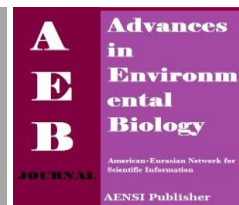




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## The Islamic Approach to Conserving Biodiversity For Global Sustainability: An Exploration

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### ABSTRACT

Cultural and biological diversity is closely interwoven to form a symbiotic relationship which may in fact hold the key to global sustainability. Some of the major religions of the world contain the blueprints for the conservation of natural biodiversity since it provides the ethical and social models for regulating our relationship with nature. Islam provides a holistic approach in addressing the current global crisis in the face of loss of biodiversity for it propagates balancing conservation with sustainable use of nature and the wealth of resources found therein. This article explores the fundamental principles enshrined in Islam and discusses their relevance in addressing the extinction crisis which is threatening the future of this planet as has been prophesized in the Qur'an. The findings are based on a qualitative research design which employs a contents analysis of translations of Qur'an and related studies that discusses the provisions therein. Islamic perspectives on crucial areas that impact on biodiversity such as sustainable development, fair trade, the sustainable utilization of biodiversity through biotechnology and related issues such as biosafety, benefit sharing and intellectual property rights were discussed. The article concludes that it is timely to re-explore and tap the potential of religious values to shape the way people think and behave as well as the way they relate to the natural world in the face of environmental crisis faced by the global population. Conservation efforts undertaken through holistic approaches prescribed by holistic principles enshrined in Islam may be the requisite tool that is needed to unite the global community and find pathways to live harmoniously with the environment.

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## INTRODUCTION

*When the earth is shaken with a (violent) shaking,*

*And the earth reveals what burdens her,*

*And man says: What has befallen her?*

*On that day she shall tell her story.... (Qur'an, Surat Az-Zalzalah: 99:1-4)*

When we talk about building more sustainable societies, it is essential to explore the values and criteria underlying long term sustainability that contributes to conserving the Earth's biodiversity. Such an effort requires us to go beyond the four corners of the Western conceived notion of 'new environmental ethics' and re-examine a wide range of viewpoints representing many of the world's cultural and religious traditions to help the global community make better determinations for themselves. The juxtaposition of diverse perspectives invites us to engage in brainstorming with a view to establish a common foundation for making ethical decisions about our environment. In fact, the composition of the 'new' environmental ethic is predominantly the 'old' pre-Western land ethic of an African, a Buddhist, a Muslim, a Hindu or a Taoist [16].

The link between conservation of land and water has been evidenced historically throughout the world with every belief system and faiths demonstrating some of the earliest forms of habitat protection either through the preservation of particular places as 'sacred natural sites and/or through religious based control systems such as the *hima* system in Islam [i] [49] which protects areas of land to promote the sustainable use of resources [26]. These notions were relegated with the privatization of religion in modern society i.e., when religion was forced to withdraw gradually from the modern secular state and the modern capitalist economy and to find refuge in the newly found private sphere [61].

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But recent developments are pointing to the de-privatization of religion in the modern world in reaction to the increasing penetration of the two major modern societal systems – the state and the market – into the sphere of life and hence the need for revival of values and norms interposed by religion to “question and contest claims of states and markets that function according to their own intrinsic functionalist norms without regard to extrinsic traditional moral norms” [61]. Additionally, in the wake of environmental crisis and with humanity facing an unprecedented challenge to its continued existence – a challenge it has created itself – a new form of religiously motivated-social action i.e., religious environmentalism and a virtually new field of academic study have emerged in the last two decades, each based on the recognition of the connection between religion and humanity’s treatment of the environment [20]. More precisely, every aspect of religious life continues to be challenged and profoundly altered by the ongoing environmental crisis: theology, institutional self-definition, the everyday conduct of religious people, and even the rituals [21].

The way people relate to their faith and how it affects their attitude to the environment has to be explored since most people in this world subscribe to some form of religious faith [26]. The implicit values which have shaped the attitude of western society towards nature and the environment, particularly post Industrial Revolution, is predominantly anthropocentric where the status of man is exclusively divine, placed at a higher level than all other creatures and things and has the right to dominate nature [19]. The Judeo-Christian tradition in contrast to Asian religions is founded on a dualism of man and nature – man is separated from other physical creatures because it is God’s will that man exploits nature for his own proper ends, and when science and technology developed their enormous forces, these were used against the interests of all of nature [51].

It is widely argued that the eastern outlook depict a contrasting approach where respect for nature was an integral part of the underlying philosophies [51] but it is believed that such values had gradually eroded in these societies with the onset of modernization and in its wake western values have predominated since they are equated with progress and development. In actual fact such a generalization is overly simplistic and fails to analyze the philosophical (and religious) causes for human being’s rapacious attitude towards his environment – promulgating disrespect for nature can be traced to the underlying ethics of these religious traditions [ii] [60]. Ziauddin Sardar (1985) had astutely observed that the roots of our ecological crises “lie in our belief and value structures which shape our relationship with nature, with each other and the lifestyles we lead” [56].

The interplay between belief systems and nature is far more complex and deeply rooted and many of the world’s mainstream religions as well as localized belief systems are not only recognizing the said link [26] but also sharing the responsibility in creating the attitudes and philosophies that have led to the unabated environmental degradation [27]. It is therefore an exercise in prudence for the practice of biodiversity conservation to adequately consider the diverse spiritual, cultural and religious values of the global community when planning conservation management and perhaps even engage religious leaders in such efforts. It needs to veer away from the ‘one size fits all’ approach towards biodiversity conservation that is deeply rooted in western science with its associated secular and materialistic worldview.

Traditional religions such as Islam [iii] [22] present an important reference point with which alternative responses to the environmental crises that is threatening our humanity can be analyzed. The standpoint of Islam becomes all the more pertinent considering the fact that Muslims currently inhabit more than eighty-three countries located in varied geographic locations around the world ranging from oil-rich countries such as the United Arab Emirates to poorer countries such as Somalia and Bangladesh [5]. Consequently these inhabitants with assorted histories and cultures speak numerous languages/dialects in their daily lives but are bound together by the divine revelations of the Holy Qur’an. Amidst such plurality and diversity complexities further abound in the form of many mainstreams and marginal views arising from the differing interpretations of Islam.

Nevertheless, this article makes a modest attempt at analyzing the perspectives of Islam on the conservation of biodiversity, sustainable development, the sustainable utilization of biodiversity through biotechnology and related issues such as biosafety, benefit sharing and intellectual property rights.

#### *The Islamic Approach to Environmental Sustainability:*

It is increasingly recognized around the world that the diversity of life encompasses not merely the living forms (biological diversity) but also the world views and cosmologies of what life means (cultural diversity) [52]. Of the many environmental worldviews in literature, two from different ends of the continuum have predominated i.e. ‘planetary management worldview’ and ‘environmental wisdom worldview’ [iv] [29]. However, Islamic worldview which was developed fourteen hundred years ago falls somewhere in the middle of the said continuum and combines the two world views in a single melting pot [29].

The teachings from Islam – derived primarily from the revealed knowledge in the Qur’an (the highest religious and most absolute source), the *Hadiths* (the Prophet’s Sayings), the *Sunnah* (the Prophet’s Actions) and *Ijma* [v] [22] as well as the *Ijtihad* of existing jurists [vi] [37] – is considered a comprehensive way of life whose teachings cover, directly or indirectly, every possible human relationship including that with the environment [29,5]. The revelations of the holy text are categorized into Meccan and Madani because of the place they were revealed: the former generally addresses theological/religious injunctions and the latter

addresses social, political and environmental practices [5]. The epistemological parameters of Qur'an are revealed in some of the verses therein which in essence indicates that Qur'an encompasses the foundations for knowledge and ethics [5]. Allah narrates the following in the said text [29]:

“...*Nothing have We omitted from the Book...*” (6:38)

Thus Islam is considered as a *Din* i.e. a way of life that has been perfected by Allah and accommodates every aspect of it [29]. Islamic environmental ethics are derived from clear-cut legal foundations which Muslims hold to be formulated by God and consist of revelations in the form of legal instructions that has been approved and acknowledged by the conscience as correct [51].

Hence a complete demarcation of law and ethics becomes unnecessary in Islam since a Muslim is obliged to obey whatever God has ordered [31]. Sadly however the message of this perfected religion has failed to transform the Muslims particularly in the area of environment due to advancement of modernity whereby the “secular ethic progressively seeped into the Muslim psyche and as industrial development, economic indicators and consumerism became the governing parameters of society, there has been a corresponding erosion of the Muslim perception of the holistic and a withering of its understanding of the sacred nexus between the human community and the rest of the world”[31]. As a result, the current status quo in Muslim countries is not noticeably different to that in the rest of the world [32].

#### *The relationship between Humans and Nature in accordance to Islam:*

It is interesting to note that the existing state of affairs did not arise during the “Golden age of Islamic culture when literature and science was all encompassing, all discoveries and researches revolved around the profoundly dominating concept of *tawheed* (which states that the only God is Allah) and economic prosperity was at its climax. Qur'an in fact has provided a cautionary reminder that [5]:

“...*The creation of heavens and the earth is far greater than the creation of mankind. But most of mankind do not know it*” (40:56).

Although the Muslim environmental ethical tradition is based on the unchanged words of God in Qur'an, it is constantly evolving according to the changing historical condition of Muslim communities [5]. The arising expression of the Muslim conscience differs in response to “their understanding of God's purpose for humanity” which “operates within the limits and possibilities imposed by the specific situation”[5]. Hence despite the fact that Islam is still a strong religious and spiritual force, the Muslims who are also not immune to the ubiquitous forces of globalization have to contend with their changing circumstances which is vastly different from six hundred years ago [5].

The profound “sense of the sacred and the spiritual” in Islam has been viewed as having an important role in the rediscovery of our human responsibilities of which environment is but one [32]. The Qur'an is very precise about nature; it is “a manifestation of God's almighty power” (20:5) and the guidelines concerning nature and its resources are a very crucial part of Islamic message. The Qur'anic injunction, “whosoever you turn there is the face of God” (11:115) reveals that the reverence of God is not merely limited to what is sacred but also constitutes a part of the reason for the existence of creatures upon earth [32] because everything God creates reflects this holiness.

Certain verses of the Qur'an have made references to all creatures including plants and animals, sun and stars as signs of Allah and they are witnesses of Allah which demonstrates a powerful emphasize to nature in the Qur'an [40]. The protection of nature is thus based on the principle that God created the various components of the universe which are ordered, and have purpose and function:

*Verily, all things have we created with measure* (54:49); *Everything to Him is measure* (13:8).

Thus respecting God necessitates respecting his creation. Additionally, certain verses in the Qur'an address natural forms as well human beings – the revelations therein do not demarcate humans and nature; the unity, *tawheed* between humans and nature is further exemplified by the verse in Qur'an (24:25) depicting the common origin of life, “God created every animal out of water: of them there are some that creep on their bellies, others that walk on two legs and others on four” [32].

The said unity is further revealed in terms of social structure where all of God's creations are as communities: “There is not an animal in the earth nor a flying creature on two wings but they are nations unto you. We have neglected nothing in the Book [of our decrees]. Then unto their lord they will be gathered” (6:38). The said unity is also exemplified in the obedience of God by all of his creations (22:18). In essence, the Qur'an not only assumes a fundamental link and interdependency between all natural elements but further asserts that if man abuses or exhausts one element, the natural world as a whole will suffer direct consequences – this assumption is not derived from one concise phrase but instead is the underlying principle that forms the foundation of all the Prophet's (SAW) actions and words [15]. Abusing any of his creations constitutes a sin since all of God's creations are considered to be equal before God [29].

Although all creatures are alike and equal by virtue of being created from a common origin, human beings are endowed with special qualities, namely the ability to speak and reason which qualifies them as God's vice-

regents (*al-Khalifah*) or guardians with sacred duty on Earth due to their ability to distinguish between good and evil (91: 7-8) [5,29]. The relationship between humans and nature arose from the decline of an offer of global trusteeship that was presented by God to the Heavens, the Earth, and the Mountains (Hussain & Hussain, 1991): “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 (the trust)...” (33-72).

The idea of human vicegerency on earth has drawn much criticism in environmental ethics (Kirman, 2008). But the privilege arising from humankind’s stewardship of the earth invokes a profound responsibility. As such the concept of stewardship doesn’t imply that the rest of creation is under the exclusive ownership of humanity (Islam, 2004: 54). It not only holds man responsible for the well-being of other creations the destruction of environment or cruelty to animals and birds are also forbidden.

In summary, the environmental philosophy of Islam relates man not only with man but with nature and ultimately with his relations with the Divine which is revealed in the five (5) important principles, namely:

a) *Tawheed* (Unity of God) which is the axis in which Islamic philosophy revolves and implies the unity and equality of all God’s creations and their equality as partners in terms of due recognition of the existence of all and the due appreciation of interdependency and interconnectedness between all (Kamla et al., 2006: 249). It further dictates that all of God’s creations have rights (Farook, 2012);

b) *Khalifah* and *amānah* (stewardship and trust): As God’s steward/vicegerent (his representative) humans are bestowed with freedom and far-reaching power that is latent within him. However, as the trustee of God, humans are expected to use the power given to him in accordance to the wish of the creator of the trust and not otherwise. Thus it is the fundamental duty of humanity to protect and preserve nature to the basic design of the Almighty (Farook, 2012);

c) *Shari’ah* (The ethics of Action): In Islam, all moral or ethical issues are codified in the Shari’ah to be preached, practised and incorporated into the laws of the land thereby providing a practical normative framework within which men as individuals and as a society can fulfil the role of trustee (Farook, 2012).

d) *‘Adl* and *I’tidal* (Justice and Moderation): Justice has been accorded several dimensions in the Qur’an not only is it the supreme attribute of God, it is also synonymous with Order and Equilibrium and requires submitting oneself to the will of God, accepting the mandate of trusteeship and striving to be a moderate community (*ummat-e-wast*). “Thus, have We made of you an Ummah justly balanced, that ye might be witnesses over the nations, and the Messenger a witness over yourselves. (Qur’an, 2:143). Therefore it can be deduced that Islam insists the same moderation and balance in utilising natural resources and therefore prevents undue exploitation of natural resources (Farook, 2012).

e) Accountability (Belief in the Day of Judgment): the said belief is the driving force in Islam which guides the believers to fulfill the trust bestowed upon humans and curtails mundane urges and motivations that are self-centered lust and passions (Farook, 2012).

f) *Sunnatullah* – this is a concept which explains that Allah has set the *fitrah* or nature of every being. For every action there will be a resulting reaction. For example, when a seed is planted and nurtured it will grow; it takes in the sun light and carbon dioxide to produce oxygen. If we deprive the seed from sun light, it will fail to grow, it cannot make its own food without the sun. As a result, the carbon dioxide will not be utilized and no oxygen will be released. Therefore, if the *Sunnatullah* is disturbed, there will be very serious repercussions.

Qur’an emphasizes nature not only to have an idea about God’s existence and his Presence through whatever he creates but also to have a moral feeling of obligation towards a transcendental being, God (Özdemir, 2003: 6). According to Parvez Manzoor, nature and ethics are at the very core of Qur’anic *weltanschauung* [vii] wherein “the main purpose of man is to infuse the natural world with transcendental (revealed) ethics (Seifert, 1998: 2). A full awareness of the divine environment which surrounds and permeates both the world of nature and the ambience of humanity (Nasr, 1992: 92) strengthens the moral dimension of humans and motivates them to act accordingly (Özdemir, 2003: 8). Islam has prescribed guidelines in the Qur’an that emphasize respect (*ihitiram*) for nature and the use of natural resources in accordance to the trust accorded by God which requires humans to adhere to five moral obligations (Ammar, 1995: 131-132):

(i) the use of nature and its resources ought to be in a balanced, not excessive manner (7:31) – this rule is supported by a variety of Hadiths by the Prophet where “the merit of the utilization lies in the benefit it yields, in proportion to its harm”;

(ii) nature and its resources have to be treated with kindness (*ihsan*) since kindness to nature is a celebration of God’s creation: even animal rights statements were created as early as the thirteenth century;

(iii) the damage, abuse or distortion of nature is prohibited in any way – the Qur’an states “Do no mischief on the earth after it hath been set in order, but call on him with fear and longing in your hearts: for the Mercy of God is always near to those who do good” (7:56);

(iv) the fourth rule requires the sharing of natural resources: in Islam no one person can own nature as all are beneficiaries but under exceptional circumstances such as population pressure, the sharing must be regulated so as to ensure equal access and equal opportunity to all without discrimination, abuse corruption, or coercion and;

(v) the fifth rule entails conservation which includes preventing damage as well as expanding on the already existing marvels of nature – this later resulted in various laws covering the conservation of forests, water bodies and animals including Islamic *Sharia'h* relating to conservation of land such as protected zones (*Haram*) and the reserves (*Hima*) established for public purpose and of preservation of natural habitat.

In addition to the above rules, there is also the concept of *sunnatullah* (God's law) which is reflected in natural law. This essentially means that Allah has created things in a way that one act will lead to a predicted reaction as contained in Newton's third law of motion. For example Allah has created the mountains as the foundations of the earth. Therefore, if man destroys these mountains this will inadvertently destroy the foundations of the earth. This concept underscores "the state of inherent equilibrium and balance" Allah has envisaged for the Earth's environment [viii] (Kamali, 2010: 1, 4).

Furthermore, the Oneness of God (Tawhid) is in many ways manifested in the unity of His creation. From this perspective, the human being is part and parcel of a cosmic equilibrium that must not be disturbed, and effort must be made to strike a balance between the material and spiritual requirements of life. Man is deemed to violate the trust of vicegerency when he neglects the care of the natural world (Qur'an 7:172) (Kamali, 2010: 6). Acts of injustice are deemed to be committed by the mistreatment of natural environment through acts that pollute the earth, air and water and lead to dangerous diseases to humans and other life forms [ix] (Kamali, 2010: 6).

#### *Islamic Perspective on Sustainable Development:*

Issues relating to sustainable development have taken the center stage in view of the catastrophic impact of activities undertaken in the name of development to the extent that the future of the planet Earth is at stake. It is important to explore the Islamic standpoint on 'sustainable development' under these circumstances whilst bearing in mind that the said concept is a secular idea devised by secular institutions to deal with the crises created by a secular mindset wherein science has ascended over religion and a radical shift of psychological alliance occurred from the divine to humankind (Khalid, 2002).

Descartes, the French philosopher and mathematician referred science as the resultant fruit of the dualism between rational subject and the material world, including the scientific capacity for rendering intelligible certain aspects of the material world and for making man "master and possessor of nature" (Khalid, 2002). According to Muslim thinker Seyyed Hossein Nasir (1997), "there is a near total disequilibrium between modern man and nature as attested by nearly every expression of modern civilization which seeks to offer a challenge to nature rather than co-operate with it".

The literature which looks at sustainable development from the point of view of Islam has been conflicting. At one extreme we see discussions that totally repudiate sustainable development since it has a normative framework that is on a collision course with how Islam teaches Muslims to view the world (Seyyed Hossein Nasir, 1997). Then at the other end of the continuum the discussions revolve around the Islamic way of life and concludes that in a truly Islamic society, sustainable development is a logical outcome of a normal life and that there is no need for a separate strategy of sustainable development (Ansari, 1994). In the middle these two extremes we see discussions that prescribe a non-western/Muslim civilization that replaces the idea of 'development' (Sardar, 1996).

Irrespective of the approach, it is unanimous that the notion of development arising from an imperialistic and conflict ridden world view of the west is totally unsuited to both the needs and requirements of developing and least developed nations that are predominantly non-western cultures especially (Sardar, 1996). This is especially so for the Islamic communities who intend to stay true to the teachings of Islam which promulgates 'cosmology of justice' – a cosmology that takes into its fold the human within the cosmic (Haq, 2001, 152). The Qur'an speaks of the existence of cosmic balance (*mīzān*) and declares that everything is "measured out" with the exception of God (*qadar, quadr, taqdīr*) i.e. that everything is given its natural principle of being and its place in the larger cosmic whole (Haq, 2001, 153).

Islam does not deal with development issues per se as they are being spelled out today due to the fact that such issues simply did not exist when Islam made its advent on the scene (Hasan, 2006:5). Nevertheless *shari'ah* has issued many unmistakable warnings albeit in the generic form that the world is likely to be overwhelmed by the development problems of the sort it is now facing if men do not resist selfishness, greed and rapacious exploitation of natural resources (Hasan, 2006:5). It has been suggested that a whole blue print of instructions can be extracted particularly from *maqasid al-shari'ah* – the objectives of the Islamic law [x] – which not only offers solutions to current problems but has the potential to positively improve the crucial biodiversity crisis that the global community is currently facing (Hasan, 2006:5).

Thus, despite the absence of a formal Islamic theory on sustainable development, such a theory can be constructed from the existing Islamic precepts which are based on the premise of discipline in the utilization of nature (Ansari, 1994, 397). The cornerstones of a generally agreed conceptual Islamic framework are predicated on the ordained role of human beings as God's trustees/stewards/vicegerents where God as the creator is the one

and only master and possessor of nature and the owner of all resources therein (Ansari, 1994: 394; Ammar, 1995:129).

It is interesting to note that the concept of human stewardship for the environment is part of the Agenda 21 adopted at the United Nations Conference on Environment and Development in Rio 1992. There are many verses in the Qur'an that describe human duties and responsibilities, such as the following which aptly summarizes humanity's role: "It is He who has appointed you viceroys in the earth" (Qur'an 6:165) (Kirman, 2008). The limits of use of Earth's resources by humanity are conditional upon the said trust (*amānah*) not being violated i.e., consuming nature's resources in a utilitarian way whilst maintaining their aesthetic respect for it as the creation of God (Ammar, 1995:134).

The Islamic religion promulgates conservation of biological diversity since the declarations in Qur'anic revelations and other sources of Islam require environment/nature to be used in a manner that does not disturb its order, balance, and function; it emphasizes moderation in, kindness to, and preservation of nature (Ammar, 1995:134). In addition to safeguarding the environment, there is also an obligation to cultivate it – consistent with maintaining the balance (Kamla *et al.*, 2006:251). The Qur'anic verse further connects the economic wellbeing of the community to the conserving order of nature:

*Eat and drink but waste not by indulging in excess (7:31).*

Since man is the sole being whom God holds responsible for the earth and to whom preservation was entrusted, as a deputy he could not betray the trust of God who created the world with a particular order, balance, and harmony (Ammar, 1995). If he violates the trust by spoiling the order and harmony of nature and destroys them, he becomes an unreliable and disloyal deputy. Undoubtedly the Islamic world view will never endorse any view of man's vicegerency of the earth which destroys and spoils the ecological balances and the order and systems of nature (Ammar, 1995).

The natural world is ruled by equilibrium wherein all God's creations are in a state of balance or in harmony for having been created in a measured way or by measure (Qur'an 54:49), a measure not to exceed or to fall short of (Qur'an 55:5-9) (Kamla *et al.*, 2006: 249). The said equilibrium should not be 'transgressed at any level, whether at that of harmony of nature or in the spheres of human justice, morality of everyday commerce...the principle of balance, measure and moderation is all pervasive....' (Kamla *et al.*, 2006: 249). Thus ecological balance and its sustainability have importance in Islam (Ammar, 1995) – observing the measure or maintain the balance implies being modest, just and fair in Islam whilst failure to observe God's measure or a tendency to lose balance is understood to engender action with detrimental consequences for the environment (Kamla *et al.*, 2006:250).

Advancement of any society based on the Islamic way of life needs to entail living in peace and harmony with active promotion of harmonization of individual, social, and ecological interests (Ansari, 1994: 394-395). The principles in Islamic teaching establish guidelines for humankind on how to manage the Earth and use all the resources therein to ensure protection of all the communities of God's creations which includes the present and future generations (Ibrahim *et al.*, 2011:332). These guidelines are also enshrined in the aforementioned *maqasid al-shari'ah* wherein the main objective is to govern human life and protect humankind's interests or *maslahah* (Ibrahim *et al.*, 2011:332).

Both material and spiritual needs are emphasized in pursuing sustainable economic development and it concentrates on protecting human interests from any harm under the principle of any "wrong is to be undone"[xi] (Ibrahim *et al.*, 2011:332). Implicit in these guidelines is that sustainable development can be achieved through faith, knowledge and the conduct of good deeds – the reward for "doing good deeds" are based on Allah's guidance and have to be accompanied by "belief", result in sustainable development, safety and vitality in human societies (Ibrahim *et al.*, 2011:332). In essence the sustainable use of Earth's resources will be integral to the Islamic approach to the advancement of societies. Sustainable living for Muslims requires them to live in peace and harmony with oneself, with fellow beings, and with everything that God has created. It entails fulfilling (Ansari, 1994:398) three aspects of self-actualization:

- a) the personal aspect that involves the fostering one's wellbeing by satisfying all spiritual and material needs;
- b) the social aspect i.e., the satisfaction of equity and social justice needs which will automatically result in the fulfilment of spiritual needs; and
- c) the ecological aspects which require the using all available resources in economically efficient and ecologically sound ways which also leads to the fulfilment of the individual's spiritual needs.

The dual principle of cosmic justice and the theistic naturalism explains the central doctrine of Qur'anic ethics – that of *zulm al-nafs* (self-injury) – which embodies a moral tenet that seems to carry the seeds of a comprehensive ecological philosophy (Haq, 2001:157). Accordingly, human beings are part of nature and as such are subject fully to the laws of nature just like any other entity, participating as an integral element in the overall ecological balance (*mīzān*) that exists in the larger cosmic whole. Consequently, to damage, offend, or destroy the balance of the natural environment is to damage, offend, or destroy oneself. Any injury inflicted upon "the other" is self-injury (*zulm al-nafs*) which is a prime doctrinal element in the foundations of Qur'anic ethics: "Whoever transgresses the bounds of God has done wrong but to himself"(65:1); and again: "God

wronged them not, but themselves they wronged" (16:33) (Haq, 2001:157). The rule is that perpetrator will ultimately suffer the consequence of his wrong-doing when it recoils back upon him – “for when the balance is wilfully disturbed, this disturbance takes the culprit too into its fold” (Haq, 2001:157).

Finally, the boundless scope of Islamic concern with regard to the wider, including ecological environment has also applications in the context of sustainable development which coincidentally is in consonance with the 1987 World Commission on Environment and Development. Islamic holism in this respect addresses the entire mankind not the believers alone by virtue of it being a universal religion – the main objectives of Islamic law are “to promote the well-being of all mankind which lies in safeguarding their faith (*din*), their human self (*nafs*), their intellect (*aql*), their posterity (*nasl*), and their wealth (*maal*) – and this entails employing wisdom, mercy and justice (Hasan, 2006:8). Additionally, Islamic holism extends to a concern about the survival but also the well-being of future generations. The Prophet is quoted as saying: “....do not leave those who come after you a burden (of your doings) to deal with” (Kamla *et al.*, 2006:254).

It has been pointed out that one of the most important Islamic concepts is the solidarity of Islamic generations one with the other and therein arises a concern to safeguard the ecological as well as the more general environment which extends beyond the anthropocentric focus, towards the well-being of all of God’s creations or balance of the eco-system and general flora and fauna (Kamla *et al.*, 2006:254). As such it is not allowed for one generation to have a monopoly of prosperity derived from nature and God’s creations at the expense of future generations (Kamla *et al.*, 2006:254). This Islamic principle has the most evident linkage to notions of sustainable development and emphasizes the negativity of waste, obsessive extravagance (*Israf*), excessive consumerism[xii] and conspicuous consumption (Kamla *et al.*, 2006:254).

The scope of protecting and enhancing the well-being of future generations in Islam also includes prohibition of spoiling the environment by polluting it or being aggressive to it. Furthermore, the Qur’an repeatedly indicated that humans should not engage in acts that spoil or abuse the Earth – which God has created as suitable and well prepared for successive generations – in any way that would make it deviate from the purpose God had created it for:

“*They hasten about the Earth, to do mischief there: and God loves not the workers of mischief*” (5:64).

Caring and solidarity with future generations are not merely limited to prohibition of waste and harm on Earth but also extends to working towards improving and progressing the environment for future generations. Hence, the *Shari’ah* insists on the preservation of the progeny by ensuring that all the required links in the said chain to ensure inter-generational equity are present i.e., distribution of wealth and prosperity, conservation of resources, and sustenance of the environment (Hasan, 2006: 8).

#### *Islamic Perspective on Fair Trade:*

##### *Islam has prophesized:*

“Abuses of khilafah are manifested in mischief making and corruption in which is when man becomes, instead of builder and caretaker of the earth, an agent of its degradation and ruin through greed, extravagance, infliction of harm and altogether arrogant disregard of Divine guidance” (Kamali, 2010:11).

It is clear from the above that Islamic principles are built around the intrinsic realization that environmental degradation is likely to arise due to the greed of man and his desire to amass worldly riches. To a large extent this is done through trade and exploitation of the environment to that end. This tendency is more pronounced in the modern industrialized world has created a divide between science and religion (Jusof& Abu Samah, 2011:46). This basically paves the way for man to engage in the applications of science in a manner that benefits himself without due care to the environment that he lives in. Development is undertaken in a manner which solely considers man to the exclusion of all else and this has resulted in the present state of ecological imbalance which in essence demonstrates “the spiritual rootlessness of modern culture”(Jusof& Abu Samah, 2011:46).

It is apparent that the “Islamic economics approach to environmental problems is based on Islamic worldview” which prescribes “limits to human behavior and contain excess”(Khalid, 2002:6). These limits are set within the principle of Unity (*Tauhid*) (Isma’eel Ibrahim Na’iya, 2007). Islam has numerous teachings and instructions in the area of trade and commerce which had played a key role in the expansion of Islam at different periods of Islamic history (Khan &Thaut, 2008). Globalization by virtue of its secularized nature is the antithesis to Islam and constitutes a threat to Islam’s benevolent influence in the world – both actual and potential – by affecting the ability (of Islamic principles) to beneficially and variously challenge, enhance and refine their positions (Kamla *et al.*, 2006:246).

This will be an important reference point with which to compare the operating principles of the WTO and its relevant treaties that promulgate trade especially in the context of trade involving GMOs and the arising issues and concerns (economic, social, and environmental) faced by the global community particularly those who are economically challenged e.g. small and medium scale farmers and indigenous communities of the developing nations. The fact that global trade in GMOs are dominated by a few albeit powerful transnational corporations goes against the tenets of Islam whereby “concerns about people also translate into concerns about

the community (*Umma*) or community principles emphasising social justice (*Adl*), social welfare and the countering of oppression” (Kamla *et al.*, 2006:252).

As pointed out in the preceding sections, Islamic holism exerts a strong influence in the different aspects of the lives of its people where the overarching duty beyond worship is to build *Emaar* (the earth) – specifically the Arabic term *EmaaratuAlardh* (building of the earth) essentially means “to make it full of life or, to make it better in every sense (Alserhan, 2011: xi). Thus the religious aim of trade in Islam, like all other human activities, is to make the world better and the said duty assumes special significance in the context of global trade in general and trade involving GMO products in particular. In other words, trade cannot be undertaken with the sole purpose of making profits at the expense of the communities and nature. A term intrinsically related to *EmaarisIfsad* (ruination) and the application of the said concept in Islamic teachings imposes on man the duty “to build without causing ruination before, during or after the building” (Alserhan, 2011:xi-xii).

In Islam, the activities undertaken by man in the context of trade is evaluated through a long term perspective to determine what is permissible (*Halal*) and not permissible (*Haram*) respectively: if a particular activity causes harm or ruination to the earth, it becomes forbidden and under such circumstances man is required to explore more innovative and less harmful ways to carry out the said trade activity (Alserhan, 2011:xi-xii). In addition, special precautions have to be undertaken to address the harm and ameliorate any imbalances that result to nature and all of its creations. The Islamic doctrine not only clarifies right from wrong or good from bad but goes further by making it obligatory on its followers and all those who deal with them to adhere to its teachings of causing no harm (Alserhan, 2011). It is within this framework that the Islamic teachings on fair trade should be understood: a person involved in trade needs to make sure *a priori* that the consequences of his activities are justifiable [xiii] (Alserhan, 2011).

Some of these principles that form the foundation in the Islamic fair trade are as follows:

(a) *promoting fairness and equity*: The concepts of fairness, equity, mutual respect and consideration of others are also enshrined in the teachings of Islam and thus are integral in business and commerce dealings as well (Khan &Thaut, 2008:6). The basic principles of trade from an Islamic perspective are justice and fairness (Khan &Thaut, 2008:6). Self-interest only has a place in the community in as much as it takes into account the interests of others and trade activities that cause greater harm than benefit is prohibited (Khan &Thaut, 2008:6). In addition, the Qur’an on several occasions states unequivocally: The conditions for everlasting success or *falah* in Islam are the same for all Muslims—whether in conducting their business affairs or in carrying out their daily activities. Without specifying any situational context, Allah describes people who attain success as those who are “inviting to all that is good (*khayr*), enjoining what is right (*ma’ruf*) and forbidding what is wrong (*munkar*)” (Beekun, 1996).

(b) *promoting social justice*: Implicit in the vision of fair trade is the concept of social justice which is paramount in Islam. The concept of social justice encompasses several essential features, namely: (i) a fair and equitable distribution of wealth as well as protection of the weak from economic exploitation by the strong; (ii) the struggle against poverty and inequality [xiv] (Khan &Thaut, 2008:8).The Prophet Muhammad (pbuh) said, “He who sleeps on a full stomach whilst his neighbour goes hungry is not one of us,” (reported by Bukhari and Muslim).

(c) *promoting sustainable development*: The practices and policies that promote sustainable development as indicated hereinbefore are firmly supported in Islam particularly in relation to man’s stewardship over the earth as bestowed by God which implies taking care to manage, preserve and protect the natural environment for future generations (Khan &Thaut, 2008:8).Islam further imparts principles important in the production of fair trade products and to the consumers who purchase them: the teachings prescribe moderation in consumption, exhorts man to avoid wasteful use of natural resources, and enjoins mankind to maintain the natural balance (Khan &Thaut, 2008:8).

(d) *trade through mutual consent*: Islam encourages mutual consent between parties as a necessary condition for a valid trade transaction and as such coercive strategies are not permissible in sales activities (Khan &Thaut, 2008:9). Islam also (i) forbids any form of pecuniary exploitation such as the taking advantage of someone’s plight and charging a high price; and (ii) condemns acts of intermediary intervention that involve exploitation of one’s ignorance of market conditions (Khan &Thaut, 2008:9).

(e) *payment of decent wages and fair treatment of workers*: the goals of the fair trade system to provide workers with fair wages and fair treatment are also principles expressly affirmed in the teachings of Islam. Such rights are pertinent since it paves the way for workers to initiate farmer or producer co-operatives so that the benefits are felt community-wide and enhances the ability of producers to negotiate for fair wages and prices outside of the fair trade system not to mention gain value from long-term relationships, direct trade, and credit provision, all of which will aid them in their non-fair trade sales negotiations”(Khan &Thaut, 2008:10).

(f) *‘free trade’ and price controls*: Islam favours the open market system for pursuing trade activities which prescribes the removal of any barriers or restrictions to free trade such as price controls, tariffs etc. so that trade activities can be conducted fairly and freely [xv](Khan &Thaut, 2008:11). At the heart of Islamic marketing is



the principle of value-maximization based on equity and justice (constituting just dealing and fair play) for the wider welfare of the society (Mohammad Saeed, 2001).

The above principles regarding on Islamic fair trade are also relevant in the transboundary movements of GMOs/LMOs when states and/or individuals are involved in the activities of export and promote in the process of pursuing economic development. There is a dire need to consider *a priori* the detrimental effect of such activities on human health and the environment since the principle of 'darar' (injury), stipulates that no one should be hurt, or cause hurt to others (*la dararwa-la dirar*), and that any injury should be repelled or else mitigated to the extent possible (*al-dararyudfa 'uqadr al-imkan*).

Moreover as a trustee (*amīn*), a trader should not alter or disturb the ecological balance when he manufactures LMOs utilizing biotechnology – the obligations arising under the Islamic principles of *maslahamursalah* (public interest) and the concept of *amānah* corresponds to the precautionary principle in Cartagena Protocol on Biosafety to the Convention on Biological Diversity because based on the said principles a trader has to undertake precautionary measure to prevent or mitigate the adverse impact arising from his activities when there is scientific uncertainty (Sri Wartini, 2011: 398-399).

Furthermore, states and individuals in trade are duty bound to apply the principles of justice revealed in the Qur'an [xvi]in relation to the export and import of LMOs (Sri Wartini, 2011: 402). Thus, it can be deduced that the non-discrimination principles stated in the WTO pertaining to the national treatment and most favored nation are in line with the aforementioned concepts of justice and fairness in Islam because it equally gives rise to obligations to treat all WTO members equally (Sri Wartini, 2011: 402). Similarly the Islamic principles that proscribe barriers or restrictions to free trade such as price controls, tariffs also resonate with the corresponding WTO rules of the same. States should also not engage in business transactions that can potentially cause greater harm than benefit to the community or environment of other states since the fair trade system in Islam instructs people to defend and pursue just economic relationship (Sri Wartini, 2011: 407).

The principles of promoting social justice are equally important in the trade involving LMOs whereby neither States nor individuals are allowed to economically exploit the weak in the arising transactions. In addition, by virtue of the exporting and importing states being on equal footing despite variances in economic and development conditions, the exporting and importing of LMOs should not only adhere to the principle of mutual consent and equality but also promote sustainable development practices in accordance to the fair trade principles of Islam (Sri Wartini, 2011: 408). This would necessitate the application of responsible methods of production and distribution of LMOs that will ultimately contribute to the preservation of valuable ecosystems in accordance to the principles of intergenerational equity.

#### *Islamic Perspective on Applications of Biotechnology and Precautionary Principle:*

Modern biotechnology and its products are considered to have the potential to address many of the exigencies currently faced by the global communities: it is deemed to have the capacity to address degradation of biodiversity arising from intensification of agriculture; it can potentially benefit poor countries and communities by improving food security and nutrition; it is able to ameliorate the impact of global climate change on agricultural productivity and world food supply. In the same vein, one has to contend with the fact that it may unleash untold consequences on Earth's biodiversity as well as the global population residing therein.

From the earliest stages of laboratory-bound research and development to commercial use and release, the application of modern biotechnology requires that environmental, health, and socio-economic risks be addressed (La Vina & Fransen, 2004). These risks need to be identified and understood with the best available information; reduced or mitigated through appropriate management measures; or avoided entirely – through prohibition if necessary – where found to be entirely unacceptable. In addition, the religious implications of the applications of the said technology cannot be ignored especially in communities where religion plays a focal point in their lives such as the Muslims. Genetic engineering is widely believed to be the most controversial form of biotechnology, with multifaceted implications for individuals and society as a whole since it touches the core of our self-definition (Solihu & Ambali, 2011). Reconfiguring genetic makeup of nature, changing God's creation to derive "better" products and finally claiming legal ownership over such products are some hot issues in biotechnology that have given rise to ethical and religious concerns (Mohd Safian, 2005:2).

For starters, biotechnology research per se is no longer a taboo for Muslim nations in accordance to the declaration of the 1998 Kuwait Conference, which was attended by a large number of Muslim scientists (Ansari, 2008: 142). In accordance to the said declaration, all kinds of genetic research excluding cloning are viewed to be in conformity with Qur'an and Sunnah on the basis that all plants and animals have been created for the beneficial use of man and better varieties of plants and animals will bring about benefits both to the present and future generations of human population (Ansari, 2008: 142). Thus the interest of the general public (*maslaha*) will be served provided they are safe and good (*halal* and *tayeb*) in accordance to the tenets of Islam. This is indeed a departure from the traditional view that no change can be brought about in Allah's handiwork (Qur'an 30:30) (Ansari, 2008: 142).

Although the majority of the participants were of the view that genetic modifications were acceptable for public interest, tampering with nature and changing God's creation and disturbing nature's balance (*sunatullah*) and harmony should not be undertaken lightly. The whole universe along with all of its factors has been created with perfect wisdom (*hikmah*) of God who is the Creator and Sustainer of the Universe whereby the number, quantity, and quality of these factors is precisely determined by the divine plan in a manner that is beyond the comprehension of humans – for the sustenance of His creation, Allah has placed a measured quantity of the environmental resources which matches the total demand of the resources in the universe thereby implying the existence of environmental balance in the natural ecosystem and as a part of the universal 'grand balance' (Akhtar, 1996: 60-61).

The Quran describes the notion of environmental balance in various terms like *adl*, *qadar* and *mouzoon* (Akhtar, 1996: 60-61) [xvii]. The tinkering of the genetic material by scientists/genetic engineers to produce "better varieties" are done without a comprehension of the intrinsic balance in the ecosystem or the universal grand balance will inevitably spell disaster: the technology has the power to break down fundamental genetic barriers at the inter-species and intra-species levels. These scientists/genetic engineers are altering the very nature, essence and qualities of God's creation in clear violation of the Qur'anic injunctions. It is imperative that the benefits accrued from biotechnology should be balanced against wide reaching consequences of such endeavors.

Both scientists and genetic engineers play differing roles at various stages of research on genetic engineering but the latter are largely involved in the designing, processing and packaging through final production of finished product thereby making them more visible to the consumers and responsible for the integrity of the end-products. Undoubtedly, the creation of useful and safe technological products has the potential to improve the conditions of many humans, but just a 0.01% error in them could endanger many lives (Solihu&Ambali, 2011: 134). The manner of resolving issues with such moral dilemma are hinged upon the engineers' course of actions that are inherently shaped by their moral value orientations and can potentially change the living conditions at times for the better and at other times for the worse (Solihu&Ambali, 2011: 134).

Their course of actions are further curtailed by their loyalty to their organization since engineers are mostly in a position of taking orders rather than assuming authorship or authority despite the enormous impact that genetically engineered products have on society - hence they are forced to consider whistle-blowing in dubious circumstances to maintain professional standard and retain public trust (Solihu&Ambali, 2011: 134). As such moral dilemmas involving multiple choices emerge in the course of their engineering a product which has the potential of affecting the lives of all living organisms of this planet.

For genetic engineering to contribute to sustainable development, it must be grounded in a well-established philosophy of values such as Islam which provides a value-based mechanism rooted in the aforementioned *Maqasid al-Shariah* that prioritizes some values over others which can enable conflict of interests and moral dilemmas to be resolved (Solihu&Ambali, 2011: 135-136) – its foundation contain variables that ensure progress and development, accommodate novelties and helps to resolve unfolding issues that might be encountered in the course of human progress. Unfortunately, the code of professional ethics is largely neutral or silent on spiritual dimension of ethics although it does endorse and promote many principles common to religious ethics (Solihu&Ambali, 2011: 135). But many of those involved in the field are predominantly from the west and due to the secularization of religion they may not have adequate interpretive-evaluative maxims of problem solving to engineering ethics such as that provided by the *Maqasid al-Shariah* matrix.

The next issue relates to status of biotechnology products *vis á vis* Islamic principles. These products have also been approved as *halal* by the Islamic Jurisprudence Council (IJC) which declared that foods derived from biotechnology-improved (GMO) crops are *halal* and are fit for consumption by Muslims (Sachchathep&Balitzer, 2007: 108). Nevertheless, according scholars from certain quarters have cautioned that foods derived from biotechnology-improved crops could possibly become *haram* (non-*halal*) if they contain DNA from forbidden foods. GM plants are the by-product of gene manipulation utilizing genes not used in traditional plant breeding methods and offer ways to quickly improve crop characteristics such as yield, pest resistance, or herbicide tolerance; it also helps to produce completely artificial substances, from the precursors of plastics to consumable vaccines. GM food has posed serious moral dilemmas in genetic engineering since the benefits it promises is accompanied by costs which could have detrimental effects translated into grave danger in terms of human health (both current and future generations) and the environment.

There is still an ongoing debate among scholars and certifying organizations on the subject matter but in general it has been accepted that except for the use of pig's genetic material, other forms of GM food are accepted and can be consumed by Muslims without any religious concerns (MohdSafian, 2005; Ansari & Jamal, 2011:18640). Nevertheless, no one can predict how present and future human life can be affected by the use and application of this powerful technology (Abdul GhaniAzmi *et al.*, 2011) and Islam advocates that the door of scientific research should not be left wide open without proper *Shari`ah* examination and all possible precautions should be taken to ensure public interests (referred to as *maslahahmursalah*) are protected and the research is in line with the *Shari`ah* (MohdSafian, 2005): 11; Ansari & Jamal (2011), 18640).

It is apt to briefly review at this juncture the Islamic worldview in relation to GM foods. It can be deduced that genetically modified food is also part of God's *rizq* in the sense that it has been manufactured and produced from raw materials primarily obtained from primal nature, and the process of fertilization is made possible by the divinely sustained and regulated laws of nature (*sunnatullah*) [xviii] (Solihu&Ambali, 2011: 138). Even those foods which have been made *haram* (forbidden) are still part of God's *rizq*, not necessarily for human consumption but for the general ecosystem and biodiversity (Solihu&Ambali, 2011: 138). For any food to become *halal* (lawful), it has to be *tayyib* (good) and vice versa (al-A'raf 7:157) [xix] (Solihu&Ambali, 2011: 138; Ansari & Jamal, 2011) and due to humans' interference in nature's way, *halal-tayyib* applies not only to the raw materials but also to the chains of production and supply, including the foods' ingredients, additive materials, processing and packaging which largely involves inputs of biotechnological engineering (Solihu&Ambali, 2011: 138).

In addition GM food generates moral dilemmas which are depicted by two situations or conditions associated with GM food: the first centre on the possibility of harm of GM foods to persons and other living things, and even the environment at large – the *Maqasid* approach requires putting the magnitude of harm in GM food into consideration; the second relates to the balancing of the harm generated by GM food against its benefits – in *Maqasid al-Shari'ah*, priority should be given *a priori* to the prevention of harm arising from GM foods as opposed to the evaluation of its benefits and such an approach tallies with engineering ethics which is primarily preventive, consisting of rules which are mainly prohibitive and negative in character (Solihu&Ambali, 2011: 139, 140).

In addition, since the monetary prospects of GM technology will ultimately benefit a handful of powerful biotech industries at the expense of health and life of the people, animals and even ecosystems, such benefit has to be overridden in accordance to principles of *Maqasid al-Shari'ah*. Furthermore, in situations where there are two contrasting opinions about issues related to GM food safety, the *Maqasid* approach places a great emphasis on the a precautionary side (biosafety) of the dilemma i.e. negative information (even from biased sources) about GM food if majority of the people do not gain much from a new food technology and there are plenty of alternatives to nutritious and tasty natural food (Solihu&Ambali, 2011: 140).

A second situation illustrates circumstances where there is a possibility that the harm may be minimal and outweighed by the benefits and the moral act of pursuing GM foods would be ethically sound and hence mere objections cannot by themselves justify a permanent ban on GM food (Solihu&Ambali, 2011:140). In certain exigencies GM food might even be considered despite confirmation of its negative effect on health e.g. when GM food aid is given to starving, malnourished and dying populations. However, certain quarters have argued that donating GM food even under such conditions is morally questionable since those already ravaged by AIDs and malaria, will be more susceptible to the potential harmful effects of GM food which Islamic *shari'ah* regards as unethical to give away as a *sadaqah* (charity) something that is bad (Solihu&Ambali, 2011:140). However, *shari'ah* makes exceptions that necessity overrules prohibition (*al-Daruratubih al-mahzurat*) and that whatever became permissible by necessity is estimated by the extent thereof - in that particular circumstance and to the extent needed to keep one alive, GM foods would be preferable to starvation (Solihu&Ambali, 2011:140; Ansari & Jamal, 2011).

Finally in relation to intellectual property protection of biotechnology products such as GM crops many of the general principles in Islam are applicable to the issues and concerns arising therein. It is important to note that there are no specific provisions regulating intellectual property (IP) under Islamic law (Hassanien, 2008: 164). Of the five types of conduct under the *shari'a* i.e., mandatory, recommended, permitted, recommended against, and banned, intellectual property falls under the category of permitted because of the lack of any express statements about it (Jamar, 1992: 1082). It has thus been surmised that (1) the protection of intellectual property is neither prohibited nor mandated in the *shari'a*, and (2) consequently, the state can protect intellectual property under its powers to regulate human society in a manner consistent with Islamic law (Jamar, 1992: 1083).

Nevertheless, with regards a theoretical framework for the ownership of intellectual property, their intangible rights are forms of usufructuary rights within the definition of *manfa'ah* which are "dispensable with their origin and of separate value are capable of being traded separately" (Abdul GhaniAzmi, 1995: 308). Despite their being intangible rights, in many ways the usufructuary rights of intellectual property conform to the accepted characteristics of property and thus their value is easily quantifiable and can be transferred, transacted upon, inherited and disposed of through will (Abdul GhaniAzmi, 1995: 308). The only difference it has with tangible property is by virtue of it not being attached to the physical medium and therefore the usufructuary rights are independent of the physical embodiments and are not affected by the alienation of the latter.

Alternatively, the ownership of intellectual property can be justified on the basis of *amal* (doctrine of economic gain through labor) which is more in line with contemporary literature on the subject matter (Abdul GhaniAzmi, 1995: 308). Accordingly, those who use their intellectual creativity and spend time and effort to develop unique productions in science, art, and literature should be allowed to reap the fruits of their efforts

(Raslan, 2007: 515). Thus, creators of intellectual property have a legitimate right to their creations, thereby allowing them to benefit from those creations (Raslan, 2007: 515).

Regardless, the proprietization of 'ideas' in the Islamic context does not lead to the monopolization of 'ideas' but only the exclusive control of them (Abdul Ghani Azmi, 1995). In general, Islamic law has the capacity to meet most of the exigencies in the contemporary commercial world and the Majalla (art.39) further provides that "it cannot be denied that with a change of times, the requirements of the law change." It is safe to deduce that the principles of *shari'ah* call for strong punishment for transgressions against personal property – national and foreign IP owners thus cannot be denied their rights and there is no excuse for lax enforcement of IP laws (Hassanien, 2007-2008):187). In fact, the principles of Sharia enjoin any transgression against these rights and obligate Muslim governments to strongly guard and enforce them (Raslan, 2007:558). Hence, it is irrefutable that protection of IP is compatible with Islamic notions and concepts (Hassanien, 2007-2008).

It is also relevant to discuss the principle of *maslahah mursalah* which is the principle that may be adopted to justify the necessities of changing God's creation in GM technology as well as justify the necessities of claiming legal ownership over such foods and products (MohdSafian, 2005: 9). The guidelines in the application of the principle of *maslahah mursalah* to legitimize an action indicate that this principle cannot be simply violated by whatever means. Upon closer examination the reasons behind the modification of genes through biotechnology by manufacturers have less to do with fulfilling a legitimate public interest such as feeding the hungry population of this world and more to do with political and economic motivations (MohdSafian, 2005: 10).

Many of the technologies that are utilized such as the 'terminator gene' technology will have a detrimental effect on farmers arising from the loss of their autonomy and consequently become under the monopolistic control of GM companies (MohdSafian, 2005: 10). Despite the fact that these GM companies have legitimate intellectual property rights over the foods, plants and seeds, their practices constitute a violation of *shari'a* principles which imposes obligations to help the less fortunate and those who are undergoing hunger without profit motivation (MohdSafian, 2005:11). Although such technology can be beneficially utilized to enable staple crops to grow in marginal condition, the farmers are still farmers still have to purchase the seeds from the conglomerates and are prevented from sharing the seeds or replanting the seeds for the next season. In addition, such the use of such seeds can result in endangerment to the indigenous crops and ultimately result in the loss of agro-biodiversity. This is in direct violation of the trusteeship (*amānah*) concept that as a vicegerent (*khalīfah*), man has to maintain the balance of the ecosystem for sustenance of the human beings and other creatures of the planet (Sri Wartini, 2011: 397).

#### Conclusion:

The discussions in the preceding sections have revealed that it is indeed timely to re-explore and tap the potential of religious values to shape the way people think and behave as well as the way they relate to the natural world in the face of environmental crisis faced by the global population. In this regard, the Islamic way of life holds the blueprint for the conservation and promotion of ecological resources not to mention sustainable development.

This article has demonstrated the complexity of the choices that the global community needs to make about modern biotechnology applications and its products in the context of sustainable development. The applications of modern biotechnology have also provoked many debates on the moral aspects and religious views. Islam in particular provides a holistic development framework to address many of the arising concerns in relation to the applications of the said technology.

In accordance to Islam's basic tenets, there exists environmental balance in the universe (Akhtar, 1996: 62). Accordingly, two constraints are imposed: firstly both humans and non-humans need to maintain their demands for resources within the capacity of the natural ecosystems on a sustainable basis; secondly, there should be precaution in the quantities of waste discharged into the system so as not to impair ecosystem productivity (Akhtar, 1996: 62). Environmental problems are triggered by the violations of these constraints and the Islamic approach to environmental balance explicitly takes cognizance of these causes and suggests appropriate institutional arrangements for solving the problem based on the requisite socioeconomic and political behavior (Akhtar, 1996: 62). In fact, many of the principles enshrined in the international treaties, conventions and declarations are in conformity to or mirror the guidelines set forth in the various sources of Islamic law.

Conservation efforts undertaken through holistic approaches prescribed by holistic principles enshrined in Islam may be the requisite tool that is needed to unite the global community and find pathways to live harmoniously with the environment.

Notes:

- [i] The *hima* is a traditional system of resource tenure that has been practiced for more than 1400 years in the Arabian Peninsula. It predates Islam. The *hima* is the most widespread and longstanding indigenous / traditional conservation institution in the Middle East, and perhaps on Earth. The Arabic word “hima” literally means “a protected place” or “protected area.” Access to this place was declared forbidden by the individual or group who owned it. Later its meaning evolved to signify a reserved pasture, a piece of land set aside seasonally to allow regeneration. Source: Odeh Al-Jayyousi, “*Hima* as a model for natural resource management in West Asia and North Africa,” IUCN: 11 August 2010, <http://www.iucn.org/about/work/programmes/forest/?5853/Hima-as-a-model-for-natural-resource-management-in-WANA>.
- [ii] Traditional religions like Christianity and Judaism have been held accountable as they supposedly espouse an anthropocentric (human centered) reality. In fact medieval historians like Lynn White Jr. (specifically referring to the problem inherent in Christian tradition) see this as the root cause for the ecological/environmental problems of today. Source: Whyte, Lynn, “The Historical Roots of our Ecological Crisis”, *Science*, vol. 155 no. 3767 (10 March 1967): 1203, 1205-1207.
- [iii] Islam is a monotheistic religion originating in western Arabia in the seventh century when the angel Gabriel revealed the *Qur'an* (the word of God) to the prophet Mohamed. The term Islam means “submission to the will of God” as revealed in the *Qur'an*. Source: Hanson, Maron (1987), “The Influence of French Law on the Legal Development of Saudi Arabia,” *Arab Law Quarterly*, vol.2 (1987): 272-291, 272.
- [iv] The basic environmental beliefs of planetary management worldview are that: (i) human beings are the planet’s most important species, and they are apart from and in charge of the rest of the nature; (ii) the Earth has an unlimited supply of resources for use by humans through science and technology and (iii) human’s success depends on how well they can understand, control and manage the Earth’s life support systems for their benefit. On the contrary, the views of the environmental wisdom worldview believes that: (i) human beings are part of nature, and nature does not exist just for them; (ii) the Earth’s resources are limited and should not be wasted (iii) Earth’s resources should be used sustainably and efficiently both for themselves and other species. Source: Islam, Muhammad Muinul, “Towards Green Earth: An Islamic Perspective,” *Asian Affairs*, vol.26 no.4 (October – December 2004): 44.
- [v] *Ijma`* is the consensus of the community and is used to resolve situations in which no applicable rules are found in either the *Qur'an* or *Sunna*. Source: See above Hanson (1987), 273.
- [vi] If the *Qur'an*, *Sunna*, and *Ijma`* are unable to supply an appropriate solution to a problem, the fourth method in obtaining the position of a particular position is through the use of *ijtihad*. This would include the use of *Qiyas* or analogy. In addition, *istihsan*, *istislah* or *masalih al mursalah* and *sad al- zara'i* is used to derive the correct rule." This allows for the use of logic and reasoning and results in a wider range of interpretation. Source: Muhammad Hashim Kamali (2003), *Principles of Islamic Jurisprudence*, <http://www.faihinallah.org/faihinallah/wp-content/PrinciplesofIslamicJurisprudence.pdf>.
- [vii] The term *Weltanschauung* does not only refer to the human position in the cosmos, nor just to some limited systematic whole of questions and answers regarding issues of being and value of the universe and human life but to the ultimate nature and meaning of being and value of the universe, and especially of human life, as a whole. *Weltanschauung* in this sense, does not only refer to humans but, as its name implies, to the whole world. In this sense, most religions, including some atheist philosophies and ideologies, most ancient and medieval philosophies, but only some contemporary philosophies can be regarded as *Weltanschauungen*. Source: Seifert, Joseph (1998), “The critical role of *Weltanschauung* – Axiological Reflections,” Boston, 20th World Congress of Philosophy 1998, <http://www.iap.li/oldversion/site/research/Seifert/Weltanschauung.pdf>, 2.
- [viii] Note: The primordial character of Qur’anic messages visualizes man and the cosmos in a state of harmony that reaffirms man’s inner bond with the natural world. Source: Mohamad Hashim Kamali (2010), “Environmental Care in Islam: A Qur’anic Perspective,” <http://www.iais.org.my/e/publications/articles/item/43-environmental-care-in-islam-a-qur'anic-perspective.html>, 1, 4. Accessed on 25 December 2012.
- [ix] “Two of the broad and comprehensive principles of Islam that subsume most of these are justice and the doing of good (‘*adlwaihsan*- cf., Q 16:91). Acts of injustice are committed not only among humans but in the human treatment of natural environment.”
- [x] This concept shows the aims of the Shari’ah are to protect 5 main principles, i.e. protection of life, religion, progeny, intellect and property. Protection of the environment would relate to the protection of life. This is important because, if the environment is not protected, every human life will be affected. Aside from that the protection of progeny also entails protection of the environment. Muslims must ensure that the world remains safe for future generations.

- [xi] The main objective of *shari'ah* can be classified into five matters namely: protection of al-din through the observance of different kinds of *ibadah*; protection of life/human soul (*al-nafs*); protection of dignity (*al-'ird*); protection of intellect or mind (*al-'aql*), protection of property (*al-mal*). Source: *ibid*.
- [xii] *Excessive consumerism is considered as a form of corruption in Islam whereby the Earth suffers and thus is forbidden by Islam: "...and do not follow the bidding of the excessive, who causes corruption in the earth, and do not work good"; and 'And do not cause corruption in the earth, when it has been set in order' (Qur'an 26: 151-152).*
- [xiii] As an illustration when a tree was cut down in the Amazon, scientists found nearly four thousand species and life forms living off and on that tree – in this context he needs to determine a priori whether he can justify the displacement of four thousand lives. If no justification can be provided then the tree should be left alone.
- [xiv] Note: Allah commands Muslims to stand firm for justice at all costs: '*O ye who believe! Stand out firmly for justice, as witnesses to Allah, even as against yourselves, your parents, or your kin, and whether it be (against) rich or poor: for Allah can best protect both.*' (Qur'an 4:135)
- [xv] Note: If the freedom to sell one's goods at an acceptable price is curtailed or alternatively denied the opportunity to make reasonable profits permitted by Allah by virtue of price controls, it is *haram* in accordance to Islam.
- [xvi] See Qur'an, 5:8: "*...O you who have believe! Be upright, for the sake of Allah, in testifying for fairness; and do not let the hatred of a people urge you to be unjust, be just, that is closest to Godliness. Fear (from displeasing) Allah verily Allah is aware of what you do*".
- [xvii] See also: Qur'an, 15: 19-20; Qur'an 27:88; Qur'an: 54:59; Qur'an 67: 3-4.
- [xviii] Note: Food constitutes one of the basic needs for human survival and the Qur'anic words such as *rizq* (sustenance and provision), *fadl* (bounty) and *ma'ash* (livelihood) are of relevance in this context. Even though the primal sustenance has been guaranteed by Allah, man still has to strive to retrieve it under the principle of *sunnat Allah* that requires personal effort and hard work.
- [xix] The Qur'an makes it clear that not all foodstuffs are edible – those which are nutritious and pure have been accorded the status *halal* (lawful) to eat (al-Baqarah 2:168, 172). The two key-words *halal* and *tayyib* are conjoined by virtue of their attributes where one clarifies the other: (i) *halal*, meaning 'lawful' or rather 'not unlawful' and *tayyib*, meaning 'nutritious, hygienic, wholesome, healthy, environmental friendly and, in short, good'. The term *tayyib* is not an additional attribute to the quality of *halal*; it simply clarifies it.

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