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A REDD SOLUTION TO A GREEN PROBLEM: USING REDD PLUS TO ADDRESS DEFORESTATION IN GHANA THROUGH BENEFIT SHARING AND COMMUNITY SELF-EMPOWERMENT

WILLIAM DANIEL NARTEY*

I. INTRODUCTION

When you enter a grove peopled with ancient trees, higher than the ordinary and shutting out the sky with their thickly intertwined branches, do not the stately shadows of the wood, the stillness of the place, and the awful gloom of this doomed cavern then strike you with the presence of a deity?

(Seneca, 4 BC–AD 65)

As the ancient Roman philosopher correctly observed, a reverent presence is felt when one enters the forest. Its composition of still beauty and the feel of protection it generates confirm that it is indeed God's gift to humanity. Then should humans not be thankful for this gift bestowed upon them, accord it with respect, and treat it with the utmost care? Unfortunately, man's desire for economic wealth and a need for survival have led to a reckless and negligible attitude toward the use and care of the world's forests.

The process of converting forests into non-forests deforestation claims 17 million hectares of the world's tropical forests each year.¹ Deforestation has a significant impact on environmental damage and economic deterioration, and a direct effect on climate change.² In addition to releasing stored carbon, which is a greenhouse gas (GHG), it reduces the remaining forests' capacity to absorb

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1 M. K. Hoyt, Note, 'Breaking the Trade Barrier: Common Property Solutions to Tropical Deforestation', 5 *Minnesota Journal of Global Trade* (1996): 195, 212.

2 *Ibid.*

carbon from the atmosphere.³ Tropical forests represent most of the forest lands in developing nations, accounting for 42 per cent of the world's forests.⁴

Ghana is located on the West Africa's Gulf of Guinea, in a tropical climate, a few degrees north of the equator. It has a total land area of 238,540 square kilometres of which the land area constitutes 230,020 square kilometres.⁵

Ghana is no stranger to the problem of deforestation. The developing country's rainforest has been decreasing rapidly and significantly over time. The condition of Ghana's forests has been in decline for many years, particularly since the 1970s.⁶ The country loses its forest cover at the rate of 700,000 hectares per annum. Of the 8.3 million hectares of high forest existing at the beginning of the twentieth century, only 1.6 million hectares remain.⁷

The immediate drivers of deforestation are: (1) policy and market failures in the timber sector; (2) growing population in rural and urban areas, which increases local demand for agricultural and wood products; (3) high demand for wood and forest products on the international market; (4) heavy dependence on charcoal and wood fuel for rural and urban energy; and (5) slash and burn agricultural practices destroying the fertility of lands.⁸ Many forest reserves are heavily encroached and degraded, and being rapidly depleted.⁹ The impact of deforestation is widespread, affecting the livelihoods of local people, disrupting important environmental functions, and disturbing the biological integrity of the original forest ecosystem.¹⁰ There is a serious concern in the region about climate change as a result of state and local practices and interests contributing to this phenomenon.¹¹ A contributing factor to this problem is the country's land tenure system.

3 R. S. Abate and T. A. Wright, 'A Green Solution to Climate Change: The Hybrid Approach to Crediting Reductions in Tropical Deforestation', 20 *Duke Environmental Law and Policy Forum* (2010): 87, 89.

4 B. Chase, 'Tropical Forests and Trade Policy: The Legality of Unilateral Attempts to Promote Sustainable Development under the GATT', 17 *Hastings International and Comparative Law Review* (1994): 349, 354–5.

5 J. K. Teye, 'Deforestation in Ghana', *Human Landscape Ecology, Selected Term Papers 2003/2004*, ed. K. Potthoff (2005), available at <http://www.svt.ntnu.no/geo/Doklager/Acta/Human%20landscape%20ecology.pdf> (accessed 30 October 2012).

6 Forestry Commission of Ghana, *Ghana Investment Plan for the Forest Investment Program* (31 August 2012), available at http://www.fcghana.org/assets/file/Programmes/Forest_Investment_Plan_fip/Ghana%20Draft%20FIP%203-5%20_31_august2012.pdf (accessed 3 November 2012).

7 E. Abotsi, 'Ghana's Environmental Framework Law and the Balancing of Interests', in M. Faure and W. du Plessis (eds), *The Balancing of Interests in Environmental Law in Africa*, Pretoria University Law Press (2011), pp. 135–66, p. 139, available at http://www.pulp.up.ac.za/pdf/2012_04/2012_04.pdf (accessed 9 November 2012).

8 Forestry Commission of Ghana, *supra* note 6, p. 3.

9 Forestry Commission of Ghana, *REDD Readiness Preparation Proposal*, available at http://www.fcghana.org/assets/file/Programmes/Reduced%20Emmissions%20for%20Deforestation%20&%20Degradation/Revised%20Ghana%20R-PP_1%20Nov.pdf (accessed 30 October 2012).

10 TED Case Studies, *Ghana Forest Loss*, available at <http://www1.american.edu/TED/ghana.htm> (accessed 30 October 2013).

11 *Ibid.*

The Ghanaian government is vested with management and commercial rights of natural resources on all public lands, including customary lands in the national interest, even though ownership rights to these lands may be retained by stools or communities.¹² These vested designations include many forest lands upon which these communities dwell. In addition, the laws direct all benefits and revenue from minerals on these lands exclusively to the government.

The government holds the exclusive right to grant logging and mining licences as it deems proper and which typically provide minimal financial and economic benefit to the affected communities and stakeholders. The licensees, including commercial timber companies upon completion of timber logging activities, often fail to regenerate the forest area felled thereby leaving forest land bare. These companies also regularly exceed the scope of their licence by logging beyond their designated areas. These activities are conducted without the fear of serious reprimands because of lack of adequate oversight by the Forestry Commission.

The lack of oversight is due to a lack of resources to monitor the vast amounts of land for which logging licences are granted.¹³ Another reason for this defiant attitude of the commercial timber logging companies is due to corruption among forestry officers designated to monitor the forest, who may be paid off. Observed in other parts of the world as a common phenomenon, corruption thrives especially well in the forestry sector.¹⁴ For one, forest regions tend to be remote and sparsely populated.¹⁵ As such, illegal practices and bureaucratic corruption can easily go unobserved by the public, the press and the honest elements of forest agencies.¹⁶ This has contributed significantly to the country's deforestation problem as often economic interests overshadow the threat of loss of forest cover and ultimately contribute to the lasting effects of climate change.

For the forest-dwelling communities, deforestation is an essential part of their income, as agricultural expansion and logging activities contribute to their economic stability. Due to the absolute power in the State in the appropriation of financial benefits from the minerals and other natural resources on forest lands, actively combating deforestation is not a primary agenda for forest-dwelling communities because it threatens their very economic existence. A balance between government and local community economic interests is a necessary goal that must be achieved to effectively address the country's deforestation problem.

The government, through adoption of a policy, should recognise carbon rights as a natural resource and some of its management and benefit rights must be focused toward the forest communities who directly impact its production. Like other countries with tropical high forests, Ghana is in the early stages of grappling

12 Constitution of the Republic of Ghana 1992, article 257(6).

13 Interview with Mr Richard Dornu Nartey, Former Minister of Lands and Forestry, Fourth Republic of Ghana (25 September 2012).

14 M. L. Brown, 'Limiting Corrupt Incentives in a Global REDD Regime', 37(1) *Ecology Law Quarterly* (2010): 237, 254.

15 *Ibid.*

16 *Ibid.*

with the opportunities and challenges posed by carbon finance and REDD.¹⁷ Carbon, which has recently evolved globally as a natural resource, has not been specifically recognised or provided for in the Ghanaian constitution or related legislation. This objective can be met, within an institution of REDD and REDD plus policies.

REDD refers to efforts and strategies to reduce GHG emissions from deforestation in developing countries. The idea of REDD was conceived in 2005 by developing countries, as their important way of contributing to solving the problem of climate change, and also supporting their economies. REDD plus is an extension of REDD that delineates specific conservation activities, and is the most developed method of forest conservation. It allows governments and private companies to offset their own carbon emissions by paying to keep forests standing, and, in effect, purchasing the carbon that is stored inside.¹⁸ This method of forest conservation is proving effective worldwide in the conservation of tropical rainforests.¹⁹ The most common avenue of implementation is a national approach where credits are paid to national governments who implement policies in controlling the emissions of carbon in their forests.²⁰ This form of centralised government implementation presents some challenges, however. The implementation of REDD plus policies requires extensive extraction of historic forest data monitoring and verification, which is costly.²¹

The vast areas that tropical forests usually encompass makes it a challenge for effective monitoring and thus heavy financial investment is required for monitoring activities. As a result, the financial benefit obtained by government from investors and from carbon credits rarely finds its way into the hands of local forest communities and stakeholders. A REDD plus approach places the implementation burden and financial benefit of the programme in the government's hands and thereby creates a disincentive in rural communities to play an active role in curbing carbon emissions through the preservation of forest cover. This is of particular concern because for many developing countries, the day-to-day stewards of tropical forests are the indigenous and forest communities in the forest area.

A plan is needed that can create a substantial financial benefit for the local communities and strike a healthy balance between the government and its people to effectively curb the problem of deforestation. Within this plan also lies an opportunity for the advancement of gender roles for women, who in many developing countries have traditionally been limited to homemaking roles.

17 Katoomba XV, *Realizing REDD+ Implications of Ghana's Current Legal Framework for Trees* (October 2009), available at http://www.katoombagroup.org/~forestrtr/documents/files/doc_2354.pdf (accessed 2 November 2012).

18 J. Vidal, 'Q&A: Reducing Emissions from Deforestation and Forest Degradation (REDD)', *Guardian*, 24 September 2009, available at <http://www.guardian.co.uk//2009/sep/24/redd-reducing-emissions-from-deforestation> (accessed 2 November 2012).

19 *Ibid.*

20 *Ibid.*

21 *Ibid.*

Deforestation in Ghana also poses an immediate threat to the economic future of the country. In spite of the extensive body of Ghanaian laws espousing land and forest protection, these sectors continue to be plundered by national and private interests and a dire need for sustenance for forest dwelling communities. A perpetuation of this status quo will eventually eliminate an important source of financial and sustainable resources to both government and local stakeholders.

Ghana needs to adopt a modified REDD plus policy in light of its economic and social realities. This will require a significant integration of the forest communities and stakeholders in governmental policy implementations as well as adequate compensation for their efforts.

The government of Ghana can learn from the Brazilian approach to tropical deforestation in the Amazon region. A community monitoring, reporting and verification (MRV) system as well as the development of sustainable forest practices supported by a government-established public stewardship fund which recognises the efforts, and integrates and compensates the stakeholders, will be effective in addressing the country's deforestation problem. This would achieve the ultimate objective of REDD, which is to sequester carbon in forests. This model has been successfully implemented in the Brazilian Amazon under the Juma Sustainable Development Reserve Project. Ghana will realise greater effectiveness in addressing its deforestation problem by adopting a slightly modified and personalised approach to Juma.

Part II of this paper addresses the primary driving factors of deforestation in Ghana, including human activities such as legal and illegal logging and unsustainable agricultural practices, as well as non-human factors such as poverty and population growth, which are inevitably linked. Part III identifies the constitutional land tenure rights and laws of the timber industry, assessing how these have contributed to deforestation in Ghana as well as established measures to combat the problem. Part IV explains the historical background and a working framework of REDD. Part V evaluates the Brazilian approach to its deforestation problem, with specific emphasis on the Juma Sustainable Development Reserve Project in the Amazon region. Part VI proposes a solution to Ghana's deforestation problem advanced within a modified and multifaceted REDD plus model with a significant emphasis on a community-centred monitoring, verification and reporting system, self-empowerment and gender advancement, and a recognition of carbon rights as motivational and stronger enforcement measures.

II. DRIVERS OF DEFORESTATION IN GHANA

Generally there has always been a recognised and accepted human relationship with nature, including its forests. This includes human use of the natural forest land for food and economic survival, which if properly controlled, is not generally harmful. However, the imbalance between the forests deforested for community and commercial uses and their reforestation is the major contributor to the country's problem. All the vegetation types in Ghana, except for those comprising

the savannah, are considered tropical forests and play a very important role in supporting the livelihood of 21 million Ghanaians, particularly the rural communities.²²

There are various factors that account for the deforestation problem in Ghana. They can be divided into direct and indirect causes. The direct causes are human activities, which include logging, agricultural activities, fuel wood production, bush fires and the expansion of human settlements. Ghana's economy has historically depended heavily on its natural resources. It is especially dependent on sectors affected by the climate such as agriculture, fisheries, tourism and the forest sector. Over 70 per cent of the population depends on natural resources for their basic food, water and energy requirements.²³ The agriculture sector, which includes forestry, is the largest contributor to GDP, while forestry alone contributes an estimated 4 per cent.²⁴ Timber, cocoa, minerals and fish represented 48 per cent of GDP, 90 per cent of foreign export earnings and 70 per cent of total employment.²⁵

Over the last decade, however, agriculture's contribution to the national economy has declined from 51 per cent to 36 per cent of GDP.²⁶ About one-third of the land area is threatened by deforestation caused mainly by slash and burn agriculture and over-cultivation of cleared land, resulting in widespread soil erosion and degradation.²⁷ As a result, the rural population now accounts for almost 75 per cent of the Ghanaians who live below the poverty line.²⁸ The continuing rise in the rate of population growth without a parallel and necessary increase in social amenities has also had a deleterious effect on the environment.²⁹ The increase in temperature, and decrease in rainfall and its predictability are likely to jeopardise the employment of small-scale rural farmers. This will result in unsustainable livelihoods and negative consequences for socio-economic growth in areas including poverty, health and natural resources.³⁰

The timber industry is currently the fourth-largest foreign exchange earner after minerals, cocoa and tourism. Primary wood and processed products account

22 T. Tyynelä, L. Damnyag, M. Appiah and A. Pappinen, 'Benefits of Restoring Degraded Forest Lands in Ghana', in K. Piatek, B. Spong, S. Harrison and D. McGill (eds), *Seeing the Forest Beyond the Trees: New Possibilities and Expectations for Products and Services from Small-scale Forestry*, Proceedings of the 2009 IUFRO 3.08 Small Scale Forestry Symposium, Morgantown, West Virginia (7–11 June 2009).

23 Forestry Commission of Ghana, *supra* note 6, p. 1.

24 *Ibid.*

25 World Bank Group, *Ghana Economics of Adaptation to Climate Change, Final Consultation Draft* (2009), pp. 31–8, available at http://siteresources.worldbank.org/EXTCC/Resources/EACC_FinalSynthesisReport0803_2010.pdf (accessed 28 October 2012).

26 Ghana Environmental Protection Agency, *Policy Series Advisory* (26 June 2011), available at http://www.epa.gov.gh/index.php?option=com_docman&task=doc_details&gid=92&Itemid=73 (accessed 3 November 2012).

27 The United Nations Environment Programme (UNEP), *Republic of Ghana Country Profile*, available at http://www.unep.org/pdf/PressReleases/Ghana_Africa_Atlas.pdf (accessed 30 October 2012).

28 *Ibid.*

29 Abotsi, *supra* note 7, p. 139.

30 UNEP, *supra* note 27, p. 1.

for 89 per cent and 11 per cent of timber exports, respectively.³¹ Mining is one of the most important sectors in the Ghanaian economy. The main minerals mined in Ghana are gold, diamonds, manganese, bauxite, sand, stone, salt and kaolin. Mining occurs both on a large- and on a small-scale level. Small-scale mining is also known as traditional mining.³² For decades, the State has allowed timber and mining corporations through the grant of mining concessions free reign to destroy Ghana's tropical forests.³³ The afforestation of lands destroyed or greatly affected by timber and mining activities, an important component of the requirements in mining contracts, is largely ignored by both timber and mining companies. What further compounds the problem is the lack of accountability by the state bodies responsible for oversight in this area. A lack of adequate financial resources, resulting in inadequate official personnel, contributes to this lack of proper oversight.³⁴ Another contributing factor is the problem of corruption. Forestry officials, responsible for oversight, are sometimes selectively and lucratively compensated by some of these mining companies to absolve them from responsibility and in effect to turn a blind eye to the mining companies' non-compliance.

Compensation for natural resource extraction on privately owned lands, provided for in the constitution, including communities that live within these timber and mining concession areas, is very limited and highly inadequate. The power of the State to promote this continued inadequacy is derived from the State's supreme control of natural resource rights expressly provided for in the country's constitution. As a result, Ghana's forest cover has considerably diminished. Between 1990 and 2005, Ghana lost an average of 135,400 hectares of forest per year. This amounts to an average annual deforestation rate of 1.82 per cent.³⁵ Between 2000 and 2005, the change in hectares of forest lost increased by 4.2 per cent resulting in a 1.89 per cent increase in the annual deforestation rate. In total, between 1990 and 2005, Ghana lost 25.9 per cent of its forest cover, about 1,931,000 hectares.³⁶

The indirect causes of deforestation are those factors which initiate the immediate direct causes. They include factors such as fast population growth, poverty, climate change and ineffective government policies. The high population growth rate in Ghana over the past decades presents a number of environmental challenges. Primarily, rapid population growth exerts enormous pressure on the country's natural resources and amenities.³⁷ A consequence of rapid population

31 Forestry Commission of Ghana, *supra* note 6, p. 4.

32 Abotsi, *supra* note 7, p. 142.

33 A. Katako and M. Vigoda, 'The Case of Forest Watch- Ghana' (2007), <http://pqdl.care.org/CuttingEdge/Advocacy%20in%20Programming-The%20Case%20of%20Forest%20Watch-%20Ghana.pdf> (accessed 1 November 2012).

34 Nartey, *supra* note 13.

35 Ghana Forest Information and Data (2010), available at <http://www.rainforests.mongobay.com/deforestation/2000/Ghana.htm> (accessed 2 November 2012).

36 *Ibid.*

37 Abotsi, *supra* note 7, p. 141.

growth is poverty among a nation's people. Climate change can lead to declining agricultural production and ultimately food shortages. In the same way, some of the socio-economic effects may later serve as underlying factors to further trigger the direct causes of deforestation. For instance, low production due to climate changes may lead to poverty but poverty itself can also further aggravate the rate of deforestation.

Logging for timber, clearing for cash crops and cultivation for fuel wood are some of the resultant contributory factors. The agricultural activities are directly related to deforestation in several ways. Significant portions of the forests are cleared annually for the production of cash crops such as cocoa, which is the second-largest foreign exchange earner in Ghana but only grows well in the forest zone.³⁸

Policy failures have also contributed to the perpetuation of deforestation in Ghana. It can be argued that the actual policies are influenced to some extent by personal interests irrespective of various reforms. As a result, fee setting for logging activities may not be at an otherwise premium level and thus facilitates significant profits for the timber companies. As a result, policy makers may benefit from political and financial kickbacks from timber companies, furthering conflicts of interest. Another view with respect to policies is that it is not the policies themselves that have failed. This school of thought emphasises the lack of enforcement of the policies as the cause of deforestation.

III. LAND TENURE IN GHANA

A. Constitutional provisions

Land tenure can be defined as the rights regarding who can hold and use land and resources for prescribed periods and conditions. Land tenure and administration in Ghana is generally governed by provisions of the country's 1992 Constitution.³⁹ Two separate tenure systems are recognised: one for public lands and the other for customary lands.⁴⁰

All public lands are vested in the president on behalf of and in trust for the people of Ghana. This power is drawn from two major authorities. The 1992 Constitution and the Administration of Lands Act exclusively grant the president the power, on behalf of the public interest, by executive instrument, to declare any land to be vested in him in trust.⁴¹ The administration of these public lands is implemented by the Lands Commission, which operates under Act 483 of the Lands Commission Act with the coming into force of the country's 1992 Constitution.⁴² Article 258(1) of the 1992 Constitution expressly

38 Teye, *supra* note 5, at 14.

39 See Constitution of the Republic of Ghana 1992, chapter 21, article 257.

40 *Ibid.*

41 Act of Parliament of the Republic of Ghana Act 123, section 7, Administration of Lands Act (1962), available at <http://faolex.fao.org/docs/pdf/gha3115.pdf> (accessed 1 November 2012).

42 Act of Parliament of the Republic of Ghana Act 483, Lands Commission Act (1994), available at <http://ghanalegal.com/?id=3&law=163&t=ghana-laws> (accessed 29 October 2012).

empowers the national and regional Lands Commissions to manage public lands and any lands vested in the president or the Commission on behalf of the government. The Commission also advises the government and local and traditional authorities on the policy framework for developing particular areas to ensure that the development of individual pieces of land coordinates with the relevant development plan for the area concerned.⁴³

The government of Ghana, through the Lands Commission, acts as a trustee vested with complete management rights even though the day-to-day oversight and management is primarily handled by the district stools. Public lands encompass many of the country's forests. Consequently, the stools or communities may own the land but not the forests on the land. Article 257(6) of the 1992 Constitution further provides the State with exclusive mineral rights,⁴⁴ specifically, that every mineral in its natural state in, under or upon any land, rivers, streams, water courses throughout Ghana, and any area covered by the territorial sea or continental shelf, is the property of the Republic of Ghana and shall be vested in the president on behalf of, and in trust, for the people of Ghana.⁴⁵ In effect, regardless of who owns the land upon or under which minerals are situated, the exercise of any mineral right requires, by law, a licence granted by the Minister for Mines who acts as an agent of the State for the exercise of powers relating to minerals.⁴⁶

Customary lands are those lands generally managed in common by traditional authorities known as stools. A 'stool' refers to a community governance or administrative structure similar to dynasties.⁴⁷ Stool lands make up about two-thirds of the land in Ghana. The Constitution of Ghana recognises that stool lands may become a part of public lands if the Regional Lands Commission of the region in which the land is situated has certified that the disposition or development is consistent with the development plan drawn up or approved by the planning authority for the area concerned.⁴⁸

B. Forests and timber rights

In pre-colonial Ghana, forests were owned in common by communities composed of families, clans and stools. However, the country's Forest Ordinance of 1927 gave authority to the colonial government to reserve parts of the country's forests.

43 *Ibid.*

44 *Ibid.*

45 *Ibid.*

46 G. A. Sarpong, 'Improving Tenure Security for the Rural Poor: Towards the Improvement of Tenure Security for the Poor in Ghana', Workshop for Sub-Saharan Africa Working Paper No. 2, Food and Agriculture Organization of the United Nations (2006), available at <ftp://ftp.fao.org/docrep/fao/010/k0783e/k0783e00.pdf> (accessed 20 October 2012).

47 R. K. Kasanga, J. A. Cochrane, R. King and M. J. Roth, 'Land Markets and Legal Contradictions in the Peri-Urban Area of Accra Ghana: Informant Interviews and Secondary Data Investigations', Research Paper 127, Land Tenure Center, University of Wisconsin-Madison, Land Administration Research Center (1996).

48 Act of Parliament of the Republic of Ghana, Public Lands Act, Act 267 (1992).

Although the bill did not alter ownership of the forest reserves, it vested them in the government of Ghana and prescribed that they should be held in trust for the communities.⁴⁹ Nevertheless, the government of Ghana's management rights have resulted in the expropriation of these communities through timber logging concessions in the country's forest reserves.

The country's timber industry is governed by its timber laws. Specifically, the Timber Resource Management Act (TRMA) enacted in 1998 provides for the grant of timber rights in a manner that secures the sustainable management and utilisation of the timber resources of Ghana and to provide for related purposes.⁵⁰ This Act also designates the areas that are subject to timber rights and addresses penalties for illegal logging. More importantly, as a matter of addressing public-service corruption that has historically plagued the country, the Act mandates punishment of public officials who conspire with individuals and/or companies to contravene the Act's provisions.

Management and commercial rights to timber species belong to the State in both reserved and off-reserve areas. Off-reserve areas include national parks and other designated areas for protection including privately owned land. The land owner has no economic rights to timber trees naturally occurring on their land;⁵¹ however, these owners and users are the primary influence on the vegetation that is allowed to grow and thus they should have a very important economic part also in its survival.⁵²

C. Current approaches to combating deforestation

The government of Ghana has existing laws and has initiated policies addressing environmental protection. If adequately implemented and enforced, these laws and policies should effectively combat the problem of deforestation; however, the lack of proper oversight and inadequate financial resources contributes to the perpetuation of the country's deforestation problem.

Article 36(9) of the Constitution of Ghana expresses the country's commitment to sound environmental management and stipulates that the 'State shall take appropriate measures needed to protect and safeguard the national environment for posterity'.⁵³

The Forest and Wildlife policy established in 1994 is the main forestry protection policy document of the government of Ghana. The objective of the policy is to target conservation and sustainable development of the country's forest and wildlife resources, maintenance of environmental quality and a secured flow

49 Gold Coast Law Ordinance Cap. 157, Forest Ordinance, 1927, revised edn (1954), available at <http://faolex.fao.org/docs/pdf/gha40761.pdf> (accessed 30 October 2012).

50 Act of Parliament of the Republic of Ghana, Timber Resource Management Act, Act 547 (1998).

51 Katoomba XV, *supra* note 17, p. 1.

52 *Ibid.*

53 Constitution of the Republic of Ghana 1992, article 36(9), The Directive Principles of State Policy, Political Objectives (1992).

of benefits to all segments of society.⁵⁴ This policy was passed in response to increasing forest exploitation and the ineffectiveness of the forestry institutions at the time, due to underfunding, to combat the growing problem in the preceding decade of its legislation. This policy has had a minimal impact overall in combating deforestation. This is primarily due to a lack of enforcement of the policy by local authorities such as the District Assemblies, who possess the related enforcement powers.

Among the many governance institutions in Ghana, District Assemblies are the institutions in closest proximity to the challenges of environmental degradation, as they are the custodians of local environmental resources.⁵⁵ The Local Government Law entrusts District Assemblies with the responsibility for the development, improvement and management of human settlements and the environment in the district.⁵⁶ They wield an enormous amount of power and influence in environmental matters and arguably are situated in a good position to shape Ghana's environmental agenda.⁵⁷ Regrettably, these assemblies have over the years consistently neglected their environmental responsibilities. This is primarily exhibited in the failure of the various assemblies to actively enforce environmental standards in the districts by publicising the relevant laws affecting the environment, and in providing the needed technical support to institutions and bodies seeking to undertake ventures with environmental consequences, and prosecuting deviations where necessary.⁵⁸ These assemblies in practice continue to demonstrate ambivalence towards the environment, largely due to their preference for economic transactions rather than environmental issues.⁵⁹ The district assembly membership is mainly composed of members of its locale. Since many of the forest communities share the same social and economic realities, the actions or non-actions of these assemblies is an accurate reflection of local interests above government and national interests.

IV. WHAT IS REDD?

The United Nations Framework Convention on Climate Change (UNFCCC), an international treaty, evolved out of a common realisation by countries to cooperatively consider what they could do to limit average global temperature increases and the resulting climate change, and to cope with the inevitable impacts as of its inception.⁶⁰ The Kyoto Protocol is an international agreement linked to the UNFCCC. The interrelationship between the Protocol and the UNFCCC is that

54 Forestry Commission of Ghana, *Forestry and Wildlife Policy, Forest Laws and Regulations*, (2006), available at <http://www.fcghana.org> (accessed 30 October 2012).

55 Abotsi, *supra* note 7, p. 153.

56 Ghana Local Government Act 462 (1993).

57 Abotsi, *supra* note 7, p. 153.

58 *Ibid.*, p. 154.

59 *Ibid.*

60 See 'Background on the UNFCCC: The International Response to Climate Change', available at http://unfccc.int/essential_background/items/6031.php (accessed 1 November 2012).

the latter encouraged industrialised countries to stabilise GHG emissions, and the Protocol committed them to actively pursue its realisation.⁶¹ Under the Kyoto Protocol to the UNFCCC, Annex 1 countries composed of developed countries that have adopted emissions reductions targets are authorised to invest in another country to reduce emissions and thus offset their own emissions as a means of meeting up to 1 per cent of their Kyoto Protocol reductions targets through the Clean Development Mechanism (CDM), which is one of three market-based mechanisms of the protocol.⁶² The aspiration of the CDM is that by providing non-Annex B nations, mainly consisting of developing nations, with financial incentives for low-carbon intensity development, they might be nudged, however slightly, onto more climate-friendly trajectories.⁶³ On conception of this framework, the parties to the agreement excluded REDD activities from the offset mechanisms because of uncertainties about the magnitude of deforestation emissions and the ability to monitor deforestation.⁶⁴ Consequently, REDD projects have been excluded from regulatory markets and are limited to the voluntary carbon market.⁶⁵

REDD refers to efforts and strategies to reduce GHG emissions from deforestation in developing countries. REDD was proposed in 2005 by developing countries, led by the Coalition of Rainforest Nations, because they saw reducing deforestation as one of the key ways they could contribute to solving climate change, while supporting the sustainability of their economies and environment.⁶⁶ The Coalition presented its draft proposal for reducing emissions from deforestation in developing countries at the Eleventh session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 11).⁶⁷ Two years of negotiations resulted in the Bali Action Plan of December 2007, which called for 'policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries (REDD)'⁶⁸ Initially focused exclusively on the avoidance of deforestation, REDD evolved to include sustainable forest management and related activities, becoming known as REDD plus.⁶⁹

61 *Ibid.*

62 See United Nations Convention Framework on Climate Change, 'Land Use, Land-Use Change and Forestry Activities', (Under the Kyoto Protocol), Decision 11/CP.7, in *Report of the Conference of the Parties on its Seventh Session, Held at Marrakesh from 29 October to 10 November 2001*, UN Doc. FCCC/CP/2001/13/Add.1 (21 January 2002), available at <http://unfccc.int/resource/docs/cop7/13a01.pdf> (accessed 1 November 2012), p. 54.

63 M. Wara, 'Measuring the Clean Development Mechanism's Performance and Potential', 55 *UCLA Law Review* (2008): 1759, 1773.

64 E. Madeira, 'An Examination of the Issues Facing the Incorporation of REDD Into Market-based Climate Policies' (2008), available at http://www.rff.org/RFF/Documents/RFF-Rpt-REDD_final.2.20.09.pdf (accessed 20 December 2012).

65 Abate and Wright, *supra* note 3, at 98.

66 L. Hayden, 'So, What is Redd, Anyway?', *Planet Change*, The Nature Conservancy, 8 December 2010, available at <http://change.nature.org/2010/12/08/so-what-is-redd-anyway/> (accessed 22 December 2012).

67 REDD, 'A History of Redd' (2010), available at <http://rainforests.mongabay.com/redd/> (accessed 20 December 2012).

68 *Ibid.*

69 *Ibid.*

REDD plus extends REDD by adding sustainable forest management, conservation of forests and an enhancement of forest carbon stocks.⁷⁰ With regards to sustainable management of forests, the focus and concern of the discussion is what actions should be considered to promote carbon stock maintenance. This focus is justified considering the importance of guaranteeing that carbon stocks will not diminish in the long term.⁷¹ On enhancement of forest carbon stocks, the discussion focuses on how certain activities may restore forest ecosystems to maintain and increase carbon stocks while also assuring environmental integrity.⁷² This theme mainly refers to activities of forestation and afforestation and in what way they occur.⁷³

In operation, REDD programmes pay developing countries for reductions in emissions from deforestation and degradation and would finance capacity-building activities that help countries and communities participate in such mechanisms.⁷⁴ Developed nations may also pay developing nations to preserve their forests and receive credits that they can trade on the voluntary carbon market. Voluntary carbon markets are utilised by buyers who are more interested in reducing their environmental impact or improving their environmental image, as opposed to remaining in compliance with a law or regulation.⁷⁵

REDD is a forestry initiative that aims at tilting the economic balance in favour of sustainable management of forests in order for their economic, environmental and social goods and services to benefit biodiversity, countries, communities and forest users while further contributing to important reductions in GHG emissions.⁷⁶ An important part of REDD plus implementation involves national MRV systems. This helps ensure that participating nations meet their mitigation commitments under the UNFCCC and the Kyoto Protocol.

Monitoring is generally defined as a systematic measurement of variables and processes over a defined period. It assumes that there is a specific reason for collection of data, such as ensuring that standards are being met.⁷⁷ With regards to REDD, monitoring is the most reliable method to determine whether and how

70 United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries Programme and REDD+, 'Frequently Asked Questions and Answers', available at [http://www.unep.org/forests/Portals/142/docs/UN-REDD%20FAQs%20\[11.10\].pdf](http://www.unep.org/forests/Portals/142/docs/UN-REDD%20FAQs%20[11.10].pdf) (accessed 1 November 2012).

71 M. C. Cenamo, M. N. Pavan, M. T. Campos, A. C. Barros and F. Carvalho, *Casebook of REDD Projects in Latin America*, 17, Working Document, 1st edn (December 2009), available at <http://www.funbio.org.br/wp-content/uploads/2012/10/casebook-of-redd-projects-in-latin-america.pdf> (accessed 10 November 2012).

72 *Ibid.*

73 *Ibid.*

74 M. Greenleaf, 'Using Carbon Rights to Curb Deforestation and Empower Forest Communities', 18 *NYU Law – Environmental Law Journal* (2011): 507, 513.

75 Abate and Wright, *supra* note 3, at 99.

76 See UN-REDD programme, available at <http://www.un-redd.org> (accessed 15 November 2013).

77 F. Danielson, N. D. Burgess, A. Balmford, et al., 'Local Participation in Natural Resource Monitoring: A Characterization of Approaches', 23 *Conservation Biology* (2009): 32, available at http://unfccc.int/files/methods_science/redd/application/pdf/local_participation_in_natural_resource_monitoring_a_characterization_of_approaches.pdf (accessed 3 November 2012).

many emissions reductions have occurred.⁷⁸ Monitoring efforts tend to be quite expensive because of the vast and often remote nature of forest areas making access and continuous monitoring challenging.

Advanced technique remote sensing equipment including satellite technology is used for monitoring and its use requires specialised training. Remote sensing instruments mounted on satellites have provided images of the Earth's surface and its forest cover since as far back as the 1970s, and are generally the most reliable data source for accurately estimating changes in forest over large areas. However, remote sensing imagery can be expensive and technically challenging to analyse, and the error and uncertainty in the data and analyses are not always well characterised.⁷⁹ Site level monitoring is also used in conjunction with remote monitoring.

Verification is the process of confirming the authenticity of emissions reductions over a specific period and is usually performed by an independent entity.⁸⁰

MRV systems are key to the success to any REDD plus initiative, and detailed planning with regards to their implementation is necessary to obtain maximum benefits of related policies and subsequent financial benefits that are derived from carbon credits. The Climate Change Department of the Forestry Commission of Ghana successfully composed and submitted a REDD Readiness Preparation Proposal approved in 2010 aimed at aggressively combating the country's deforestation problem. The country prepared and reported a National Greenhouse Inventory which includes the often difficult to estimate historic levels of emission.⁸¹ The report covered GHG emissions and removal from 1990–2006 with the year 2000 as the base year.⁸² The administrative functions of the proposal, including monitoring, verification and reporting of emissions, are exclusively concentrated in the government and there is no express provision for the participation of the affected forest communities.

The ultimate measure of success of REDD policies is also heavily dependent on existing forest inventory with which to compare carbon storage capacity (carbon stock), and Ghana, like many other developing countries, lacks an adequate pre-existing inventory. The lack of financial resources and adequate official forestry personnel makes this a continuing challenge. Thus the well-intentioned approach to REDD by Ghana also faces a significant challenge regarding access to this information.

78 K. Graham and A. Thorpe, 'Community-based Monitoring, Reporting and Verification of REDD Projects: Innovative Potentials for Benefit Sharing', 3 *Carbon and Climate Law Review* (2009): 304, 305–12.

79 L. K. Olander, H. K. Gibbs, M. Steininger, J. J. Swenson and B. C. Murray, 'Reference Scenarios for Deforestation and Forest Degradation in Support of REDD: A Review of Data and Methods', 3 *Environmental Research Letters* (2008).

80 *Ibid.*

81 UNFCCC, 'Ghana's Second National Communication to the UNFCCC' (September 2011), available at http://unfccc.int/resource/docs/natc/ghana_second_nationalcommunication_final_version.pdf (accessed 2 November 2012).

82 *Ibid.*

REDD initiatives implemented in developing countries worldwide have provided a creative framework to improve the economic lives of the often marginalised rural communities and their population. The increased participation of these communities and the compensation provided for their efforts has meant an increase in alternative sources of income generation. Further, the encouragement of active participation of women in related administrative functions in some regions where REDD and REDD plus systems have been implemented has meant that traditional barriers of limiting women to homemaking roles are gradually being broken down.

V. DEFORESTATION AND REDD PLUS IN BRAZIL

A. Background of deforestation in the Brazilian Amazon

Brazil has been the tropical country with the highest level of forestlands transferred from government-administered to social and private ownership during the last decade. Like Ghana, Brazil is home to extensive tropical rainforests. Between 2002 and 2008, the amount of collectively managed and owned forests has increased 119 per cent and 48 per cent, respectively. The amount owned by individuals and organisations has tripled.⁸³

Deforestation in Brazil was triggered initially by economic growth in the 1970s. The country's rapidly growing economy, however, made it increasingly reliant on foreign sources of energy. At one point during the 1970s, Brazil was the world's largest importer of oil.⁸⁴ In this same period, Brazil increased its foreign borrowing for its economic development.⁸⁵ When the world experienced a financial crisis in the late 1970s, the market for Brazil's exports, and significantly high interest rates, made the country's debts very hard to manage.⁸⁶ This set the stage for the plundering of the Amazon forest, which was the country's prime asset, as a responsive measure. This ill-advised approach to tackling the financial crisis it faced set off a chain of policies and management of the Amazon forests in a manner that created its historic deforestation problem.⁸⁷ From 2000–4, deforestation in the Brazilian Amazon increased from 18,226 square kilometres to 27,772 square kilometres.⁸⁸ Brazil's property laws, and the growing need for economic development and sustenance primarily through cattle ranching and illegal logging, are significant contributors to deforestation in the Amazon.⁸⁹

83 E. Corbera, M. Estrada, P. May, G. Navarro and P. Pacheco, 'Rights to Land, Forests and Carbon in REDD+: Insights from Mexico, Brazil and Costa Rica', 2 *Forests* (2011): 301–42, available at <http://www.mdpi.com/1999-4907/2/1/301> (accessed 25 October 2012).

84 A. Z. Lazarus, 'A War Worth Fighting: The Ongoing Battle to Save the Brazilian Amazon', 9 *Law and Business Review of the Americas* (2003): 399.

85 *Ibid.*

86 *Ibid.*

87 *Ibid.*

88 R. Butler, 'Deforestation in the Amazon' (last updated 20 May 2012), available at <http://www.mongabay.com/brazil.html> (accessed 3 November 2012).

89 *Ibid.*

The country possesses vast tracts of undeveloped land. As a nation that is experiencing rapid growth and attempting to define itself in the economic world, entrepreneurs and investors alike have focused their attention on these unclaimed and untitled lands. Brazil's property laws allows its citizens to gain title to land by showing 'productive use' of the land. By clearing a forested area and converting it to pasture, a Brazilian may claim title to that land. In fact, conversion of forest to usable agricultural land is one of the least expensive and easiest ways to gain title to hundreds of acres of land without purchase.⁹⁰ Private land ownership in Brazil has created a complicated system of ownership, leading to insecure tenure and disputes over land ownership.⁹¹ This has resulted in a vulnerability to land dispossession, giving private owners less leverage in relations with government and the private sector.⁹² Insecurity in land and forest ownership has undermined sound forest management because without sound secure rights, forest users have few incentives to invest in protecting forest resources, leading to deforestation.⁹³

Some of Brazil's driving economic factors can be generally analogised with those of Ghana. Cattle ranching and illegal logging are two of the primary drivers of deforestation in Brazil;⁹⁴ indeed, cattle ranching is the leading cause of deforestation in the Brazilian Amazon. Brazil is the world's largest producer and exporter of beef. Much of its expansion in this area has been in the Amazon, which currently has more than 80 million head of cattle, up from 26.6 million in 1990.⁹⁵

Similar to Ghana, illegal logging is a problem in the Amazon due to a lack of proper oversight resulting from resource constraints and logging companies exceeding the scope of their granted licences. As a result the Brazilian Amazon has been under great pressure. Despite the drive towards Amazon settlement and agro-industrial expansion, a number of measures have been undertaken to reduce deforestation in recent years.⁹⁶ These initiatives that have had a positive impact on controlling the deforestation problem in Brazil can be adopted by Ghana as part of its response to deforestation and its REDD policies. One of the successful models that Brazil has implemented and from which Ghana can benefit specifically is the Juma Sustainable Development Reserve Project for Reducing Greenhouse Gases Emissions from Deforestation.

90 T. E. Hazen, 'The Effects of Brazilian Agricultural Property Policies and International Pressures on the Soybean Industry: Incentives for Amazon Deforestation and How It May Be Reduced', 2 *San Diego Journal of Climate and Energy Law* (2010): 223, 231.

91 É. Champagne and J. Roberts, 'Annex III: Country Studies Case Study: Brazil' (2009), available at http://www.threddesk.org/sites/default/files/resources/pdf/2010/IUCN_ELC_2009_REDD-Legal-Frameworks_CASE-STUDY-BRAZIL.pdf (accessed 10 November 2012).

92 *Ibid.*

93 *Ibid.*

94 See S. Margulis, 'Causes of Deforestation of the Brazilian Amazon', World Bank Working Paper 22 (2004), available at http://www.wds.worldbank.org/servlet/WDSContentServer/WDSPIB/2004/02/02/000090341_20040202130625/Rendered/PDF/277150PAPER0wbwp0no1022.pdf (accessed 5 November 2012).

95 Butler, *supra* note 88.

96 See Hazen, *supra* note 90, at 232.

B. The Juma RED programme: a REDD plus initiative

The Juma Sustainable Development Reserve (JSDR) Project is an initiative which was aimed at curtailing deforestation and its resulting emission of GHGs in an area of the State of Amazonas under great land use pressure at one time.⁹⁷ Initiated in 2006, the programme is set to run until 2050 and is projected to prevent the deforestation of around 330,000 hectares of tropical rainforest.⁹⁸ Juma's REDD scheme will prevent an estimated 3.6 million tons of GHG emissions over the first crediting period, from 2006–16, and will rise to 190 million tons by the end of 2050.⁹⁹

The Amazon region of Brazil is home to over half of the world's largest rainforest.¹⁰⁰ In order to protect this rich and expansive natural asset, the government of the State of Amazonas implemented RED aimed at improving the livelihoods of the traditional and indigenous populations which live within the boundaries of the programme.¹⁰¹ The initial funding for the project came from the Amazonas state government and Bradesco Bank, one of Brazil's largest banks. The Marriott International hotel chain also joined this partnership and vision in 2008 by pledging significant financial support which would be generated as part of its commercial operations, specifically offering its guests the option to offset their emissions at a price of \$1 per night. The programme's goal was to set specific and achievable conservation targets.

These targets include primarily income generation through the promotion of sustainable businesses, contributions to community development, scientific research and education, and direct payment for environmental services through the Bolsa Floresta programme.¹⁰² Income generation through sustainable businesses is achieved through the research and development of new technologies which will allow for innovation in the quality and types of products local communities produce.¹⁰³ Community training relating to sustainable business practice is also supplied to those in the JSDR in order to assist with forest product extraction.¹⁰⁴ This includes research and development into technologies aimed at improving the quality of community produce and the provision of equipment to assist production including Brazil nut dehydrators, a group storehouse and an

97 The Juma Sustainable Development Reserve Project, *Reducing Greenhouse Gas Emissions from Deforestation in the State of Amazonas, Brazil* (September 2008), available at http://unfccc.int/files/methods_science/redd/application/pdf/pdd_juma_reserve_red_project_v5.0.pdf (accessed 5 November 2012).

98 International Institute for Environment and Development, *The Costs of REDD: Lessons from Amazonas* (November 2009), available at <http://pubs.iied.org/pdfs/17076IIED.pdf> (accessed 3 November 2012).

99 *Ibid.*

100 G. Crawford, 'REDD+ in the Amazon: The Juma Sustainable Development Reserve', Case Study (January 2012), available at http://www.ids.ac.uk/files/dmfile/LHcasestudy12_REDDBrazil.pdf (accessed 2 November 2012).

101 *Ibid.*

102 See The Juma Project, *supra* note 97, p. 7.

103 *Ibid.*

104 Crawford, *supra* note 100, p. 3.

agroforestry system.¹⁰⁵ Additional efforts are made to improve access to markets, for example, by providing a larger boat for transporting produce.¹⁰⁶ With respect to community development and education, centres were to be constructed to train and transmit scientific information to local communities in conservation efforts as well as provide opportunities for the training of professionals specialising in biology, forest management and environmental education.¹⁰⁷

Under the Bolsa Floresta programme, indigenous communities, for their contributions to conservation, would receive direct benefits like access to clean water, health care, information, productive activities and other improvements in their quality of life.¹⁰⁸ Furthermore, a portion of the financial resources generated by the project were paid to traditional communities in the Juma Reserve. This form of benefit sharing provides an incentive for the indigenous communities to effectively engage in developing sustainable forest practices as well as participate in new techniques to advance production from forest resources.

An important feature of the Juma project was the involvement of the indigenous and forest communities in planning and setting its goals. The programme serves to raise awareness among the community regarding their critical importance of protecting the forests in Amazonas.¹⁰⁹ Throughout the process of creation of the Juma Sustainable Development Reserve, there was participation of local residents, involved in many lines of work. Inhabitants from all communities within the reserve were interviewed to obtain their perspectives on the social, economic and environmental context of the reserve and which parts were favourable to the project's implementation.¹¹⁰ The integration of the communities in organisational planning and management decisions promoted an understanding of the measures that were implemented and a communal bond that is critical to the programme's success.

An equally important feature of the Juma project is its advancement of gender equality. In many indigenous communities, women are often marginalised to traditional roles of homemaking, removed from managerial positions and often undercompensated compared with their male counterparts. The management plans developed for the State of Amazonas uses this programme as an opportunity to promote non-traditional roles of women in organisation and management. The protected areas do not differentiate between women and men regarding their participation in decision making, development and implementation of plans and activities as well as in capacity-building efforts.¹¹¹ The Bolsa Floresta programme provides a monthly payment of \$50 per family (the equivalent of roughly 60 Ghanaian cedis) and is made out in the name of the female head of household.¹¹²

105 *Ibid.*

106 *Ibid.*

107 See The Juma Project, *supra* note 97, p. 7.

108 *Ibid.*

109 *Ibid.*

110 *Ibid.*

111 *Ibid.*

112 *Ibid.*

This is done to support the programme's goal of advancing women's participation in society.

Carbon credits generated from the JS DR are to be sold on the voluntary carbon market. This will provide revenue for the Amazonas state government to undertake deforestation monitoring activities, uphold conservation law and support communities partaking in the initiative. The Juma project, including its target communities, related areas of development and methodologies adopted to facilitate its implementation, is a model that reflects and is adaptable to the Ghanaian context.

VI. PROPOSAL

A. Reducing deforestation through a benefit-sharing monitoring, reporting and verification system

Monitoring and reporting of carbon emission levels is a financially consuming aspect of any successful REDD project, and a significant portion of a country's REDD plus initiative's budget is spent on its monitoring and reporting efforts. Effectively, there have been valid concerns expressed in implementing countries about limited financial benefits to the communities in areas targeted for REDD programmes after the technical parts of implementation have been completed. This creates a disincentive on the part of forest communities to actively engage in REDD efforts within their forest sector and communities. The benefit sharing approach of the Juma project can be modified to address this problem in Ghana.

To advance its initial REDD readiness plan, the government of Ghana should adopt a community-based monitoring and reporting programme. This monitoring system would directly involve the local forest communities in data collection and measuring the process of data collection and use necessary for analysis in demonstrating reduced levels of degradation for REDD implementation. Practical training would also be provided to participating communities on the use of advanced technology as required per monitoring technology. Monitoring under REDD requires consistency, completeness and accuracy in measuring changes in forest and vegetation using interpretation of remotely sensed imagery. Thus, a successful implementation of a community-based model form of MRV would be adequately aligned with the country's obligations as required for a forest conservation and management project under REDD.

The government would pay compensation to the participating forest communities. Compensation for monitoring efforts could be administered through a forest stewardship fund, supported with national and international funds and other partnerships, and would be sustained along with carbon credits from foreign investment from organisations and other nations seeking carbon offsets tradable on the voluntary carbon market. As an additional policy measure, the stewardship fund would serve as an additional resource and medium to promote sustainable use of the forest by using advanced research, training and development projects which would provide education for the traditional forest communities.

By teaching these communities sustainable and efficient ways of using the forests for their agricultural practices, improved yields from better farming practices would most likely be realised. Increased yields would result in improvement of the economic livelihoods of forest communities as well as an overall improvement in the Ghanaian economy with regards to the possibility of increased exports. Further, as the national income increases from more production and exports, there needs to be a reinvestment of national finances in REDD programmes and related efforts to increase their efficiency thereby maximising the nation's resources and capabilities.

The adoption of a community-based monitoring and reporting approach and compensation through a stewardship fund would be an efficient use of Ghana's resources and would provide dual benefits. The government would use part of its acquired funds directly for affected stakeholders thereby improving the economic livelihoods of these communities. Through a community monitoring approach the government would also take advantage of the existing knowledge of forest communities and population in the area who have lived there for generations and have an intimate knowledge of the forests. This knowledge of the vast forest area would be easily accessible and inexpensive thereby reducing the government's expenditure in this area, which it would otherwise extend to employing and training new governmental forestry officials. This result would also ultimately benefit the people of Ghana from the taxpayers' perspective as the financial resources of the nation would be put to most efficient use.

To help prevent the possibility of abuse of national funds by corrupt forestry officials and stakeholders, within this proposed MRV framework, a thorough corrupt risk assessment must be conducted risk assessment independent body comprised of members drawn from the affected communities, government officials and the general public with taxpaying interests must be selected to form a financial oversight board vested with the power to recommend corrupt officials and stakeholders alike for prosecution by the national courts. This board would ensure that funds within the established programme and projects were fairly and equally distributed among various projects and their deserving recipients around the country.

B. Self-empowerment and gender advancement

Through the use of a community-based monitoring and reporting programme and advancement of sustainable development of forest and agricultural practices, the government would be investing directly in its own people. The training and subsequently acquired technology skills by participating communities would ultimately serve as a lasting self-empowerment tool for these communities. Such a programme would provide them with a wealth of management and accountability skills. The majority of the forest communities are often limited to farming activities as a source of their economic existence. The creation of an alternative avenue of occupational and economic development through REDD plus policy monitoring efforts would capitalise on and expand forest communities'

intellectual capabilities. In light of the importance and permanence of oral history and tradition as part of the Ghanaian societal fabric, the knowledge gained would transcend the existing population. Future generations would continue to benefit from this creation of intellectual wealth and thus would also be positively impacted and empowered.

As is the case in many developing countries, and especially in the rural communities, there is gender inequality in administrative functions, and predominantly the marginalisation of women to traditional homemaking roles. The emergence of REDD plus programmes and efforts provide an opportunity to bridge the gap between genders, and Ghana would benefit from the blueprint of the Juma project in Brazil with regards to the active inclusion of women in its programmes. Rural communities need to adopt a system of division of labour that allocates the physical work of planting and restoring forests to the males whilst the women in the communities can be trained to monitor, analyse data and make reports regarding forest stock and later emissions. This will provide women with empowerment to help remove the mental limitations of their traditional sole role as homemakers.

In spite of its negative climatic impacts, deforestation has presented the government of Ghana with a unique opportunity to educate and economically develop the intellectual wealth of a significant portion of its population as part of its efforts to address the environmental problem. This form of empowerment that is created will be the catalyst for a progressive and intellectual generational movement creating a win for government, forest communities and ultimately the Ghanaian economy.

C. Improved land tenure policies: carbon as a natural resource and a right to benefits

Similar to other countries with tropical forests, Ghana is in the early stages of contending with the opportunities and challenges posed by carbon as a natural resource, its related rights and REDD plus initiatives. The novelty and peculiar nature of this resource including its production, maintenance and increasing global importance, presents an opportunity for the Ghanaian government to formulate policies to redistribute land and natural resource benefit rights.

Forest communities and stakeholders are faced with the reality that although they may legally possess ownership of the land they occupy, they do not own the naturally growing trees on that land and thus have no primary rights to any national financial benefits obtained from their use in carbon offset projects. This reality furthers a disincentive to secure the future of these trees when faced with the reality of exploiting them for daily survival.

Carbon storage from trees and its use as a financial resource obtained through the grant of carbon credits from carbon offset programmes, including effective REDD plus policy implementation, is an emerging global phenomenon. The Ghanaian constitution and existing policies have not specifically recognised carbon rights or an entitlement to their benefits. Carbon rights are most likely

going to be categorised as within the purview of established mineral rights. In line with established laws, the government may determine that carbon is generated from naturally occurring trees thereby vesting benefits from reduced carbon emissions in the government for the people of Ghana.

In the alternative, however, the government could, as an incentive to increase afforestation and build up forest stock, provide for private rights in carbon emission reduction alongside established laws for naturally occurring trees. This could be achieved by granting a direct interest in financial credits obtained on the voluntary carbon market to private individuals who engage in planting trees, recognising their distinctiveness from naturally occurring trees to which the government currently holds exclusive rights. An increase in private efforts and involvement would reduce government expenditure and continue to effectively achieve the national objective of preservation of Ghana's tropical forests. It would also actively foster a national awareness of deforestation and the valuable contributions that the country's citizens can render to help address the problem.

The exclusive nature of acquisition of benefits from carbon storage in comparison with other recognised minerals presents an opportunity for the government to provide additional benefits to the forest communities. Unlike other minerals, for which typically licences are granted and land excavation is the most common form of acquisition, carbon sequestration involves the active control of forests in their natural state thereby essentially preventing excavation. This requires an active involvement by the forest communities in maintaining the forests and serving as an unofficial oversight body in preventing unauthorised and detrimental activities in these vast forest areas. The uniqueness of obtaining value from this new 'mineral' requires equally unique measures and policies.

In the light of political and social realities in Ghana, an amendment of state minerals and natural resource policies to recognise carbon rights and provide the forest communities a direct financial benefit exclusive of national benefits acquired from carbon credits appears to be the most immediate realisable goal. Active registration and participation in maintaining forest cover including periodic progress reports may be established by the government as a requirement for continued eligibility to receive financial benefits which may also be provided from the stewardship fund.

D. Enforcement

Effective policy creation and implementation is a crucial step in addressing Ghana's deforestation problem. Equally important is the enforcement of these policies. In light of the reality in Ghana, where corruption by forestry officials and illegal logging by both commercial companies and local communities remains, the government needs to develop and enforce stiffer penalties that will prosecute corrupt officials, companies and locals who act contrary to the mandates of the implemented REDD plus policies. Such penalties should include permanent bans on obtaining logging licences, termination of public service positions in the case

of government employees, heavy fines and possible jail time. All of these criminal sanctions would be justified and serve as a deterrent to potential law breakers.

The provision of financial assistance to the forest communities through the stewardship fund for their conservation efforts will be important to the success of enforcement. The benefits from the fund will provide an incentive for the forest community population to hold their communities and logging companies in their areas accountable for monitoring for illegal activity and enforcing reforestation agreements by the State and commercial companies.

VII. CONCLUSION

Deforestation poses a real threat to climate change and the livelihoods of a significant part of the population of Ghana. Years of removal of the nation's forest cover has contributed to deforestation in Ghana. Farming activities including harmful agricultural practices like slash and burn farming, rising poverty levels and illegal logging have perpetuated the deforestation problem. A lack of proper oversight primarily due to the lack of adequate resources, technology and personnel to effectively monitor vast forest areas poses a huge challenge in remedying this environmental threat. The future, however, must not be seen as gloomy because with every challenge, an opportunity is presented.

Ghana's deforestation problem has provided the country with a unique opportunity to curb its damaging effects whilst simultaneously developing and positively affecting the lives of a significant part of its population, particularly its forest communities. This will be achieved through the government's implementation of a REDD plus policy approach that directly involves stakeholders and creates a financial benefit sharing mechanism that simultaneously empowers stakeholders and affected communities with extensive managerial and technical skills. These are tools for success that will ultimately create significant economic development for many forest communities and their future generations.

The implementation of a community monitoring and reporting model in addition to providing education and technical assistance for sustainable use of forest resources as part of its national REDD plus policy provides an important foundation for national economic development. Additionally, the Ghanaian government must advance carbon rights within a policy recognition framework. As part of this framework the active contribution of forest communities to carbon storage, as part of their stewardship, from which the government obtains carbon credits, should encourage a provision of financial benefits to these communities. This recognition and benefit presents an incentive for these stakeholders in their continued diligent exercise of their traditional roles as 'keepers' of the forests.