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**REDUCING EMISSIONS FROM DEFORESTATION AND DEGRADATION OF
FORESTS IN PAPUA NEW GUINEA**
Issues and Options



NRI
The National Research Institute

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**REDUCING EMISSIONS FROM DEFORESTATION AND DEGRADATION OF
FORESTS IN PAPUA NEW GUINEA**

Issues and Options

By

Nalau Bingeding

**NRI
The National Research Institute**

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ABBREVIATIONS AND ACRONYMS

AAC	Annual Allowable Cut
AFOLU	Agriculture Forestry and Other Land Use
CIFOR	Center for International Forestry Research
CLRC	Constitutional Law Reform Commission
CO ₂	Carbon Dioxide
COP	Conference of Parties
DLPP	Department of Lands and Physical Planning
DMS	Department of Magisterial Services
FMA	Forest Management Agreement
GoPNG	Government of Papua New Guinea
ILG	Incorporated Land Group
IPCC	International Panel on Climate Change
IUCN	International Union for Conservation of Nature
LCS	Land Court System
NLDT	National Land Development Taskforce
NLUP	National Land Use Plan
OCCES	Office of Climate Change and Environmental Sustainability
PES	Pay for Environmental Services
PNG	Papua New Guinea
PNGFA	Papua New Guinea Forest Authority
RED	Reducing Emissions from Deforestation
REDD	Reducing Emissions from Deforestation and Degradation of forests
SFM	Sustainable Forest Management
SBSTA	Subsidiary Body on Scientific and Technical Advice
TRP	Timber Rights Purchase
UNFCCC	United Nations Framework Convention on Climate Change

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EXECUTIVE SUMMARY

Reducing Emissions from Deforestation and Degradation of forests (REDD) is an international initiative that is perceived to be an effective mechanism for mitigating the adverse effects of global warming and climate change. It places a commercial value on carbon that is maintained in storage in natural forests in tropical rainforest nations. REDD offers two potential benefits for Papua New Guinea (PNG). Firstly, it can reduce PNG's carbon emissions from forest conversions through subsistence agriculture or economic activities such as logging and oil palm production. Secondly, it provides an income-earning opportunity for the Government of Papua New Guinea (GoPNG) and customary landowners via the carbon trade scheme as an alternative to traditional economic landuse activities such as logging, oil palm and other cash crop production.

The Government of PNG has already committed the country to a National REDD Scheme at the international level and this requires most of PNG's customary land and forests to be mobilised under the program. However, the mechanisms to which land can be mobilised and REDD can be effectively implemented in PNG are not yet in place, and there are many domestic challenges — land management and forest governance issues, lack of understanding by the PNG population, lack of policies and legislation — to be addressed as well as a host of technical issues to be resolved.

The following issues must be seriously addressed by the GoPNG and policy makers to make REDD a viable development option in PNG. Improving land management and administration is by far the biggest hurdle.

1. Solving land management and administration issues

Land issues in PNG continue to be one of the biggest challenges for the government, the customary landowners and the country's economic sectors which depend on the use of land and associated forests. The implementation of REDD and carbon trade in PNG will not be an easy task for the government due to the country's complex land tenure systems.

Although some of the country's carbon emissions could be controlled within timber concessions, this is only a temporary solution and will not always be effective. In order for the government to effectively reduce the country's carbon emissions and contribute to the international effort in mitigating climate change, the government will need to implement REDD projects in much of the forested land throughout the country.

The REDD plan that PNG has committed to will need much of the 33 million hectares of forested land, which is customarily owned. Therefore, the government will need to find effective ways to implement REDD on customary land so that conflict of interest among customary landowners and competition between developmental sectors for forested land for development are kept to a minimum.

The Government of PNG therefore requires a National Land Use Plan (NLUP) in order for REDD and carbon trade to be effectively implemented in PNG. The NLUP would ensure that possible risks to REDD projects are avoided in the initial stages of development and that there are no disruptions to REDD projects in the long-term. The use of a NLUP will particularly lessen the likelihood of conflict of interests among customary landowners and competition between different economic sectors for the development of forested lands.

2. Knowledge and awareness of REDD

There is a lack of knowledge and awareness of REDD among customary landowners, landuse sectors, and within the government. If not adequately addressed, this situation can create problems for the different stakeholders of REDD and carbon trade, and can put carbon projects at risk in the future. Therefore it is important that all stakeholders understand and agree on all issues pertaining to REDD and carbon trade prior to the government making any commitments at the national or international level.

Consultation and awareness are necessary and must be carried out widely within the government sector, the private sector and in the communities so that legislation or policies that are developed can be beneficial to all stakeholders involved. One way to effectively educate the public is to use simple language during awareness so that the REDD concept could be better understood by both ordinary and illiterate citizens.

3. Management of the Climate Change Secretariat

There is a need to deal with issues regarding REDD and climate change in a cohesive manner through a central office. However, this will be an additional expense to the Government of PNG, taxpayers and international donors.

The Office of Climate Change and Environmental Sustainability (OCCES) was abolished soon after its establishment due to widespread public outcry for it to be abolished. Most of OCCES's funding was used for administrative matters, while very little was used for developing REDD and climate change activities in the country. Consequently, OCCES was abolished in 2010 and replaced by the Office of Climate Change and Development.

The government currently has no proper coordination in its work on REDD and climate change. Therefore, there is a need to effectively manage REDD and climate change issues through a cost-saving mechanism so that the benefits to all stakeholders outweigh the costs to the government, customary landowners, and taxpayers. This can be done through a secretariat that coordinates REDD and climate change activities, while delegating respective activities on REDD and climate change to different stakeholder organisations. The secretariat must be administered by qualified officers and must be accommodated within an appropriate and existing government agency.

4. Pricing Carbon — can it compete with other income earning opportunities?

PNG currently has several landuse activities that provide financial benefits to customary landowners, which includes logging and oil palm. Carbon trade is a new and growing industry that involves industrialised nations paying forest owners in developing countries to save their forests from deforestation and to replenish their degraded forests.

However, carbon trade will have to compete with other existing landuse sectors in order to become an attractive option for customary landowners in PNG. Thus, the economic, social and environmental benefits offered by carbon trading will have to be better than those already offered by other landuse sectors particularly in the rural areas of the country. The carrot that could be used to induce landowners to retain their forests and ensure that forest carbon remains in natural storage is to pay a higher price for carbon credits. In this way the customary landowners could forego the financial benefits on offer by other traditional

landuse sectors and opt for REDD and in the process sustain the environment and mitigate the adverse effects of global warming and climate change.

5. Technical issues

The technical issues addressed in this paper include:

- *The need for a REDD baseline:* A baseline is needed to measure the country's success (or failure) at reducing carbon emissions from its forests. PNG does not have a REDD baseline as yet because it lacks technical expertise required in selecting the best approach in developing a baseline that is suitable for the country. There is also a lack of consensus on the data to be used in developing a suitable approach to generate a REDD baseline for the country.

This paper argues that the best approach to developing a REDD baseline would be to use the work of Shearman *et al.* (2008). Their work is comprehensive and uses high resolution satellite data that gives a clearer picture of the rate of deforestation and degradation in PNG over a 30-year period (1972–2002).

- *How to address carbon leakage.* Carbon leakage is expected to become an issue as a result of REDD projects. The implementation of REDD projects in certain forest areas will displace any activity in that area thus causing the activity to relocate and continue elsewhere.

The risk of carbon leakage in PNG is expected to be high, as land is customarily owned and customary landowners commonly use forested land for subsistence agriculture. Implementing REDD projects will cause subsistence farming and other activities to move to new areas and continue the deforestation and degradation process. Carbon leakage is expected to become a bigger concern with increasing populations and land shortages in the future.

However the problem of carbon leakage could be addressed through the use of sustainable land management practices. This includes the use of improved fallows which involves teaching villagers techniques to rehabilitate and reuse the same piece of land for gardening so that they do not have to clear new forest areas.

Sufficient land outside REDD project areas should also be allocated for subsistence agriculture to control and minimise carbon leakage. However it is important to make an estimation of the population for the future before this can be done so that there is enough land for the villagers even if the population increases. Furthermore, the use of genetically improved and high yielding crop cultivars could also be used to enhance these efforts aimed at avoiding carbon leakage.

- *Monitoring, reporting and verification of REDD program:* Since natural forests in PNG are owned by customary landowners it is expected that many REDD projects will be registered by Incorporated Land Groups (ILGs) throughout the country. This will pose a difficult task for the government in terms of monitoring the success of each REDD project.

However this situation could be managed by setting in place a reliable monitoring, reporting and verification system before the REDD program can begin in the country. The government must also be effective in instituting and enforcing appropriate regulations in order to ensure that there is strict compliance by each participating REDD project, thereby contributing to the success of the overall program. This process, when implemented on an ongoing basis, may ensure that carbon emissions are genuinely addressed resulting in a positive image of the country being portrayed at the international level.

- *Estimation of forest carbon stocks:* In order for carbon trade to take place there must be an estimation of the amount of change in forest carbon stock, over time. This can be done using estimates of carbon stock from all the five different carbon pools including the standing tree above ground, root biomass below ground, forest litter, deadwood and the organic carbon in the soil.

Estimates of carbon stock in PNG so far have been based on some of the five carbon pools, but not all. These estimates have underestimated the country's forest carbon stocks. Therefore, the challenge now is to review all methods used in PNG to estimate carbon stocks and to adopt or develop better techniques that could be used to accurately estimate forest carbon stocks from all the five pools.

6. Forest governance issues

Poor forest governance is a major driver of deforestation and forest degradation in many tropical rainforest nations. According to the World Bank (2007), 70 percent of all forestry operations in PNG are illegal. Therefore, there is a high possibility for forest governance issues to carry over from timber concessions into REDD projects when REDD projects come on stream. There is also concern that the implementation of REDD and carbon trade will bring about more problems. The government therefore needs to address current forest governance issues before REDD and carbon trade can be implemented

RECOMMENDATIONS

The following recommendations are made as a result of the issues discussed in this paper:

- develop a National Land Use Plan for the country;
- carry out REDD consultation and awareness widely and among landowners , landuse sectors, and within the government;
- create and legislate a secretariat under the structure of a governing authority to manage the work of REDD, and delegate respective climate change activities to relevant stakeholders;
- make REDD and carbon trade a more attractive alternative by increasing the price of carbon so that it can compete equally with other income-earning opportunities;
- educate land users on sustainable land management practices;
- develop a reliable monitoring, reporting and verification process for the REDD program before it is implemented;
- develop a REDD baseline for the country based on the work of Shearman *et al.* (2008); and
- address current governance issues in the forestry sector before REDD and carbon trade could be implemented.

1. INTRODUCTION

According to Gowae (2009a), Papua New Guinea and Costa Rica first proposed the concept of reducing emissions from deforestation¹ and degradation² of forests (REDD) in developing countries at the Conference of Parties (COP)–11 in Montreal, Canada, in 2005. The original proposal focused on reducing emissions from deforestation (RED) (Papua New Guinea and Costa Rica 2005). Since then the definition of REDD has progressed from simply RED to REDD+ (hereinafter referred to as REDD), and now includes reducing emissions from deforestation and forest degradation and the role of forest conservation, sustainable management of forests, and the enhancement of forest carbon stocks in developing countries (IUCN, 2009).

REDD is a new developmental issue for many tropical rainforest nations, and interest in PNG is growing (Howes, 2009). Although emissions from the deforestation and degradation of tropical forests are regarded as being large and easy to reduce, the reduction of these emissions would come at a cost for PNG (*ibid.*). There is a range of technical, legal and policy issues to sort out, and although everyone is now talking about REDD in PNG, they do not know how a potential scheme would be implemented (Gowae, 2009a). The country will have to overcome many of its domestic challenges before it can be able to efficiently implement REDD.

The Office of Climate Change and Environmental Sustainability (OCCES), due to widespread public outcry, was abolished soon after its establishment. The issue of REDD has not made much progress in PNG since the establishment and abolishment of the Office of Climate Change and Environmental Sustainability (OCCES) by the government. Although PNG is internationally regarded as a leader on REDD, the country has not contributed much to the United Nations Framework Convention on Climate Change Subsidiary Body on Science and Technical Advice (UNFCCC SBSTA) in terms of science and methodological issues of REDD since COP–11. Moreover, the country is yet to develop its climate change legislation and policy and a national policy on REDD.

Due to the complexity of REDD and because the concept is new to the country, many landowner groups including other stakeholders in the public, civil society and private sectors and the community at large lack adequate information on the issue and therefore need to be properly educated. Thus, the objective of this paper is to discuss some of the issues and options that have surfaced since the debate on REDD first emerged, so that the public is aware of these issues and the options available and can engage meaningfully in the debate and development of REDD in PNG.

¹ Deforestation is the act of removing a forest and replacing it with another landuse, such as oil palm or subsistence agriculture.

² Degradation is the act of reducing the content and quality of a forest to some extent, but not beyond the threshold of forests.

2. DOMESTIC CHALLENGES

Land, Forests, and REDD

In PNG, 97 percent of the land is customarily owned by the people (NLDT 2007:2), and this includes natural forests. Therefore, the control of deforestation and degradation of forests on customary land in PNG can be a daunting task for the government (Bingeding, 2008c).

Some control of emissions from deforestation and degradation of forests could be attained with sustainable forest management practices within timber concessions, where customary landowners have temporarily transferred their land and resource rights to the state. However, these land and resource rights are returned to the customary landowners as soon as a timber concession expires. Consequently, the control of deforestation and degradation of forests in timber concessions could be temporary, and there is no guarantee for reduction in emissions from deforestation and degradation of these forests after the expiry of timber concessions.

The inherent land tenure systems in PNG makes it challenging for the government to implement the REDD concept. Therefore, the government has to seek innovations to implement REDD on customary land. Bingeding (2009b) argued that in order to control deforestation and degradation of forested lands, customary land must be regulated by a NLUP. The NLUP should not necessarily take away the land and forest resource rights of the customary landowners. However, it should be used to designate both forested and non-forested land for different economic activities, including REDD, based on an evaluation of opportunity costs or cost-benefit analysis and sound scientific knowledge.

In order to reduce emissions from deforestation and degradation of forests in PNG, much of the 33 million hectares of forested land (Shearman *et al.*, 2008:9) will have to be used for REDD projects. This is expected to result in conflict of interests among customary landowners and competition between developmental sectors for the use of forested lands for development. Bingeding (2009a) advised that the forestry sector could lose land for biodiversity conservation, REDD and carbon trade because the agriculture sector already has a National Agriculture Development Plan (GoPNG, 2007) in place. This could see the agriculture sector competing directly with the forestry sector for forested lands once this plan is implemented. Therefore, the use of a NLUP would help mitigate potential conflict of interests among customary landowners and competition between different economic sectors to use forested lands for development (Bingeding, 2009b).

Stakeholder Consultation and Awareness

Since the majority of the landholdings in PNG is under customary tenure, free, prior and informed consent of landowners and consultations are prerequisites for economic development on customary land. Bingeding (2008a) highlighted that because land in PNG is customary owned, consultative processes must be implemented by the responsible government agency to avoid problems that may arise later and jeopardise REDD projects in the country. The land and forest resources' owners ought to be properly consulted as REDD is a new developmental issue, and the impacts it will bear on the lives of the people are yet to be fully determined, let alone, understood. The customary landowners must have a better appreciation of what they are agreeing to if their land and forests are going to be placed under a REDD scheme.

Climate change, of which REDD is supposedly an antidote is a complex multi-disciplinary issue that will affect people from all walks of life. Therefore, consultation and awareness must be carried out widely within government, in the private sector, and in the communities so that all legislations or policies that are developed would be inclusive and in the best interest of all parties concerned. In order to speed up the creation of a national policy on climate change, that would use REDD as a mitigation measure for combating climate change, stakeholders must be widely consulted so that a sound national policy on climate change is developed for the benefit of all (Bingeding, 2008a).

As far as climate change and REDD issues are concerned, little has been done in terms of awareness and consultation in PNG. The awareness carried out by the now abolished OCCES was in Goroka, Madang, Kokopo and Alotau, and was attended only by forest resource owners who could afford to travel to these regional centers. However, the majority of forest resource owners are in the districts, so efforts must now be made by responsible authorities to bring the awareness and consultations down to the district level so that more people are informed about REDD and how it will be implemented in PNG.

REDD is a scientific jargon that is still too complicated for many ordinary people to understand. Communication tools and strategies used in disseminating information about the REDD concept have been inadequate and as a result many educated Papua New Guineans do not have a good handle on the issue. The situation is even worse for illiterate citizens. Thus there is a need to simplify and customise REDD to a level where ordinary citizens are able to understand and assimilate the concept better. Seminars and workshops must be simplified by the learned minority and presented to the unlearned majority so that there is an evening out effect in terms of the general population's understanding of REDD and climate change issues affecting the country. Moreover, leaflets, books, TV programs, radio talk-back shows and drama must be funded by the government and presented in the simplest form possible, be it in English, Tok Pisin or Motu. In this manner, a wider audience can be reached with people better understanding REDD and becoming engaged in its continuing dialogue and development in PNG.

Carbon Ownership and Benefit Sharing

In PNG the natural forests are owned by customary landowners. Therefore, technically and legally, the customary landowners own the forest carbon as well (Bingeding, 2008b), whether the carbon is in the living tree, dead wood, forest litter, or the organic carbon in the soil.

In order for PNG to succeed in its endeavour to mitigate the effects of climate change through the REDD mechanism, the issue of carbon ownership must be addressed in the initial stages of its development (*ibid.*). The technical and legal aspects of forest carbon must be clearly defined and all outstanding issues clarified so that customary landowners, the government, or private companies are in full agreement about the ownership and benefit sharing from REDD and carbon trade.

However to date there has been little or no discussions on the ownership of forest carbon and how the benefits derived from REDD and carbon trade could be divided and shared between all the different stakeholders involved. Moreover, there is no national policy on REDD as yet, so carbon ownership and benefit sharing arrangements in relation to REDD and carbon trade are very much contentious issues.

There are concerns by forest owners that the state will meddle with their money, and there is already disagreement between forest owners and the state over international funding (Howes 2009). Although REDD and carbon trade are yet to be developed in PNG, the reaction of the customary forest owners to the issues of carbon ownership and benefit sharing are quite obvious: the people simply want the government to keep its fingers out of their forests and money.

Nevertheless, every businessman or business group must pay tax to the government for conducting business in a sovereign nation. Therefore, the government could simply collect its ten percent tax from the forest resource owners, or it could negotiate with the forest owners for a better deal to achieve a win-win situation for both parties..

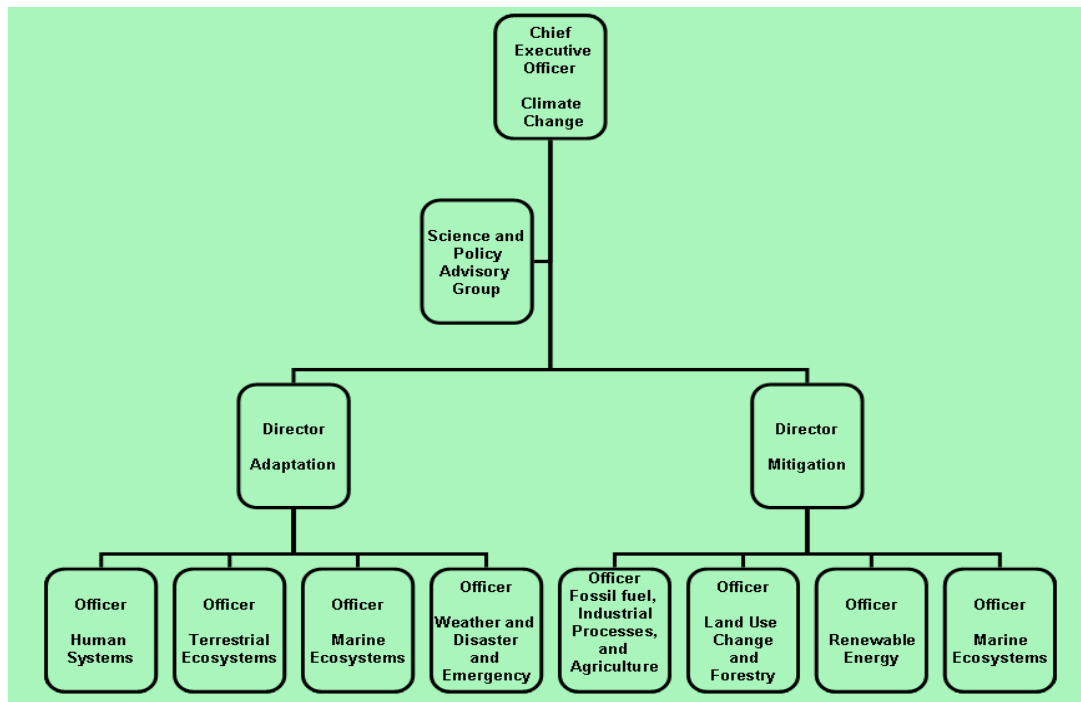
Alternatively, REDD funds could be put into a trust account set up by the parliament and then disbursed to forest resource owners by a board of trustees. This type of arrangement has been set up for the Mama Graun Conservation Fund (The Nature Conservancy 2010a and 2010b). Mogina (2010) had also proposed how REDD funds could be managed under the Mama Graun Conservation Trust Fund, which is another readily available mechanism that could be utilised. Other systems of payment for REDD that have been proposed for PNG include a PNG National Forest Fund (Green Peace, 2010) and the payment system proposed through a Payment for Environmental Services (PES) model (EcoForestry Forum, 2010).

Institutional Arrangements

Due to the duplication of roles and responsibilities between some government departments, there is usually rivalry between departments for funding and other resources from the government and donor partners. Consequently there is a general lack of inter-departmental coordination within the government sector in PNG in terms of cross-cutting issues. REDD and carbon trade is a cross-cutting issue that would require a whole-of-government approach. Therefore inter-departmental coordination is paramount to the efficient implementation of REDD and carbon trade in PNG. Consequently, the government sector needs to address outstanding issues that have impeded the efficient implementation of cross-cutting issues.

Many government departments currently lack manpower, skills, data, and infrastructure to perform their responsibilities to the required level. Thus it would be more appropriate to boost the performance of the current departments by injecting the necessary resources so that they could improve their performances rather than set up a new institution like the Office of Climate Change which would duplicate the roles and functions of these existing departments.

Many government departments are riddled with corruption and are regarded as weak state institutions, especially those involved with natural resources. The public seems to have no trust in these state institutions and wants to see an overhaul to the systems within these departments so that the integrity of these offices and public confidence are restored. Therefore it would be prudent to weed out corruption from these departments and utilise them for REDD and carbon trade activities rather than set up a new institution like the Office of Climate Change. The setting up of a new office to deal with climate change issues would only add to more corruption and the number of weak state institutions.

Figure 1: The Proposed Structure of the Climate Change Secretariat

Currently PNG lacks coordination in its endeavour to mitigate climate change using REDD (Bingeding, 2008b). Therefore, we need some form of setup to deal with climate change and REDD issues. However, the institutional setup should be modest so that the benefits received by forest owners could be maximised for the use of their forest resources (*ibid.*), while the cost to tax payers is minimal.

As a result there is a need for the government to set up a secretariat to coordinate climate change and REDD work, while respective activities on climate change can be done by relevant stakeholder organisations. For example, REDD can be managed by the PNG Forest Authority (PNGFA) in terms of scientific research and forest carbon stocks inventory, and then the required information can be fed to the secretariat for further analyses and use as per their needs. In addition, an advisory group made up of local expertise should be set up within the secretariat to discuss scientific, legal and policy issues from time to time to advise the government on the best course of action to take in terms of REDD and other climate change issues. The secretariat should be managed by a competent scientist with tertiary qualifications who will coordinate climate change and REDD work, supported by a competent skeleton staff. The proposed structure of the Climate Change Secretariat is shown in Figure 1. REDD is included in the section on Land Use Change and Forestry.

3. TECHNICAL ISSUES

Value of Carbon and Opportunity Costs

The major drivers of deforestation and degradation of forests in PNG are logging, plantations, subsistence agriculture, forest fires and mining (Shearman *et al.*, 2008:39). Logging, plantations and mining activities contribute to the country's economy, while subsistence agriculture supports the livelihoods of the majority of the population in rural areas. Consequently, these activities are well entrenched in the country's economy and society.

Today, in efforts to address the global phenomenon of climate change, the REDD concept is a new activity that will compete with the country's important economic sectors which generate revenue for the national purse and livelihood activities which sustain the lives of the majority of the nation's population. Thus the concepts of opportunity costs and cost-benefit analyses will play an important role in the implementation and acceptance of REDD in PNG.

In PNG, more than 80 percent of the population is rural-based, with a large percentage of the population living directly off the land and forests. These people lack basic government services but depend on land and forests to sustain their livelihood. Therefore the level of poverty for the rural masses could decline further if REDD is implemented on their land and no attention is paid to the opportunity costs for other forest and landuse values (Gowae, 2009b). Again, opportunity costs and cost-benefit analyses will play an important role in determining the best landuse option that would bring maximum social, economic and environmental benefits to these people without compromising the sustainability of their livelihoods.

In many remote areas of the country, provision of basic goods³ and services⁴ by the government are almost non-existent. This vacuum is filled in by the logging industry, with some logging companies providing basic goods and services which the government would have otherwise provided directly or indirectly. Consequently, the benefits of these goods and services provided by the logging companies to these remote communities, irrespective of their quality and sustainability, are added benefits that remote communities receive in addition to paid wages and the royalty payments they get from the sale of their timber. For many of these remote communities, this is the best they can get in terms of basic goods and services.

REDD, as a new developmental issue that is perceived to reduce emissions from deforestation and degradation of forests and alleviate poverty in many developing countries, will have to do better to take root in many rural communities in PNG. The benefits that come with REDD, whether social, economical or environmental, will have to surpass the social, economical and environmental benefits already provided for by the logging and oil palm companies in many rural and remote areas of the country.

In using REDD as a mechanism for reducing emissions from deforestation and degradation of forests and trading the resultant carbon credits for economic benefits, the price of carbon will

³ Basic goods include manufactured goods such as tea, sugar, rice and canned fish which are provided through company stores at logging camps.

⁴ Basic services include basic medical services such as like treatment of Malaria and other common sicknesses which are provided by company aid-posts at logging camps.

have to be significantly higher if it is going to thwart existing benefits currently provided by logging and oil palm companies. Bineding (2009c) pointed out that in order to encourage customary landowners to retain their forests for carbon storage, biodiversity conservation and preservation of the ecosystem as a whole, we need to offer higher prices for carbon credits. By paying a higher price for carbon, the opportunity cost for replacing REDD with logging or oil palm will be higher, and as a result there will be a higher incentive for landowners to retain forested lands and repair degraded forests. Conversely, landowners would revert to logging or oil palm production if the benefits under REDD are not significantly greater.

The opportunity costs for replacing logging and oil palm under a REDD scheme in PNG are \$5.02–\$7.71 and \$36.39–\$36.54 per tonne of carbon dioxide (CO₂) respectively (Hunt, 2010). By converting the prices of CO₂ given above to price per tonne of carbon⁵, the opportunity costs of foregoing logging and oil palm under a REDD scheme would be *ca.* \$1.36–\$2.10 and \$9.92–\$9.96 per tonne of carbon, respectively. Therefore, in order to forego both logging and oil palm for REDD in PNG, the price paid per tonne of carbon must be above \$10.00.

REDD Baseline

The continuation of an activity as expected, or to continue business-as-usual, without making any attempts to reduce CO₂ emissions from deforestation and degradation of forests is defined as a REDD Baseline (Griscom *et al.*, 2008). The REDD Baseline sets a benchmark to which a country can measure its success (or failure) in reducing emissions from deforestation and degradation of forests.

Although several approaches to determining national baselines for REDD have been submitted to the UNFCCC SBSTA, individual countries will have to decide on the most appropriate approach to take when determining their REDD Baseline. This will depend on circumstances within each country and how many credited avoided emissions the proposed approach can generate. Nevertheless, the linking of historical emissions with a business-as-usual scenario would be the best approach for measuring avoided emissions (*ibid.*).

PNG is internationally recognised as a leader in REDD but the country has not yet derived its baseline for REDD. There are two main reasons for this: (i) locally, there is lack of technical expertise to determine the best approach for deriving a national REDD baseline and to derive the baseline itself, and (ii) although there is sufficient literature on the rate of deforestation and degradation of forests for the country, which data to use has been the issue because there has been intense debate between academics, non-government organisations and the forest industry on which data is more reliable. There is still no consensus on this issue as yet.

Despite all the criticisms and arguments and the large pool of literature on the rate of deforestation and degradation of forests in PNG, the work by Shearman *et al.*, (2008) used high resolution satellite data and gives a more comprehensive data on the status of deforestation and degradation of forests for a 30-year period (1972–2002). Filer *et al.*, (2009) criticised the work by Shearman *et al.* (2008), basically arguing that this work overestimated the rate of deforestation and degradation in PNG for the period 1972–2002. However, these outstanding issues raised by Filer *et al.*, (2009) have been considered and were adequately

⁵ The price per tonne of carbon was derived by dividing the price per tonne of CO₂ by a factor of 3.7, which is the ratio of the molecular weight of CO₂ to the atomic weight of carbon.

addressed in Shearman *et al.* (2010), which pointed out the limitations of previous landuse maps such as PNG Resource Information System and the Forest Inventory Mapping System. Therefore, data given by Shearman *et al.* (2008) could be used confidently only after limitations pointed out by Shearman *et al.*, (2010) have been factored in to determine the most appropriate approach for deriving PNG's REDD baseline, and also to establish the baseline itself.

Leakage

Leakage is the impact a REDD project will have on carbon sequestration⁶ outside of the project area. In other words, the implementation of a REDD project in a particular forest area will displace any activity occurring within that particular forest area. As a result these activities will relocate elsewhere and cause more deforestation and degradation of forests. However, because the deforestation and degradation of forests outside of the project area are the direct result of the implementation of that particular REDD project, these carbon leakages are regarded as being due to that REDD project.

Customary landowners have traditionally used forested land for subsistence agriculture, alternating longer fallow periods with short periods of cropping (Shearman *et al.*, 2008:40). This practice allows forests to regenerate and restore soil fertility, making the area suitable for another cropping period. However, with increased population in some areas, the increased demand for food has led to shorter fallow periods, and beyond a critical population density the land is permanently used for agriculture (*ibid.*).

In implementing REDD, and due to the economic incentive that comes with it, customary landowners may decide to lock up large areas of forested lands that have been traditionally used by village farmers for subsistence agriculture. Consequently, villager farmers will look for pockets of land outside of the REDD project area to carry out subsistence agriculture.

Due to the scarcity of forested land for gardening, pockets of forested land outside of the REDD project area will be heavily used for agriculture. With increasing population these pockets of forested areas may be subjected to shorter fallow periods and may even be permanently used for agricultural purposes. Consequently, there may be permanent carbon leakages due to the implementation of REDD projects in many areas of the country.

The problem of carbon leakage could be addressed using sustainable land management practices such as improved fallows, the use of genetically improved and high yielding crop cultivars, and the allocation of sufficient land outside of the REDD project areas for subsistence agriculture. With improved fallows, villagers can be taught improved fallow techniques so that they can rehabilitate the same piece of land and reuse it for gardening rather than clear new forest areas for subsistence agriculture. For sufficient land allocation for subsistence agriculture, projection of the village population should be made so that enough land is allocated for the villagers to make gardens even if the population increases, allowing for longer fallow periods and adequate forest regeneration to take place and restore soil fertility. In this way carbon leakage due to the REDD projects will be insignificant, or not permanent.

⁶ Carbon sequestration is the capture of carbon dioxide from the atmosphere and storing it up as carbon in the tissue of trees and other plants and in forest litter, deadwood and in the soil.

Additionality and Permanence

The objective of carbon projects is to ensure that the environment or the climate benefits from carbon sequestration. Therefore, one must prove that the forestry activity currently being carried out within a given forest area that is to be used for carbon trade can sequester additional carbon without the implementation of a REDD project. This would prove that one is not a free-rider on the carbon bandwagon, and that one is genuine in addressing emissions from deforestation and degradation of forests and climate change. Thus, one's current forestry activity can be eligible for carbon credits from REDD.

Although the PNG Forest Policy (1991) calls for reforestation to be pursued (GoPNG, 1991:7) as a means to maintain a permanent forest estate to supply existing and new forest industries, to date, very little reforestation has been carried out in logged-over forests (Bingeding, 2008a). Most companies have opted to pay reforestation levies into trust accounts and move on because it is much easier to pay the levies than to engage in a reforestation exercise (*ibid.*).

The establishment of a REDD baseline would determine whether or not forestry activities that have been implemented were additional or not, and whether or not these activities qualify for payment under a REDD scheme. For PNG, there has been inadequate reforestation activities in logged-over forest to date (*ibid.*), therefore the likelihood for the country to immediately benefit from any REDD payments is negligible.

Any carbon credits that will be issued when REDD projects are implemented will be paid for sometime in the future, as specified per the carbon certificates. The specified date of payment could be five to 30 years or more, depending on the terms and conditions of the carbon market where carbon has been traded. It is vital for forest owners to understand the difference between paying for and being compensated for. Under a REDD scheme, resource owners are being compensated for the opportunity costs they have incurred in retaining their forests five to 10 years down the track as opposed to cutting them down. Therefore, there will be an issue of time-lapse between the signing of the agreement and when payments are actually issued.

However, if customary landowners do not receive immediate benefits from REDD, there are chances that disgruntled landowners may opt for, or revert to, other forest conversion economic activities such as logging which pay a higher premium within a shorter timeframe. This will only jeopardise a REDD project, therefore one option to take might be to consider reducing the time-lapse in which landowners will have to wait before benefits from a REDD scheme are paid to the customary landowners. This could be done by paying REDD compensation in the form of annuities rather than as a one-off payment like timber royalties (Hunt, 2010).

Monitoring, Reporting and Verification of REDD

Monitoring, reporting and verification are important for any carbon emissions reduction program. Therefore stringent measures must be put in place to ensure that the monitoring, reporting and verification of any carbon emissions reduction program is carried out to the highest standard possible. The stringent measures will foster a strong country emissions reduction program that should win the confidence of the international community, and ensure a strong enforcement program (Schakenbach *et al.*, 2006).

Since natural forests in PNG are owned by customary landowners, there will be a large number of REDD projects registered by various Incorporated Land Groups (ILGs) throughout the country. These large number of REDD projects will make monitoring, reporting and verification a mammoth task for the government. However the government must enact and enforce appropriate statutes and regulations in order to ensure that there is strict compliance among individual REDD projects to make the program successful. A mandatory emissions reduction program to be successful in the long run is dependent on how vigorously a country enforces its statutes and regulations (*ibid.*).

The Government of PNG has already committed the country to a national REDD program (Conrad, 2010:4), but there is still no climate change legislation or national REDD policy framework in place. In addition, in the absence of a capable institutional structure, the government is weak in its capacity to effectively monitor, report, or verify reductions in carbon emissions or enforce regulations and statutes. The international community is aware of PNG's lack of capacity and unless the country puts in place effective governance mechanisms that would manage emissions efficiently, PNG may not be able to access international funding for the development of REDD or other carbon emissions reduction programs in the country.

One of the requirements for monitoring, reporting and verifying an emissions reduction program is that these procedures must be implemented continuously over time. In PNG some regular forest inventories are carried out within timber concessions, but forest areas outside of timber concessions have not been continuously inventoried. In the past 35 years only one national forest inventory was done in the 1990s between the Government of PNG and AusAID (Hammermaster and Saunders, 1995). However, since then there has been no financial commitment from the government for any new national forest inventory (Amos, *personal communication*)⁷. This further exemplifies PNG's institutional weakness in maintaining a current forest resource inventory system. As a result, this situation weakens the country's position and argument that it could do better with the monitoring, reporting and verification of carbon emissions.

Estimation of Forest Carbon Stocks

In order to trade carbon using a REDD scheme, the rate of changes in forest carbon stocks over time must be reliably and correctly estimated. This requires estimates of carbon stocks from the five different carbon pools of: the standing tree above ground, root biomass below ground, forest litter, deadwood, and the organic carbon in the soil.

The biggest biomass of a tree is found above ground, and this is where the biggest changes in forest carbon stocks take place (Gowae, 2009b). This component of forest carbon, hereinafter referred to as tree biomass, can be estimated using direct field measurements or existing forest inventory data. Using existing forest inventory data to estimate tree biomass requires the use of stand tables (diameter classes) and the Biomass Conversion and Expansion Factors, which are readily available from AFOLU (Agriculture, Forestry and Other Land Use) (IPCC, 2006). If tree biomass is to be estimated using direct field measurements, then species specific Allometric Equations⁸ or Biomass Expansion Factors⁹ have to be locally derived.

⁷ Goodwill Amos is in charge of REDD and Climate Change in the Papua New Guinea Forest Authority.

⁸ Allometric equations establish relations between some key characteristics of trees that are easy to measure with others that are difficult to measure. The equation is established so that one would measure the easily measurable characteristics and estimate the difficult-to-measure characteristics from the derived relationship.

The derivation of Allometric Equations is highly preferable, but in order to derive these equations a lot of field data is required and this poses a mammoth challenge for PNG to achieve at the moment (Gowae, 2009b).

Country-wide estimates of forest carbon stocks in PNG under different forest strata have been derived using field-based approaches (Shearman *et al.*, 2008:18; Bryan *et al.*, 2010; Fox *et al.*, 2010). Nevertheless, these country-wide forest carbon stock estimates were not derived from all the five different forest carbon pools. The estimates of forest carbon stock by Shearman *et al.*, (2008:18) and Bryan *et al.*, (2010) was only for above ground and below ground biomass, and did not include soil organic carbon. The estimates given by Fox *et al.*, (2010) were for all pools of forest carbon above ground in lowland rainforest, and did not include root biomass and soil organic carbon.

Therefore, the challenge for PNG now is to evaluate its forest carbon stocks from all the five different carbon pools (Gowae, 2009b) using a series of complex formulae that would generate highly accurate estimates at the Tier 3 level of the IPCC Guidelines for greenhouse gas inventory (IPCC, 2006). There is a need to review all the methods used in estimating forest carbon stocks in PNG, or to derive or accept new methods that would yield highly accurate estimates for all the five different carbon pools. The more robust PNG's methodologies are for estimating carbon stocks from the five different carbon pools, then the better are its chances of acquiring suitable and higher financial returns from REDD and carbon trade.

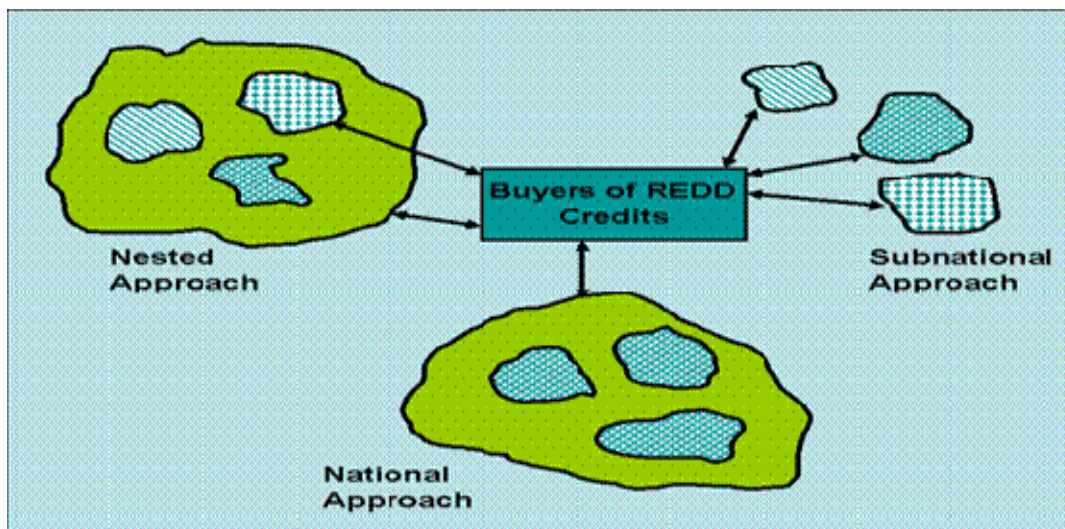
Scale and Implementation of REDD

CIFOR (2008) and Howes (2009) discussed the different scales in which REDD could be implemented in developing countries. The different scales of REDD implementation have their own advantages and disadvantages, but it is generally accepted that the implementation of REDD using the "Nested" and "National" approaches will adequately address the issue of carbon leakage. Figure 2 shows a schematic presentation of REDD under the different approaches.

Although there is no national REDD policy framework in PNG as yet, the government has already committed the country to a national REDD scheme (Conrad 2010:4). This commitment is genuine in the sense that it will assist the international community mitigate climate change and global warming, but it is ironical because the government does not own the forests and has no legal claim over customary land on which these natural forests stand.

⁹ Biomass Expansion Factor (BEF) is the ratio of tree biomass to stem volume. Biomass is measured in tonnes while stem volume is measured in cubic metres.

Figure 2: Approaches to REDD



Adapted from CIFOR (2008). The arrows indicate money from international buyers, and information from the sub-national entities.

Since the government has already committed the country to a national REDD scheme, much of the forested land in PNG will have to be used for REDD. Therefore, the government will have to mobilise much of the customary land needed for REDD projects.

In its recommendation to the government, the National Land Development Taskforce (NLDT) called for the establishment of a single land court to be established to settle disputes on land (Recommendation 48) (NLDT, 2007:84) and for the establishment of a system for voluntary customary land registration (Recommendation 49) (*ibid.*:88). This has resulted in changes to the Law on Incorporation of Land Groups and Voluntary Customary Land Registration (CLRC, 2009). In March 2009, the government passed two Acts, the *Land Group Incorporation (Amendment) Act 2009* and the *Land Registration (Customary Land) (Amendment) Act 2009*.

Although the government has passed these enabling Acts for the incorporation and registration of customary land for development purposes, the response to these changes has not been overwhelming. The Department of Magisterial Services (DMS) has promptly responded to Recommendation 48 of the NLDT report by setting up a single Land Court System (LCS) for PNG (Kolo, 2009). The LCS now has the task of reviewing all land disputes and to fast-track outstanding issues to allow for more land to be opened up for development. On the other hand, the Department of Lands and Physical Planning (DLPP) is yet to establish a Directorate on Voluntary Customary Land Registration as per Recommendation 49 of the NLDT report. This Directorate will be responsible for registration of customary land on a voluntary basis. Nevertheless, indications are that the establishment of a Directorate for registration of customary land under the DLPP will take a while.

The passing of the enabling Acts for the incorporation and registration of customary land for development purposes directly affects the DMS and DLPP. But other governmental agencies that are to be indirectly affected by these enabling Acts include the Department of Agriculture and Livestock, Department of Environment and Conservation, and Papua New Guinea Forest Authority. Therefore, there is a need for a whole-of-government approach to

effect changes to facilitate the implementation of REDD and other climate change mitigation and adaptation activities.

There is also significant and general lack in institutional mechanisms in which customary land can be mobilised and accessed for economic developments such as for a REDD scheme. Without these in place there is no way the Government of PNG can expect to access customary land for use in reducing emissions from deforestation and degradation of forests and therefore contribute its obligatory share towards the international effort in mitigating climate change.

The international community is anticipating that a new treaty will replace the Kyoto Protocol in 2012, in which REDD will be accepted as a mechanism for mitigating climate change, and for trading carbon credits from developing countries in the tropics. Alternatively, if a new international treaty is not reached in 2012, international funding for REDD could come in the form of “Carbon Aid”. Therefore, if the government is serious in its resolve to assist the international community mitigate the effects of climate change using REDD, it must push for appropriate institutional changes within the government system to have the necessary mechanisms put in place for customary land to be accessed for economic development before 2012.

4. FORESTRY AND REDD

Incorporating REDD into Timber Concessions

All current timber concessions in the country, both Timber Rights Purchase (TRP) and Forest Management Agreement (FMA), have been acquired by the state for harvesting of timber. The rights of the customary landowners have been temporarily transferred to the state for the required number of years for timber harvesting — 35 years for TRPs and 50 years for FMAs. Thus the customary landowners cannot rescind their decision and convert a current timber concession into a different land use, but will have to wait until the current timber concession expires or if the current timber concession has been nullified through a court decision.

In recent times there have been media reports of so-called “carbon cowboys” entering the country and striking carbon deals with forest owners of some timber concessions in the country. One such case was the East Pangia FMA in the Southern Highlands Province, in which the customary landowners struck a deal with a “carbon cowboy” to convert the timber concession into a carbon project. However, since East Pangia is a timber harvesting project the PNGFA threatened to take the matter to court the carbon project went ahead.

The incorporation of REDD into an FMA is technically possible, but it will have to be a national policy decision (Gowae, 2009b). Since REDD includes reducing emissions from deforestation and forest degradation and the role of forest conservation, sustainable management of forests, and the enhancement of forest carbon stocks in developing countries (IUCN, 2009), the incorporation of REDD into an FMA would serve almost the same purpose as “Sustainable Forest Management”. Also, the incorporation of REDD into FMAs would bring about good forest governance and control illegal carbon trade (Gowae, 2009b). But since there is no REDD policy as yet, the incorporation of REDD into timber concessions would be illegal unless the timber concession had expired or has been nullified by a court decision.

Although the PNGFA has already developed a draft Forestry and Climate Change Policy Framework for Action (PNGFA, 2009), the document is too general and does not cater for the incorporation of REDD into timber concessions. Therefore, the draft policy framework needs to be improved upon, or a national policy for REDD needs to be developed in order to allow for the incorporation of REDD into timber concessions.

Forest Governance

Although logging, plantations, subsistence agriculture, wildfires and mining activities have been identified as the drivers of deforestation and degradation of forests in PNG (Shearman *et al.*, 2008), poor forest governance has been one of the historical drivers of deforestation in many tropical countries (Saunders and Nussbaum, 2007:2). Therefore, in our endeavour to reduce emissions from deforestation and degradation of forests, the issue of poor forest governance as a driver of deforestation needs to be seriously addressed.

The view by Saunders and Nussbaum (*ibid.*) was consistent with the World Bank’s claim that 70 percent of forestry operations in PNG were illegal, highlighting the poor state of governance in PNG’s forestry sector (World Bank, 2007). This has been supported by various government sanctioned reports that at every stage in the development and management of these forestry projects, non-compliance had been a key problem (Saunders and Nussbaum,

2007). In many instances lawsuits brought against logging companies or the state by customary landowners are more to do with procedural matters such as the illegal issuance of licenses or permits; however the breach of environmental regulations are rarely reported and dealt with at all.

Currently, the country has 13.7 million hectares of production forests, of which 11.3 million hectares has already been acquired for timber harvesting while another 2.5 million hectares is yet to be acquired (PNGFA, 2009). Of the total forest areas acquired for logging, the PNGFA is currently dealing with *ca.* 4–5 million hectares¹⁰ and only those ILGs whose land is found within these current timber concessions.

However, since the government has already committed the country to a national REDD scheme the country will now have to deal with more than the 4–5 million hectares of forests currently dealt with by PNGFA and a much larger number of ILGs throughout the country. Consequently the much larger area of forested land than what is currently being dealt with by PNGFA and a staggering number of ILGs will inevitably increase its workload and associated issues for the government.

With timber concessions in PNG the issue of forest governance is a major concern, nationally and internationally, with some issues of illegality and other irregularities now pending before the country's courts. Therefore, there are concerns that problems currently faced within timber concessions may carry over into REDD if they are not adequately addressed prior to the implementation of REDD and carbon trade. Since REDD and carbon trade would involve substantially larger amounts of revenue than those currently gained from timber concessions, there is already concern that the revenue derived from REDD could also lead to other problems, such as increased corruption, rent-seeking and exchange rate appreciation (risks) (Howes, 2009). Therefore, the onus is now on the government of the day to address governance issues now facing timber concessions prior to moving onto the implementation of REDD and carbon trade.

Sustainable Forest Management

The concept of sustainable forest management (SFM) was developed by a German forester some 200 years ago. In its simplest form, the concept involves inventorying a forest concession and dividing it into individual logging setups¹¹ based on its total volume of timber and annual allowable cut (AAC).¹² If calculations — based on total timber volume and AAC — show that the timber concession would have a life of 50 years, the forest concession is divided up into 50 logging setups and each setup is harvested annually until all the setups have been harvested after 50 years (see Figure 3). Theoretically, when setup #50 is harvested, setup #1 should be ready for harvest by then. Thus the whole logging process can be repeated a second time around, or in perpetuity. However, over the past 200 years the concept of sustainable forest management has progressed from a simple definition based on AAC and

¹⁰ This calculation is based on the assumption that 60 percent of the 11.3 million hectares of acquired forests have been returned to customary landowners, while 40 percent is still under timber concessions.

¹¹ A logging setup is an area of forest within a timber concession that has been apportioned for logging and management purposes.

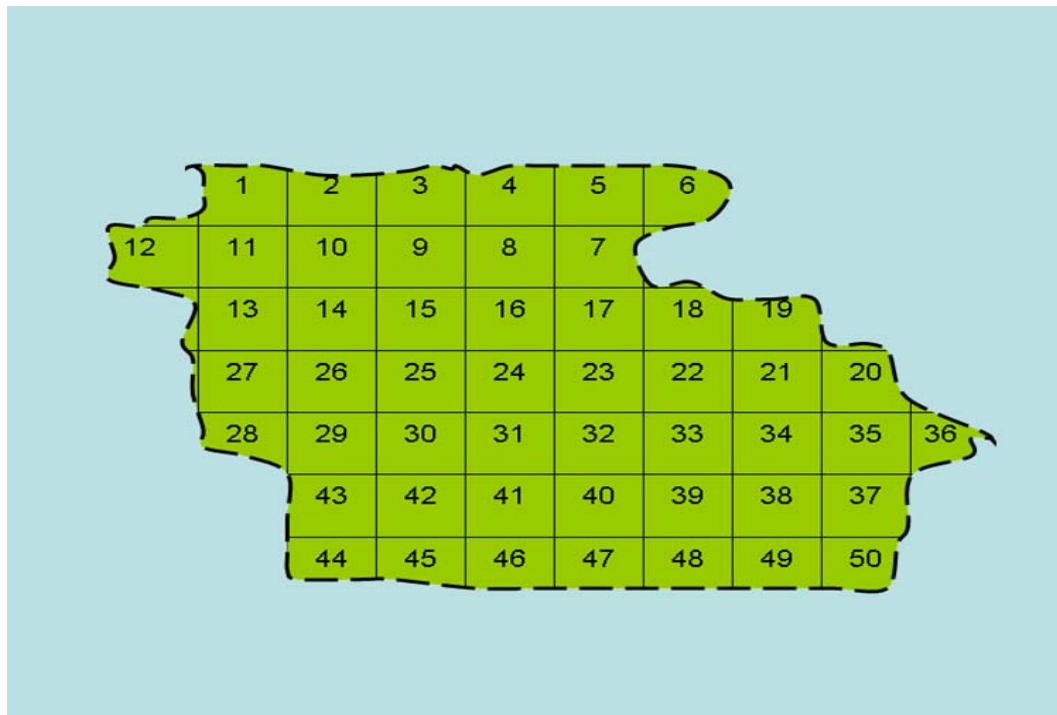
¹² Annual allowable cut (ACC) is the amount of timber that is allowed to be harvested in one year so that timber supply is sustained over the life of the timber concession. ACC is basically calculated based on total volume of the forest area and its growth rate.

total volume of timber to become more complex as other components of sustainability were incorporated into the concept.

Under the TRP and FMA in PNG, this basic principle of SFM does not seem to be working. Poor monitoring and enforcement of zoning in the harvest cycle is a major issue for the forest sector in PNG. Instead of a single forest concession being harvested and maintained over and over again as a permanent timber estate, the concession ceases to exist after a 35-year period for a TRP and a 50-year period for an FMA, and a new timber concession has to be sought for harvesting. Some reasons for this peculiar practice of harvesting include the inherent land tenure systems which make it impossible to maintain customary land as permanent forest estates and because there are more new primary forest areas that are yet to be exploited (Bingeding, 2008c). There is a better incentive to move on and harvest primary forests than to maintain logged over forests.

This system of timber harvesting has led to excessive issuance of timber permits and extensive deforestation and degradation of forests in PNG. However, in PNG's endeavour to reduce emissions from deforestation and degradation of forests and to explicitly practice SFM, the country needs to revisit timber concessions and address loopholes and technical issues that have impeded any real progress in SFM. One option that needs to be looked at is to turn current timber concessions into permanent timber estates so that the concepts of SFM and sustainable development are attained. Moreover, having permanent forest estates ensures legitimate control of deforestation and degradation of forests and therefore guarantees logging companies with a continuous resource base.

Figure 3: Logging Setups in a Timber Concession



5. SUMMARY AND CONCLUSIONS

REDD is a new developmental issue that has taken PNG by storm. A lot of interest has been generated among customary landowners and the government about the financial benefits that will be derived from the sale of carbon credits from REDD. Despite all the excitement within government and among customary landowners, REDD is very much a complex issue that needs to be fully understood by all stakeholders. Many issues and concepts pertaining to REDD are yet to be adequately understood and addressed respectively, before the concept could be efficiently implemented in the country.

Although the GoPNG, through its Climate Change ambassador, His Excellency Kevin Conrad, has committed the country to a National REDD Scheme at the international level, the implementation of REDD in PNG had been demonstrated to be a daunting task for the government because the majority of land and natural forests in PNG are under customary holdings.

Currently customary landowners, public servants, and the public are yet to fully grasp the REDD concept and understand how it will be implemented in the country. This is because scant consultations and awareness have been carried out on the issue to date.

Carbon ownership and benefit sharing from REDD and carbon trade is another issue that is yet to be resolved with the people obviously wanting the government to keep its fingers away from their forests and money.

REDD is part and parcel of the climate change issue, but the institutional setup of climate change and REDD in PNG and the roles that will be played by the different stakeholders in climate change and REDD are yet to be understood and finalised.

Although there is a lot of excitement about REDD and the economic benefits that will come with it, there are many technical issues which are yet to be addressed before any implementation of REDD could take place. These issues and their options are highlighted below:

- REDD is a new economic development option that will compete with other well entrenched economic activities such as logging and oil palm plantations in the country. However paying for carbon above \$10 per tonne could thwart the economic benefits currently provided by logging and oil palm activities. It would on the other hand bolster the status of REDD as a new and lucrative development option in PNG.
- The country has not been able to determine its REDD baseline due to lack of local expertise on REDD. This is also because there has been no consensus on which data from literature should be used for establishing a REDD baseline. However, the data given by Shearman *et al.* (2008) is quite comprehensive and can be confidently used to establish a REDD baseline for the country.
- The implementation of REDD projects could cause subsistence agriculture activities to relocate elsewhere and most probably intensify in magnitude, causing more carbon leakage. Nevertheless, this problem could be controlled using sustainable land management practices such as improved fallows, the use of genetically improved and

high yielding crop cultivars, and allocation of sufficient land for subsistence agriculture outside of REDD project areas.

- PNG does not stand to benefit immediately from REDD projects because little or no additional activities have been carried out in current forest concessions or other forest areas in the country to date.
- The country is eager to implement the REDD concept as soon as possible but it lacks the appropriate institutional structures such as legislation and policy in place to effectively manage climate change and implement REDD. Therefore, it would be an impossible task to implement the concept and to monitor, report and verify REDD activities in the country.
- Several methods have been used to estimate carbon stocks in PNG but these methods have only estimated carbon stocks from some of the five different forest carbon pools. Therefore there is a need to review existing methods used in estimating carbon stocks in PNG. Alternatively the country could develop or accept robust methods that could be used as standard methods for estimating carbon stocks from all the five different carbon pools.
- The government has already committed the country to a national REDD program, which means that most of the customary land and forest in PNG will have to be mobilised for REDD implementation. But since the mechanisms for mobilising and accessing customary land for development are not yet in place, the government needs to drastically push for institutional changes within the bureaucracy to have the necessary mechanisms for implementing REDD in PNG to be available prior to 2012.

It is possible to incorporate REDD into timber concessions because it serves almost the same purpose as Sustainable Forest Management (SFM). However this can only be done if it is a national policy decision and as there is still no national REDD policy framework for PNG, the incorporation of REDD into timber concessions may be illegal. Although it is possible to incorporate REDD into timber concessions, poor forest governance in timber concessions is a critical issue that is yet to be adequately addressed by the GoPNG. In addition, there are concerns that the current forestry governance issues in timber concessions in PNG could carry over into REDD projects if they are implemented. SFM serves the same purpose as REDD, but the basic principle of the SFM concept does not seem to work under current timber concessions in PNG. Therefore, the concept of SFM in timber concessions must be revisited to ensure loopholes and technical issues are adequately addressed before the country is ready to embark on REDD.

Due to a lack of understanding and appreciation by the general population about the climate change phenomenon and the socio-economic conditions in PNG, a more effective option would be to use an economic incentive or PES approach in order to achieve climate change mitigation in PNG. Landowners in PNG could not be easily convinced to give up their forests just like that and forego their economic aspirations just for the sake of saving the planet. If the world wanted conservation they must be prepared to pay for it through REDD, Carbon Aid, and so on.

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