ENVIRONMENTAL FITRAH IN THE LIGHT OF A SYSTEMIC APPROACH TO SHARI'AH AND SCIENCE

Ahmad Badri Abdullah*
Shahino Mah Abdullah**

Abstract: In the context of global warming and world climate change, Muslim nations across the globe are no exception in grappling with catastrophic and multifaceted environmental crises. In dealing with this phenomenon, Muslim scholars have been promoting a laudable principle of environmental preservation (hifz al-bi'ah) via the magasid al-shari'ah, however not without unresolved ambiguities with regard to its actual focus and real implementation. This article provides an alternative conception of environmental preservation by drawing a connection to the well-established Shari'ah's objective of preserving fitrah. While the mainstream discourse of preserving fitrah primarily deals with human's innate dispositions, this article suggests its expansion to a wider scope of nature's innate properties, drawn upon from the resource of scientific discourse in systems thinking. Through a comparative analysis on Islamic sources and systems thinking literatures on nature, the article proposes that 'nature's ability to sustain life through systemic interconnections', constitutes the important aspect of fitrah that necessitates preservation, even enhancement. Finally, through the suggested conception of environmental fitrah, the article discusses some pressing issues of Genetically Modified (GM) foods, and climate change in order to delineate the feasibility of systems thinking approach that may lead to reasonable policy recommendations.

Keywords: *maqasid al-shari'ah*, *fitrah*, environmental protection, systems thinking, living earth.

Introduction

Muslim countries are currently suffering from serious environmental crises due to multifaceted factors. A large part of the crisis is due to the little attention to environmental care and protection in mainstream Islamic teachings. Modern Muslim societies have somehow departed from their traditional culture of environmental consciousness and concern. As far as environmental protection is concerned, it is unfortunate to note that modern Muslim nations across the globe are putting economic progress as the sole aim of their development programme, often at the expense of environmental sustainability. This is evident in the latest Pollution Index 2017: Muslim countries like Lebanon, Egypt, and Bangladesh score among the highest in the world in terms of pollution rate. It shows that the

ideal aspect of Islamic teaching on environmental protection and its real practice in the Muslim countries are dauntingly at dissonance. Therefore, ascertaining prompt measures and their execution are of high priority in order to develop and nurture Muslim societies as a sustainably designed community whereby their social life, economy, infrastructures, and technology properly attune to nature's inherent ability to sustain life.

In response to this development, contemporary scholars have added a modern Shari'ah objective namely the preservation of environment in addition to the five main essentials (*daruriyyat al-khamsah*) of *maqasid al-shari'ah*, primarily to showcase Islam's environmental concern and commitment.² Nevertheless, until recently, this new concept has remained under-developed; its actual focus has yet to be thoroughly elaborated, particularly in facing complex and interconnected environmental crises to date

This article draws attention to the concept of natural disposition, widely known as *fitrah* in Islamic intellectual tradition, to lay an intelligible foundation for the *maqsad* of environmental protection. It calls for an expansion to the scope and definition of the word *fitrah* which refers to human's innate abilities and inclinations in Islamic tradition; and to also include the environmental element and its embedded dispositions. This proposal finds support from classical as well as modern renditions of *fitrah*, particularly that of 'Allal al-Fasi and Ibn 'Ashur who suggested preserving *fitrah* as the central aim of Islam and its teachings as they linked the Shari'ah's objectives to human nature.

This article also draws attention to a synergistic interaction between science and religion that may postulate what actually constitutes the natural disposition of the environment, which is the focal point of the said objective. Therefore, by developing a focused conception of nature's intrinsic dispositions, it would enable related parties to translate them into specific action plans as well as problem solutions for complex environmental crises that are currently besetting the Muslim nations

The Meanings of *Fitrah* in the Islamic Tradition: From Exclusive to Inclusive Concept

Linguistically 'fitrah' originates from its root, 'fatara', which means to originate something, therefore it is arguable that the word hints to acts exclusively attributable to Allah.³ It is noteworthy that there is a chapter in the Qur'an entitled 'al-Fatir' (The Originator) which predominantly carries the theme of calling upon human being to duly observe natural creation surrounding them in the pursuit of recognising the Omnipotence and Wisdom of its Creator. Moreover, the only verse with the word 'fitrah' in the Qur'an reads as follows:

And so, set thy face steadfastly towards the [one ever-true] faith, turning away from all that is false, in accordance with the natural disposition which God has instilled into man: [for,] not to allow any change to corrupt what God has thus created-this is the [purpose of the one] ever-true faith; but most people know it not.

The term *fitrah* in this verse, Asad argued, denotes man's innate capability to rightly discern between truth and false as well as to recognise God's existence and oneness. Fitrah is also used in the Qur'an and Sunnah to mean the religion of Islam and a substitute as such for the word 'religion'. Ibn Qutayba however, in commenting the *hadith*: 'every baby was born on the foundation of fitrah', contested the opinion, arguing that Islamic theological doctrine does not assert that all children are born Muslim, rather they are adorned with spiritual and inclination towards the Truth and goodness. In other words, an analysis of the main Islamic sources could signify that *fitrah* normally connotes the original disposition of human being and its intrinsic qualities.

On another note, Islamic intellectual heritage over the span of centuries has vastly contributed to different aspects of human innate psychological properties. Classical Muslim theologians and philosophers paid extensive attention to *fitrah* as an epistemic concept. There is a wide array of views among Muslim classical scholars with regard to human natural dispositions in the light of free will and responsibility. A cursory analysis of Islamic sources, as Qarni suggested, shows that there are at least three vantage points on this⁷; i) *fitrah* as a state of intrinsic goodness and evilness ii) *fitrah* as a state of neither goodness nor evilness iii) *fitrah* as human's state of innate goodness, mainly propounded by Ibn Taymiyyah.⁸

In the modern context, disputes have emerged among scholars on the concept of Islamic naturalism. It is in fact the impetus of Muslim reformists project that evinces an appeal toward modernity so as to defend the feasibility of Islamic law in the modern world. 4 'Allal al-Fasi, a Moroccan independence leader and religious scholar made a significant contribution to the modern conception of *fitrah*, as he represented a complex and open-ended initiative to draw connections between *fitrah*, revealed law and the role of politics. He propounded the idea that human beings have common innate qualities and Islam is the guiding path for this disposition. Therefore, he argued that the Shari'ah will not decree anything in conflict with man's innate nature. It is worth noting as well that, al-Fasi, as well as other modernist thinkers, have substantially departed from the classical theologians and philosophers regarding *fitrah*. He offered a more fluid and wide conception of *fitrah* than those of the philosophers, denoting human disposition as a necessity to obtain sound knowledge in order to present Islam as a religion that appeals to modern Muslim communities. 11

Furthermore, Ibn 'Ashur (d.1974), also subsumed *fitrah* into the larger edifice of *maqasid al-shari'ah*. Despite providing an all-encompassing meaning of *fitrah* i.e. the natural disposition and order of God's creations, Ibn 'Ashur's focus, like his predecessor al-Fasi, is more on human innate abilities and inclinations. Ibn 'Ashur equated *fitrah* with rational faculty or sound moral judgement, which is engraved in the human soul, that affirms moral laws. Thus, it signifies man's ability to exercise rationality in matters pertaining to their belief and moral systems. Like al-Fasi, he also maintained that safeguarding *fitrah*, maintaining acts resulting from it, as well as restoration of its original state are cardinal directives in Islamic teachings. Anything that leads to the preservation of *fitrah* would be an order of the Shari'ah while its violation necessitates prevention or even prohibition. To establish a close relation between *maqasid* and *fitrah*, Ibn 'Ashur argued that:

maqasid are built on the Islamic Shari'ah's greatest characteristic, namely fitrah. 12

The grounding of *maqasid al-shari'ah* in human *fitrah* in the modernist discourse has opened another horizon in Islamic legal discourse whereby new findings on human psychology occupy its foremost attention.

Notwithstanding the classical and modern conceptual disputes over the meaning of *fitrah*, in the light of current environmental crises, it is an urgency now to expand the concept, encapsulating elements beyond mere human self, i.e. to encapsulate as well the intrinsic quality and order of the natural environment. The Qur'anic discourse on this subject matter hints on this wider concept of *fitrah*. In fact, there are contemporary Muslim scholars who have set forth a fertile ground for this expansion.

Kamali argues that the Qur'an conveys Islam as the primordial religion (*din al-fitrah*), not only to men and women, but also to the whole cosmos at large. ¹³ There is also a chapter in the Qur'an, as mentioned earlier, with the title *al-Fatir*, a word that shares the same root with '*fitrah*', calling the believers to duly observe natural creation surrounding them. In this wider perspective, Badawi and 'Abd al-Haleem for instance, defined *fitrah* as the genesis of creation, the original unadulterated nature of things or in other words the unassailable natural disposition. ¹⁴ As mentioned earlier, Ibn 'Ashur's conception of *fitrah*, in its wider sense, supports this in that it connotes the natural disposition and order of God's creations. ¹⁵ It is interesting to note how al-Fasi, when he was describing the role of Shari'ah in maintaining the *fitrah*, he referred to it by using an ecological metaphor:

The law before all else is the correction and refinement of nature, just as gardening is the correction and refinement of trees.¹⁶

Taylor suggested that *fitrah* might refer to the essential nature of God's creation and in its widest sense refers to God's pattern i.e. the natural order by which He created the universe.¹⁷ In essence, by referring to these arguments, it could be argued that, '*fitrah*' may engulf a much wider scope of meaning that transcends human innate quality, encapsulating the essential characteristics of natural environment, which calls for further elaboration from the scientific field.

The Conception of *Fitrah* from the Outlook of Natural Science: A Proposal

The Western worldview sees nature through an anthropocentric and mechanistic outlook, devaluing nature merely as a physical resource for human being, which is devoid of any intrinsic value, purpose or meaning. Through this worldview, nature, as a passive and subservient entity in the universe, needs to serve humans at any cost for their benefits and well-being. In this context, Baconian and Newtonian ideas underpin the materialistic, atomistic and reductionist worldview. It was Bacon who promoted human domination of nature through exploitation and manipulation to unearth its truth and further human's end, while the latter laid the foundation for a mechanistic outlook of nature which is purely physical, operating with a set of predictable physical laws that is devoid of any purpose. This fundamental understanding of nature, aside from influencing the field of natural science, permeated other domains such as economics, social thought, as well as management sciences.

Given its pervasive influence, the mechanistic outlook of nature has eventually triggered environmental crises on a global scale as the culmination of climate change, deforestation, desertification, hazardous waste and pollutions. These crises in turn threaten the very composition of life on earth. In other words, due to narrow assumptions about the essential characteristic of nature, the modern man sees nature as an exploit for the pursuit of their 'well-being' and 'progress', two concepts that eventually brought about industrial productions, consumerist culture, acquisition of mineral resources, as well as over reliance on technology.²⁰

Systems Thinking and the Conception of Nature: A Paradigm Shift

Systems thinking emerged in mid-twentieth century when suspicions arose with regard to the assumption of Newtonian physics and Darwinian evolution, the two pillars of modern science. It marked the paradigm shift in Western scientific thought as it transcends conventional science and unveils the underlying order and complexity of nature and social life.²¹ The emergence of systems thinking also marks the end of the 'Machine Age' and the onset of 'System Age' as the two

underpinning pillars of the former, namely reductionism and mechanism were replaced by the latter's principle of teleology. According to Ackoff, the end of the 'Machine Age' and the beginning of the 'System Age' could be dated back to the 1940s, when philosophers, mathematicians, and biologists worked together in the pursuit of defining a new intellectual framework during the post-war period.²² In other words, systems thinking denotes the paradigm shift in the scientific community as Senge had described it as follows:

The essence of the discipline of systems thinking lies in a shift of mind – seeing relationships rather than linear cause-effect chains, and seeing processes of change rather than snapshots.²³

System thinking has developed as a field of inquiry and practice in the 20th century from multiple origins such as biology, chemistry, anthropology, physics, psychology, mathematics, management, and computer science. Much of the works in systems thinking have brought together scientists from different disciplines to transfer methods from one to another and work across disciplinary boundaries.

The word "system" comes from the Greek 'sunistanai' which means, "to cause and to stand together". A system is a perceived whole in which all the parts interact with one another towards a common purpose. Systems thinking is thus a methodology to perceive the connection between the components of a whole entity. It is an approach to problem solving which perceives 'problems' as part of a wider and dynamic system. It requires profound understanding on the relations, interactions, and behaviours of subsystems that designate the characteristics of a system. Concepts such as organic, holistic, and ecological signify the systems view of life and nature.

According to the systemic perspective, nature is not a gigantic lifeless machine. Instead, it is an indivisible and dynamic whole, with parts which interrelate, and which are conceivable as patterns of the cosmic process. In other words, systems thinking has a pivotal role in framing nature as a holistic system. This is crucial as the 'conversation' between man and nature necessitates special cognitive tools and language. As a framing device, systems thinking functions as a tool that enables the understanding of reality, especially in generating meaning and purpose of our engagement with the 'reality', thereby encouraging greater responsibility towards the environment.²⁵

A defining feature of framing nature through the systemic perspective is the recognition and appreciation of the multiple interrelationships and interdependencies of all elements in the world's structure. In the span of decades, systems thinkers initiated several attempts at framing the natural world in terms of a system. In 1970, Jay Forrester drafted a world model namely 'World1', based

on systems dynamics method to depict contemporary global problems. In his 1971 book, *World Dynamics*, he introduced a revised model namely 'World2'. The model has led to publication of a controversial report entitled *The Limit to Growth*, an important document that uses systems analysis to examine key variables like resources, population, industrial output, food supply and pollution, so as to forecast the future of industrialised modern societies. In 1992, the same team revised the report and refined Forrester's model into 'world 3/91' model, and the most current refinement of the model is the Donella Meadow's 'world 3/03' model in 2004.²⁶

Another popular expression of systems thinking as the framework for environmental responsibility and sustainability is that of Fritjof Capra. Capra's conceptualization of nature is based on living systems theory, which is more scientific than other systemic approaches given its roots in biology and chemistry. The two main characteristics attributable to living systems, according to Capra are self-regulation and emergent properties²⁷, the defining traits of all living organisms as well as the earth itself. In describing the earth as a living and self-regulating entity, Capra draws attention to the work of James Lovelock, an atmospheric chemist who was commissioned by the United States National Security Agency (NASA) to detect life on Mars in the 1960s. ²⁸ During the task, Lovelock found that the detection of life on any planet is feasible through an analysis of the chemical composition of its atmosphere. He also found that earth's atmosphere exhibits a special state, as it contains gases such as oxygen and methane which normally react to each other but coexist proportionately, forming a mixture of gases far from chemical equilibrium. This, Lovelock argued, marks the presence of life on Earth. He also found that even though the solar temperature has increased by 25% since the advent of life on Earth, the Earth's surface temperature has remained stable at a level which is conducive for life, evincing self-regulatory ability of a living entity. In 1972, Lovelock introduced his living Earth theory by the name of 'Gaia hypothesis'. In 1974, with another scientist, Lynn Margulis, Lovelock refined his theory by formulating a feedback cycle, interlinking living creatures (plants, animals, microorganism) with the non-living elements (rock, ocean, atmosphere) to depict their common role in regulating Earth's climate, ocean salinity, as well as other planetary aspects.²⁹ Therefore, Gaia hypothesis, Capra argues, is a systemic way of seeing life and nature, indicating a substantial departure from conventional science.³⁰

The ideas of interconnected nature and even a living, self-regulating earth are not at all foreign to Islamic intellectual and scientific traditions. Ziauddin Sardar contended that the unity of nature is a recurrent theme in the Qur'an, so much so that the description of natural phenomena in the Qur'an invariably hints at an ordered, well-knit and predictable nature.³¹ Ismail al-Faruqi laid a religious

foundation for the living earth theory by arguing that, if the universe is really the unfolding fulfillment of natural laws, which are among the commandments of Allah, it should represent, in the Muslim eye, 'a living theatre' operating by God's decree.³² In the same vein, Katanegara drew attention to classical Islamic expositions of the world as a living entity.³³ Jalal al-Din al-Rumi for instance, clearly regarded the universe as alive, organic, and intelligent, with the ability to love and be loved.³⁴ The Brethren of Purity (*Ikhwan al-Safa*) in their well-known epistles (Rasa'il), regarded the universe as the great man (al-insan al-kabir), an entity possessing a single soul (al-nafs al-kulliyah) that permeates all its part, akin to the soul residing in human body.³⁵ It is interesting to note that, like Rumi and Ikhwan al-Safa, Capra when describing the systems view of life, concluded that instead of being a machine, nature as a whole, exhibits human nature i.e. unpredictability, sensitivity to its surrounding world, and responsiveness to small fluctuations.³⁶ The shared metaphor of nature as a human macrocosm among classical Muslim scholars and systems scientists reinstates the significance of applying the concept of *fitrah* to the innate properties of the environment, even if originally it merely implied man's intrinsic disposition.

Systems thinking sheds light on nature's innate disposition from the scientific standpoint, the one that we would like to propose here as 'the ability of nature to sustain life through its systemic interconnections'. This framework in turn can be used as guides for actions and policies towards solving environmental issues, and also towards the adoption of an environmental code of ethics.

Issues and Challenges in Preserving *Fitrah* in Contemporary Context: Beyond Pragmatism

The practical relevance of environmental *fitrah* proposed here can be seen in two case studies: (1) genetically modified food; and (2) climate change.

Genetically Modified Foods

Genetically modified organisms (GMOs) refer to plant breeding method via genetic engineering mechanism. GM method is unique, in the sense that the selective breeding (artificial selection) of the chosen male and female organisms of different traits will sexually reproduce and have offspring together in order to develop particular phenotypic traits (characteristics).³⁷ This artificial selection technique aims at genetic improvement. Charles Darwin celebrated this achievement as a springboard to introduce and support his theory of natural selection. Later on, selective breeding became a precursor to the modern concept of genetic modification. In the case of GMO for instance, scientists may infuse one or more added genes to an organism, move or even turn off any of its gene to achieve desired traits.

The original purpose of GMO production technology was to improve the output of agricultural products, due to the disproportionate increase of global food demand relative to its supply. Other purposes include the improvement of species resistance to pathogens or parasites; promoting better resilience to environmental challenges (such as high temperature); and forging growth to food conversion. These have been scientifically considered as positive measures to increase plant endurance and crop production.³⁸ Nonetheless, GM may also be abused for commercial gain through flesh character determination, reproduction control, organism behaviour modification, as well as fertility and viability control. These mechanisms do not merely modify the outward characteristics of organisms, but also alter their very nature and function. The activity does not only involve plant species, but also animals. In fact, the attempt to modify animal genes preceded that of crops although genetically modified (GM) crops were the first to receive global demand due to their commercial value. The most common GM crops currently available in the US market are corn, soybean, cotton, canola, alfalfa, sugar beets, papaya, squash, potato and apple.³⁹

Environmental groups, such as GreenPeace, have been campaigning against GMO products. According to GreenPeace, studies show that genetically engineered crops harm the environment and pose potential risks to human health. David Wolfe, an environmentalist and entrepreneur, claimed that GM foods are linked to numerous health problems, and when animals eat them, the GMOs can remain in their byproducts like eggs and milk. He added that even though GM foods are able to produce bigger animals, their monstrous size is actually hazardous to their well-being. Intensive breeding has transformed these animals into "super-breeds" in order to produce the most meat. However, the increase in size does not always signify better health for these animals. For instance, some GM cows have been developing breathing problems, chickens have been suffering from bone and joint deformities, and pigs are getting arthritis. Moreover, these animals are being treated inhumanely especially during their breeding process in the factory farms. Factory farming has also been receiving criticism from activists due to inhumane treatment of animals and unhygienic conditions of those industrial farms. GMO food is also hazardous to human health in the sense that new antibiotic and virus resistances may well be connected with the widespread GMO products in the market.⁴⁰

According to *Time Health*, the approval of GMOs for commercial use in the 90s has increased their production dramatically ever since. More than 90% of all soybean cotton and corn acreage in the US currently are genetically engineered crops. The land use of GMO crops is significantly increasing over the years, since 1996.⁴¹

Recent statistics reveal that food production and consumption produces considerable greenhouse gases.⁴² According to "Inventory of U.S. Greenhouse

Gas Emissions and Sinks: 1990-2015", agriculture contributes 9 percent of 2015 greenhouse gas emissions. Another report revealed a different figure by mentioning that agriculture and food production contributes up to 29 percent of global greenhouse gas emissions. Figure 1 shows that agricultural activities may cause greenhouse gases (GHG) emissions, one of the contributors to global warming which in turn triggers climate change. Conversely, climate change could also lead to the increase of temperature that causes drought or heavy rainfall that may destroy crops. This could lead to restriction of global acreage for cultivation. In general, Figure 1 shows the cycle of consequences from poor agricultural management and the impact of climate change towards global acreage for cultivation which then limits the global food production.

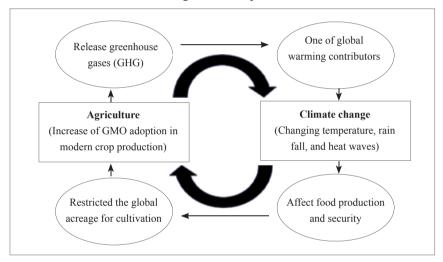


Figure 1: Environmentalist view of agriculture and climate change interrelated process.

Given the rapid development of GMO technology, the question then arises: have the fundamental problems of GMO foods been sufficiently addressed by contemporary *fatawa* (legal opinions)? In the Malay Archipelago (Malaysia, Brunei and Indonesia), Muslim scholars seemingly pay more attention to the genetic material (DNA) used in producing GM foods. Malaysia's first fatwa on this matter, for instance, issued in July 1999 mentioned that, GM products must not contain swine gene; otherwise the foods/drinks are considered unlawful (*haram*) based on a clear ruling in the Qur'an (Baqarah 2:173):

He has only forbidden to you dead animals, blood, the flesh of swine, and that which has been dedicated to other than Allah. But whoever is forced [by necessity], neither desiring [it] nor transgressing [its limit], there is no sin upon him. Indeed, Allah is Forgiving and Merciful.

For the Islamic council, the use of swine DNA by any means of modification process will never comply with the transformation process of *istihalah* and remain forbidden (*haram*) in any condition. Moreover, since there are many other available options of *halal* food and drink for Muslims, GM products are yet to attain legality from the state of *darurah* (necessity). The decision is based on the legal maxim, "preventing harm takes precedence over securing benefit". Other applicable maxims (*qawa'id*) are "all things are permissible unless proven to be unlawful" and "when the lawful and unlawful are mixed up, the unlawful prevails". The latest *fatwa* of June 2011 stated: "It is not permissible to use genes from *halal* animal that is not properly slaughtered according to Shari'ah compliant method. The production of GMF that may bring harm to human health and unknown long-term risks on the environment is also prohibited". The *halal* standards for GMF in Malaysia, Brunei, and Indonesia are as follow:

Malaysia and Brunei Darussalam: "Foods and drinks containing products of genetically modified organisms (GMOs) or ingredients made by the use of genetic material of animals that are non-halal by Shariah law are not halal" (MS1500:2009, 3.5.1.6 and PBD24:2007, 3.1.6). The Brunei standard uses "*Hukum Syara*" in place of Malaysia standard's "Shariah law".

Indonesia: HAS23201 differs in wording, but contains similar message "For microbial materials from recombinant microbes then... the microbes should not use gene[s] derived from pigs or humans" (4.3e).

Thus far, the Islamic council in Malaysia emphasises two main concerns related to the production of GM foods; firstly, the prohibition of swine DNA material, and secondly, the slaughtering technique of *halal* animal from which their genes are used. While the status of halal food becomes the main concern of the Muslim scholars, more fundamental drawbacks of GM products do not really capture much of their attention. Due consideration on the broader ethical aspect of GMO production is crucial, especially its related by-products, potential side effects on human, and other arising issues. The proposed Islamic principle of preserving environmental *fitrah* i.e. the nature's ability to sustain life, could perhaps provide a lucid framework to substantially address the issue.

The most pressing setback of GMO enterprise, according to a systemic framework, is its reductionist approach, predominantly focusing on technological advancement and business models while disregarding environmental and social impacts. This enterprise is the product of the modern paradigm that views living organisms as machines. Facing a complex reality of living organisms, Capra

argues that the average success in genetic modification experiment is only 1% due to the inaccessible living background of the host organism to the conventional approach of current biotechnologies. Biologist nowadays are just beginning to shift their focus from genetic structure of organisms to their complex metabolic network, an area which until recently is little known to them. Moreover, as all plants, including the transgenic crops, are embedded in a complex ecosystem, scientists know very little about this ecological networks and surrounding to the extent that they have little information with regard to the ensuing biological process of a GMO plant once it becomes part of the entire ecosystem.⁴⁶

One of the viable measures to reduce the overreliance on GM products is, among others, to allow for 'the return' of ecological farming system as it promotes sustainable agriculture practices by the introduction of symbiotic farming species. Ecological farming entails a systemic approach that recognises the environmental fitrah of life sustenance, providing methods by which the regeneration of ecosystem is possible like the prevention of soil erosion, water infiltration and retention, carbon sequestration in the form of humus, and promoting biodiversity. This farming system is in line with the struggle of environmentalists to conserve the environment as well as that of scientists who could play their role to provide scientific advancement in boosting the crop production without manipulating their intrinsic nature. Accordingly, ecologically oriented farming should be seen as Shari'ah-compliant agricultural technique as it is capable of preserving the environment by conserving its fitrah. Considering the agricultural activities have been causing, to some extent, a climate change (contribute up to one-fourth global greenhouse gas emission),⁴⁷ the next section will discuss on climate change, their causes, and consequences.

Climate Change and Clean Energy

According to MIT Technology Review, climate change represents one of the major causes for the increasing reliance on the GMO.⁴⁸ Climate change restricts the expansion of global acreage for cultivation. Nevertheless, crop production increase is a pressing necessity to meet the ever increasing global food demand. Even though the use of chemical pesticides and fertilisers is crucial to support high crop yields, these chemicals also negatively impact the environment by polluting the groundwater. Therefore, as the conventional ways to increase crops production are no longer feasible, GMO production technology becomes an alternative method to produce sufficient quantity of foods worldwide.

It could be argued then, that the violation of *fitrah* in the GMO production technology is just a symptom of another environmental *fitrah* violation, namely global climate change. So, what is climate change? Originally, earth's atmosphere

contains important greenhouse gases, mainly water vapour that consists of small amount of carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). The greenhouse gases function as a thermal blanket for the planet to absorb heat from the sun and to keep its surface warm in order to support life on average of 15 degrees Celsius (°C). It is one of the natural causes for global warming that enables life. However, the current expansion of global warming is a serious environmental issue that may affect humans and other living organisms on earth. It occurs when the earth's atmosphere and surface are gradually heated due to the trapped thermal infrared (IR) radiation that fails to escape into the outer space. This is attributable to the increase of greenhouse gases that form a thick blanket to the earth. It keeps the planet's warm surface above what it would be without its atmosphere, and this process is the fundamental cause of the greenhouse effect. In the span of Earth's history, the climate has varied in different patterns which implies a natural trend.⁴⁹ However, the existence of past global warming does not necessarily suggest that current global warming is natural. Climate scientists have unanimously agreed that the main cause of the current global warming is due to human activities that expand greenhouse effects rather than natural phenomena.50

In the natural environment, methane is the most potent greenhouse gas. However, CO2 is the most significant since it exists in the largest concentration and has longer life-time than methane. Recently, human activities continue to increase CO2 concentration and contribute to the emission of chlorofluorocarbons (CFCs) that have heat-trapping potential, thousands of times greater than CO2. The CFCs have been banned in most parts of the world because they also degrade the earth's ozone layer. However, since their concentrations are much lower than that of CO2, none of these gases adds as much warmth to the atmosphere as CO2 does. There are at least ten key indicators of a human fingerprint on climate change: 1) human emits a large amount of CO2 weighted 30 billion tonnes per year, 2) more fossil fuel carbon in the air, 3) falling oxygen level in air, 4) more fossil fuel carbon in coral, 5) less heat escaping out to space, 6) more heat returning to earth, 7) the earth warms faster at night than during the day, 8) cooling in the upper atmosphere or stratosphere, 9) rising of the boundary between troposphere and stratosphere or tropopause, and 10) cooling of the higher atmosphere layer or ionosphere leading to the shrinking of thermosphere. These fingerprints have been the observing points of scientists for a few decades and now become the proven evidences of climate change phenomenon.

It is clear that, high concentration of CO2 emission to the environment is the main cause of global warming that led to climate change. So, where is the origin of the CO2 emission? The increase in CO2 emission is actually caused by energy-driven consumption of fossil fuels. It originates mainly from electricity production

(25%), industry (21%), transportation (14%), commercial and residential building (6%), a sum of agricultural activities, land use and forestry (24%), and other energy (10%).⁵¹ A large fraction of carbon dioxide (CO2) emissions worldwide comes from electricity generation using carbon based fuels, followed by the sum of agricultural activities, land use and forestry. Both sectors, energy production and agriculture, contribute up to half of global greenhouse gas emissions that could always lead to global warming and climate change. Moreover, most of the CO2 emissions from burning fossil fuels stem from electricity production, industry, transportation, commercial and residential buildings which made up to 66 percent of global CO2 emission.⁵²

Therefore, the world is in dire need for clean and efficient energy to curb the impacts of climate change. The transition from fossil fuels to renewable energies, for example, could be the best measure to reduce greenhouse effect and at the same time reduce the impacts of climate change. With proper energy and waste management, these clean energies are safe from hazardous elements, economical that bring about stable market prize, and social benefits. One example is solar photovoltaic power system; a system that converts sunlight directly into electricity. Solar energy radiates infinitely from the sun. It is clean, free, natural and has zero carbon emission. It is considered by many scientists as a future energy resource and alternative to fossil fuels. In terms of social benefits, solar energy industries have offered jobs to people in European Union countries, China, Japan, USA and Malaysia. In Malaysia for example, there is RM45 million budget for MySuria programme which aims to uplift the economic opportunities of B40, the bottom 40 percent household group. Through this initiative, more than 1,600 houses have installed solar panels to generate electricity that is to be sold directly to Tenaga Nasional Berhad (TNB) where each participant will be able to earn an extra monthly income up to RM600.53

Globally, Muslim scholars from around the world have taken an initiative to combat global climate change during the Islamic Climate Change Symposium in Istanbul by releasing the Islamic Declaration on Climate Change. The declaration first calls on policymakers responsible for crafting the comprehensive climate agreement to be adopted in Paris to come to "an equitable and binding conclusion". And secondly, it urges people and leaders from all countries to commit to 100 percent renewable energy and a zero-emissions strategy as soon as possible, and to recognise that unlimited economic growth is not a viable option. Seyyed Hossein Nasr, in an interesting message delivered at the event to Muslim world leaders, adopted the notion of the living nature:

In the Islamic point of view, nature is alive. It's conscious. It follows God's laws. And what we're doing is breaking those laws in the name

of our own earthly welfare, and now we're destroying the very habitat that God created for us."

Moreover, he maintained that the main value of the declaration will be to remind Muslims that "nature is not just a machine; it has a spiritual meaning".

The transition from conventional power resources to renewable energy is fundamental to Islamic based sustainable development, as the protection of life (hifz al-nafs) and the protection of environment (hifz al-bi'ah) are predicated upon the assumption that they offer the balances between economic and social development and the environment. Besides, the principle of building the earth (i'mar al-ard) also mentioned in the Quran (Q 11:61): "He it is who created you from the earth and made it your assignment to build it", and its significance has been rekindled in the hadith, "The world is green and pleasant and God has put it under your charge to see how you will manage" (Khatib al-Tabrizi). According to Kamali, Islam advises its followers to practise moderation (wasatiyyah) in the use of resources including energy and water. Since the world is facing a climate issue and humanity runs the progressive shortage of energy, generating renewable and safe energy from natural resources such as from the sun rays is highly recommended from the Islamic point of view. It can be understood from this point of view that one should share and manage the resources responsibly by taking into account the well-being of the community through protection of the environment. The rising issues, in relation to GMO-based agriculture and global climate change, as discussed in this paper may be addressed by the implementation of ecologically-oriented farming and the transition to renewable energy.

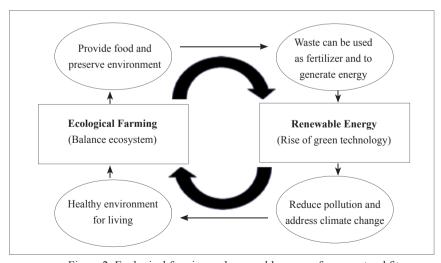


Figure 2: Ecological farming and renewable energy form a natural fit

From the above figure, it can be seen that ecological farming and renewable energy complement each other in the pursuit of sustainability. It shows an enhancing or positive feedback loop of the mutual interaction between ecological farming and renewable energy. Firstly, technological advancement is mainly utilised to address landfill issue from the agricultural sector and to generate greener energy that could reduce environmental pollution and curb climate change. Secondly, the green practices embedded in ecological farming are taking place in agricultural sectors (crop cultivation and husbandry) which then provide healthy foods. This could also reduce pollutants including carbon emission and concurrently, converse environmental wellbeing.

Conclusion and Policy Recommendations

The pursuit of sustainable development and environmental protection in Muslim countries can only succeed with substantial support from their own intellectual and cultural traditions. In the wake of *maqasid al-shari'ah* as the epistemological reference for Muslims, not only in reforming Islamic law, but also in charting development programmes; it should be able to provide a clear path to the desired future of Muslim communities. As far as the environment is concerned, this article draws reference from the resources of classical and modern discourse of *fitrah*, as well as the scientific discourse in systems thinking, to outline an intelligible aspect of environmental protection i.e. to preserve and enhance nature's ability to nurture and sustain life through its systemic interconnections. Streamlining development programmes, public policies and new technologies with this salient principle of environmental *fitrah* is the pivotal responsibility of every segment in Muslim societies. In doing so, this article proposes several policy recommendation as follows:

- Environmental *fitrah* is essentially systemic due to many interconnections in the nature. Systems thinking seems to be the only valid approach to environmental study.
- On issues on specialised nature such as GMO and climate change etc., Shari'ah position is strongly influenced by scientific evidences and expert opinions, provided that there is no contradiction to its basic principles.
- Scientists and Shari'ah scholars should liaise with one another to ensure that they move in tandem with the basic principle of Shari'ah and science.
- Policymakers and society leaders need to be fully aware of the fact that the environmental intrinsic nature (*fitrah*) is ultimately systemic i.e.

- consists of closely interrelated elements to the extent that distractions on any of its parts can directly influence the other. Therefore, environmental crises are also systemic in nature and they demand for holistic and allencompassing solutions.
- A follow up measure post 'Paris Agreement' and 'Islamic Declaration on Climate Change' is needed to create an efficient delivery mechanism that may trigger awareness among Muslims and non-Muslims on the importance of preserving environmental *fitrah*.
- Governments need to provide ample support to pilot programmes in promoting ecological farming similar to solar power programmes such as MySuria. As a sustainable agricultural system, it must be proven viable in order to ensure food security. This pilot programme can be an attempt to raise public confidence, so that this agricultural system can be widely accepted, practised and commercialised.
- More support is necessary to encourage the use of renewable energy technology among society members. It can begin with a wide array of educational activities, promoting ecoliteracy among society members through various avenues, followed by generous incentives for those who opt to pursue greener and sustainable lifestyle.

Notes

- * Ahmad Badri bin Abdullah is Research Fellow at IAIS Malaysia, with a focus on maqasid al-shari 'ah (the higher objective of Shari 'ah), usul al-fiqh, and contemporary Islamic jurisprudence discourse. He is pursuing his PhD in the study of maslahah. He can be contacted at badri@iais.org.my.
- ** Shahino Mah Abdullah completed his Ph.D in Physics from the University of Malaya in 2015. Currently, he is Research Fellow at IAIS Malaysia, with interest in Science, Technology, Environment and Ethics. He may be reached at shahino@iais.org.my.
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