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Chapter

An Islamic Perspective on Ecology and Sustainability

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Abstract

Islam, based on the prescriptions of the Holy Qur'an and the Sunnah of Prophet Mohammad (Peace be upon him), provides guiding principles on the relationship between humans and the rest of the creation. A fundamental aspect of that relationship is that humans are a part of the creation, including known and unknown living creatures. Islamic teaching emphasises the specific ability of humans to act with understanding, compared to the rest of the creation. Such pre-eminence comes with practical obligations to preserve and use natural resources, be it water, land, or animals sustainably and within limits. The article presents the ecological ethics of Islam and describes how it is being revitalised through education. Finally, it presents principles and means to act responsibly on key global environmental challenges such that society can function in harmony with itself and with nature.

Keywords: religion, Islam, ecosystems, environmental sustainability, sustainable consumption and production, nature and humans, distributive justice

1. Introduction

This paper considers how Islam, through the prescriptions of the Holy Qur'an and the Sunnah of prophet Mohammad (Peace be upon him), provides guidance on the relationship between humans and the rest of the creation. Muslims consider the Holy Qur'an as the message from God the Almighty and Creator of the universe, as transmitted to humanity through the messenger and of prophet Mohammad (Peace be upon him). Several verses of the Holy Qur'an speak to the creation of the heavens and the earth, and all that is between them. If applied correctly and concretely, Islamic principles can highly contribute to the protection of the environment and the conservation and sustainable use of natural resources.

This starts with the conceptual understanding of ecological ethics of Islam, according to which Muslims believe that the universe has been created in measure and balance, with and order that humans should refrain from disrupting. As a part of creation, humans stand in a specific state of privilege owing to their ability to act with conscience. Such a situation of privilege of humankind implies an immense responsibility to act as trustee in the preservation of the Creation, including the protection of the environment.

From a more practical perspective, Islam prescribes a behavioural attitude towards all elements of the Creation, based on the trusteeship and the notion that everything in the Creation has an intrinsic value, and that nothing has been created without a purpose. From the consumption of resources, like water and food, to how a Muslim acquires and disposes of his/her wealth, Islam provides practical guidance for behaviour which are not only moral ethics, but religious obligations. Such is the case with the obligation of the practice of Zakat (obligatory tax) and the fasting during the month of Ramadan. Such guidance has relevance in the context of current environmental challenges such as climate change, the loss of biodiversity, pollution and sustainable production and consumption.

The first part of the paper presents the conceptual basis of ecological ethics in Islam and discusses environmental education in Islam. The second part discusses select environmental policy issues facing the world today and how Islamic religious principles and obligations help address them. The paper concludes with insights and suggestions for further research and analysis.

2. The ecological crisis: a planet and a people out of balance

Muslims believe that the universe has been created in measure and balance (*mīzān*) [See The Moon 54: 49]¹. It is mentioned in numerous instances in the Qur'an that humankind should observe the order in Creation and should not cause corruption (*fasād*) therein after it has been set in order. Muslim scholars writing on the ecological crisis regard excesses, both in the unbridled consumption of natural resources and the production of waste, as transgressions of this balance. Most ecoIslamic writers 'interpret' the destruction of the environment as an impairment of this balance for which humanity will be called to account [1, 2]. In the words of Abdul-Matin [3]: "By treating the natural world as though it were our dumping ground, we risk disturbing the delicate balance (*mīzān*) that exists in nature". *Mīzān* when applied to ecological balance—the balance that exists between the different components of our earth system—has a strong correlation with the notion of ecological limits, notably expressed in the concept of planetary boundaries.

For Muslims, there are several key points to extract from the concept of *mīzān*, notably, that the measure in which the world was created was set by the Creator, and "must not be transgressed at any level, whether at that of the harmony of nature or in the spheres of human justice, morality or everyday commerce" ([4], p. 41).

And as to the sky—it is He alone who has set the balance of all things so that you might not transgress the just balance. Therefore, shall you establish weights and measure with justice. And you shall not by fraud diminish the balance. [The All-Merciful 55: 7-9]

The second point which can be gleaned from *mīzān* is that Creation is an inter-related system in which all things, from the delicate butterfly of the Himalayas to the mysterious sea creatures inhabiting the ocean depths, serve a purpose, making "the world one telic system, vibrant and alive, full of meaning" ([5], p. 25). Creation, in addition to providing a means of subsistence to humans, also plays a role in fulfilling

¹ The verses from the Qur'an have been drawn from the Yusuf Ali translation which is included in the references.

the needs of other creatures, in a manner created by Allah² [See The Stone Valley 15: 19–20] and [Tāhā 20: 50].

*And as to the earth—it is He alone who has laid it down for all living creatures.
[The All-Merciful 55: 10]*

Every individual creature exists as a sign of God which He has given form, nature and guidance and to which He has assigned a specific role [6]. The proportion and interdependence of the natural world is set forth time and again in the Qur'an, revealing the connections between all things [7]. The final aspect of *mīzān* relates to its implications for the wise utilisation of the earth's resources since God has created "...everything related to life in a most delicate balance" [The Stone Valley 15: 19]. Yusuf Ali, in his commentary on this verse says that "every kind of thing is produced in the earth in due balance and measure...an infinite chain of gradation and interdependence" ([8], p. 640). Balanced usage of the earth's bounties, and the need to take reasoned actions to preserve this balance should thus be the guiding factors in utilising the natural resources of the earth. Özdemir [6] suggests that the Qur'anic verses pertaining to *mīzān* would be sufficient in developing Islam's ecoethic since they "establish, first, that justice and balance are universal, second, that this universal balance is created by God, and third, that humans must attempt both to comprehend this universal balance and to follow it in their social life as well as in their interactions with the environment." What then is the ecological ethics of Islam, and how is it being applied today?

3. An overview of the ecological ethics of Islam

Muslims own a fair share of the global concern around the earth's health and well-being and religious teachings continue to shape their values, beliefs and attitudes towards life - including the environment. From the *minbars* (pulpits) of Cape Town to the *masājid* (mosques) in Morocco, Muslims are rediscovering the environmental teachings of Islam and putting these into practice. A burgeoning movement, actively voicing its concern about the ecological crisis; unearthing the ethical teachings of Islam as it relates to the human-environment relationship; and increasingly striving to implement practical initiatives based on the ecological teachings of Islam now exists [9].

Ethics is about the principles which guide our actions, the way we live and behave, including our interaction with the natural world. The ecological ethic of Islam presents an example of liberation theology since caring for the earth and humankind is a religious duty focused on just action in the life of this world. It is an environmental imaginary, based on the sovereignty of God, the responsible and just trusteeship of humankind and the value of all Creation. It also highlights the importance of religion as a vehicle for social and environmental change. Concern for the environment is deeply rooted in all fields of Islamic teaching and culture. The implications of key principles in Islam, such as *tawhīd* and *khilāfah*, the oneness of God and human trusteeship, has profound implications that shape human interaction with Creation (*khalq*).

² The Arabic term Allah, means the One True God is used interchangeably with the word God in this chapter.

Tawhīd is often put forward as the key principle underlying the green ethic of Islam. This principle, which centres upon the Oneness of the Creator, spells out clearly that the Owner, Creator, and Sustainer of the entire universe is Allah. His Oneness infuses the entire environmental worldview of Islam with the recognition that nature originates from Him, is purposive, and functions in accordance with His Will. Khalid [10] calls *tawhīd* the “bedrock of the holistic approach in Islam” as it affirms the interconnectedness of the natural order, the creation of One God. Indeed, it is *the* principle which gives the religion of Islam its distinctive morphology and makes the ecoethic of Islam wholeheartedly theocentric.

Humans have only been appointed as trustees on earth, holding it in usufruct, answerable for the just and responsible discharge of this trusteeship in accordance with Divine Laws. This trusteeship, or *khilāfah* is further shaped by the belief that humans, in their servanthood, are accountable for all their actions. True *khilāfah* (stewardship) is thus not about dominion, mastery or control over any part of creation, but is centred on responsible trusteeship, cherishing and carrying out the capabilities entrusted to human beings with humility and obedience to the laws of the Creator in all human endeavours.

The ethical notion within every human being, the ability to distinguish between right and wrong, is the main reason why humans have been appointed as vicegerents on earth and accorded a central position in the natural order [11]. However, this metaphysical exaltation of humans is linked to a weighty moral burden - to adhere to a code of action reflecting the best social behaviour and highest ethical values [12].

The term *khalīfah* has also been translated as steward, deputy, viceroy, guardian and vicegerent. Vicegerency covers every aspect of life and essentially tests humanity's just exercise of authority over those within their stewardship. *Khilāfah* is therefore a responsibility and a trial by which human beings will be evaluated in terms of who has done the most good, acted according to Allah's purpose, served humanity and shepherded those under her care [13]. As the Prophet Muhammad (Peace be upon him) so eloquently uttered, “Each of you is a shepherd and will be answerable for those under his care” (Ṣaḥīḥ [14], p. 1(853), 304).

In her relation to the Creator, a Muslim is thus a *trustee* and *servant* on earth, with the responsibility of living in kindness, compassion and justice with all of creation and caring for the gift of nature in accordance with the guidance of its Bestower – which is found in the Qur'an and in the actions and saying of the Prophet Muhammad (Peace be Upon Him). In relation to creation, humankind enjoys the rights – as do all other living beings, to partake of nature's bounties, but humans are at the same time a *partner* of Nature, unified in praising and glorifying the Originator of the Universe.

Nature as the divine book of creation should, in the same vein, be treated with respect and reverence. The early verses of the Qur'an is an invitation to contemplate upon and observe natural phenomenon in a quest for meaning, to look to nature and to observe its perfection and order and from there, to deduce the Oneness of God [6]. Creation (*khalq*), which is a reflection of divinely-arranged structure and order, is deserving of care and respect since it possesses inherent value as the signs of Allah, ecological value as part of the integrated system which He designed, and utilitarian value in sustaining both humans and the rest of creation. Thus, while humans have the right to partake of the natural bounties of the earth, these rights must be tempered with moderation, balance and conservation. When nature is disrupted by evil human forces, such as misuse, destruction, extravagance, greed and waste, corruption (*fasād*) will appear on the earth. Muslims are repeatedly forewarned in the Qur'an against causing corruption (*fasād*) on earth, by exploiting and oppressing

the weak and poor, and misusing, polluting and wasting natural resources, created in measure and for the benefit of all.

Corruption (fasād) prevails in the land and the sea because of all the evil that the hands of humanity have earned—so that He may cause them to taste something of that which they have done—so that they may return in penitence to God.
[The Byzantines 30: 41]

Instead, Islam urges Muslims to observe the rights of others, both present and future generations, human and non-human, and to live in accordance with the teachings of the religion and to return to their *fiṭrah*, the beautiful deepest human nature which has been gifted to humanity. This notion is vividly illustrated in the following verses:

So set thou thy face steadily and truly to the Faith: (establish) God's handiwork according to the pattern [fiṭrah] on which He has made mankind: no change (let there be) in the work (wrought) by God: that is the standard religion: but most among mankind understand not. [The Byzantines 30: 30]

Ethics in Islam seeks to achieve and establish the wellbeing and ensure the welfare of the entire Creation. This ethic is increasingly making its way into the actions and daily life of Muslims – in the building of mosques, in the discharge of charity, in the way that food is being produced. And at the core of this movement lies a mission to raise awareness and educate Muslims about the liberatory and transformative ecological ethic, much needed in this era of climate and environmental breakdown.

Grounded on the ethical basis which guide the behaviours of the believer, Bagader et al. [15] present the relationship between human beings and the universe, as defined in the Qur'an and in the Sunnah, in three ways:

- A relationship of meditation, consideration and reflection on the universe and on what that it contains.
- A relationship where man uses and develops in a sustainable way, to his advantage and in his own interest, the elements of the universe.
- A relationship where man takes care and cares for all living beings and not only human beings, for the Prophet said: "There is a recompense for the good that we do to all living beings. (sahih al-Bukhari).

He planted firm mountains in the earth, (mountains) which rise high above its surface. He blessed the earth and assigned its food resources in four days, according to the needs of those seeking food. (Qur'an 41:10).

The relationships are described above imply many of the principles, norms and practices recognised in modern environmental policy, including for the emergence of sustainable consumption and production systems.

As a custodian rather than the owner of the elements of the creation, human being are entrusted with the responsibility of care, attention, prevention and preservation.

4. Environmental Education: calling Muslims to Action for the Earth

From the cradle to the grave, a Muslim is charged with seeking knowledge—of her Creator, of His Laws, and of the workings of Creation—drawing on all the sources of knowledge placed on planet Earth—in revealed and non-revealed knowledges, through sensory and spiritual experiences, in the Qur'an and in the universe. This wondrous search for knowledge should be visible in her life, and manifested in just action in this world, in good works, which incorporate environmental care. Revitalising ecological ethics in the educational establishment of Islam provides an impetus to not only uncover Islam's environmental tradition, but to affect Muslim awareness and action on the ecological question [16]. If faith propelled the Muslim mind to seek knowledge and to ponder, reflect on, and understand the Creator and the workings of the universe; faith must also, of necessity, be anchored to right and just action in this world, to *'amāl ṣālihāt*, as the Qur'an repeatedly affirms.

The definitive purpose of the educational process in Islam is to facilitate the trusteeship of humankind on Earth. With belief in God, comes the mandate of responsible trusteeship on Earth—a life lived in accordance with the Divine laws, discovered in the Qur'an, a Book of Revelation, *and* the Book of Nature. Environmental education, which will assist humankind in 'reading' the Book of Nature and understanding the working of the Universe, of which environmental education is an integral part, is therefore essential in the knowledge-structure of Islam.

Within the Muslim educational landscape, and amid a vibrant culture of lifelong learning, there exists a myriad of institutions which can be harnessed to share knowledge of the workings of the Earth. Boasting an extensive and growing educational establishment, both traditional and modern institutions, the mosque and Muslim school for example, continue to play a vital role in the educational life of Muslims the world over.

Examples of environmental education programmes, premised on the Islamic teachings on the environment can be found in Pakistan [17, 18], in the Philippines [19], in Zanzibar [20], in Indonesia [21] and in the United Kingdom [22]. These programmes have targeted religious leaders, young children and women and men who manage natural resources. Sourcebooks, teaching modules, classroom materials, videos, posters and pamphlets and outdoor educational experiences have been developed to relay the environmental ethic of Islam. Coupled to this has been the intellectual output of Muslim researchers such as the introductory work of Subbarini on Islam and environmental education [23]; Al-Naki's [24] pioneering study on communicating environmental ethics in Kuwait which shows how it is possible to "learn and select from concepts and teaching techniques derived in the West...to help put in place an Islamic environmental ethic appropriate to an Islamic context"; and the work of Haddad [25] who develops an Islamic environmental education framework centred upon faith, knowledge and action.

Haddad Islamic environmental education framework, as extracted from the Holy Qur'an, is based on a balanced tripod structure. He presents a structure in which God (Allah SWT), is the head (the nucleus) the one and only-creator, represented by the belief in and the application of his rules and directions. The three legs of the tripod represent (a) knowledge/understanding, (b) manifestation/differentiation, and (c) faith/believing ([25], p. 7).

The ecotheology movement, Muslims included, is making its mark on the environmental landscape and is now an established 'interested and affected party' in environmental deliberations. Three areas of commonality between environmentalists

and religious leaders have been identified by Gardner [26]. These could easily be applied to environmental educationists. Firstly, both see the world “from a moral perspective, stressing obligations that extend beyond the individual to other people, distant places, and future generations”; both regard the “natural world as having value that transcends economics” and both “oppose the excessive consumption that drives industrial economies” ([26], p. 8). Religions also possess five sources of power: It shapes people’s worldview; wields moral authority; influences and holds the attention of its adherents; possesses financial and institutional assets; and generates social capital - all of which could be used to build a socially just and sustainable world. Furthermore, a religious view of nature is indispensable since it serves as a rich source of environmental ethics and also knowledge of the order of Nature [27] and “generates strong beliefs which can lead to high levels of commitment in certain individuals or social groups...[offering] the nearest hope to certainty of action in terms of pro-environmental behaviour” ([28], p. 142).

In terms of the environmental question, Islam can thus make both an ethical and educational contribution since it not only possesses ethical reference systems which guide human interaction with Creation, but educational visions which impact upon environmental teaching and learning. It presents a theocentric ecological ethic which is based on the sovereignty of God, the responsible trusteeship of humankind and the intrinsic value of Creation. It puts forward an activist, transformative approach to education, premised upon an integrated knowledge structure and educational objectives which require reflective and critical engagement with all ecological knowledge, responsible environmental action, and social transformation. And it proposes a transformative approach to environmental education to bring the liberatory intent of the Islamic environmental tradition into focus,

5. Acting on sustainability from an Islamic perspective

The position of privilege attributed to humans comes with an intrinsic responsibility to protect, conserve and use sustainably nature and natural resources. The concept of sustainable consumption and production in Islam is not driven by material considerations to sustain the needs of human being. It is a religious imperative, grounded on the relationship between the believer and The Creator, and is indeed an act of adoration.

5.1 Conservation and sustainable use - global common goods

Global commons typically refer to resources, including natural resources such as air, water, forests, and biodiversity which are shared by of people and nations around the world. While such resources might be located in individual countries or territories, their value and benefits accrue beyond such specific countries or territories. Therefore, a key challenge in the management of the global commons is the design of effective governance structures and management systems considering the public and private interests. The very nature of the complexity of managing what belongs to all makes ethical considerations, including faith, an important dimension and driver to orient and shape the behaviour of individuals.

In the context of Islamic belief, humans are not considered the sole beneficiaries of the bounties of nature. Rather, such benefits accrue to the entire creation, including other human beings, living species, including animals and plants. First is to share

among human beings, and the obligation to act positively in favour of others. Prophet Muhammad (may the peace and blessings of God be upon him) said: “If a Muslim plants a tree or sows a field and a human being, a bird or an animal eats what they have produced, he will be rewarded as if he had given to charity. (Sahih al-Bukhari, Sahih Muslim). Several hadiths reaffirmed the benefits accruing to one that performs a deed on nature, which benefits other human and living species, in addition to bringing value to the conservation and sustainable use of nature itself.

An authentic Hadith narrated by Imam Ahmad in his Musnad and by Tabarani in al-Mu’jam al-Kabir indicates that: “Whoever plants a tree, there is no human being or creature of God who will not eat of its fruit without the one who planted it being recompensed as if he had given in charity.”

Similarly, another authentic hadith narrated by Imam Ahmad in his Musnad, by al-Bukhari in al-Adab al-Mufrad and by Abu Daoud at-Tayalisi, in his Musnad mentions that: “If the Day of Resurrection comes when one of you holds in his hand a seed that he was about to sow, let him sow it.

The principle of sharing commons goods, in particular those essential for everyone’s living and wellbeing has been mentioned explicitly by the Prophet Muhammad (may the peace and blessings of God be upon him) when he said that: “Muslims must share these three things: water, pasture and fire. (Abu Daoud, Ibn Majah, and al-Khallal.). This is clearly stated in the Qur’an: “Teach them that the water will be shared among them...” (Qur’an 54:28).

In addition, the notion of global commons extends beyond human beings. It applies in the relationships between humans and other part of the creation, including animals. Several verses of the Qur’an refer to the notion of sharing of resource between humans and other creatures.

“As for the land, We have spread it out, planted firm and still mountains there, and caused all species to grow there in a balanced way. And We have endowed it with sustenance for you and for other creatures that you are not required to feed. (Qur’an 15:19-20).

The story of the Thamud and the camel, in the Qur’an is a good illustration of this aspect. According to the Qur’an and the Islamic exegetical tradition, the Thamūd were an early Arab tribe who rejected the message of the prophet Ṣāliḥ. God sent down a female camel as his sign, and Ṣāliḥ told his countrymen that they should not harm the camel and allow it to drink from their well. But the Thamūd cut its hamstring or otherwise wounded it. God then destroyed the tribe, except for Ṣāliḥ and a few other righteous men.

According to the Qur’an, the Prophet Muhammad (may the peace and blessings of God be upon him) was sent by God as a... “...mercy to the universe. (Qur’an Surah 21, Verse 107). The Prophet taught how to interact with and take care of the creatures of the earth. It is narrated by Abu Daoud, at-Tirmidhi to have said that “Those who show mercy are treated the same by the Merciful. Show mercy to the living beings of the earth and He who is above the heavens will show mercy to you.” According to hadith narrated by Sahih Al-Bukhari and Sahih Muslim the Prophet ordered men to provide for the needs of the animals in their care and warned that anyone who lets an animal die of hunger or thirst will be rewarded with the fire of Hell.

The establishment of protected areas, either land or marine, is considered an approach to conserve nature while meeting the needs of humans. The International Union for the Conservation of Nature and Natural Resources (IUCN) defined

protected areas as “defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”³. It has been documented that the Prophet Muhammad (may the peace and blessings of God be upon him) himself established protected areas, known as *himās* in Arabic language, for the conservation and sustainable use of rangelands, plant cover, and wildlife. Today, protected areas exist in many countries and contribute to the rehabilitation of forests, marine species and other living species at risk of overexploitation or extinction.

5.2 Inter-generational equity and responsibility to address climate change

The Report of the World Commission on Environment and Development: Our Common Future, known as the Brundtland report of 1987, makes of the notion of intergenerational equity a central dimension of the concept of sustainable development. It defines inter-generational equity, and indeed, sustainable development, as “meeting the needs of the present without compromising the ability of future generations to meet their needs”.

Such an understanding implies a sense of fairness among all generations, present and future, in the use and conservation of the environment and its natural resources. In Islam, it is understood that the administration of natural resources is a shared responsibility of all generations. Each generation must use nature wisely, according to their needs, without compromising the needs of future generations. All people have therefore an obligation not to abuse or make an inappropriate use of natural resources, damage them, or consume without consideration of the needs of others.

Central to inter-generational equity and responsibility is the challenge of climate change. Climate change is considered a defining issue of our time, with compelling evidence from the United Nations’ Intergovernmental Panel on Climate Change (IPCC) that human activities have been a key driver of global warming. The latest IPCC report on the physical science basis noted that emissions of greenhouse gases from human activities are responsible for approximately 1.1°C of warming since 1850–1900, and finds that averaged over the next 20 years, global temperature is expected to reach or exceed 1.5°C of warming [29]. Growing world population, consumption and production patterns increasingly demanding on energy, material, transport and housing all contribute to underlining the prospects of sustainable development for current and future generations.

All the principles of ecological ethics in Islam, and the Islamic principles of balance and measure and prevention of corruption can contribute to behavioural changes in human activity which are indispensable to address climate change and secure a sustainable future for generations to come. In particular, the notion of measure must be applied in all respects, including in the management and control of the individual demands and the collective pressure on natural resources and the generation of carbon emissions. The *Islamic Declaration on Global Climate Change*⁴, which was adopted at a symposium held in Istanbul, Turkey, on 17, 18 August 2015 and gathering representatives of Islamic organisations, decision makers and researchers, note many of the principles derived from the Holy Qur’an and referred to in this paper, as important foundational elements in the fight against climate change.

³ <https://www.iucn.org/theme/protected-areas/about>

⁴ https://www.ifees.org.uk/wp-content/uploads/2020/01/climate_declarationmmwb.pdf

5.3 Resource efficiency

Resource efficiency can be understood as the use of the Earth's limited resources in a sustainable manner, minimising the negative impacts on the environment, and making it possible to create more goods and services with less resource use, and to deliver greater value with less input. Resource efficiency is central to achieving sustainable production and consumption.

While in a market-driven, globalised, and open economy the flow of goods and services is essential to meet the needs of people, there is increasing concerns about the ecological consequences of such a system. It is a fact that the world produces large quantities of food, however, excessive consumption and waste occur in certain parts of the world, whereas hunger prevails elsewhere.

There are several policy principles to manage food production and consumption in a more sustainable manner. Systems of food production, transportation, conservation, and distribution represent logistical and infrastructural challenges in many developing countries. On the other hand, the consumption of food, including fruits and vegetables out of season, is a reason for huge quantities of fruits and vegetables being transported around the world, and systems of production that are highly energy and resource-intensive are employed to produce fruits and vegetable out of season.

It is well accepted among policy circles that changes in consumption and production patterns are indispensable; however, such changes have proven very hard to materialise. Increasingly, in several countries and regions around the world, the notion of local and sustainable consumption is gaining traction. Islam, through the Qur'an, provides insights and teachings which can guide production and consumption more in line with natural cycles and processes.

“It is He Who has brought into being gardens, the cultivated and the wild, and date-palms, and fields with produce of all kinds, and olives and pomegranates, similar (in kind) and variegated. Eat of their fruit in season, but give (the poor) their due on harvest day. And do not waste, for God does not love the wasteful. [Qur'an 6:141].

An important message and learning from this verse concern the merits of local consumption, and the consumption of food that is produced at the right season of the year, following natural cycles, and avoiding food waste which may occur. In effect, each type of fruit and vegetable has its own set of specific natural conditions for ideal growth and quality. For example, oranges are climate-sensitive plants and grow better in places with hot dry summers such as Spain, Italy, and Greece [30].

5.4 The avoidance of waste

The UN Food and Agriculture Organisation (FAO) estimates that one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tonnes per year. Both food loss and food waste, because of systems of production, storage, transportation, but also consumption habits are central to environmental sustainability and sustainable development.

Islamic belief teaches and warns against waste and excessive behaviour.

“Children of Adam! Wear your beautiful apparel at every time and place of prayer and eat and drink. But do not be excessive – verily God does not love the wasteful”. [Qur'an 7:31].

One can consider water as example of Islamic teaching and practice against waste. Water is at the centre of creation and is indispensable for all life. It requires particular attention. The Qur'an teaches that God Almighty made of water the origin of life. Several verses of the Qur'an speak about water, its relation to the creation, life, and religious practice.

"Then We . . . made every living thing out of water. (Qur'an 21:30)

"And We send down purifying water from the sky to revive by it a dead land (of drought) and to give drink to the many beasts and human beings whom We have created. (Qur'an 25:48-49)

"Do you see the water you drink? Are you bringing it down from a cloud? Or do We bring it down? If We wanted to, We would make it bitter. So why aren't you grateful? (Qur'an 56:68-70)

"Say: 'What do you think? If (all) your water were to disappear deep within the earth, who then would bring you a spring of gushing water? (Qur'an 67:30)

UN Water indicates that water is a finite resource having to serve exponentially more people and usages. Therefore, ensuring everyone has access to a reliable supply is crucial to human survival and sustainable progress. Considering the critical importance of water as a source of life, Muslims consider that The Creator has made its use a common right for all living beings, men, plants and animals, and that waste of water is highly reprimanded. It was reported that once the Prophet passed by Sa'd, one of his companions, who was doing his ablutions for the prayer. He tells him: "What is this waste, Sa'd?" "Can we speak of waste even when we do our ablutions for the pray?" asked Sa'd. And the Prophet replied, "Yes, even if you do them by a river." "[2] (Ibn Majah.)

The practice of fasting during the month of Ramadan is an illustration of self-education, discipline and control, which can lead the individual to a more regular behaviour of avoiding waste and appreciating the value of food and water. The Holy Qur'an prescribes fasting in the following terms:

"O you who believe, fasting is prescribed for you as it was prescribed for those before you, that you may develop God-consciousness." (Qur'an 2:183)

During the month of Ramadan, which is the month during which the Holy Qur'an was revealed, Muslims observe a fasting for a period of 1 month. Such a fasting is meant to demonstrate devotion and is an exercise of renouncement oneself, upon the order of God, from drinking and eating, and other body appetites such as intimate relations, from dawn to dusk. By refraining oneself from drinking and eating water and food that one can have at disposal, the practice of fasting is a practical way of putting oneself in the situation of those who lack water and food, and to experience directly and personally thirst and hunger, rather than only reading about it in newspapers and seeing hungry people on television. It helps appreciate the value of water and food, stimulate compassion and generosity vis-à-vis the most deprived people in our societies, and gain a sense of conservation, sustainable use and avoidance of wasting.

5.5 Zakat, distributive justice, and sustainability

Oxfam International estimates that half of the world's net wealth belongs to the top 1% richest people. Inequality and the concentration of wealth represents a key challenge to achieve sustainable development. It is for this reason that Sustainable Development Goal (SDG) 10 seeks to reduce inequality within and among countries. The SDG 10 calls for reducing inequalities in income as well as those based on age, sex, disability, race, ethnicity, origin, religion or economic or other status within a country.

The World Bank has estimated that about 97 million more people are living on less than \$1.90 a day as a result of the COVID-19 pandemic, increasing the global poverty rate from 7.8 to 9.1 per cent. Globally, 3 to 4 years of progress towards ending extreme poverty are estimated to have been lost [31].

The concentration of wealth and the increasing number of people living in poverty have both consequences for environmental sustainability. On the one hand there is a risk of over and excessive consumption, with living standards high and carbon and resource-intensive; and on the other hand, poverty and the sole reliance on fragile ecosystems to ensure a livelihood leading to further environmental degradation.

In this context, systems of wealth redistribution can contribute not only to greater social justice, improve living standards, but also minimise negative impacts on the environment. In Islam, "Zakat" (obligatory tax) is a compulsory charity that Muslims pay yearly on their money and material property. Zakat has been established to rank as the third of the five pillars of Islam is, after faith in God and His prophets, and the accomplishment of daily prayers. Several verses of the Qur'an treat of Zakat matters:

"And establish prayer and give zakat, and whatever good you put forward for yourselves – you will find it with Allah." (Qur'an, Surah 2, Verse 110).

"The Believers, men and women, are protectors one of another: they enjoin what is just and forbid what is evil: they observe regular prayers, pay their Zakat and obey Allah and His Messenger. On them will Allah pour His Mercy: for Allah is Exalted in power, Wise." (Qur'an Surah 9, Verse 71).

As per Islamic principles, every year, 2.5% of wealth is subject to Zakat. In Islamic jurisprudence, if a Muslim owns an equivalent monetary sum of Nisāb, he has to pay 2.5% of surplus wealth above the Nisāb every year. As such, Zakat is an important institution and an instrument for Islamic economic policy for social redistribution, poverty alleviation and economic welfare. It also plays a role in preventing accumulation of wealth and property, including from agricultural yields, animal husbandry, speculation, and corrupt economic and market structures.

Zakat has a significant potential to generate financial resources and goods for social redistribution. Firdaus et al. (2012), cited in [32] estimated the potential of Zakat in a country such as Indonesia by surveying 345 households. Their results show that Zakat collection could reach 3.4% of Indonesia's GDP, which can help in reducing poverty to a large extent. In a number of countries in Africa, farmers pay Zakat through yields and seeds that fall within the part subjected to Zakat, making it possible to redistribute seeds across communities and allowing for subsistence of the poorer and most vulnerable. Shaikh [33] estimates potential Zakat collectible in 17 member countries of Organization of Islamic Cooperation (OIC) to be enough to fund resources for poverty alleviation in all 17 OIC countries combined.

6. Conclusion

This paper has shown that Islam, based on the prescriptions of the Holy Qur'an and the Sunnah of prophet Mohammad (Peace be upon him), provides guiding principles on the relationship between humans and the rest of the creation, which play a central role in the protection of the environment and the conservation and sustainable use of natural resources.

The ecological ethics of Islam demonstrates the importance of religion as a vehicle for social and environmental change, based on the sovereignty of God, the responsible and just trusteeship of humankind and the value of all Creation. It presents a relevant foundation to meet the needs of humans, of current and future generations, living in harmony with nature, and the recognition of the indispensable balance of the universe in the way The Created conceived it.

Beyond the theoretical and conceptual basis, Islamic belief and practice offer approaches that are fully relevant to modern environmental policy and to the achievement of sustainable development, from the management of global commons to social and redistributive justice. Considering that the world Muslim population is currently estimated to be close to 2 billion people, the full and regular practice of the teachings of Islam could contribute to addressing current global and local environmental challenges which relates to the behaviour of people and their way of living. As moral ethics and religious obligation, the practical influence of Islam in the daily lives of people is naturally subjected to the true reality of their faith and its practice as prescribed. The fact that normative rules and obligations in many countries of significant Muslim population are based on laws and regulations not necessarily driven by religious norms means that the practical application of Islamic teaching remains in the domain of individual choices. This poses the broader question of the role of religion in modern societies. However, from a research and analytical perspective, it can also trigger the question of whether or not countries with legal systems based on Islamic values, and for this matter other religions as well, have relatively better environmental performance than others.

Further thinking, research and analysis around such questions can contribute to deepening the knowledge of Islamic principles, teaching and practices and ways to converge spiritual values, ethics and current consumption and production patterns to face local and global environmental problems.

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