Environmental Principles in the Holy Koran and the Sayings of the Prophet Muhammad

Djamel Ghernaout¹,²

¹Chemical Engineering Department, College of Engineering, University of Ha’il, Ha’il, Saudi Arabia
²Chemical Engineering Department, Faculty of Engineering, University of Blida, Blida, Algeria

Email address: djamel_andalus@hotmail.com

To cite this article:
Djamel Ghernaout. Environmental Principles in the Holy Koran and the Sayings of the Prophet Muhammad. American Journal of Environmental Protection. Vol. 6, No. 3, 2017, pp. 75-79. doi: 10.11648/j.ajep.20170603.13

Received: May 8, 2017; Accepted: May 17, 2017; Published: June 7, 2017

Abstract: “Corruption has appeared throughout the land and sea by [reason of] what the hands of people have earned so He may let them taste part of [the consequence of] what they have done that perhaps they will return [to righteousness].” Ar-Rūm (The Romans) (30: 41), The Holy Koran. “Indeed, in the creation of the heavens and the earth and the alternation of the night and the day are signs for those of understanding. Who remember Allah while standing or sitting or [lying] on their sides and give thought to the creation of the heavens and the earth, [saying], "Our Lord, You did not create this aimlessly; exalted are You [above such a thing]; then protect us from the punishment of the Fire.” Al-Imran (3: 190-191), The Holy Koran. “[Muhammad] was the only man in history who was supremely successful on both the religious and secular levels.” Michael H. Hart, “The 100: A Ranking of the Most Influential Persons in History”. A Hadith (Saying of the Islamic Prophet) attracted the attention. Prophet Muhammad said: "If the Final Hour comes while you have a palm-cutting in your hands and it is possible to plant it before the Hour comes, you should plant it" [2]. Planting a palm-cutting (shrub, bush, and sapling) even if the Final Hour comes is astonishing. Firstly, if planting a palm-cutting is considered as a work it indicates that the Prophet Muhammad invites humankind to keep activating until the last second of the Life. When the environment problems are taken into account such as global warming, air and water/wastewater pollution, planting a palm-cutting may be a good solution. Such readings suggested reviewing the Islamic principles from the point of view of environmental principles. This study arrives at its time since the World environmental Engineers and the Green Chemistry specialists have largely opened the discussion about polluting industry (especially chemistry) and preserving nature. Returning Man to its initial and noble Mission on Earth is reflected through this research to preserve both humankind and nature.

Keywords: Environmental Principles, Islamic Principles, Prophet Muhammad, Human Health, Drinking Water, Green Chemistry, Global Warming

1. Introduction

As an environmental engineer, a Hadith (Saying of the Islamic Prophet) [1] attracted the attention. Prophet Muhammad said: "If the Final Hour comes while you have a palm-cutting in your hands and it is possible to plant it before the Hour comes, you should plant it" [2]. Planting a palm-cutting (shrub, bush, and sapling) even if the Final Hour comes is astonishing. Firstly, if planting a palm-cutting is considered as a work it indicates that the Prophet Muhammad invites humankind to keep activating until the last second of the Life. When the environment problems are taken into account such as global warming, air and water/wastewater pollution [3-10], planting a palm-cutting may be a good solution.

Moreover, taking care of useful animals such as horses, Prophet Muhammad said that good will remain (as a permanent quality) in the foreheads of horses. This Hadith mentions the significance of taking care of horses and other useful animals for man. Prophet Muhammad also prohibited killing and torturing animals, so he asserted in the noble Hadith that “a woman was doomed to hell because she imprisoned a cat for she didn’t give the cat food or drink nor
did she free it to eat the insects of the earth.” This Hadith mentions the importance of taking care of animals and not causing their death as well as the necessity of treating them kindly [11].

Also Prophet Muhammad taught humankind to wash using the water as he said “if there is a river beside the house of any of you and that man is washing himself five times a day, do you think that he may keep dirties in his body? The companions said indeed no, then he replied that is the same as the five prayers if we persist on them, sins will be removed out of us” [12].

Such readings pushed us to review the Islamic principles from the point of view of environmental principles. This study arrives at its time since the World environmental Engineers and the Green Chemistry specialists have largely opened the discussion about polluting industry (especially chemistry) and preserving nature. Returning Man to its initial and noble Mission on Earth is reflected through this research to preserve both humankind and nature.

Studying the link between Islamic principles and the concept of considering the environment is relatively a new focus in the specialized environmental literature [13]. The main concentration of this review is to clearly show the concept of considering the nature, in its large meaning, and Environment, in its restricted meaning, via an arrangement with the Islamic principles [13]. This would contribute to a more significant accounting for the importance of Islamic principles in the revision of the main background and real facts. Since the presence of pollution catastrophes and environment degradation has not to be hidden and since those Islamic principles are not only restricted to the theoretical but give helpful orientation, this is a welcome orientation. Koranic verses and Prophet Muhammad Sayings will give an important introduction into what is vital for human beings existence, focusing especially on the nature future.

Reviewing some basic Islamic texts and significant references, the form of this review is based on a discussion of the main Islamic principles and a research of fruits from that for a concept of protecting nature.

2. Nature in Islam: Some Basic Concepts

The link between Islam and nature is not yet allowed to be perceived [13]. The increasing degradation of nature can evidently be related to a mess of values. The pollution catastrophes taking place now are in fact the most degrading side-effect of the behavior of Western civilization. This is well demonstrated in the reality of the fact that contemporary science and technology have given humankind a realistic and palpable ability to totally ruin ourselves. However, there is no great effort has been performed to mirror Islamic orientations as counterbalanced to those of the West. In fact, defending, saving and cherishing Nature rarely form a Western principle: actually, such worries for nature are mightily planted in all levels of Islamic principles and civilization [13].

The environment is most important in Islam. Several Islamic ideas or basics in The Holy Koran and in the Sayings and activities of the Prophet Muhammad, such as Tawheed (Unity of God), Khilafah (vice-gerency), Umma (community), Adl (justice), Ihsan (kindness), Hikma (wisdom) and Tawadu (modesty), transport considerable suggestions about the link in the middle of human beings and nature [13-16]. Kamlaa et al. [13] presented a brief view of these ideas. Besides, the Islamic Sharia’, that leads Muslims, illustrates so great worries [13]:

2.1. Unity of God

A most significant basic of Islam’s vision of nature is the axial Islamic basic of Tawheed (Unity of God). The idea involves the union and equity of all God’s creations in the adoration of The Creator and their egalitarianism as consorts in matter of the proper well-mannered recollection of the life of all and the rightful respect of mutuality and interconnection between all. Consequently, there is balance leading nature, and all God’s creations are assumed to be in equilibrium or in accord in this regard: “Indeed, all things We created with predestination” (Al-Qamar, 54: 49, The Holy Koran ). And: “The sun and the moon [move] by precise calculation, and the stars and trees prostrate. And the heaven He raised and imposed the balance. That you not transgress within the balance. And establish weight in justice and do not make deficient the balance.” (Al-Rahman, 55: 5–9, The Holy Koran). The balance should ‘not be transgressed at any level, whether at that of the harmony of nature or in the spheres of human justice, morality or everyday commerce… the principle of balance, measure and moderation is all-pervasive…” [14]. This global vision forms a reference to, and possesses a range of implying for, the nature. The inspiration is of a fragile equilibrium forming the environment, a breakable eco-equilibrium. The ‘balance’ may admit many options compatible with ‘moderation’ but it is vital that more excessive borders are not surpassed. The repercussion of the idea will have more importance once its suggestions towards men are more completely recognized. A worry about men is inherent to the concept and application of protecting the nature following Islamic principles: men constitute themselves a fraction of their nature.

Moreover, in this respect, noticing that the measure or preserving the balance suggests living humble, equitable and just in Islam. However, there is a confrontation with an anthropocentric direction: there is a worry to show an equitable consideration for all the flora and fauna as created by God, with no exceptional consideration to men, as a fraction of and in the perspective of protecting the equilibrium. The universal well-being in the midst of human beings and the World is boosted by the Islamic portrait of other beings as ‘peoples or communities’: “And there is no creature on [or within] the earth or bird that flies with its wings except [that they are] communities like you. We have not neglected in the Register a thing. Then unto their Lord they will be gathered.” (Al-An'am (The Cattle), 6:38, The Holy Koran). Consequently, this strongly suggests a great esteem for the universe, seen as a well-ordered whole, and inside this a consideration for all beings and communities. The Islamic base of affectionateness
(Ihsan) connected with the banning of misuse and the esteem for all, may be considered as intrinsic to the Tawheed concept. The ecological catastrophes are on account of human beings’ mislaying eyesight of the commonweal of the globe and its interconnection. Except if human beings realize the equitable reason of all beings to live in the nature in the correct equilibrium, their works will conduct to the demolition of these beings and, as a consequence, the devastation of the global equilibrium.

2.2. Trusteeship

“It is He who has made you successors upon the earth”. (Fatir, 35: 39, The Holy Koran).

There is an important affirmation on Trusteeship in Islam. During the time that Islam, conforming to Tawheed, visualizes humankind as inherent to the nature, it grants them a major function of Trusteeship in direction to the earth. The man is nominated a trustee (steward, guardian) or Khalifah and is loaded with preserving or controlling himself and others, at the same time the understanding of others widens further away people to the larger nature or universe. The weight of this trusteeship is not underappreciated in Islam: this is put in words, for example, of the Trusteeship being presented to the mountains and others, and humankind being understood to have accepted the load in their ‘lack of good sense’. Trusteeship is at no time in the past or future to be separated from Islamic values, regardless of whether or not the Khalifah is considered as a master or scholar. This ‘trusteeship’ of the man in the Universe does not signify that he has been accorded an authority to maltreat nature for his proper interests. Conversely, this trusteeship requires the circulation of justice, truth, good deeds and virtue by the man. Men have to make boundaries to their works (to keep equilibrium) in this direction, since they have a decision. As a trustee for the nature, the Muslim has to protect the nature but also fertilize it—in cohesion with keeping the equilibrium. Consequently, what is implicated at this point is protecting environment and the Universe, comprising its beings, and fertilizing it to the greatest level in accord with sustainable development. This comprises by diffusing the Islamic principles of justice, truth, good deeds, virtue and modesty so that the missions of Khalifah expand to all.

2.3. Community Principles

An emphasis is accorded above to the idea that inherent to Islam’s worry for the nature is worry about human beings. One may attach to this worry at this point by presenting that, as well as interpreting into worries concerning human beings (the accent is on the enlargement of inborn aptitudes), worries concerning men likewise interpret into worries concerning the society (Umma) or community principles stressing social justice (Adl), social welfare and the countering of oppression. Therefore, as persons and as a society, human beings constitute a part of the environment and consequently in Islam should to be greatly esteemed. As fraction of the equilibrium, there is an attention at this point that esteeming humans is connected to esteeming the larger nature: taking into account the interrelationship, morality conducts to morality. Moreover, at this point one has a concept of growing the society to the greatest level that is potential. There is improving, or fertilizing, as well as protecting. Expansions of the intellect, wisdom and knowledge (Ilm), particularly self-knowledge, are fundamental. As a rule, life, prosperity, well-being and wealth are to be protected and improved by means of mercy and justice. The worry to reach social justice is focal to Islam: “We have already sent Our messengers with clear evidences and sent down with them the Scripture and the balance that the people may maintain [their affairs] in justice. And We sent down iron, wherein is large military might and benefits for the people, and so that Allah may make evident those who support Him and His messengers unseen. Indeed, Allah is Powerful and Exalted in Might.” (Al-Hadid (The Iron), 57: 25, The Holy Koran). “Indeed, Allah Orders justice and good conduct and giving to relatives and Forbids immorality and bad conduct and oppression. He Admonishes you that perhaps you will be reminded.” (An-Nahl (The Bee), 16: 90, The Holy Koran).

The Muslim has not the choice to do not attach importance to others. The Umma fundamental responds an immoderate egoism and selfishness on the other side of ethics. Participation and distributing are preferred over personal surplus, which is considered as an ethical misconduct. Indeed, Islam by and large forbids misuse and greed: The Holy Koran affirms: “Indeed, the wasteful are brothers of the devils, and ever has Satan been to his Lord ungrateful.” (Al-Isra (The Night Journey), 17: 27, The Holy Koran); and “O children of Adam, take your adornment at every masjid, and eat and drink, but be not excessive. Indeed, He likes not those who commit excess.” (Al-A’raf (The Heights), 7: 31, The Holy Koran). Overindulgence, misuse, greed and dishonesty are affairs that should load heavily the Muslim conscience. The covering or defensive aspect is accorded a large accent in Islamic community principles and this expands to safeguarding the nature: “avoiding harm is paramount to achieving utility” (The Prophet Mohammad). Inside this accent on safeguarding there is an additional stress on preserving the comparatively fragile. Islam’s community principles give an importance to how employees are treated by their employers and therefore the environment of their working situations. As a rule, analogous bases are vital to the operation of business and business running. During the time that Islamic visions support the making of money (and the ownership of personal estate), in accord with the Muslim’s worry to be fair, honest and just towards others, Islamic bases do not accept to find profit being acquired to overpass and do not tolerate the action of making profit to induce damage to others.

2.4. The Limitless Vision of Islamic Concern: Holism and the Future

Concerning the larger, comprising nature, Islam is worried to take care of the nature, to safeguard it, and improve it in accord with keeping the equilibrium. Islamic holism, in this vision, expands to a worry concerning the existence but also the prosperity of next generations. Indeed, one of the most
vital Islamic principles is the unity of Islamic generations one with the other. A worry to protect the environmental as well as the more wide nature flows from this identification with next generations. It is not permitted for one generation to have a monopolism of wealth extracted from environment and God’s creations at the charge of next generations. This Islamic concept has the most known relationships with bases of sustainable development. It is a concept that accents the badness of waste, obsessive extravagance (Israf), excessive consumerism and conspicuous consumption.

2.5. Appreciation of the Beauty of Nature

“Who remember Allah while standing or sitting or [lying] on their sides and give thought to the creation of the heavens and the earth, [saying], "Our Lord, You did not create this aimlessly; exalted are You [above such a thing]; then protect us from the punishment of the Fire". " (Ali 'Imran (Family of Imran), 3: 191, The Holy Koran).

“Exalt the Name of your Lord, the Most High, Who Created and Proportioned, and Who Destined and [then] Guided, and Who Brings out the pasture, and [then] Makes it black stubble.” (Al-Ata (The Most High), 87: 1-5, The Holy Koran).

“Then do they not look at the camels - how they are created?, and at the sky - how it is raised?, and at the mountains - how they are erected?, and at the earth - how it is spread out?” (Al-Ghashiyah (The Overwhelming), 88: 17-20, The Holy Koran).

In Islam, admiration of the elegance of God’s creations gives resourcefulness for a trusteeship that will correctly take care of the nature. Muslims are invited to explore immensely into nature and to love and contemplate on its greatness, including its arrangement, proportionality, flora and fauna. Animals are reported in the Holy Koran for their loveliness and as an indication of The Creator: “And for you in them is [the enjoyment of] beauty when you bring them in [for the evening] and when you send them out [to pasture].” (An-Nahl (The Bee), 16: 6, The Holy Koran).

Understandings of the biography and Sayings of the Prophet Muhammad permit us to build true Islamic environmental ethics and reveal a large way of originative and original decisions in the modern situation [16]. Moreover, the Koranic assurance on the nature and the Earth is an attestation of the importance of the link bonding human beings and the Earth and Universe in Islamic dialogue [17, 18]. The requirement to safekeeping the Earth and the nature [19, 20], and a linked obligation to expand morality and kindly actions [21, 22], are again and again dictated in The Holy Koran: “That home of the Hereafter We assign to those who do not desire exaltedness upon the earth or corruption. And the [best] outcome is for the righteous.” (Al-Kassas, 28: 83, The Holy Koran). Moreover, the color green is the most favored of all colors for Muslims. It constitutes an ‘intense sensation’ of the value of nature for God and Muslims (and is mirrored in the flags of many nations in several ways influenced by Islam): “Do you not see that Allah has sent down rain from the sky and the earth becomes green? Indeed, Allah is Subtle and Acquainted.” (Al-Haj, 22: 63, The Holy Koran) [13].

In Islam, there is no detachment between the religious and the nonreligious and observation on this avoids distraction from the leading morals in search of, for example, a laic and instrumentalist materialism [23, 24]. This fact explains why Islam is so different from the capitalistic socio-political order [25, 26]. Muslims have not in kind belief to classify their comportment into godly and nonreligious elements [27, 28], and their behaviors are at all times bent by the Sharia’ [13]. Consequently, Islam and Islamic Sharia’ do not simply give us a ‘private’ religion; they also reveal a system of setting civilization and its foundations, as well as giving us a model, i.e., the Prophet Muhammad, for the direction of humans inside the society. Therefore, regarding as social foundation and application in an Islamic concept would mirror the field of Islamic fundamentals, giving universal understandings.

Al-Damkhi [18] focused on the developed concepts of environmental principles in Islam which should take into account these basic duties:

(a) No wastage or over - consumption of natural resources;
(b) No unlawful obstruction or destruction of any component of the natural resources;
(c) No damage, abuse or distortion of the natural environment in any way;
(d) Sustainable development of the Earth, its resources, elements, and phenomena through the enhancement of natural resources, the protection and conservation of them and of all existing forms of life, bringing new life to the land through its reclamation, and the rehabilitation and purification of the soil, air, and water [18].

Moghul and Safar-Aly [27] demonstrated that contemporary principles of environmentalism are deeply imbedded within classical Islamic law and ethics. If it attempts to conduct investment and financial activities within the scope of the Shari’ah, the Islamic finance industry has great potential, if not a necessary mandate, to promote a pro-environmental agenda through investment in green projects in addition to the carbon conscious initiatives already taking place globally and within Islamic communities worldwide.

3. Conclusions

In a time of large ecological issues, Islam can provide humankind an authentic vision of environment.

(1). Islamic life is crucially vital for the protection and promotion of natural resources. There are three characteristics of this life: (a) ecological awareness, (b) naturalness, and (c) fellow-feeling all of which have active support for the nature.

(2). The revival of Islamic lifestyle and Islamic government are the two tools by which natural equilibrium can be maintained for the future.

(3). Taking into account the environment problems such as global warming, air and water/wastewater pollution, planting a palm-cutting may be the best solution.

(4). Taking care of animals and not causing their death as well as the necessity of treating them kindly is well-proven in Islam.

(5). It is time to return Man to its initial and noble Mission on Earth is reflected through this short letter to preserve both humankind and nature.
References

[1] Hadith, http://en.wikipedia.org/wiki/Hadith (accessed on November 11\textsuperscript{th}, 2016).

[2] http://sunnah.com/urn/2304770 (accessed on November 11\textsuperscript{th}, 2016).

[3] D. Ghernaout, The best available technology of water/wastewater treatment and seawater desalination: Simulation of the open sky seawater distillation, Green Sustain. Chem. 3 (2013) 68-88.

[4] D. Ghernaout, B. Ghernaout, M. W. Naceur, Embodying the chemical water treatment in the green chemistry – A review, Desalination 271 (2011) 1-10.

[5] D. Ghernaout, M. W. Naceur, Ferrate (VI): In Situ generation and water treatment – A review, Desalin. Water Treat. 30 (2011) 319-332.

[6] D. Ghernaout, B. Ghernaout, On the concept of the future drinking water treatment plant: Algae harvesting from the algal biomass for biodiesel production—A review, Desalin. Water Treat., 49 (2012) 1-18.

[7] A. Ketsetzi, A. Statoulopoulou, K. D. Demadis, Being “green” in chemical water treatment technologies: issues, challenges and developments, Desalination 223 (2008) 487-493.

[8] A. Zidanšek, R. Blinc, A. Jeglič, S. Kabashi, S. Bektashi, I. Šlaus, Climate changes, biofuels and the sustainable future, Int. J. Hydrogen Energy 34 (2009) 6980-6983.

[9] A. Maczulak, Environmental engineering, designing a sustainable future, Facts On File, Inc., An imprint of Infobase Publishing, New York, USA, 2010.

[10] J. B. Manley, P. T. Anastas, B. W. Cue Jr., Frontiers in Green Chemistry: meeting the grand challenges for sustainability in R&D and manufacturing, J. Clean. Product. 16 (2008) 743-750.

[11] http://kaheel7.com/eng/index.php/earth-science/875-quranic-a-chemical-earmarked-in-ecology-10 (accessed on November 11\textsuperscript{th}, 2016).

[12] http://kaheel7.com/eng/index.php/health-a-medicine/832-wash-your-hands (accessed on November 11\textsuperscript{st}, 2016).

[13] R. Kamlaa, S. Gallhofer, J. Haslam, Islam, nature and accounting: Islamic principles and the notion of accounting for the environment, Account. Forum 30 (2006) 245-265.

[14] I. Hobson, Guiding principles for a solution to environmental problems. In H. Abdel Haleem (Ed.), Islam and the Environment (pp. 33–42), London: Ta-Ha, 1998.

[15] S. S. Shah Haneef, Principles of environmental law in Islam, Arab Law Quarterly 17 (2002) 241-254.

[16] A. A. Bagader, A. T. Elechirazi El-Sabbagh, M. A. Al-Glayand, M. Y. I.-D. Samarrai, O. A. Llwellyn, Environmental protection in Islam, IUCN Environment Policy and Law Paper N. 20 Rev., 2\textsuperscript{nd} Revised Ed., IUCN, Gland Switzerland and Cambridge, UK, 1994. http://cmsdata.iucn.org/downloads/eplp_020reven.pdf (accessed on January 16\textsuperscript{th}, 2017).

[17] F. M. Khalid, Islam and the environment, (Vol. 5) Social and economic dimensions of global environmental change, pp 332-339, P. Timmerman (Ed.), Encyclopedia of Global Environmental Change, T. Munn (Editor-in-Chief), John Wiley & Sons, Ltd, Chichester, 2002. http://www.kantakji.com/media/1607/j1000.pdf (accessed on January 16\textsuperscript{th}, 2017).

[18] A. M. Al-Damkhi, Environmental ethics in Islam: principles, violations, and future perspectives, Inter. J. Environ. Studies 65 (2008) 11-31.

[19] A. Bagader, A. El-Sabbagh, M. Al-Glayand, M. Samarrai, Environmental protection in Islam (part 1 of 7): A general introduction (http://www.islamreligion.com/articles/307/viewall/environmental-protection-in-islam/) (accessed on March 12\textsuperscript{th}, 2017).

[20] T. Berhane, M. Teklemedhn, Environmental law, teaching material, https://chilot.files.wordpress.com/2011/06/environmental-law-teaching-material.pdf (accessed on March 12\textsuperscript{th}, 2017).

[21] Environmental law, A handbook for Afghan Judges, United Nations Environment Programme, http://postconflict.unep.ch/publications/afg_tech_theme_01/afg_judges_EN.pdf (accessed on March 12\textsuperscript{th}, 2017).

[22] I. Ozdemir, An Islamic Approach to the Environment, http://www.islamawareness.net/Nature/environment_approach.html (accessed on March 12\textsuperscript{th}, 2017).

[23] M. R. Akhtar, Towards an Islamic approach for environmental balance, http://www.iri.org/English/Research/Documents/IES/137.pdf (accessed on March 12\textsuperscript{th}, 2017).

[24] I. Schatzschneider, Environmental ethics and Islam, https://www.citecenter.org/en/articles-essays/environmental-et-hics-and-islam/ (accessed on March 12\textsuperscript{th}, 2017).

[25] Islamic ethics, https://en.wikipedia.org/wiki/Islamic_ethics (accessed on March 12\textsuperscript{th}, 2017).

[26] A. M. Schwencke, Globalized Eco-Islam, A survey of global Islamic environmentalism, Funded by Leiden University Fund, pilot study grant (2012), http://media.leidenuniv.nl/legacy/report-globalized-eco-islam-a-survey-schwencke-vs-24-february-2012-pdf.pdf (accessed on March 12\textsuperscript{th}, 2017).

[27] U. F. Moghul, S. H. K. Safar-Aly, Green Şükük: The introduction of Islam’s environmental ethics to contemporary Islamic finance, http://www.simmons-simmons.com/~/media/Corporate/ExtensivePublications%20pdfs/Moghul%20SafarAly%20Cre n%20Sukuk%20Final.pdf (accessed on March 12\textsuperscript{th}, 2017).

[28] I. Abuomogli, Sustainable Development in Islam, https://www.google.dz/url?sa=t&rct=j&q=&esrc=s&source=w eb&cd=29&cad=rja&uact=8&ved=0ahUKEwiPo5ybyeDSAhXiwyKhdVXAm84FBAWCFYwCA&url=http%3A%2F%2Fwaterwiki.net%2Fimages%2F8%2F85%2FSustainable_De velopment_in_Islamic_Law-%20Abuomogli.docx&usg=AFQ jCNFhBYLAIaO8HSay660PfwnAVUVd&sig2=YmJ0S8a8qqGbOxHdRJt4w&bvm=bv.149760088,d.bGg (accessed on March 18\textsuperscript{th}, 2017).