starting point to comprehensively understand the consequences of global climate change.⁶³ Yet, this report and other eye-opener reviews about climate change did not bat an eyelid for the global north, as they are still emitting CO₂ the most in the world. Paul G. Harris argued that: "If every were to live like Americans, the world would require ten times the energy it is using today"⁶⁴ This is an example of a country among many rich countries in global north. Therefore, former British Prime Minister Boris Johnson at UN-sponsored meeting on 20th September 2021, rightly admitted and reminded rich nations by these words: "Rich nations have reaped the benefits of pollution for generations. We have a duty to help developing countries grow their economies in a green and sustainable way".⁶⁵ (d) To implement the kafalah programme, world governments in global north must pay damages as well as return the utilities to global south for exploited resources of the future generations according to their carbon emissions from 1965 to present time. In this scenario, UN ought to be assumed as a guarantor (kafeel/damin) for the statistically proved future generations-climate creditors (makfol lahu) to collect the damages of resources and lives (makfol bihi/aseel) from the carbon polluter-debtors (makfol anhu). However, UN would have to ensure this process with justice across the board. The only way to pay the damages is to generate the shariah's objective of hajiyyah-led negative feedback loop in most of the mankind's fields and systems.

Chart No. 1 (Kafalah Programme)



e. It is worthy to know that the contract of surety/guarantee (kafalah/daman) is not a test of punishment rather it is a way of accountability for the sake of good reward. Imam Ghazali said: It is tempting to conclude that every surety that comes through as a punishment is negated, for it is an accountability.⁶⁶

3. Environmental Science

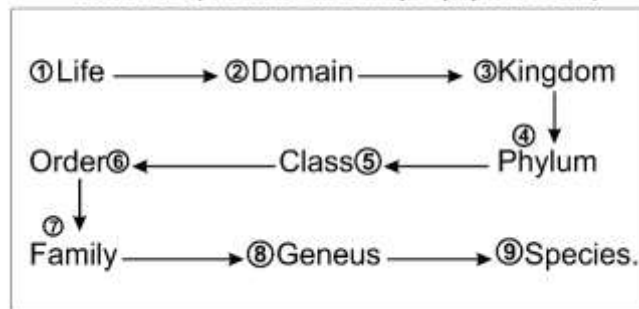
3.1 Vulnerably

3.1.1 Risk : There are some common objectives of many faculties of social and environmental sciences that give the way to understand the problem and provide the different kind of ways to protect and preserve the wealth and life from harm. One of the basic principles of social science is 'risk management.' It is also given more extension to Environmental Risk Management (ERM). ERM helps to ensure that environment risk is contained to the degree of acceptable levels. Criteria and objectives for the assessment of the risk have to be determined. In the sight of IPCC, consequences of global climate change are described under the terminology of risk. So what is the risk?

According to the IPCC, the potential for adverse consequences for mankind or ecological system, recognizing the diversity of values and objectives associated with such system. In the context of climate change, risks can arise from potential 'Impact of climate change as well as mankind 'responses to' climate change.⁶⁷

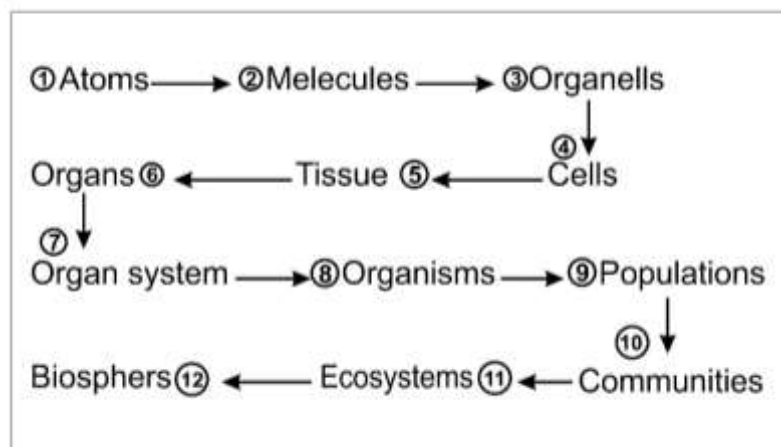
i. Explanation : (a) "The potential for adverse consequences for mankind" is meant to be consisted of lives, livelihoods, health and wellbeing, economic; social and cultural assets and investments, infrastructure, services including ecosystem related services. (b) "The potential for adverse consequences for ecological system" is meant to be included all ecosystems (biosphere) and species. According to the Oxford Dictionary, ecosystem means: "all the plants and living creatures in a particular area considered in relation to their physical environment."⁶⁸

Chart No. 2 (Structural hierarchy of physical world)



While the biosphere is the part of the Earth's surface and atmosphere in which plants and animals can live.⁶⁹ The biosphere is a global ecosystem consisted of animate and inanimate factors from which they get energy and nutrients. It is advisable to understand the structural hierarchy of physical (ecological) world in order to conceptualize the ecosystem and biosphere.

Chart No. 3 (Biological hierarchy)



Similarly, the biological hierarchy is as follows:

Natural interrelationships and interdependence among all levels of ecological organization are of paramount importance. Disturbance and problem in ecology could lead to disruption in the whole ecosystem. As Rachel Carson beautifully argued on this point in *Silent Spring*. She wrote:

"We poison the caddis flies in a stream and the salmon runs dwindle and die. We poison the gnats in a lake and the poison travels from link to link of the food chain and soon the birds of the lake margins become its victims. We spray our elms and the following springs are silent of robin songs, not because we sprayed the robins directly but because the poison traveled, step by step, through the now familiar elm leaf-Earthworm-robin cycle. ... They reflect the web of life or death that scientists know as ecology."⁷⁰ (c). Recognizing the diversity of values and objectives means that: individuals would judge the potential consequences for mankind and ecological system according to their own point of view. Majority would evaluate the risk from the value of the material point of view while a portion of population would judge the risk according to their cultural, aesthetic and spiritual objectives and values of mankind or ecological systems.⁷¹ By recognizing the risk for mankind and ecological systems from the objectives of spiritual, cultural and aesthetic point of view would include the narratives of different religions towards the environmental risk. In this regard, Islamic point of view and its legal philosophy have a leading role to address the risk of global climate change in a spiritual as well as the material way. (d). Risk includes to both 'impacts of' and 'responses to' climate change. The basic question is that why the 'responses to climate change' is added into the definition of risk? The answer is that mankind tries their best to protect themselves and their wealth from the impacts of climate change by taking up the adaption and mitigation measures. But novel challenges and new impacts later emerge in this process from the natural

phenomenon or mankind activity which further lead to another 'responses to climate change'. This positive feedback loop consequently goes on and on. Therefore 'responses to' (control of) climate change was added in the definition of risk. But this kind of approach was scholarly criticized by Elizabeth Kolbert in *Under the White Sky*. She argued that the control of nature (responses to climate change is a fancy term instead of it) is a positive feedback loop. She wrote: "Mankind is producing no-analog climates, no-analog ecosystems, a whole new no-analog future. We as a mankind face a no-analog predicament. If there is to be an answer to the problem of control, it's going to be more control." She later proved with evidences that man-made frequent disasters have been unfolded thanks to the idea of controlling the nature. She concluded that:

"And so a new round of public-works projects is under way. If control is the problem, then, by the logic of the Anthropocene, still more control must be the solution."⁷²

3.1.2 Risk's Components

Risk is consisted of three components: hazard; exposure and vulnerability. Data from each of these components can be used to paint a picture of risk in a certain place and time. (a). Hazard: According to the IPCC, hazard is defined as the potential occurrence of a natural or mankind-induced physical event that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.⁷³ Waves, drought, erosion, storms and sea level rise are few examples of hazard. (b) Exposure: According to the IPCC, exposure is defined as the presence of people; livelihoods; species or ecosystems; environmental functions, services and resources; infrastructure; or economic, social or cultural assets in places and settings that could be adversely affected.⁷⁴ Such as: hazard-prone areas like coastal and low lying areas exposure to erosion. (c) Vulnerability : According to the IPCC, vulnerability is defined as the propensity or predisposition to be adversely affected and encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.⁷⁵ For instance, people who live on plains are more vulnerable to floods than people who live higher places. It is believed that the great benefits can be achieved by reducing the vulnerability to natural hazards. There are multiple theories about vulnerability. 'The double structure of vulnerability' was presented by Bohle in 2001. 'Pelling model' was described by Pelling in 2003. While MOVE framework was explained by Birkman in 2013. Vulnerability can be defined as physical; economic and environmental vulnerability. It is measured by using physical or analytical methods. Identification and awareness of hazards, vulnerability and risk are essential steps to perform effective management of risk caused by geological, hydro-meteorological and anthropogenic or technological hazards. Susceptibility and fragility are conditions of vulnerability that indicate the predisposition that can be described in physical, environmental, social or economic terms. The another factor of vulnerability is the lack of resilience that reflects the capacity level of a society to adapt (to be prepared to face future hazardous events) as well as to cope and recover effectively when such events occur. A lack of resilience increases the vulnerability of the society.⁷⁶ In other words, when we discuss about vulnerability we simultaneously think about resilience as well.

3.1.3 Risk's Examples

Risk along with its components constitute an objective science of environmental risk to address the global climate change. Thus identification of risk and its components through examples is very important. (i) Flood Risk: To mankind and ecological systems, the 'risk from flooding' is caused by the 'flood hazard' (which includes the frequency and magnitude of flood events), the 'exposure of the system' affected (such as particular geography and infrastructure in the area potentially affected by flooding) and the vulnerability of the system (for instance, design and maintenance of infrastructure, existence of early warning systems) In this example, changings in frequency and magnitude of flood events should not be considered as changes in flood risk. Because the damage from flooding could be reduced even if the frequency of flooding increases, provided measures are taken to reduce the exposure and vulnerability of affected systems. Such as river management in many parts of the world has decreased flood risk.⁷⁷ (ii) Risk to food security: Climate-related risk to food security comes either from the impacts of climate change or response to climate change. In the context of impacts of climate change, it includes climate hazards such as drought, humidity, extreme weather and temperature and so on; indirect climate-related impacts such as pest outbreaks triggered by ecosystem responses to weather patterns; exposure of people such as how many people depend on a particular crop; and vulnerability such as how able are affected people to get other means of food which may be related to financial access and markets. In the context of response to climate change, risk may include demand for land from climate change responses by adaptation and mitigation.⁷⁸

3.1.4 Impacts of Global Climate Change

There are many key scientific findings that stated by IPCC on the current state of global climate are as follows: Mankind activity has unequivocally warmed the atmosphere, land and ocean. Changes in the atmosphere, cryosphere, ocean and biosphere have occurred rapidly and on a massive scale.⁷⁹

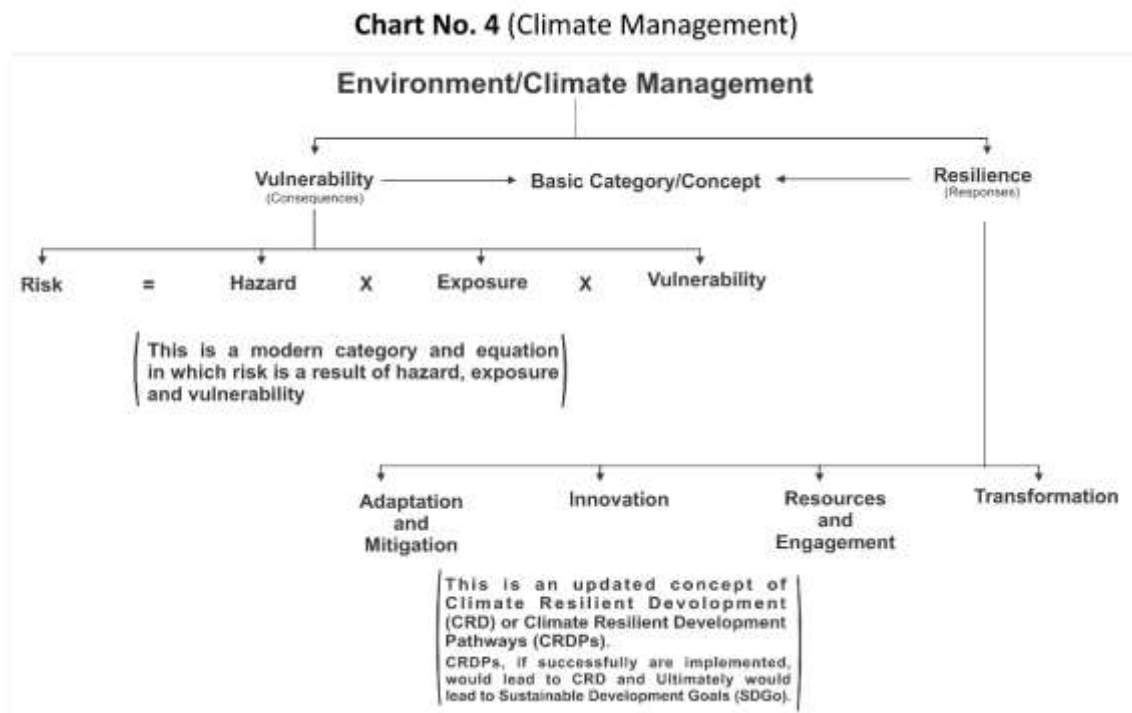
Anthropogenic activity has warmed the climate that is unprecedented in at least the last 2000 years.⁸⁰

The degree of current alteration across the climate system as a whole, and the present state of many aspects of the climate system are unprecedented over many centuries to many thousands of years.⁸¹

Mankind activities, principally through emissions of greenhouse gasses (GHGs), have unequivocally caused global warming, with global surface temperature reaching 1.1 °C above 1850-1900 in 2011-2020. Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyle and patterns of consumption and production across regions, between and within countries, and among individuals.⁸²

Large and rapid changes in the atmosphere, cryosphere, ocean and biosphere have occurred. Mankind-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to the widespread adverse

impacts and related losses and damages to nature and people. Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected.⁸³



Stern Review, in 2006, has warned that the benefits of strong and early action far outweigh the economic costs of not acting; and innocent poor people and poor countries would suffer the most by global climate change⁸⁴ through extreme weathers and heat, air pollution-led diseases, smog, droughts, flash floods, wild fires, deforestation, desertification, ocean acidification, deglaciation-led rising sea levels, deteriorating ecosystem, chemical-drenched edibles like meat; fruits and vegetables, scarcity of pure water and food, antimicrobial resistance, urbanization-led inequality, and mass migration etc.

3.2 Responses

3.2.1 Responses to Global Climate Change/CRD

‘Sustainable Development Goals’ (SDGs) are one of the primary objectives in the United Nations. Yet sustainability cannot be achieved during the exceedance of planetary boundaries or global climate change. To counter the threat and risk, SDGs are required to planned responses and resilience. These actions are called ‘climate action’ and ‘sustainable development.’ They are interlinked and interdependent processes and their leveraged interdependency is essential to pursue the Climate Resilient Development (CRD) in order to enhance mankind and ecological well-being. According to the IPCC’s Sixth Assessment Report: “Climate Resilient Development (CRD) is a process of implementing greenhouse gas mitigation and adaptation options to support sustainable development for all.”⁸⁵ The links between ‘climate change’ and ‘development’ has been discussing since the IPCC’s First Assessment Report and successive Reports. The concept of CRD in the literature was firstly described as to reduce poverty and adaptation to climate change simultaneously, without properly mentioning mitigation; and later was mentioned with mitigation and poverty reduction as ‘low-carbon development’, without explicit description of adaptation. Thus, a balanced and inclusive definition of CRD is drawn in AR6 of IPCC. ⁸⁶ CRD discusses the matter of equity in which poor and developing countries are involved with regard to the payments for achievements from carbon-polluter developed countries. CRD involves the matter of system transitions in energy; industry; land, ocean and ecosystems; urban and infrastructure, and society. It also includes adaptation for mankind, ecosystem and planetary health.⁸⁷ There are multiple factors that enable CRD. It includes societal behaviour to adjust the effects of climate change (adaptation); reduction in GHGs emissions in order to mitigate the global warming, for exceedance of warming levels from 1.5°C could limit the prospects of CRD (mitigation); access to appropriate technology (innovation); CRD related investment, access to rapidly scaled-up finance as well as inclusive governance, capacity building of governments at all levels, private sector and civil society (resources and engagement); urgent leveraging change in the development of people, prosperity, partnership, peace and planet (transformation). ⁸⁸ Mankind has relentlessly been using the resources of their future generations as well as contaminating the air, water, land, and biosphere for centuries. Therefore, we are culprit to commit the sin of exceedance of planetary boundaries such as: biodiversity loss, changes in land systems, freshwater use, novel entities (chemicals, plastics, nuclear waste etc.), altered biogeochemical cycles (acidic oceans etc.) and climate change. This generational level inflation of planet Earth will take an unbearable toll from our future generations. These all exceeded planetary boundaries are undermining CRD to achieve the SDGs.⁸⁹ To operationalize the concept of CRD in a decision making context is required a methodology to implement it. This methodology is described by CRD Pathways (CRDPs). CRDPs mean: “development trajectories that successfully integrate mitigation, adaptation and sustainable development.”⁹⁰

There are three most important components of sustainable development: innovation; resources and engagement; and transformation. We shall briefly discuss of these tools after explaining the adaptation and mitigation. **(i) Adaptation:** According to the IPCC: “Adaptation is defined in mankind systems, as the process of adjustment to actual or expected climate and its effects in order to moderate harm or take advantage of beneficial opportunities. In natural systems, adaptation is the process of adjustment to actual climate and its effects; mankind intervention may facilitate this.”⁹¹

In this definition, two approaches have been discussed to deal with adaptation: adaptation in mankind systems and adaptation in natural systems. (a) Adaptation in mankind systems means that we have to change the way of cities they grow. Several hundred millions of people in coastal cities would be compelled to leave their homes as sea level rise and storm intensity get worse. The toll of climate change to all coastal city areas would exceed 1 trillion dollar each year by the middle of this century. City planners need the latest data on climate risks and projections from computer models that forecast the effects of climate change. Equipped with the latest information they can make better decisions about planning for outskirts and industrial areas, building and expending seawalls, supporting storm-water drainage systems. For instance, if demand of a bridge over the river is currently about 12 feet high and storms and flooding, on the other hand, are going to severe in future which is required expensive 18 feet tall bridge compared to the 12 feet of that cheaper one, city leaders have to adapt the adaptation by building the last one.⁹² A recent example can be presented from the work of Ravi Urban Development Authority (RUDA), a segment of the Punjab Government, Pakistan. RUDA or city planers are committed to ‘Revive Ravi’ and ‘Save Lahore’ from the unplanned urban sprawl and disposal of large amount of industrial waste in Ravi River. They are working on a number of sustainable development solutions including barrages, environmentally regulated industrial estates and waste water treatment plants.⁹³ To avoid inland flooding, structural and non-structural measures of levees and early warning systems respectively are required to reduce loss of life and wealth.⁹⁴ (b) Adaptation in natural systems means: mankind ought to support nature through conservation, protection and restoration measures. In many natural systems, no adaptive actions would be possible to avoid risks as natural adaptive capacity and additional systems will reach their limits with increasing global warming. Ecosystems already surpassing aforementioned hard adaptation limits include some warmwater coral reefs, some coastal wetlands, some rainforest, and some polar and mountain ecosystems. After the crossing 1.5°C, many ecosystem-based adaptation measures will lose their effectiveness.⁹⁵ **(ii) Mitigation :** According to the IPCC, mitigation is a mankind intervention to reduce the sources or enhance the sinks of greenhouse gases. Mitigation along with adaptation to climate change leads to the objective described in Article 2 of the UNFCCC in which ultimate objective is of the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. ⁹⁶A number of options of mitigation are technically viable, generally supported by the public, and are becoming increasingly cost effective. Notable options are as follows: solar energy, wind energy, electrification of urban systems, urban green infrastructure, energy efficiency, demand-side management, improved forest and crop/grassland management, and reduced food waste and loss. About 85 percent in the unit costs of solar energy, 55 percent in the wind energy and 85 percent in the lithium-ion batteries have been observed sustained decreases from 2010 to 2019 as well as large increases in their deployment as to ten times for solar and hundred times for electric vehicles (EVs) differently over all the regions.⁹⁷

(iii) Innovation: Innovation refers to inventing climate-smart machines and new processes to achieve the carbon zero target. It also includes new approaches towards social sciences and business policies that will pave the way for new inventions on a global scale.⁹⁸ Mankind has to discover more innovative ways and technologies in household recycling, industrial recycling, alternative cement, refrigeration, recycled paper and bioplastics.⁹⁹ **(iv) Resources and Engagement:** Resources and engagement refer to enable climate actions transitionally from local to the global level in order to achieve Climate Resilient Development. Increased access to resources can build capacity to address mitigation and adaptation especially for developing countries. There is a large amount of global capital to close global investment gaps, yet barriers to redirect capital to climate action in the context of economic vulnerabilities and debt-trapped developing countries are a major problem. CRD is achieved by increased international cooperation including mobilizing and enhancing access to finance for developing countries. It also includes support to NDCs and accelerating technology development and deployment. Effective climate action is achieved by political commitment, cooperation in the different level of governance, laws, policies and strategies. To achieve adaptation, mitigation, risk management and CRD to synergistic governance is required inclusive decision processes that encourage equity, justice and democratic control. CRD is also achieved through just laws and policies that address inequities based on gender, ethnicity, disability, age, location and income.¹⁰⁰ **(v) Transformation:** Transformation towards CRD is required engagement in climate actions of different arenas (e.g. ecological, governmental, economic and financial, political, knowledge, science and technology, and community). There is a cycle of engagement among arenas which creates positive feedback loop to achieve the CRD. The cycle of engagement is as follows: engagement between ecological and economic arenas would improve planetary health; interaction between economic and knowledge-technology related arenas would create connections between nature and society; knowledge and political arenas in totality would improve social justice and equity; political and sociocultural arenas would create empowerment and inclusion; and at the end of the cycle, sociocultural and ecological arenas would develop solidarity and well-being based development. To sum up, transformation refers to interactions between individual, collective and systems change. It largely exists at the community or city level but can bring about positive global-scale outcomes. ¹⁰¹

Conclusion:

1. Preservation of religion provides a strong rationale behind conservation of natural world.
2. In the five essential objectives of islamic legal philosophy, the concept of ‘preservation’ has a leveraging contrast with ‘vulnerability’.
3. Regarding to the response-methodology of climate science, adaptation mitigation and innovation may develop a leveraging relationship with Islamic legal philosophy of essential objectives as well as principle of sadd al-zarai.

4. In CRDPs, resources and engagement may be based upon the religious concept of kafalah and hajjah (needed)-led negative feed-back loop.
5. "Transformation" can be achieved through the legal philosophy of preservation of religion and reason.

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