

Islamic Perspectives on Natural Resources Management and Sustainability

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Abstract: The complexity of natural resources management has challenged the most willing governments and their most dedicated scientists. The many intangible dimensions of the environment have defeated the most creative valuation methods. Recently, more and more professionals and researchers have turned to religious teachings about nature and society, in order to tackle those intangibilities. In this context, so far, only a few efforts have been dedicated to the use of Islamic sources of law (*shari'ah*) and tradition (*sunnah*) to inform natural resource management efforts. This paper sets out to review these efforts and to contribute an analysis of these Islamic sources. It concludes that, in Islam, the use of natural resources for consumption and profit lies at the juncture between individual worship (*ibadat*), and group transactions (*mu'amalat*). A balance between the two defines the relationship between human society (*ummah*) and the natural environment and is a defining factor of Muslim human ecology.

Keywords: Islam, natural resources, environment, *shari'ah*, *Qur'an*,

I - INTRODUCTION

Does religion have a place in natural resource governance? And, if it does, do basic religious teachings have what it takes to judiciously inform the arduous task of sustainable balancing of the three constraints of greed (i.e. self-interest), efficiency, and fairness, that shape the decision-making processes of natural resource management?

It would be too presumptuous to even attempt to answer such complex and all-encompassing questions in a book-length treatise, let alone to assume the task feasible in just one short paper. However, by trimming down the extent of these questions we may be able to make them manageable while still meaningful, and to contribute, along with many others, toward building a system of informative relations between religion and natural resource management. First, I will limit my effort to one major religion, Islam. Second, I will also focus on illustrative rather than definitive or exhaustive evidence for the arguments I will make. Not to be confused with the "woolly" way of anecdotal proof, my choice of illustrative evidence is based both on the humility that is due the subject, and on the observed fact that "covering Islam," in the West, to use Edward Said's words, has been at least ill-guided, if not ill-intentioned--an attitude that has encouraged ignorance and misunderstanding, on which some more later.

In acknowledgment toward our host--the International Institute of Fisheries Economics and Trade (IIFET), I will start by briefly framing this contribution with a reference to the FAO's Committee on Fisheries, COFI's work: On 31 October 1995, the 28th Session of the FAO Committee on

Fisheries (COFI) adopted Resolution 4/95 which spells out the Code of Conduct for Responsible Fisheries. This Code was requested by the UN from the FAO in 1991, based on the urgent need to develop "new approaches to fisheries management embracing conservation and environmental, as well as social and economic, considerations." (FAO, 1999, 1). Between 1991 and 1995, nine COFI conference sessions, and many working group meetings, were held with the participation of delegates from numerous countries, including some countries whose national law system is based on *Shari'ah*, the source of Muslim law.

Shari'ah forms the basis of law, for example, in countries as diverse as in Iran, Saudi Arabia, Morocco, Malaysia, etc. Thus, we are entitled to ask: Would a Muslim delegate to COFI, from any of these countries, have been able to contribute to the building of the Code of Conduct while at least checking for compatibility and validity from a *Shari'ah* point of view, if not using it as a source? Or, did Muslim delegates start from scratch, on a completely new territory so to speak, given that issues of the environment, natural resources management, and sustainability are seemingly quite recent as a human concern?

In this paper, I intend to compare the framework of Islam's view of nature and of material resources deriving from that view, with that of the modern concept of natural resources and their sustainable use. I will show that a Muslim delegate to COFI, as an example, would find little conflict between the modern rules of good governance of natural resource use, and the teachings of Islam. Better than that, in Islam, the use of natural resources for consumption and profit lies at the juncture between individual worship (*ibadat*), and

group transactions (*mu'amalat*). A balance between the two defines the relationship between human society (*ummah*) and the natural environment (*al-mu'heet at-tabee'ee*) and is a defining factor of Muslim human ecology.

II - METHOD AND LITERATURE REVIEW

We all know about the explosion of research and publication on many aspects of natural resources and their management. From the triad of science, technology and society which are the key frameworks of dealing with natural resources and the environment, and for the purposes of this paper, I will provide sample references to previous work on the societal aspect only. Although Islam deals with science and ecology of knowledge in the context of the Oneness of God (*taw'heed*), it is more relevant to focus, here, only on Islam-Society-Justice, in other words, on Islamic teachings as they refer to greed and fairness in natural resource contexts, not so much on efficiency (in natural resource use), which we should leave for science and technology, and for another forum.

My approach in informing this research effort has three components: (i) I used a number of published sources, both paper and electronic, (ii) I relied on culturally-lived experience, that is my own, growing up in an oasis in North Africa, and as a corollary to the lived experience, (iii) I kept in mind the situatedness of knowledge claims, not as much in terms of precariousness or of lack of objectivity, but in the feminist sense of strong objectivity.

Along these lines of situatedness, and in terms of method, it is legitimate to claim an Islamic color, so to speak, in what I have done: I was taught that Islamic epistemology to develop new knowledge, should include: explication (*tafseer*), interpretation (*ta'weel*), analogy (*'qiyas*), and critical thinking (*ijtihad*). *Tafseer* and *ta'weel* are used to interpret statements in the Qur'an and Sunna; *'qiyas* allow us to expand findings about, say fairness in water resource distribution, to other natural resources, fisheries for example; and *ijtihad*, or critical thinking, is the creative intellectual route that leads to truth and wisdom in problem-solving, without having to acknowledge any debt to "late comers" such as Descartes, Bacon, and Newton.

From the plethora of publications about societal aspects of natural resources: *Syme et al.* (1999), at the Australian Research Centre for Water in Society, have studied "the components of fairness in the allocation of water to environmental and human uses." Social psychologists *Wilke* (1991) and *Levine* (1986) have dealt with greed, efficiency, fairness, and community involvement in natural resource situations. Various UN bodies and international NGOs, such as IUCN (The International Union for the Conservation of Nature, UNEP (The UN Environmental Programme), and

the WWF (World Wildlife Federation), contributed to summarizing the principles of a sustainable society (*Gilpin*, 2000). Goodland and co-workers developed a critical analysis of priorities for sustainable development (*Goodland et al.*, 1992, quoted in *Gilpin*, 2000). *Cropper and Oates* (1992) published in their comprehensive survey of environmental economics a discussion of the vexing question of assigning numerical values to intangible factors in order to adapt the tried-and-true engineering method of Cost-Benefit Analysis (CBA) to natural resources management. The inadequacy of science and mathematical computations alone, to deal with natural resource dilemmas in an age of globalization, has been argued by a number of authors, such as *Schneiderman et al.* (2000), *French* (2000), *Swanson et al.* (1996). A world-systems based approach to a sustainable ecosystem was given by *Bergesen and Bartley* (2000). The elusive and very complex concept of political problem-solving capacity deriving from scientific findings was addressed by *Andresen et al.* (2000), as well as *Fuller* (1997, 2000).

These references, valuable though they may be, have one important thing in common: They are utterly secular. Most of them are critical of the "tyranny of science," in its Cartesian form, but, at the same time, all of them steer clear of religion as a parameter, potentially important in reaching participatory solutions to allocatory problems of scarce natural resources. It looks like a tyranny of another kind, but a tyranny just the same.

The spiritual and religious dimensions are obviously quite important in the lives of the majority of humans throughout the ages, including today. Works abound on theology, philosophy of religion, religious ethics, and the like. However, only a small number of authors have addressed the question of religion and the environment. Once we limit ourselves to Islam, for the purposes of this paper, the number of published works becomes even smaller. A recent web search turned up only a few scattered texts (fewer than ten). A quick evaluation of the reliability of the information on these sites shows that many of them, while well-meaning, fall in the category I want to avoid: That is "apology and/or preaching." Many of these sources are useful through the pointers to the original sources of *Sahri'ah*, i.e. *Qur'an*, *Sunna*, etc.--bits of information easily checked and confirmed in the originals.

In the *Journal of Beliefs and Values*, *Izzi Dien* (1997) uses an Islamic perspective to discuss "some aspects of the industrialization effects on the natural environment in the Middle East." Out of the dozen or so references he quotes, and in addition to the Qur'an itself, only a few are scholarly and covering Islam. A number of periodicals and specialized publications can be relied upon to draw some conclusions about the political choices of natural resource management in predominantly Muslim areas. Examples of these are: Publications from *Bengladesh Center for Advanced Studies* (Bengladesh Environmental News), ...

Ahmed and Hussain's work on community-based natural resource management in an area in North Pakistan, "Natural Resource Perspective" series of working papers put on line by the Overseas Development Institute in the UK (ODI, 2000), including two important reports on the role of fisheries in development policy, and on the role of aquaculture in poverty alleviation.

Three contradictory features stand out in the review of all these references: (i) their secularism, already mentioned, dictated by (ii) the preponderance of the Western frame of knowledge production; in spite of (iii) an increased acknowledgment of the importance of indigenous knowledge, of cultural specificity, and of the role of community stakeholders in natural resource management. This contradiction is clear from the fact that community stakeholders would rely mostly on traditional and religious ethical values to inform their choices, while the Western "development expert," often leading the process, thanks to tie-clauses in development financing, is bound by a certain scientific and cultural baggage--a legacy that goes back many centuries in the history of interaction between East and West.

III - THE "DIALOGUE DE SOURDS" OR THE LEGACY OF THE CRUSADES

I announced from the beginning the presumed harmony, or lack of contradiction between *Shari'ah* concepts of nature on the one hand, and modern day environmental conservation and sustainability, on the other. Before arguing for such a thesis, it is imperative to preempt the facile knee-jerk reaction prevalent in Western intellectual circles. This reaction amounts to the following: Any one trying to describe Islam in a humane and positive light must be a bleeding-heart apologist. For example, didn't a "Muslim" President-Dictator order the burning-up of hundreds of oil wells in Kuwait a short decade ago? How can one reconcile the claim that Islam is friendly toward the environment, and calls for the wise use of natural resources on the one hand, and the extravagance of Arab oil sheiks, on the other--aren't these oblivious sheiks bona fide representatives of an Islamic ethic, and apt heirs to what "we knew all along" from the morals narrated in the tales of the Arabian Nights?

From the outset, I need to make some remarks on, and frame my argument in spite of, the heavy legacy of misunderstanding between Islam and the West. This misunderstanding dates back to the swift expansion of the Muslim empire into North Africa and the southern flank of Europe, into Iberia and the wine country of Burgundy, early in the eighth century--a dark age in Europe. Occasionally, this misunderstanding erupted into bouts of jealousy, suspicion, and enmity, with flare-ups into all-out armed conflict from the ancient crusades to the modern-day Gulf War of a

decade ago. Such a legacy has had its intellectual dimension as well. For starters, Islam, in its early days, with the threat it represented to church dogma and dominance in Byzantium and Rome, wasn't about to be accepted as a benign and harmless, if not beneficial, development in the history of human society. Winning converts in large numbers from among Christians who loathed their church-based, imperial and ineffectual governments, such as in Egypt and in the rest of North Africa, made Islam the target of denunciation and vilification by church scholars around the Mediterranean.

While a full-fledged review of these "wars of words" is outside the scope of this paper, it is perhaps well to point out a few of its significant stages. The first translation of the *Qur'an* into Latin was made *circa* 1143 A.D. by a group of theologians at the Monastery of Cluny, in France. Although this Latin version wasn't published until 1543, i.e. 400 years later, it formed the source of translation into almost all European languages (French, German, Italian, Dutch, etc.). That a key Western version of the *Qur'an*, perpetuated as it had been, through secondary translations into the European vernaculars, came out at the height of the Crusades speaks volumes about the intentions of its initiators. 'Abdullah Yusuf Ali, an Indian Muslim scholar who translated the *Qur'an* into English during the 20th Century, comments on some of these earlier translations as being "carefully selected and garbled," and notes that one of the translators had "no pretense about the object he had in view, *vis.* to discredit Islam" (*Yusuf Ali*, 1934, 1989, p. xix)

On another "intellectual" front, the Galland French translation of the *Thousand and One Nights* (a. k. a. *The Arabian Nights*) came out in Paris in the early 18th century, and formed the basis of translation at least into English too. These "free" translations, of a beautiful, but fanciful work of fiction, unfortunately caused further ravages to the reputation of Islamic and Arab cultures, as Enlightenment "philosophes" of the stature of Voltaire, recognized that they read, and were influenced by, the *Arabian Nights* (there is an account that says Voltaire read the book 14 times!!), then went on to write damning articles on Islam, in the *Encyclopédie Universelle* edited by Diderot--a reference work for attainment in human knowledge in the West for a long time after that.

IV - ISLAM AND THE KNOWLEDGE OF NATURE

Muslims are quick to point out the prominence of knowledge in Koranic teachings. Indeed, the first word uttered by the Angel Gabriel to Muhammad in the *Hira'* cave outside Mecca was: "*I'qra!*", i.e. "Read!" (96:1, *Iqra' / al-'alaq*). Although the original meaning is to "read" or "recite" or "proclaim aloud" Allah's message, it also calls for the teaching of others (to teach = *'allama*, and knowledge =

ilm, both have the same root in Arabic). The entire *Surah* of *I'qra* is an exhortation to learn and to be literate, as well as to teach others. One can also find exhortations in favor of the study of nature (3:190, *A:li Imran*), (6:99, *al-an'a*), (10:5-6, *Yunus*), (13:3-4, *ar-ra'd*), (16:10-16, *an-na'hl*), of travel to learn (29:20, *al-'ankabut*).

Many of the Prophet's sayings (i.e. *Sunnah*) also encourage learning and the seeking of knowledge. For example: "Seek knowledge from the cradle to the grave," [*Utlubu-l-Ilma mina-l mahdi ila la'hd*]; or "[seeking] knowledge is the duty of every Muslim," (*Al-'ilmu wajibun 'ala kulli Muslimin wa muslimah*). With regard to nature and natural resources, the *Qur'an* as well as the Prophet's *Hadith* led to the development of various fields of inquiry shortly after Muhammad's death, and that was in the context of *Taw'heed* (Oneness of God), while at the same time answering pragmatic questions about the well-being of people. Typical among these is the work of Muslim physicians such as *al-Razi*, *al-Tabari*, *Ibn-Sina* (Avicenna, *The Book of Healing, Kitabu Shifa'*), and others. Within the larger field of Arab/Islamic Medicine, a group of erudite theologians/physicians developed a *Shari'ah*-based "Medicine of the Prophet," (*at-tibb an-nabawi*). A recent translation of *Ibn-Qayyim al-Jawziyah's* "Prophetic Medicine" (Johnstone, 1998) shows that *Ibn-Qayyim al-Jawziyyah* (d. 1350 AD) and other proponents of "prophetic medicine," base their work on two important premises: (i) cures are to be found in natural resources, and, (ii) well-being requires the restoration of both the body and the heart/soul. Today, development consultants who engage in natural resources management projects anywhere from Senegal, to Bengaldesh, to Indonesia, would be well-advised to complete the much-praised participatory approach, by elements of local belief and traditions. Improving productivity and using Cost-Benefit Analysis just won't cut it, even if it is made to appear that the stakeholders are listened to in the process. The Islam-based indigenous knowledge, when freed from charlatans who thrive on superstition, would be found to be kind toward nature and wise about the use of its resources.

V - ISLAM, ECOLOGY, AND SOCIETY

Islam started in Mecca, an important urban trading post at the time with some material wealth and worldly possessions available to the merchant families. However, given the arid climate, and the desert environment prevalent in the entire region, scarcity was the name of the game for the average tribe. Many of the classical epic poems (*al-mu'allaqat*) depicting tribal courage and warfare from the so-called "days of the Arabs" [*ayyam al-arab*], prior to Islam, describe this scarcity--in water, in forage, and in all manner of natural resources. The message of Islam in the *Qur'an* often deals with questions familiar to the people it was destined to, and

in metaphors and imagery which spoke to them. Nonetheless, the *Qur'an* also referred to various natural and cosmological phenomena that must have left the contemporaries of the Prophet either in awe, or in disbelief. In Table 1 (see Appendi A), I list a series of references in the holy text of Muslims, to two sets of concepts; one having to do with ecology and nature (conservation, diversity, water, fisheries), and one with society (earthly possessions, greed, waste, ships, etc.).

The risk is there of conveniently reading "too much" in a religious book of a metaphysical nature. While striving to escape that risk, it is, nonetheless, still possible to illustrate, from the inventoried statements in Table 1, a number of ecological principles. Examples of such principles:

1/ Islam considers the creation of the universe an open book, inviting observation, discovery and learning. In this, the primary metaphysical purpose advocated by the *Qur'an* is to recognize the role of the Creator, and to have stronger faith in the oneness of God (*taw'heed*). Muslim scholars of the classical age (Seventh to Fourteenth Centuries AD) exploited this principle to its fullest in pursuit of worldly matters, including for the appropriate use of natural resources. Al-Jahiz, in his *Book of Animals (Kitabu al-'hayawan)* talks eloquently about the sign of the Creator in the minutest of creatures [*dila'latu ad-daqqeeqi minal khalqi 'alal khaliq*].

2/ In the *Qur'an* we read' (21:30) "We made from water everything living" (*Wa ja'alna'minal-ma'i kulla shay'inn'hayi*). It is one of the most quoted verses in Islam. Environmental extension programs in some Muslim countries use it as a motto in posters and on TV to promote conservation. Believers in Islam who may be otherwise illiterate, understand such message quite clearly.

At this point, I would like to relate a personal lived experience: When I was child, I had the daily responsibility of loading our donkey, once a day, with four pitchers of drinking water from a spring four miles away from home. My responsibility started well before I developed enough strength to lift the full pitcher. Still today, tens of millions of people in the Muslim regions, as elsewhere, have a limited access to such crucial natural resource as non-polluted water. One might be led to believe that necessity and scarcity teach people to be careful about resources. Would that it were that simple!

Today, in my home oasis, thanks to urbanization and "so-called" development, children expect running water in the bathroom, and have less respect for its sanctity. They are bewildered when the faucet noisily spurts out air rather than water, which happens, only occasionally for now. Obviously the fact that the local culture is still "nominally" Islamic does not explain the change of attitude. Neither does the scarcity of a resource. Water being the secret of life, Islam forbids its wastage and its use without benefit,

[although there was no specific mention of water needs of grass on golf courses!]. According to interpreters of Muslim dogma from the classical age, the preservation of water is a form of worship. Actually such a view doesn't require much explication (*tafseer*), nor interpretation (*ta'weel*); it is clearly spelled out, with regard to water and many other components of nature, in the original text of the *Qur'an*, and reiterated in the Prophet's *Hadith* tradition.

3/ Fairness, ethical behavior, and solidarity are among the tenets advocated in Islamic teachings. They are important factors when decisions have to be made in matters of natural resources management. Stakeholders of the Muslim faith would become active contributors in community-based, participatory processes, when they are asked:

- to be just in "their" opinions 4:58, 5:8, 5:42, 6:152, 16:90 (see Judgement)
- to be true and equitable 4:135, 5:8, 25:72, 55:8-9, 70:33, 83:1-3,
- to be moderate 2:143, 25:67
- to avoid conceit 4:36, 31:18, 57:23
- to behave justly toward others 17:26-29, 17:35, 17:53, 25:63, 28:55, 60:8 .

It would make sense to them if they are told that:

- greed brings destruction 102:1-6, literally, in the case of selfish and exaggerated resource use
- ruining others is forbidden 2:188, 4:32
- squandering is a bad behavior 17:27, 25:67

Going back to secular sources again, *Ignacy Sachs* (1999, 32) [in *Becker and Jahn*] provides a list of criteria for partial sustainabilities that he considers as "indicating a desired direction of processes of [sustainability]," rather than a final state or a static zero-one situation, a dynamic toward the ideal of whole sustainability. By comparing *Sachs's* criteria with the inventory table of Koranic references, it becomes clear that a certain degree of matching can be done between the criteria and the references--a merger of sorts of the secular and of the religious. This being a work in progress, I will provide only a draft version [Table 2, Appendix B], at this time, of the matching of concepts between the secular and the religious principles of natural resources management. Honestly, more work needs to be done just to remain true to the promise I started with: In the formulation of this matching between the religious and the secular/scientific, we need to keep in mind that the risk is lurking close by that we read unjustifiably "too much" into the metaphysical at the expense of what is reasonable. No tyranny in one direction, and none in the other either.

VIII - CONCLUSIONS

The main goal of the professionals dealing with issues of

sustainable natural resources management, is to solve the dilemma of quantifying or accurately defining the parameters that lead to a better judgment of the problem at hand. These parameters may be for a Code of Conduct for responsible fishing, or for the equitable use of water in an arid region, or any one of the many modern-day environmental aspects of resource use, preservation, and renewal. One feature common to most of these parameters is their fuzziness, their non-linearity, their intangibility. Religious references, terms, and principles to tackle natural resource problems are more and more invoked by professionals. That would have been unthinkable just a few decades ago. In order to reverse the destruction inflicted by humans on the earth and its resources, many more efforts need to be mustered. More than paying lip service to the role of the stakeholders who would live with the outcomes of implemented solutions, their local knowledge must be mobilized toward "Saving the Planet." We need to constantly re-examine our behaviors toward Nature and its resources, and that can be adequately be informed by religious tenets in the case of Islam.

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APPENDIX- A**Table 1. The Qur'an and Sustainability:**

CONCEPT	REFERENCE IN THE <i>QUR'AN</i>
Conservation	al-an'am (6:141), al-a'raf (7:31)
Diversity Of humans Of life	ar-rum (30:22), Fatir (35:27-28 fatir (35:27-28)
Earthly Possessions	at-tawba (9:24, 9:34, 9:55, 9:85), al-'qasas (28:76), al-'hadeed (57:20), al-'munafiqun (63:9) at-taghabun (64:15), Nun or al-qalam (68:14), Nu'h (71:12, 71:22), al-fajr (89:20), al-layl (92:11), al-'adiyat (100:8), at-takathur (102:1), al-humazah (104:2-3), al-masad [al-lahab] (111:2)
Greed	at-takathur (102:1-6)
Waste and squandering	al-isra' (17:27), al-furqan (25:67)
Fisheries	an-na'hl (16:14), fatir (35:12)
Sea	al-baqarah (2:50, 2:164), al-ma'idah (5:96), al-an'am (6:59, 6:63), al-a'raf (7:138, 7:163), Yunus (10:22, 10:90), Ibrahim (14:32), an-na'hl (16:14), al-isra' (17:66, 17:67, 17:70), al-kahf (18:60, 18:61, 18:63, 18:79, 18:109), Ta-Ha (20:77), al-'hajj (22:65), an-nur (24:40), ash-shu'ara' (26:63), an-naml (27:63), ar-rum (30:41), Luqman (31:27, 31:31), ash-shura' (42:33), al-jathiyah (45:12), aat-tur (52:6), ar-ra'hman (55:24), at-takweer (81:6)
Ships	al-baqarah (2:164), Yunus (10:22), Ibrahim (14:32), an-na'hl (16:14), al-isra' (17:66), al-kahf (18:71, 18:79), al-'hajj (22:65), al-mu'minun (23:22), al-ankabut (29:65), ar-rum (30:46), Luqman (31:31), fatir (35:12), ya sin (36:41), as-saffat (37:140), al-ghafir or al-mu'min (40:80), ash-shura (42:32), az-zukhruf (43:12), al-a'hqaf (45:12), ar-ra'hman (55:24)
Water	al-anbia' (21:30), Muhammad (47:15), al-waqi'ah (56:31, 56:68), al-mulk (67:30), al-mursalat (77:27), al-ghashiyah (88:17)

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APPENDIX - B

Table 2. Criteria for partial Sustainability

CRITERIA CATEGORIERS (Sachs, 1999, p.32)	CRITERIA (Sachs 1999, p. 32)	REFERENCES IN THE <i>QUR'AN</i> (Selection)
social	*achieve fair degree of social homogeneity *provide employment *provide equitable access to resources and social services	ar-rum (30:22), Fatir (35:27-28)
cultural	*change within continuity (balance) *rely on self	Nu'h (71:12, 71:22), al-fajr (89:20), al-layl (92:11), al-'adiyat (100:8)
ecological	*preserve the potential of "natural capital" to produce renewable resources	al-isra' (17:27), al-
environmental	*respect capacity of natural ecosystems to restore themselves	al-waqi'ah (56:31, 56:68), al-mulk (67:30), al-mursalat (77:27), al-ghhashiyah (88:17)
territorial	*balance urban and rural *overcome disparities *select environmentally sound development strategies	N/A
economic	*balance the various sectors *secure food *provide leeway for autonomous research	ash-shu'ara' (26:63), an-naml (27:63), ar-rum (30:41), Luqman (31:27, 31:31), ash-shura' (42:33)
political (national)	*adopt human rights principles *include wide scope of stakeholders *provide for social cohesion	at-takathur (102:1), al-humazah (104:2-3), al-masad [al-lahab] (111:2)
political (international)	*Prevent wars *Implement North-South Co-development *Control international finance and trade *Enhance precautionary principles in the management of natural resources *Manage the global commons *De-commodify science	N/A

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