

Islam, the Environment and the use of Vetiver Grass

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Introduction:

Bisimillah Rahmani Rahim

The objective of writing this paper is to contribute to developing an Islamic response to the current global environmental crisis, particularly as experienced in Senegal by

- firstly examining the relationship between Islam and the environment, in order to establish whether there is an Islamic environmentalism
- secondly to establish what an Islamic response might be to the environmental crisis, and what the implications may be for individual duties of Muslims
- thirdly to propose a possible practical response that Senegalese Muslims can make, in conformity with their faith, to respond to the growing environmental problems they are encountering

In relation to these objectives I would like to make a couple of points. Although this paper addresses the environmental crisis in Senegal specifically, I by no means want it to be read as exclusive to the Senegalese context. Islam itself is not bound by national borders, ethnicity, gender or language, and neither is the environment. This paper is situated in the Senegalese context purely because that is the context within which I am familiar, and active in.

The paper is focussed on the Islamic perspective. This is not meant to reflect negatively, or comment on, the wider environmental movement, or other religions. Senegal is a secular state and the Senegalese nation is composed of different religious traditions living in harmony with each other. My objective is rather to stimulate both religious and environmental dialogue about the environmental issues which are confronting the Senegalese population on a daily basis.

I take full responsibility for any errors or omissions in this paper.

Only Allah (SWT) knows best.

The environmental crisis in Senegal

The Senegalese environment is in crisis. The majority of studies and research carried out indicate that it is the countries of the South who find themselves confronted, in the most acute way, by the global environmental crisis. These countries are also the most dependant for their development on their natural resources and environment. Senegal, in common with other countries of the South, and particularly the Sahel region, is especially concerned by these problems. ¹

Whilst this is recognised on an intellectual level by a range of academic sources and studies, it has a direct on the daily experience of the

population. Virtually all sectors are affected. It is characterised by seriously degraded natural resources caused by repeated cycles of drought, coastal erosion and human action (bush fires, cutting wood for fuel etc), ² The Ministry of Environment website identifies a number of important environmental challenges:

- Deforestation, loss of tree cover and the difficulties of successful re-forestation.
- Loss of top soil, and land fertility through soil erosion (particularly cause by wind and rainwater run-off)
- Desertification and drought with rain dependant agriculture
- Coastal erosion, with the loss of farmland and urban infrastructures by the action of the Atlantic ocean.
- Waste disposal - landfill sites with toxic chemicals leeching into the water table, or rubbish blown over the landscape.
- Pollution from industry, farming (fertilizers and pesticides) and sewage impacting on the water table.
- Air pollution from emissions from transport and industry
- Stagnant water and open sewage canals breeding disease and mosquitoes.

The impact of climate change is particularly acute as a contributory factor to the above problems as summarised in an ENDA report:

“Senegal has endured 17 years of drought from the last 30 years. This situation of chronic drought spawned a process of desertification that is quasi irreversible. This is because of the extent of the degradation of ecosystems that followed the drop in agricultural yields and consequent rise in deforestation and rural poverty and exodus...rainfall has dwindled by 30 to 40% over the last three decades” ³

Whilst there are many government and NGO initiatives, it is not in the scope of this article to discuss these in detail; rather we will focus on how simple environmental action can be easily integrated into the daily life and religious practice of Senegalese farmers and citizens.

The Islamic perspective on the environment

The IUCN Commission on Environmental Law and the Meteorology and Environmental Protection Administration of the Kingdom of Saudi Arabia produced a comprehensive report in 1994. It summarised the situation faced by the environment:

“Today, Mankind finds himself at a point in history that is pivotal in terms of the very nature of his relationship to the natural world. His footprint is to be found everywhere throughout the Planet, in the air, in the deep seas, the forests and the polar ice. Human activities over the last century have so affected natural processes that the

very atmosphere upon which life depends has been altered”
(Abdulbar Al-Gain et al) 4

There is now a worldwide consensus that we are faced with a profound global environmental crisis caused by mankind. Across the planet we are experiencing climate change, soil erosion, loss of soil fertility, pollution, drought, famine, flooding, loss of forests, costal erosion and many symptoms of a sick planet, and this is reflected in the state of the environment in Senegal. Millions of people across the world are dying or finding their existence threatened as a direct result of this crisis. The Holy Qur’an has predicted this crisis, clearly identifying mankind’s responsibility:

“Corruption has appeared on land and sea as an outcome of what men’s hands have wrought: and so He will let them taste the evil of some of their doings, so that they might return to the right path.”
(Qur’an 30:41)

These calamities or ‘corruptions’ can have their causes traced to mankind’s greed and lack of stewardship in his use of the resources given to us by Allah (SWT).

The Prophet (pbuh) (pbuh) declared, *“The world is beautiful and verdant, and verily Allah (SWT), be He exalted, has made you His stewards in it, and He sees how you acquit yourselves.”* (Muslim) 5

But we have left the *“right path”* in our greed to accumulate material wealth, our thoughtless materialism and consumerism. We are ignoring the principles of good stewardship, instead by focusing on the benefits of the present we have little regard for the destruction we are causing, the poisonous emissions we spread, and the wider impact of our actions.

“The roots of our ecological crises are axiomatic: they lie in our belief and value structures which shape our relationship with nature, with each other and the lifestyles we lead.” (Ziauddin Sardar) 6

The results of un-sustainable use of our environment are becoming plain for all to see, in the Holy Qur’an mankind is warned about the good use of the creation, especially in relation to the most basic resource of life, the soil:

“And do not corrupt in the earth after being tilled, and invoke Him in fear and longing. Surely the mercy of Allah (SWT) is near to the fair-doers.” (Qur’an 7:56)

“And when he turns away, he [diligently] endeavours about the earth to corrupt in it and cause the tillage and stock to perish; and Allah (SWT) does not love corruption” (Qur’an 2:205)

Islam, in its common perception prevalent in the world today, among both Muslims and non-Muslims alike, is not generally associated with issues of environmentalism. In the popular imagination it is not concerned with the

extremely serious issues of environmental degradation and global warming. It is rare to hear reported prominent Muslim scholars speaking out on what are now called 'green' issues. Examples of good environmental stewardship are not prominent amongst Muslim countries, Mustafa Abu-Sway, in a lecture presented at Belfast mosque, argues that; *"no government in the Muslim world...is paying attention to this question at a serious level"* 7. Muslims and Islam itself is not visible in the leadership of environmental movements and yet the Qur'an and the Hadith are emphatic about protecting the environment as a central feature of faith.

This aspect of Islam is often overlooked, and many Muslims, are often ignorant of this central principle of their religion. Dr. Hasan Zillur Rahim writing in 'Ecology in Islam: Protection of the Web of Life a Duty for Muslims' sums up the centrality of the environment in Islam. He talks of the holistic nature of Islam and its approach to the environment:

"Everything in creation is linked to everything else; whatever affects one thing ultimately affects everything. Man has been distilled from the essence of nature and so is inextricably bound to it" 8

All life is linked, but Humanity, of all life on earth, has been endowed by Allah (SWT) with free will, the ability to use reason, and to think and act on the basis of that reason. It is in this, just as in other parts of our life, for which we will ultimately be judged. For that reason *"...He ...has appointed you viceroys in the earth"* (Qur'an 6: 165).

The responsibility of this 'viceroy' or stewardship gifted to mankind is not one to be taken lightly, it implies a responsibility and duty to reflect on, and understand nature, to learn from, and act on, the "signs" provided by Allah (SWT).

"Verily in the heavens and the earth, are Signs for those who believe. And in the creation of yourselves and the fact that animals are scattered (throughout the earth), are Signs for those of assured Faith. And the alteration of Night and Day, and the fact that God sends down Sustenance from the sky, and revives therewith the earth after its death, and in the change of the winds,-are Signs for those that are wise." (Qur'an, 45:3-5)

Dr. Hasan Zillur Rahim the Bangladesh born American physicist and author of *"Understanding Ecology in Islam: Protection of the Web of Life a Duty for Muslims"* urges us to pay attention to these signs;

"Man can detect God's "signs" in all the natural phenomena that surround him and should, therefore, observe them better to understand "God's way," which is the Qur'anic term for "laws of nature... God reminds humankind that there are "messages" for those who reason and think and to act in a way in harmony with it" (Dr. Hasan Zillur Rahim) 9

From these insights we can say that the relationship between mankind and

the universe, drawing on sources from the Qur'an, Hadith and Sharia, is:

- A relationship of meditation on, consideration for, and contemplation of, the universe and what it contains.
- A relationship of sustainable utilization, development and employment for man's benefit and for the fulfilment of his interests.
- A relationship of care and nurture, for man's good works are not limited to the benefit of the human species, but rather extend to the benefit of all created beings; and *"there is a reward in doing good to every living thing."* (Bukhari & Muslim)¹⁰

Islam's approach to the sustainable utilization of natural resources is the concept of 'judicious use', with responsibility to improve. It is stated by Ali ibn Abi-Talib, the fourth Caliph, in relation to land use:

"Partake of it gladly, so long as you are a benefactor, not a despoiler; a cultivator, not a destroyer." ¹¹

The principle of stewardship, of not being a 'despoiler' takes at its core the avoidance of harm, even at the expense of possible benefits. A Hadith establishes the Sharia legal principle in this when the Prophet (pbuh) is narrated as saying; *"There shall be no damage and no infliction of damage."* ¹²

This testimony to harm avoidance is reinforced by further words of the Prophet (pbuh);

"Prevention of damage and corruption before it occurs is better than treatment after it occurs....The averting of harm takes precedence over the acquisition of benefits." ¹³

Abdulbar Al-Gain *et al* have highlighted the development and enshrinement of these principles in the Sharia in early Islam, and a resulting range of 'environmental' rulings on issues including; land conservation, allocation of water resources and the conservation of wildlife:

- *Land reclamation or revival (ihya'al-mawat)*
- *Reserves (al-hima)*
- *inviolable sanctuaries (al-haramaan)*
- *Inviolable zones (al-harim)*
- *Charitable endowments (waqf)* ¹⁴

Even in the most extreme of circumstances, that of war, Islam makes environmental stewardship and environmental conservation a priority which should not be transgressed. This was demonstrated in action by Abu Bakr, the first Caliph, in his commands to Yazid Ibn Abu Sufian, the military commander who led an expedition to Sham [i.e. Greater Syria]:

"...And I instruct you...[to fulfil the following]ten [orders]: Do not kill

a woman, nor a child, nor an old man; do not cut down fruitful trees; do not destroy [land or housing] in use; do not kill a goat or a camel unless for food; do not flood palm trees [with water] nor burn them down ...” 15

All these rulings emphasise a basic principle of how Muslims should behave in conformity with the will of Allah (SWT), summarised by Ibn Taymiyah, as;

“What is required is to safeguard all benefits and bring them to perfection, and to eliminate all detriments and minimize them. And if they prove irreconcilable, it is to safeguard the greater good by the exclusion of the lesser, and to remove the greater harm by acceptance of the lesser. This is the mandate of the Law.” 16

The environmental duties of individual Muslims

Having outlined some of the environmental principles of Islam, how might this relate to the daily duties of Muslims?

In Islam the ultimate responsibility for right action lies with the individual, who will be judged on the Day of Judgement for what he did with his life, regardless of what the governing authorities with their various administrative and municipal agencies and courts of law required of him.

Following from the previous discussion, it follows that the protection, conservation, and development of the environment and natural resources is a mandatory religious duty to which every Muslim should be committed. This commitment emanates from the individual's responsibilities, before God, to protect himself and his community...

- No wastage or over-consumption of natural resources;
- No unlawful obstruction or destruction of any component of the natural resources;
- No damage, abuse, or distortion of the natural environment in any way;
- 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.

For Allah (SWT) commands;

“Do good, even as God has done you good, and do not pursue corruption in the earth. Verily God does not love corrupters.” (Qur'an 28:77)

And do not follow the bidding of the excessive, who cause corruption in the earth and do not work good.” (Qur'an 26:151-152)

Islam encourages a pro-active approach to the environment, by enjoining people to plant trees and all useful plants. Indeed, similar to all acts performed in line with the Islamic world-view, and when done intentionally for the sake of Allah (SWT), they are considered and rewarded as acts of worship. Jabir reported that the Prophet (pbuh) said:

“No Muslim, who plants a shoot, except that whatever is eaten or stolen from it, or anyone obtains the least thing from it, is considered [like paying] almsgiving on his behalf until the Day of Judgment.” (Muslim) 17

This pro-active duty towards our environment is further reinforced by Allah (SWT), who in giving mankind free will has ensured that *“Therefore man can have nothing but what he strives for”* (Qur’an 53:39)

But nothing from Allah (SWT)’s creation can be used by us without also incurring a liability or responsibility for the consequences of that use. As the Prophet (pbuh) is reported to have said; *“The benefit of a thing is in return for the liability attaching to it,”* 18

Instead of mindlessly exploiting the environment, or unthinkingly consuming the products of destructive exploitation of that environment, regardless of whether we have direct control of that destruction, we are not allowed to escape our responsibilities, or *liabilities*” attached to its use:

“...And make not your own hands contribute to (your) destruction; but do good; for God loveth those who do good.” (Qur’an, 2:195)

Our duty, as individual Muslims, is in doing good, for our selves, and for all living creatures;

“Created beings are the dependents of God, and the creature dearest unto God is he who does most good to God’s dependents.” 19

“There is a reward in doing good to every living thing.” 20.

This duty is further ultimately a duty to Allah (SWT), a recognition of the Truth of Allah (SWT)’s creation, for as Allah (SWT) says,

“We have not created the heavens and the earth and all that is between them carelessly. We have not created them but for truth.” (Qur’an 44:38-39)

Practical aspects of the environmental duties of individual Muslims

If we accept that mankind's duty to the environment is an Islamic duty, is it not our responsibility to guide individual Muslims in how to put this duty into practice? In Senegal today, what are the practical steps that can be taken by Muslims to mitigate the suffering caused by the environmental crisis?

Confronted with huge scale disasters, drought, climate change, the discharge of toxic pollutants (including the diesel fumes that clog the lungs of inhabitants of our cities), it can be all too easy to lose faith, to see them as insurmountable problems which we are powerless to confront. When we want to speak out, often those views are seen as standing in the way of 'technological' progress.

But the Prophet (pbuh) has shown us clearly what our actions in this respect should be. Rather than fatalistically accepting the destruction of the environment, or life itself as an inevitable punishment for losing our way, the Prophet (pbuh) enjoins us to take action regardless of how extreme the circumstances;

"If the day of resurrection comes upon anyone of you while he has a seedling in hand, let him plant it." 21

If fatalism and defeatism are the antithesis to our religious duties, what then should be our course of action? Professor Seyyed Hossein Nasr sums this up as being two-fold, to advocate and spread our beliefs but also to take practical action:

"The effort to change minds in the Muslim world needs to be carried out on two different levels. At one level, we need to increase awareness about this issue among people who understand both the modern world and Islam in a deep manner. They will then in turn transform the minds of general populace. Secondly, at the popular level, we need to have more small action groups, people who are committed to protecting the immediate environment, who can begin organic farming and take other measures--small-scale steps to protect the environment around them..." 22

The first level falls on the duty of "enjoining what is proper and forbidding what is improper". (Qur'an 3: 104)

For the second level, there are many of these 'small-scale steps' which are open to us. Many we are already familiar with, tree planting, organic farming, 'set settal' (cleaning our immediate environment) etc. The challenge is to become 'cultivators, not destroyers'.

Why planting Vetiver grass ('Cepp') provides an example of a way to fulfil religious duties

The Qur'an provides us with the assurance that Allah (SWT) has given us the

tools to avoid our own destruction if we but open our eyes: Allah (SWT) says:

“Verily We established his power on earth, and We gave him the ways and the means to all ends...” (Qur’an: 84-85)

“And We have produced therein everything in balance.” (Qur’an: 15:19)

The solutions to our problems are there if we just have faith as Allah (SWT) reminds us;

“So, verily with every difficulty there is relief.” (Qur’an 94:5)

This is restated by the Prophet (pbuh) who says:

“There is no affliction that Allah has created, except that He also has created its treatment.” ²³

As this is the case we must use our duty to seek knowledge (*“To acquire knowledge is the duty of every Muslim man and woman.”* ²⁴), to establish what the most effective course of action to take is.

Acquiring knowledge to find these Allah (SWT) given *“treatments”* of our *“afflictions”*, in this context, means finding the most appropriate and effective solution to achieve our aims, both for the benefit of our environment and for our duty towards Allah (SWT). This search for knowledge has led me to the example of Vetiver grass (*Vetiveria zizanioides*, recently reclassified as *Chrysopogon zizanioides*) as indeed being one of the *“means towards (these) ends”*. This is not to claim exclusiveness in respect of this plant, but to recognise that it is one which is effective, proven, available and accessible in its use to the widest possible constituency.

Vetiver, known as ‘*Cepp*’ in Wolof, ‘*Toul*’ in Fulani and ‘*Semban*’ in Tukolor, is a plant which can provide, using the simplest and most available technology, a proven and effective solution to many of the environmental issues confronting Senegal (and elsewhere) today. The native Vetiver grass in Senegal is *Vetiveria nigritana*. However it is rather different to the non-fertile *Vetiveria zizanioides*. The latter has been imported into Senegal in the 1990’s and should be used in preference to the local Vetiver as it is non-invasive. I will argue that in implementing the Vetiver System we can, on an individual and collective basis fulfil many of the religious duties we have towards our environment.

What is Vetiver grass?

Vetiver is a perennial clump grass which grows easily in the Senegalese climate and soils. When grown in rows, and its leaves and stems that grow

up to 2 metres in height form, a thick but flexible barrier. It has a very vigorous root system, which grows vertically to between 3 - 4 metres deep, binds the soil and forms an underground 'wall' of roots. It has been described by non-Muslims as being a 'miracle grass' or 'Rolls Royce' of plants in recognition of its many special attributes, which include:

- tolerance to drought
- growth in a wide range of soil types
- tolerance to heavy metals and other pollutants
- tolerance to fire
- ability to grow under very high saline conditions
- ability to withstand flooding and submergence for long periods
- tolerance to most insects and plant diseases,
- non-competitive with and beneficial to other plants
- non-invasiveness (in its *Chrysopogon zizanioides* variety. 25)

Although there may be other plants that may have some of these characteristics, none are known to combine all these characteristics.

The mystery and strength of Vetiver lies in its hidden veil of roots deep in the soil, and it is in these that if we look, we can find a sign of the hidden strengths of Allah (SWT)'s creation. For as Professor Seyyed Hossein Nasr, of George Washington University, argues, we are not hostile to 'Western science' but recognise its limitations in not recognising "*the need for a higher knowledge into which it could be integrated*" for we "*can't save the natural world except by rediscovering the sacred in nature.*" 26

We can therefore look at this example of Allah's (SWT) creation, Vetiver grass, as a spiritual metaphor for the Truth of Allah revealed through 'Signs'. Vetiver superficially appears to be very ordinary grass, its significance easily missed by the casual observer. It is only when one looks beneath the surface, discovering the hidden roots, and the properties and benefits of the plant that its full value is revealed. This relationship between the hidden and the revealed in the work of Allah (SWT) is well summarised in a verse by the poet Rumi:

*"The real Workman is hidden in His workshop,
Go you into that workshop and see Him face to face
Inasmuch as over that Workman His work spreads a curtain
You cannot see Him outside His work.
Since His workshop is the abode of the Wise One,
Whoso seeks Him without is ignorant of Him.
Come, then, into His workshop...That you may see the Creator and
creation at once" 27*

"Do you not see that God has subjected to your (use) all things in the heavens and on earth? And has made His bounties flow to you in exceeding measure, (both) seen and unseen?" (Qur'an 31:20)

How can Vetiver treat the afflictions of the environmental

crisis?

We have listed briefly in a preceding section, the main environmental issues confronting Senegal, and many countries of the South today.

Whilst there are a range of possible solutions to these problems, we will focus on how the use of Vetiver can be used to treat a wide range of these problems. The reason we choose this particular focus is because of the solutions which we are aware, Vetiver represents a proven technology, cheap, widely available, easily implemented, and one that produces multiple benefits.

Soil and water conservation:

It is incontestable that today Senegal is experiencing serious problems with soil erosion. The majority of agriculture is dependant on increasingly unpredictable rainfall and with the spectre of famine, conservation of what water is available has become a priority.

Vetiver, when planted in a closely spaced hedge, planted on the contour, creates, when mature, a barrier of stiff grass that acts as a buffer (above and below ground), and spreader of rainwater flowing down a slope. This reduces rainfall run off by as much as 70% which increases the filtration of the water through the roots into the soil ²⁸. Above the ground the dense hedge greatly reduces the flow speed of the water and prevents gullying which is so visible in the Senegalese landscape.

The hedge is also able to filter the sediment by as much as 90%. And thereby traps precious topsoil that would otherwise be lost. A hedgerow will stay where it is planted and the fertile sediment that is spread out behind the hedgerow gradually accumulates to form a long lasting terrace with Vetiver protection. In this way even severe gullies can be recovered to productive land.

This prevention of erosion and recovery of land, and;

“...the appearance and emergence of corruption in ecosystems, (the prevention of) corruption on earth (fasad f'il-ard), is one of the primary responsibilities of all believers” (Ozdemir) ²⁹

It is also the very physical manifestation of one of the parables of Allah (SWT) found in the Qur'an. In Sura Al-Baqara, the example of soil erosion is used as a parable to guide mankind. Soil erosion represents the moral bankruptcy, and ultimate futility of self seeking individualism:

“... those who spend their substance to be seen of men, but believe neither in Allah nor in the Last Day. They are in parable like a hard, barren rock, on which is a little soil: on it falls heavy rain, which leaves it (Just) a bare stone. They will be able to do nothing with

ought they have earned. And Allah guideth not those who reject faith” (Qur’an 2:264)

Whereas those who work for good, in the way of Allah (SWT), benefit from heavy rains which do not wash away the soil, but bring benefit;

“And the likeness of those who spend their substance, seeking to please Allah and to strengthen their souls, is as a garden, high and fertile: heavy rain falls on it but makes it yield a double increase of harvest...” (Qur’an 2:265)

By using Vetiver grass against erosion, we are able to physically demonstrate the parable by ‘*spending our substance*’ in ‘*pleasing Allah*’ through our stewardship of the earth and the conservation of its resources, and therefore benefiting from the water that Allah (SWT) sends down;

“...from the sky according to (due) measure, and We cause it to soak in the soil” (Qur’an 23:18)

In protecting the topsoil we preserve and increase its fertility, and increase productivity of the land. Deesaeng et al 30, amongst others, have demonstrated that Vetiver barriers (hedgerows) significantly reduce rainwater run off and increases ground water recharge. In this it can mitigate the effects of irregular rains, and storms. By trapping, filtering and slowing water flow, it allows rain water to be absorbed into the soil, feeding into the underground water table rather than allowing this precious resource to become a source of destruction, causing flooding, and carrying the eroded, fertile, top soil to be lost in the sea.

Increase in crop yields and soil fertility improvement: -

God sends down Sustenance from the sky, and revives therewith the earth after its death, (Qur’an, 45:3-5) ”

“And do they not see that We do drive rain to parched soil (bare of herbage), and produce therewith crops, providing food for their cattle and themselves? Have they not the vision?” (Qur’an, 32:27)

The importance of agriculture is clear to us as we face a period of increasing food shortages, crop failure, loss of soil fertility; reducing yields, bad agricultural policies and climatic change are showing their effect. Governments, after years of neglect, are desperately trying to find solutions for when;

“...the earth reveals what burdens her, And man says: What has befallen her? On that day she shall tell her story....” (Qur’an 99:1-4)

The technique of using Vetiver grass planted in hedgerows next to crops, around the edges of fields or in circles around fruit trees, and using its leaves as mulch, has been proven around the world to protect crops and

increase soil fertility.

Experience has shown that when Vetiver is planted as a hedge, in conjunction with other crops, yield is increase by at least 15-30%, particularly in areas of low rainfall. Its long roots that penetrate the soil up to 4 metres in depth, recycle soil nutrients for the use of crop plants and trees and improve soil moisture. The Vetiver hedgerows trap fertile soil sediment increasing overall soil fertility.

As a hedge planted around crops it forms an effective barrier to prevent the invasion of stoloniferous weeds.

Vetiver grass, when cut and used as mulch, significantly reduces weeds and when decomposed adds many valuable anti-fungal elements and nutrients to the soil. Similarly this is the same when Vetiver is used for compost for soil improvement.

Truly, when used to improve the soil and crop yield we can become; *“benefactors”, not “despoilers” of the soil,” cultivators”, not “destroyers”*
31

When we look after the soil, and work in harmony with nature, as is appropriate to our status of stewards we are able to fully benefit from the blessings of Allah (SWT) for; *“To Him belongs what is in the heavens and on earth, and all between them, and all beneath the soil”* Qur’an 20:6

This is summed up by Bagader et al, who state:

“If we would truly give thanks to the Creator, we are required to maintain the productivity of the soil, and not expose it to erosion by wind and flood; in building, farming, grazing, forestry, and mining, we are required to follow practices which do not bring about its degradation but preserve and enhance its fertility. For to cause the degradation of this gift of God, upon which so many forms of life depend, is to deny His tremendous favours”. (A. Bagader et al) 32

Fodder for animals:

“The rights of livestock and animals with regard to their treatment by man: These are that he spend on them the provision that their kinds require...” (Izz ad-Din ibn ‘Abdas-Salam) 33

Good quality fodder for animals like cattle and sheep is becoming increasing scarce and expensive, especially in years of drought. Vetiver can produce high amounts of biomass and makes a renewable source of excellent fodder for animals when cut or grazed at a fairly young stage. Research has shown that compared with other grasses such as Rhodes and Kikuyu it has a higher energy value, is more digestible, and contains higher levels of minerals. 34

Unlike many other grasses this process of harvesting or grazing does not kill the plant or cause any detriment to its development. With the next rains, or with watering it thrives anew. When planted where there is access to water or moisture it can provide a year round source of animal fodder. This is particularly important during drought conditions in Senegal, especially toward the end of the dry season, where fodder is in short supply and many cattle and sheep die of starvation. This benefit to other creatures, apart from its benefit to pastoralists, is in itself a reward for:

"...We have provided in it (the earth) sustenance for you, and for those whom you do not support" (Qur'an, 15:19-20) And "there is a reward in doing good to every living thing." (Bukhari & Muslim) 35

Pest management:

Many farmers in Senegal are trapped by the increasing costs and decreasing benefits of dangerous pesticide use and yet Allah (SWT) says: *"Verily We established his power on earth, and We gave him the ways and the means to all ends. One (such) way he followed."* Qur'an 84-85

Vetiver grass has been shown to have a deterrent effect on some insects and other pests. In other cases it acts as a 'trap' crop, when adjacent to other crops Vetiver grass attracts pest such as stem borers, termites, drawing them away from the main crop, and exposing them to their own natural predators, and without suffering any lasting damage itself.

Vetiver is used to protect banana plantations, maize and millet crops in many regions of the world. It has been shown to be effective against nematodes in the soil 36. Furthermore there are reports of Vetiver roots containing compounds which have insect repellent qualities 37.

Pollution control and Water purification

"And to remove a harmful thing from the way is also sadaqah (a charity)." (Bukhari and Muslim 38) From this statement by the Prophet (pbuh) we can infer that 'clearing the path' can mean, in another context, the removal of wastes and pollution harmful to mankind and other creatures. In support of this it is further reported by Abu Hurayrah that the Prophet (pbuh) said: *"Beware of the two [acts that bring] curses: relieving oneself in the path of people, or in the shade [i.e. where they usually rest] 39.*

Pollution and its impact on the Senegalese environment is having a visible and invisible effect. Factories discharge their waste into the landscape with little control, waste sewage is discharged into the sea, or flows through towns like Rufisque in open sewers. People live beside untreated stagnant water which contributes to disease and mosquitoes. Urban rubbish is dumped untreated into landfill sites where toxic chemicals, including lead from discarded batteries seep into the water table. Pesticide, herbicide and

fertiliser use creates concentrations of these chemicals, through rainwater run-off, in lakes, ponds and dams, and which eventually affect the quality of water in aquifers. The pollution crisis has the effect that in some areas drinking water is now contaminated 40.

From an Islamic perspective the values underlining the previous quotes from Hadith should;

“...be understood as applicable to the pollution of critical resources and habitats in general. Wastes, exhausts, and similar pollutants should be treated at their sources, with the best feasible means of treatment, taking care in their disposal to avoid adverse side effects that lead to similar or greater damage or injury.” (Abdulbar Al-Gain et al) 41

This leaves mankind with the duty to avoid creating such pollution but also with the *“requirement...that scientists should come up with environment-friendly solutions”* (Abu-Sway) 42

Whilst there are many technological approaches to resolving these problems available in the world, few are as simple, cheap and effective as the use of Vetiver to clean up the environment.

The roots of Vetiver grass have a tremendous capacity to absorb and fix a wide range of highly toxic pollutants in soil and water. This was understood by previous generations through a method of water purification which has largely disappeared today. Traditionally earthenware water containers were perfumed with Vetiver roots (*‘Cepp’*). Apart from the flavour these roots give the water, they have the effect of purifying the water and removing harmful elements. This same effect can be seen in the way the roots work in the wider environment.

Vetiver roots, planted in heavily polluted soil around the discharge from industry have been proven to remove the dangerous chemicals from discharge effluent 43. In China Vetiver is used widely on landfill waste sites to stabilise the soil (preventing rubbish from being blown across the landscape and to absorb toxic chemicals, including lead from discarded batteries (90% absorption rate) leaking into the water table.

It has been demonstrated, through many projects in a number of countries, that Vetiver grass grown hydroponically, floated on polluted water, has the effect of removing toxins, bad smells, controlling insect breeding (such as mosquitoes) and preventing the growth of algae in the water. Used around open sewers, on stagnant water, and in basins trapping toxic effluent from industry it could make a significant contribution to rehabilitating environmental pollution and protection of the water supply from contamination.

Vetiver hedges, planted to surround cultivated fields, or around dams, ponds and lakes can prevent, or reduce the need for agricultural chemicals,

and prevent their leakage into, and pollution of, precious water supplies where animals drink and which recharge underground water tables. For Allah (SWT) says;

"Have you seen the water which you drink? Was it you who sent it down from the raincloud , or did We send it? Were it Our will, We could have made it bitter; why then do you not give thanks?" (Qur'an 56:68-70)

Not only should we give thanks, but we should demonstrate that awareness of the nature of Allah's (SWT) gift by ensuring that we ourselves do not make that gift "bitter" or polluted, and where we have, seek all means to restore it. If, as the Prophet (pbuh) has said; *"The whole earth has been created as a place of worship for me, pure and clean."* (Bukhari, Muslim, and al-Tirmidhi) 44. Is it not our duty to do all in our power to keep it so?

Air pollution and Carbon sequestering:

Whilst air pollution is not a major factor in Senegal outside of the pollution cause by vehicle emissions in the major cities, Senegal is seriously effected by climate change which it is now universally accepted to be caused by global warming. The carbon emissions are generated in the main by CO2 emissions from the developed world. As Dr Muzammal Hussain puts it:

"...what is clear on considering the geographical distribution of the impacts of climate change, is that it is those who are relatively low emitters of greenhouse gases...who appear to be affected the most; and it is those that emit the most greenhouse gases, who are in general facing the consequences least. Equally, predictions for the future suggest a similar pattern, that the regions that are likely to be most affected, are not necessarily those that are most polluting. It is also clear that those polluting today will be affecting the lives of those born tomorrow" 45

Does this mean that because we in Senegal are not responsible for the bulk of emissions that we should not involve ourselves in action to combat this pollution?

Dr Muzammal Hussain goes on to argue that:

"From ...an Islamic approach to responding to climate change impacts, it seems clear that damage limitation, acute assistance and reducing greenhouse gas emissions would form an integral part of such a response... (and that) individual followers (of Islam) would be expected to engage with the challenges according to the extent that they are able... it is apparent that on the basis of individuals being affected by the actions of another's wrongdoing, that this could present a motivation for the believer in this principle to attempt to right the actions of those who are doing the wrong. Hence, (the) effort to slow down or prevent further climate change ...whether or

not they are large emitters of greenhouse gases, seems to be encouraged in the religion” 46

This is supported by the Prophet (pbuh)’s saying that;

“who sees something detestable, let him change it with his hand, if he cannot, then with his tongue and even if he is able, then with his heart, and that is the weakest form of faith” (Muslim) 47

Whilst there are many things that the ordinary citizen can do to support local and global campaigns against carbon emissions, there are also simple practical measures which Senegalese farmers and environmentalists can take to play their role when seeing something “*detestable*” (global warming caused by carbon emissions) can “*change it with (their) hand(s)*”.

Research quoted by Dick Grimshaw, from the Vetiver Network International, suggests that Vetiver grass is “*one of the worlds best carbon sequesters*” and it is estimated that “*1 linear km of Vetiver hedgerow (6,000 plants) might sequester as much as 15 tons of carbon per year. Vetiver would sequester 4.5 times more carbon than a fast growing poplar trees per unit area*”. 48

By planting Vetiver hedges, as well as other benefits outline above, Senegalese farmers can also contribute to fulfilling their religious duty of stewardship of the planet in relation to mitigating against global warming and CO₂ in the atmosphere.

If atmospheric pollution can be equated to effects of eating garlic or onion before entering the mosque, as described in a Hadith of the Prophet (Ahmad, Abu Dawud and Ibn Hibban) 49 Abu-Sway argues after a fatwa by Dr. Yusuf Al-Qaradawi 50, that

“By analogy, anything that pollutes the air and is detrimental to the health should be prohibited. This includes indirect harm such as in the case of CFC which depletes the ozone. Harmful fumes that cannot be prohibited all together, should be reduced and alternatives should be made popular” 51

Other uses of Vetiver:

Although the theme of this paper is principally on Islam, the environment and the environmental benefits of Vetiver, it is as well to make some references to the many other benefits of the Vetiver plant.

Poverty alleviation using Vetiver Plant material for handicrafts:

Vetiver grass has the possibility to be used for a number of purposes useful in generating income and alleviating poverty.

Initiatives in both Thailand and Venezuela have demonstrate that by using the plant leaves as a material for handicraft production, especially for the high-end handicraft market has produced benefits both for those who make the handicrafts and those who grow the raw material.

“Venezuela started working with Vetiver Systems some 10 years ago by approaching its introduction through community development as a handicraft for the rural poor. The impact is impressive and over 11,000 poor people have benefited from Vetiver handicraft income. Many of these people have completely changed their lives and have a new sense of self-esteem” (Grimshaw) 52

The Thai renowned research scientist, research administrator, lecturer, author and editor, Dr Narong Chomchalow, in commenting on the Venezuelan experience of using Vetiver handicrafts in community development and poverty alleviation, says:

“That by utilization of Vetiver as a source of raw material for handicraft making, the poor people in the community not only earn extra income - most often the only income -, but are united in their mutual activity in the community. This has culminated in more and more Vetiver is being planted for soil and water conservation in the farmlands and elsewhere” (Chomchalow) 53

There is every reason to believe that, with it’s tradition of highly skilled handicraft work, Senegal could use Vetiver grass to similar effect, and make a real impact to relive poverty.

“And if ye fear poverty, soon will Allah enrich you, if He wills, out of His bounty, for Allah is All-knowing, All-wise.” Qur’an 9:28

Vetiver for thatched roofs

Mature Vetiver grass, due to its toughness, and its resistance to pests makes an excellent thatch that has a long life since the leaves do not deteriorate quickly. This use of the leaves is known worldwide, but in Senegal its use in thatching is found principally amongst farmers and pastoralists in the river region where some wild varieties are found.

Medicinal uses and aromatic oil

The use of plants as medicine is well known in both Senegalese medical traditions and in Islam. Vetiver has traditionally been utilized as for

medicinal and aromatic purposes since ancient times, particularly in India, Indonesia, Pakistan, Sri Lanka, and a few other countries including Senegal.

Narong Chomchalow ⁵⁴ provides a thorough outline of some of the traditional medicinal uses of Vetiver in a number of countries;

- In Senegal the variety *Vetiveria nigritana* is traditionally used to calm emotional stress, as an aphrodisiac, but most commonly used and sold as a water purifier. Young women use an infusion of Vetiver roots to relieve menstrual cramps and after childbirth, the water is used to clean the reproductive system. In Casamance it is used to speed up the healing of wounds and open sores.
- In India it is used to treat mouth ulcers, boils, epilepsy, burns, snake bite, scorpion stings, fever, headache, a tonic for weakness, a treatment for urinary infections, and as a leaf paste for rheumatism, lumbago and sprains.
- In Pakistan, Vetiver is used traditionally, to treat fever, cardiac debility, palpitations, fainting, inflammation and irritability of the stomach, as a cure for polydipsia in children, to check vomiting in cholera, as a cure for and to drive away adverse effects of polluted air and atmosphere.
- In Thailand it has been used to dissolve gallstone, to reduce fever, to treat diseases related to bile and the gall bladder, and in healing stomach discomfort. Vetiver is used to improve functioning of the heart, to nourish the blood, to cure urination problems and in treating nervous disorders.

"There is no affliction that Allah has created, except that He also has created its treatment." ⁵⁵

The roots of the Vetiver grass contain an essential oil, known as Vetiver oil or 'khus oil', which can be extracted for a number of uses;

Vetiver oil has been utilized as raw material for various fragrant products such as perfumes, including several famous brands, deodorants, lotions, and soaps.

Apart from the medicinal uses found in the roots, leaves and oil, stated above, the oil also has pesticidal properties. Vetiver oil is known to repel insects, flies and cockroaches, moths and termites.

Infrastructure and coastal protection

There is a wide variety of experience worldwide in using Vetiver to strengthen and protect a range of infrastructures subject to erosion and degradation. The Vetiver system has proved effective in strengthening bridges, railways, dams, mines, buildings, and highways, in countries

ranging from China, Vietnam, Venezuela, El Salvador, Australia, India, Congo, and Madagascar to name but a few.

Conclusion:

In this paper I have humbly tried to understand the relationship between Islam and the Environment. I have tried to uncover the Muslim perspective for the benefit both of Muslims, who are not as aware as they might be, but also for the many non-Muslims who have a very narrow, and often negative, view of Islam.

I have searched to try and establish what the duties of Muslims are towards the environment, in order that these principles can act as a guide to our actions.

Whilst there are other, much more learned writers on Islam and the Environment, many of whom are quoted here, I was concerned to not only establish an academic or religious view, but to also provide a practical introduction to one of many potential practical solutions (for only Allah knows) for the daily environmental problems confronting the Senegalese people. It is for this reason that I selected Vetiver grass, as the closest example of a multi-purpose solution that I am aware of, indeed it is an example of Allah's (SWT) creation, that for me, at least, been one of the 'signs' of Allah's (SWT) 'Truth'. I believe that if Vetiver becomes consciously used widely and popularly in Senegal, it will have a significant beneficial impact, not just on the environment, but on our own spiritual understanding of Islam.

By writing this, it is my sincere wish that the paper will also be of use to the wider Muslim community beyond the focus on Senegal that this paper has taken.

“Verily We established his power on earth, and We gave him the ways and the means to all ends. One (such) way he followed.” Sûrah al-Kahf : 84-85

WAllahu Ta`ala A`lam wa Ahkam.
{Glory to You, we know nothing except what You taught us.}

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Tony divides farming with time with in London UK, as an educationalist, and organises and delivers training to professionals working with young people.

He was converted (reverted) to Islam in 1980, by the late Imam Ratab Abdoulie Jobe, whilst working as a teacher in the Gambia.

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