

Inputs to the development of a national REDD strategy in Tanzania

Table of content

1	Introduction and summary.....	2
2	What is REDD?	3
3	Overview of the set-up of a national REDD system	5
4	The first I: Information (Monitoring, Reporting and Verification - MRV).....	6
5	The second I: Incentives	11
6	The third I: Institutions	13
7	REDD pilot projects.....	15
8	Capacity building, technical assistance and research	16
9	Risks	17
10	Conclusion and recommendations.....	19
11	Annexes	21

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1 Introduction and summary

The governments of Tanzania and Norway signed on 21. April 2008 a *Letter of Intent* expressing their partnership in reducing emissions of greenhouse gases from deforestation and forest degradation in Tanzania. The Norwegian government pledged a sum of USD 100 million in support of climate change mitigation and adaptation activities; REDD being one important component among them. The objective is both to initiate activities that will have an effect in themselves, and that will serve as a preparation for a global post-Kyoto climate change regime after 2012 (capacity building, information systems, institutional building). Moreover, the experience and insights gained from REDD pilot activities in Tanzania should feed directly into the global climate negotiations.

As part of this process, a team from the Norwegian University of Life Sciences (UMB), was in August 2008 put together to advice on this partnership and provide inputs to the development of a REDD strategy for Tanzania (see Annex IV for the TOR). The present report is the outcome of that assignment. We focus on some general principles and critical issues in a national REDD strategy, rather than going into great details.

The government of Tanzania in September 2008 established a task force to develop a national REDD strategy. The task force consists of three representatives from each of the Forest and Beekeeping Division (FBD), Ministry of Natural Resources and Tourism, and the Division of Environment (DoE), Vice President's Office. The preparation of the report will involve consultation with a broad range of stakeholders, and the report is expected finalized in January 2009.

As a summary, we would like to highlight the following elements that might appropriately be included in that strategy:

1. A broad review and proposals for policies for REDD in the following three main areas:
 - a. Establishment of a national system for REDD payments (PES), that is give monetary incentives to the service providers (sections 3 and 5).
 - b. Broad non-forest policies which aim at reducing demand for forests products and for conversion of forests to agricultural land (section 11.2.)
 - c. Tenure and governance, including the issue of enforcement in forest reserves and the status of public forest (section 11.2.6).
2. Implementing REDD has huge informational requirements, and requires a major investment to fully establish a system that can produce reliable information on changes in forest biomass (carbon) on an annual basis (sections 4 and 8).
3. Establishing a REDD institutional structure that provides incentives to the forest users and enhances good governance (sections 4.6-6).
4. Initiating REDD pilot projects to gain experience, not only for Tanzania but also for the global REDD and climate negotiations (section 7 and Annex III).

2 What is REDD?

2.1 Focus on incentive mechanisms and tangible benefits

REDD, short for: Reduced Emissions from Deforestation and forest Degradation, has no universally agreed-on definition. A broad definition would be: *any action taken at the local, national or global level to reduce deforestation and forest degradation (DD), compared with a business-as-usual (BAU) scenario*. As such one might argue that REDD is not something new, but a continuation of previous and ongoing efforts to reduce DD. A more narrow definition, in line with the mainstream debate internationally, is that REDD concerns the *creation of incentive mechanism (payments) to those responsible for reducing DD*. As such REDD represents a break with the past thinking on how to reduce DD. It might appropriately be seen as an application of Payment for Environmental Services (PES) for standing forest (Wunder, 2005). Thus there are important new elements in REDD, and this should be reflected in the REDD strategy of Tanzania. In this report, we use REDD as an umbrella term to include broad policies to reduce DD, but have the main focus on creation of incentive mechanism. This is in line with the Letter of Intent referred to in the introduction (see Annex IV).

REDD is likely to be included in the next climate protocol, to be signed at COP15 in Copenhagen in December 2009. While even the broad elements are yet to be agreed on, REDD represents an unprecedented opportunity for countries like Tanzania to receive substantial financial rewards for actions taken to reduce DD. The magnitude is highly uncertain, but simple “back of the envelope” calculations suggest that even under conservative estimates they can be hundreds of millions of US dollars per year.² What is certain, however, is that rewards will be performance based, i.e., depending on the results achieved, and that these must be documented and verified through a credible system of forest information. The government of Tanzania has therefore taken important steps to get ready for the full participation in an international REDD regime.

An *international* REDD regime will reward countries that reduce DD below an agreed-upon reference line (an adjusted BAU scenario). The finance will come from bilateral donors (like Norway), multilateral/global funds, or from selling REDD credits in an emerging global market for carbon credits.

A *national* REDD regime must transfer these rewards to those taking the action on the ground: the forest owners/users/managers (the question of *de facto* ownership is in many cases not clear, thus we use this more vague formulation of owners/managers/users). *Thus the incentives created at the international level must be mirrored at the local level for both effectiveness and equity reasons*. Producing carbon credits is in many ways like producing coffee, in order to boost coffee (carbon) production the producers must be paid more. Without incentivising those making the actual decisions about forest use the system is likely to fail, i.e., the national reductions in DD (and therefore international transfers) will be small. From an equity point of view, many of the forest owners and managers are among the poorest, and carbon sequestration in trees might become an important new ‘cash crop’.

² Zahabu et al. (2007) suggests that Tanzania could *potentially* earn USD 630 million annually, or USD 119 per rural household, *if all* deforestation and degradation were to be halted. While such figures are based on uncertain assumptions, their main purpose should be to illustrate the potential of REDD.

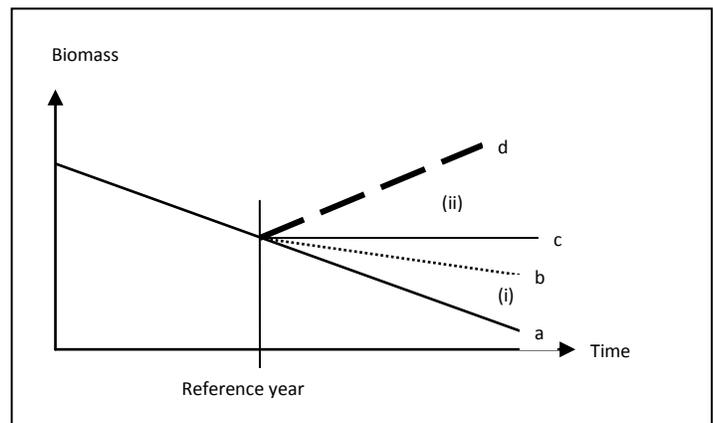
The Norwegian REDD support to Tanzania is classified as development aid, but represents a clear shift compared with traditional aid. The main new element is *performance based payments*, with performance = reduced emissions of CO₂ from DD compared with a baseline. Although the support in the initial phases focuses on assisting in a national REDD strategy, capacity building (“readiness” activities in climate jargon), and REDD pilot projects, this will rather quickly shift to a system of “performance based payments”. This is already being the case for Norwegian climate-forest support to Brazil, announced in September 2008.

REDD is also different from previous efforts related to forest conservation. A major element of these efforts, in Tanzania and elsewhere, is the community forest management. This approach has much merit, but a general lesson – both in Tanzania and elsewhere – is that this system has delivered reasonably well in term of forest conservation, but the local economic benefits have been small or even negative (Pagdee et al., 2006). A key purpose of REDD is to change this, and provide tangible benefits to local communities and households for their conservation efforts. During the early stages, development funding can be used for giving incentives for reduced DD, but the longer term purpose would be to link the stakeholders to an (anticipated) future global REDD mechanism.

2.2 Scope of REDD

The *scope* of REDD is still a matter of international discussion and negotiations. The three main elements considered are: (i) avoided deforestation and degradation (ADD); (ii) restoration of degraded forests (natural regeneration); and (iii) tree plantations.

The difference between (i) and (ii) is illustrated in the figure. The reference line (baseline) is a, and realized biomass is b, the reduction or ADD being the difference between the two lines. Consider another development, d. The question is whether one should be rewarded for only ADD (c-a) or also the restoration taking place (d-c). We would argue that there is no reason to stop at line c: the restoration of degraded forest should be included in the REDD mechanisms, given that the purpose from a climate perspective is maximising carbon storage.



The issue of plantations is more difficult. From a climate perspective, the focus should be on amount of sequestered carbon, not the (number of) tree species, management or purpose of the forest. One argument for exclusion is that plantations establishment is already included in the Clean Development Mechanism (CDM) as A/R projects (afforestation and reforestation). Further, the criterion of *additionality* might be more difficult to handle for plantations. We therefore recommend that at least for the REDD pilot activities one concentrates on ADD and forest restoration.

3 Overview of the set-up of a national REDD system

At the core of the discussion on Reduced Emissions from Deforestation and forest Degradation (REDD) is to create incentive mechanism (payment) to those responsible for reducing deforestation and degradation (DD). REDD therefore represents a new way of thinking compared with both traditional development aid and forest conservation. The key is to establish performance based systems, where payment is made to those that produce ‘certified emission reductions’ (CER) from reduced DD. Carbon credits can become a new cash crop for Tanzania and its population, produced locally and sold globally. Verified Emission Reductions (VER) for the voluntary carbon market may also contribute significantly to the volume of carbon trading.

Establishing a REDD mechanism along these lines is the major challenge for the REDD strategy of Tanzania. It requires detailed **information** about changes in the carbon stock of forests, appropriate **incentives** given to decision makers to undertake activities that reduce DD, and that the flow of information and incentives are embedded within a set of effective **institutions** to ensure good governance. We refer to this as the **triple I requirements**. A schematic view of a possible set up of a REDD mechanism is given in Figure 1. The 3 Is (information, incentives and institutions) form the basis for the discussion in the following three sections.

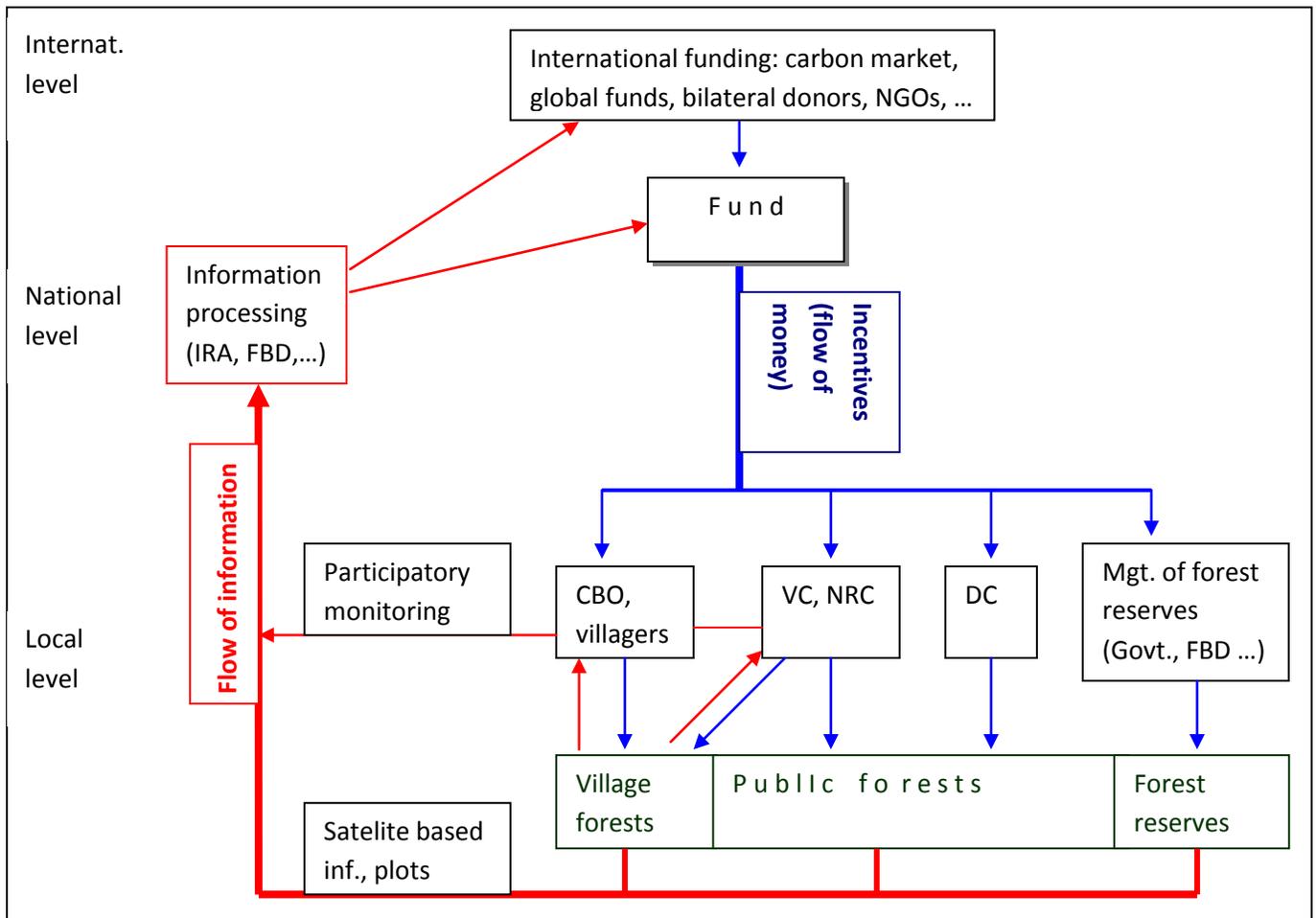


Figure 1: Schematic view of a REDD PES system.

4 The first I: Information (Monitoring, Reporting and Verification - MRV)

The provision of reliable and timely information on forests is a prerequisite to make a REDD system work. Historical rates of DD must be established to produce baselines, and changes in DD must be produced on an annual basis. Forest information will become much more important and valuable than in the past, as it will form the basis for potentially very large financial flows. This should encourage heavy investments in providing better information, but also increase the temptation of producing biased information. Transparency in the whole process and public access to all information is therefore essential. And, the quality of information needs to be verified by an independent body.

4.1 Status of information on DD

National forest inventories based on satellite imagery have been carried out twice in Tanzania, in 1984 and 1996. The latter, based on images recorded in 1995, estimated the forest area of Tanzania at about 39 million hectares. Compared to the first inventory this indicated a loss of 512,000 ha/year in the interim period, and this is still applied by FAO in their annual statistics (FAO 2008). Much lower estimates (130,000 ha/year) of present deforestation have, however, been presented (URT 1998). Vegetation maps based on the 1995-7 inventory and corresponding definitions of forest types are available at the Institute of Resource Assessment (IRA) at the University of Dar es Salaam. We have not been able to establish whether forest was defined according to present FAO guidelines (crown cover > 10 %), but suspect stricter criteria were applied (Can not Zahabo & co verify this?) . FAO (2000) estimated that 75 million ha had a crown cover above 10 %, and that more than 45 million ha had a crown cover percentage above 25, illustrating that different definitions will produce widely different estimates. It is therefore an urgent need to both agree on some common definitions of vegetation types and to carry out a new national forest inventory (see below).

Participatory Forest Management (PFM) has been found to be effective in halting deforestation and reversing degradation in unreserved forests (URT 2006, Zahabu 2006, Blomley *et al.* 2008). PFM is now included as a major element in Tanzania's National Forest Policy and its subsequent Forest Act of 2002 (URT 2002), although only 11% of the forest (3.6 million ha) are under such management owing to lack of funds and capacity (URT 2006). The current speed under which PFM projects are established is also observed to be very low. Access to carbon finances could potentially facilitate and speed up this process and possibly reducing the high levels of deforestation and forest degradation. About 16 million ha are unprotected forests in General Land³ (URT 2006), and typically 'open access'.

4.2 National inventories

The FAO has planned a national inventory of Tanzanian forests with financial support from the government of Finland. The inventory is to be implemented as a project with the Forestry and Beekeeping Division (FBD), Ministry of Natural Resources and Tourism, and will run from 2008 to 2011 with a total budget of about USD 4 mill. The inventory will combine measurements of area under different vegetation types based on satellite imagery with field measurements of trees. Area estimates will be specified for seven geographical zones. On the ground, a number of sample plots will be established in clusters of one square km. Height, DBH, species and health condition of trees will be recorded on the sample plots. A GIS and information data base developed by the FAO will be established in Tanzania and made available to all interested parties.

³ General Land as used here means all public land which is not reserved or village land (URT, 1999) including unoccupied or unused village land.

This will give fairly accurate area estimates for broad vegetation classes in seven agro-ecological zones of Tanzania, and good estimates of standing timber volume and above ground biomass will be available for the same geographical units. It is also stated that the inventory will supply management oriented data for selected areas. National estimates will not, however, be available before 2012.

It is critical that the new inventory apply similar definitions of vegetation classes as used in the two previous assessments (1984 and 1995). Only then one would be in a position to quantify deforestation between 1995 and 2009, which will form the basis for setting baselines both at the national and sub-national level. At the same time FAO would obviously also like to apply the global definitions to make the Tanzanian situation comparable to other countries, and to use the information as a basis for producing tradable carbon credits in the future.

Some have expressed an expectation that the planned national inventory will give forest data (area, biomass) at district level. It is not evident from the preliminary project document that this will be available. Biomass data presuppose a minimum number of sample plots in each district. Mainland Tanzania is divided into 21 regions, which again is subdivided into districts, divisions, wards, villages and communities. At present, there are more than 130 districts. If reliable biomass estimates (standard deviation less than 4%) are to be available for every district, this would require a very high number of sample plots across the country ($\approx 200,000$).

A key point in the design of a monitoring system is the level of disaggregation. The demand for REDD payments to reach the rural poor with traditional user rights to forests and woodlands has been clearly expressed in connection with international negotiations on climate change mitigation. If these payments are to be dependent on actual reductions of emissions, the extent of change in forest cover, biomass and carbon must be measured. If these measurements are not reliable and accurate at a much disaggregated level, local organisations for collective management and income distribution must be in place to handle REDD payments at a more aggregate level.

4.3 Participatory monitoring

If participatory forest management (PFM) projects are to be seen as REDD projects, measurements, verification and marketing the carbon will be required. These could be costly for the participating communities. In order to minimize the transaction costs, local communities could be trained and equipped to use reliable, valid, easy to implement, and cost effective techniques to carry out mapping of the forest and undertake annual carbon stock measurements by themselves. An alternative forest inventory approach that will produce local forest data was developed by Zahabu (2006). The method has two components: training⁴

⁴ Training involves the training of trainers - these are field foresters working under districts or local supporting organization. The duration of the training will be about 2 weeks. These foresters will then train groups of villagers (at least 6 for each village forest) on the field methodology. Thereafter they will depart to their districts (regions) and train villagers (6 villagers in each village) managing their PFM forests. After this the actual field work in each village will begin. For the first two years the foresters will be working with the trained villagers in the field and experts will be observing to see whether they get it right. After that, the villagers should be able to roll out the field work with supervision from foresters.

including training of trainers) and actual field data collection. This arrangement has been proved to be cost effective.⁵

Zahabu and Malimbwi (2008) propose an up-scaling of this inventory method. The country will be divided into 8 zones. In each district 10 villages will be selected to participate in the proposed pilot project, therefore about 1,140 villages will be covered. With an average of about 1,000 ha of forestland in each village, the total forest area to be covered under the project will be over 1 million ha. This process should be linked to the establishment of REDD pilots, so pilot areas are covered by this inventory method.

Before the transactions of carbon credits verification by an independent party is necessary. It is necessary also to avoid fraud at the local level and to ensure that the country does not claim international carbon credits which have not been produced. The independent party would have to be a licensed and registered agent, in the same sense as a chartered accountant, but would not necessarily have to be external to the country. The system of certified verifiers used under the CDM might be a model. Ideally the verifier will undertake ground spot measurements to check the accuracy of the field measurements by the villagers. Alternatively or additionally, the use of Airborne LiDAR technology can be employed.

A challenge to this proposal is the slow implementation of village land-use plans, and subsequent establishment of Village Forest Reserves. As noted, only about 11% of forests are managed according to this system at the moment. Serious deforestation and degradation may occur in areas where PFM has not been implemented. Actually, village land-use plans are primarily made in densely populated areas where clearing of most cultivable land has already been completed. Extending participatory forest inventory to new areas fast may be required if it is to serve as a basis for payments for REDD on a national scale. Alternatively, other methods of biomass estimation may be necessary in general lands where DD are rampant at the moment.

4.4 Harmonizing national inventories and participatory monitoring

By introducing measures to curb deforestation or degradation at local (or even regional) level, GHG emitting activities may be shifted to other locations where such measures are not in place, or less effective. This is called “leakage” or “displaced emissions” in REDD terminology. It may happen most easily in case of wood harvesting and/or charcoal making since such activities are not dependent on fixed investments in land clearing or infrastructure. Local monitoring will not capture such leakage. Therefore, a national monitoring system must be in place alongside local monitoring systems.

A National Forest Inventory Service should be established in order to collect and analyze all relevant information on DD in Tanzania. The NFIS should be capable of serving the international carbon market and national policy makers. Since most forests in Tanzania are owned by the state, the NFIS should have budgetary autonomy. The professional integrity of the service should not be questioned. Other parts of the state apparatus should not be able to manipulate inventory results in their favour.

In view of the difficulties involved in expanding participatory monitoring to cover large parts of general lands, and particularly less densely inhabited forest areas, one would look for other systems that may bridge the

⁵ In the long run trained villagers can work on their own at an average cost of USD 2 per ha, which includes the costs of assistance of the staff from the local supporting organization.

information gap. We expect the new national forest inventory to give reliable estimates of biomass at regional level, distributed per agro-ecological zone and vegetation type. Whether such estimates will be available at district level, and at what accuracy, is an open question. Also, we do not know with what frequency the national inventory would be repeated. A system of regular re-measurements of permanent sample plots may be envisaged. Up-dated estimates for selected regions may then be available annually.

One may use more sophisticated techniques to measure biomass in selected forest types, or in hotspots of high rates of deforestation and degradation. LiDAR is such a promising technology that should be tested under Tanzanian conditions, but the cost of airborne LiDAR probably makes it prohibitive in regular monitoring of small changes (deforestation or degradation) in vegetation types with biomass densities less than 100 tonnes/ha.

4.5 Building institutions for continuous MRV

Independent of the monitoring system an organisational structure must be given the responsibility for both national and more disaggregated forest inventory. The FBD have, with support from various donors and consultants, conducted different management and reconnaissance forest inventories and land use management classifications in the past.⁶ Not all of this information is readily available for analysis today. Some is available, but at considerable transaction costs. Both TAFORI and IRA have been suggested as organizations that may host a national forest inventory service. At the moment IRA seems to be better staffed and equipped for the establishment of such a service, but it might also be possible to place such a service with the FBD. For such a service to be capable of downloading and interpreting satellite images, carrying out regular measurements on sample plots, analyzing data, as well as storing and disseminating information, budgets must be increased significantly and inventory competence must be strengthened through recruitment of new personnel.

It is of utmost importance that such a service makes information easily available to anybody interested in carrying out any type of analysis. Some professionals and institutions may have an interest in creating their own monopoly on such information. This would be a most unfortunate situation that may hamper the development of an effective REDD mechanism, and must be avoided. Therefore, an institutional memory independent of competent individuals must be created within the inventory service.

One should also note that establishing credible and independent MRV systems is a key requirement for Tanzania to participate in international REDD markets and to be rewarded for its emission reductions. This

⁶ During 1971-3 the GoT conducted a reconnaissance of indigenous forest Inventory for five blocks i.e. Kilimanjaro, Tanga, Kilombero, Tabora and Mtwara. During 1975-7 an industrial inventory was done in the same five blocks. In 1996 a national natural resources mapping was undertaken. A reconnaissance forest inventory was later made in three regions of Singida, Arusha and Dodoma. In 1999 FBD conducted a study on the status of non timber forest products in Tanzania. Through Tanzania Forest Conservation and Management Project in 2005, FBD conducted a reconnaissance forest inventory in 11 districts covering Liwale, Mkuranga, Tunduru, Nachingwea, Rufiji, Kilwa, Kisarawe in Southern part of the country and Kilombero/Ifakara and Mvomero the in Eastern; Handeni/Kilindi in the Northern and Mpanda in the Western.

has implications for both the institutional set up, and the amount that need to be invested in the MRV infrastructure.

4.6 Recommendations on forest information systems

The national forest inventory (2009-12) will be undertaken by FBD with support from FAO and the Government of Finland. We strongly recommend that a permanent national forest inventory service (NFIS) is established during this project period. At the moment IRA at UDSM seems better equipped both in terms of infrastructure, equipment, and personnel to undertake this function. Alternatively, the NFIS might be built within FBD in spite of the overlap with IRA in terms of equipment and competence. If the latter option is chosen, a close collaboration with IRA and other institutions with technical expertise must be maintained.

The new NFIS should continue monitoring the state of Tanzanian forests and woodlands as a permanent activity. Satellite imagery would obviously be used in monitoring changes in forest and woodland area. Experience and expertise from Brazil or other tropical countries may assist in setting up such activities. Along with remote sensing, field measurements on permanent sample plots representing all forest types in Tanzania must be undertaken in order to estimate biomass densities. This task becomes more demanding (more plots) the higher accuracy and higher resolution (geographical disaggregation) are asked for. Monitoring changes in biomass density will require updated measurements of field plots, or some remote sensing technique different from satellite images based on reflected sunlight. Repeated measurements of sample plots may follow the methods already in use in Uganda (MWLE 2002).

The position of all sample plots will be determined by GPS. Standard consumer GPS technology may be sufficient for relocating plots for re-measurements after some years. However, if more expensive precision equipment is used, the same sample plots could also be used to calibrate data from airborne LiDAR. This technology could then be applied later to update biomass estimates at shorter intervals, e.g. annually. If the objective is to update national or regional biomass estimates, LiDAR measurements could be made along non-overlapping transects with the sampling percentage dependent on required accuracy at regional level. Without deciding on the application of LiDAR, use of precision GPS equipment in the location of field sample plots during the new national inventory is highly recommended. If the FBD of MNRT and the FAO are interested, the team proposes that Norwegian funds may be used to purchase such equipment.

Frequent monitoring of biomass densities, which will detect forest degradation, can be made by airborne radar or laser. Laser is better if biomass density is very high (> 200 – 1000 T/ha). We would recommend that some research is undertaken to test the usefulness and costs of such monitoring in the Eastern Arc of Mountains and in some coastal woodland mosaics.

A new NFIS should also be charged with the task of collecting and analyzing information gathered by local communities in their Village Forest Reserves.

We are not sure whether the NFIS should also be responsible for verification of such data. Further planning is required to establish a verification system that will be accepted by all parties, Tanzanian and international. The establishment of an independent international forest carbon monitoring institution for REDD purposes could be an avenue to overcome national capacity shortcomings. To build synergies in addressing REDD monitoring requirements, COMIFAC countries are currently establishing a regional watchdog, the Central

African Forest Watchdog. Monitoring for carbon crediting purposes needs to be objective and reliable. Leaving this task to each REDD supplier country may create the incentive to biased monitoring (e.g. exaggerated emission reductions) to reap carbon benefits. The current system of external validation provides a level of control against abuses, but it adds high transactions costs, as well. Independent third party monitoring and certification in the form of an international forest carbon monitoring institution, may therefore be a more adequate response.

Ad hoc estimation of emissions from deforestation and forest degradation, as well as baseline studies may be undertaken by academic staff at UDSM and/or SUA. Detailed studies of carbon content of various forest and woodland types, above ground as well as in soils, should be undertaken. Emission studies following deforestation and forest degradation should also be made.

5 The second I: Incentives

REDD is an attempt to address a global market failure⁷, i.e., pay the forest owners for keeping their forest. Thus a system will only be function to the extent REDD provides incentives to those that make the decisions about forest use. There are several issues that need to be addressed to make this system effective:

First, there must be a real transfer of financial resource to forest owners/users/managers. The intention behind REDD is to provide real incentives. A risk of a REDD programme in any country is that the lion's share of the international transfers will end up in the central government coffers. This will undermine both the effectiveness of the programme (too small incentives for forest users), and the equity of REDD. In the case of Tanzania, the government (including Ministry of Finance and district councils) would need to accept the principle that REDD is a payment for a global service, and a substantial share of the international payment received should therefore go directly to the villagers who are producing that service.

Second, while some up-front payment is needed to overcome liquidity constraints and initiate REDD actions that, the payment should primarily be based on achieved results. The results are measured in terms tons of carbon sequester in biomass, compared with a baseline.

Third, setting a realistic baseline is a tricky issue. The baseline should reflect a business as usual (BAU) scenario, i.e., what would happen without the REDD programme. The most common practice is to let the baseline be a continuation of past recent DD. This requires readily available information, which will be provided by the new forest inventory. Annual deforestation rates can be estimated for the period 1995-2010, and degradation rates estimated based on more coarse methods. Fine-tuning of baseline, that is, to take into account other factors than historical deforestation that would influence the BAU scenario, has strong theoretical arguments, but is not recommended at this stage.

Fourth, perverse incentives must be avoided. An ill-designed REDD system might create perverse incentives in several areas. If baselines are based on recent deforestation, it might stimulate quick forest clearing in order to get higher baselines. In cases where individual land rights are established though forest use (land

⁷ There has not been any price signal in the market to tell polluters that GHG emissions from deforestation and forest degradation are costly.

clearing) or in other ways are not clearly defined, introducing REDD might lead to unproductive land races. If information is based on participatory methods, and without reliable control mechanisms, there might be an over-reporting of reductions achieved.

Fifth, and as a key issue, the forest owners/users/managers – those to benefit from the payment – must be identified. For **village forests**, the appropriate recipient might be the village council (VC) or the natural resource council (NRC). The problem is, nevertheless, that this might be a too large unit to create the more individual or household oriented incentives often needed. Community based organizations (CBO) is therefore an alternative, and so is direct payment to individuals. It is strongly recommended that the REDD pilot projects should experiment with different payment systems (see section 7 and Annex IV).

In the case of **central forest reserves**, the owner is the state, and the management under FBD and therefore a possible recipient of payments. The baseline should, however, be zero decline in biomass, and one might therefore argue that “one should not be paid for what one is supposed to do anyway”. The actual situation is however often degradation and encroachment and illegal uses. We would argue for a pragmatic approach, with partial payment to both District Forest Offices and to the adjacent villages.

The last category is the general or **public land** where, which is *de facto* open access in large tracts of the country. The puzzling fact is that this is the largest forest category (about 57 % of total forest cover), the one where most of the deforestation and degradation occur, but where it is the most challenging to introduce a REDD PES mechanism. It would be very difficult to introduce PES mechanisms without first addressing the tenure situation of the public forest land. A general strategy would be to move public forests to the management of villages (or communities), private individuals, or the state. Districts have a responsibility for general land within their boundaries, and one can envision a system where they are given incentives to manage general lands more sustainably. However, capacity constraints may make the handing over to communities or private sector more effective.

Some concerns have been raised to what extent REDD payments can be handled by Village Councils or Village Natural Resources Committees, and that it should be handled at a lower geographical unit. One may easily imagine the overwhelming data collection and reporting requirements of a PES system to serve individual communities or hamlets all over Tanzania. It is obvious that such a disaggregated system can only be implemented in a small number of districts and villages for the time being.

It may be argued that a PES system for REDD cannot solve institutional problems of corruption and skewed income distribution at district and village level in Tanzania. One may have to accept the institutional conditions of rural Tanzania as they are, and implement a PES for REDD system within the existing set-up. In that case deforestation and degradation data at district level may be sufficient. District Councils will then be given the responsibility of finding suitable systems for distributing REDD payments. Additional processes would be needed to make income distribution accountable and just within districts.

6 The third I: Institutions

6.1 Some basic principles

Setting up a national REDD system requires a rethinking of the institutional structure for several reasons. First, the REDD represents a new form of support. Second, the potentially large amount of funds calls for a new approach. Third, and related to the large amounts of involved, a system with ‘checks and balances’ must be in place to ensure good governance of both information and the funds. The starting point for the assessment of an appropriate institutional structure should be a few basic principles:

- **Separating different roles:** Creating a system for REDD payment implies setting up a market for producing and rewarding (‘buying’) REDD credits. Such roles include:
 - (i) Sellers: forest owners/users/managers providing the service (REDD).
 - (ii) Buyers: international payment channeled to the national institutions and to sellers.
 - (iii) Market facilitators: linking buyers and sellers.
 - (iv) Information providers: providing information about the service being produced.
 - (v) Auditing: verification of the services (certification?).
 - (vi) General policy formulation: setting the framework for how the market should operate.
- **Transparency, public scrutiny, and “checks and balances”:** As a general principle, all the information collected and processed should be publicly available, and at a low cost (e.g., Web published). Public scrutiny will both increase the quality of the data, and raise the awareness of the issue.
- **Embedding REDD in national policies and legislation:** While there is a need to create separate institutions to handle the various roles involved in a REDD scheme, the system must also be integrated into national policies and legislation, e.g., for contractual enforcement and fiduciary management.

Figure 1 and the below sketch represent a possible institutional set-up for a REDD system. We are well aware of the political sensitivity of some of the questions raised. We do not, however, see our role as to enter that debate, but rather to point to some key principles and possibilities for creating an effective REDD mechanism. All parties involved should, however, be fully aware of the possible pitfalls and the need for finding innovative and robust solutions.

Needless to say, the Government of Tanzania, through its appropriate ministries, should assume the overall responsibility for REDD. At the same time, we would strongly argue that the three functions related to:

- information collection and processing,
- management of REDD funds
- auditing and verification

are being handled by bodies with some degree of autonomy and independence from the central government. This underlies the suggestion below.

6.2 Information collection and processing

The informational requirements are huge, as discussed in section 4. An independent and competent organisation (NFIS) should be established to undertake national forest inventories and co-ordinate and assemble a variety of forest information from different sources. Such an organisation would serve the policy making sections of MNRT with reliable data. This task will include the responsibility of producing data that might form the basis of REDD payments in the future, and a duty and right to make all data publicly available at a low cost. Since the state is also the major forest owner in Tanzania, the linkage between policy makers and the NFIS should not be too close, however.

The work, including the operations in the field on sample plots, will have to be done in cooperation with a number of other agencies, including FBD, SUA and TAFORI FI. A working group for this co-ordination should be established in relation to the forest inventory being planned.

6.3 REDD Fund

The channelling and management of the REDD financial flows that Tanzania will be receiving should be handled separately from traditional development and government revenue. We suggest that a national REDD fund is established for this purpose. This has several advantages: by keeping it autonomous from the government, one avoids mixing too many roles within the relevant ministries. It would increase the likelihood of the money received being used for the purposes it was intended for, rather than becoming a general budget support. Moreover, donors wanting to contribute to REDD in Tanzania will be invited to contribute to the fund, ensuring better coordination and country ownership of the REDD strategy and activities.

Using again the parallel to coffee production, a major purpose of the fund would be to channel money from the global buyers of REDD carbon credits to the producers of such credits. Thus a major task of the fund would be to establish procedures for paying villages/communities for REDD, based on actual performance. Additional task will include support to information collection and processing, independent auditing and verification, and support broader policies which aim to reduce DD, cf. discussion in section 11.2.

Although different in scope and size, the establishment of a REDD funds would benefit from the experience of the Eastern Arc Mountains Conservation Endowment Fund. The fund is governed by a board of Trustees, with representatives from government, research and legal communities, NGOs (national and international), business/private sector, and local communities. Another model is Brazil, which launched its *Fundo Amazônia* on 31. July 2008. The fund is administered by the National Bank for Economic and Social Development ("Brazilian Development Bank"). The fund is governed by a council with broad representation from central government, federal states and the civil society. The Norwegian REDD support to Brazil is channeled to this Fund.

In the case of Tanzania, one possibility would be to use the proposed Forest Fund (as per provision given in the Forest Act of 2002) for this purpose. It is, however, clear that this would require a fundamental change in the mandate, and therefore boils down to crating a new fund. We therefore recommend the establishment of a new REDD fund.

7 REDD pilot projects

The Bali declaration (COP 13, December 2007) encourages countries to undertake REDD pilot activities to gain experience and test different models. REDD pilots is also the first point in the letter of intent signed between Tanzania and Norway in April 2008. According to the letter of intent, the pilot activities should develop *“incentive schemes that provide equitable benefit sharing mechanisms particularly at local levels, capacity building, provision of technical assistance, facilitate transfer of technology to improve, inter alia, data collection, estimation of emissions from deforestation and forest degradation, baseline studies, monitoring and verification systems.”* Thus by pilot projects we primarily refer to concrete projects that establishes REDD PES systems at the local level.

REDD is a new experience, both for Tanzania and other tropical forest countries. The selection of Tanzania as a the first African country for Norwegian REDD support and pilot activities also indicates a hope that the lessons learned both might be transferred to other countries with similar forest and socioeconomic conditions, and also feed into the ongoing global REDD negotiations.

We consider that pilot projects both to be part of a learning process, and to build capacity and prepare for a more comprehensive REDD system in the medium term (3-5 years). In addition, the pilot activities should achieve verifiable results in terms of reduced DD. But, the expectations here should be modest, in part due to the limited spatial coverage pilot activities necessarily will have.

7.1 Basic principles

In order to maximize the learning, and thereby form the best possible platform for building a future REDD system in Tanzania, we consider the following principles to be essential for the pilot projects:

1. **Data on the current situation** in the pilot area must be established, both in terms of forest conditions (area, biomass), and socioeconomic conditions (forest income, total income, assets).⁸ Without such information is becomes next to impossible to assess the impact of the REDD pilot project on both forests and local livelihoods.
2. **Control areas** adjacent to the pilot areas need to be established, with a similar collection of data. This is needed for several reasons, including to assess how large the problem of leakage is. A high risk is that activities like charcoal production will just move outside the pilot area.
3. The activities should include some **experimental design**, that is, some of the variables should vary across pilot project in order to gain insight in what will work under which conditions. This concerns both the payment vehicle, the recipients of the payment, and methods of data collection and verification. (These issues are elaborated in Annex I.)

The pilot activities could productively build on the Participatory Forest Management (PFM), and in particular the Community Based Forest Management (CBFM), and the organizational set up associated with that programme. The communal ownership implicit in the Village Land Act (URT 1999), is a perfect stepping stone

⁸ These are often referred to as baseline data, but the term “baseline” is used in a different meaning in this report, i.e., as a hypothetical scenario for what would happen with DD without REDD.

to local, participatory monitoring of forest and woodland resources. We fully support the proposal (Zahabu and Malimbwi 2008) to expand such monitoring as a pilot activity for REDD.

7.2 Organization

The pilot projects calls for a tripartite collaboration between:

- Government of Tanzania (FBD and DoE in particular), which are responsible for CBFM, should provide overall guidance, ensure collaboration with local authorities, and feed the results into the national REDD strategy.
- NGOs, which have a wide local experience in community forestry programmes, and can be key agents in the execution of the programmes.
- Research institutions in Tanzania, Norway and elsewhere, which should provide inputs on the design of the pilot projects, data collection and analysis, and evaluation of results.

We would suggest that a working group is established as soon as possible, with two representatives from each of the actors mentioned above, plus local community representatives, to plan and coordinate the pilot activities. The group should also explore in further details how to learn from current smaller activities, such as the a “mini-PES” being done in Tanzania as part of a larger international project coordinated by the University of Twente, the Netherlands (Zahabu, pers.com.), and work by NGOs under the CBFM umbrella.

Annex I elaborates further key aspects of the pilot projects.

8 Capacity building, technical assistance and research

Capacity building is most appropriately done as part of real activities, rather than as ‘stand alone’ components. This does in no way preclude specific support to institutions and individuals to strengthen capacity and build competence that should be an important complement.

Capacity building should take place in three main areas:

1. Information: the national forest inventory, participatory monitoring, and a pilot study using laser technology for biomass measurement.
2. Management of funds: setting up an institutional structure including the establishment of a REDD funds, and work with district and village council in the implementation of REDD activities.
3. REDD pilot projects: participatory monitoring, local payment systems, etc.

There is an obvious need to train more professionals in handling both information and money related to PES for REDD. The handling of forestry information probably requires more specific training than bookkeeping, accounting, and economics. The present situation may be described as follows:

The FBD lack the capacity to generate, manage, update and use forest inventory data. The FBD is under-resourced by forestry staff. Professionals, technicians and forest guards are not performing adequately as

they are poorly equipped. An information management system is now in its infancy, but information collected over the last decades is still scattered and inconsistent.

Consequently, a few inventory professionals with PhD-degrees in forest sampling, remote sensing and GIS should be recruited to a new NFIS⁹. If training of new personnel is necessary, this may take 4-5 years. In the meantime expatriate technical assistance may be required. IRA already has remote sensing and GIS laboratories staffed by competent technicians. A NIFS must include a section for field measurements on permanent sample plots. This section should be staffed by competent diploma holders, and equipped with GPS and forest mensuration tools as well as camping gear and suitable vehicles. Another section for management of information should be established with competent staff. IRA has the required hardware already.

There is also a need to train villagers who will monitor their own Village Reserves. To train these villagers will also require some training of trainers. Much of the above mentioned training may be undertaken by universities, NGOs and other organisations already active in Tanzania (e.g. the Forestry Training Institute at Olmotonyi).

In addition to such training, the Tanzanian and the global community should learn as much as possible from pilot REDD activities in Tanzania. In our opinion such learning becomes most efficient if it is organised as multi-disciplinary research following pilot activities in a systematic and theoretically sound manner. The research programme on climate change planned with financial support and scientific contribution from Norway is a relevant and positive contribution in this respect.

9 Risks

The Norwegian climate forest initiative, which the support to Tanzania is part of, is an unusually ambitious undertaking. While the logic behind REDD is very simple, the challenges are primarily related to two factors: (i) getting timely and reliable information on changes in forest biomass (which is needed to produce the product: certified emission reduction (CER)), and (ii) ensuring that the payment for REDD is channelled to the forest owners/managers/users (the producers of CER are paid).

⁹ In order to ensure the sustainability of the project results in the future, FBD, in accordance with its mission, will work to develop, consolidate and expand its programme of forest inventory, assessment and monitoring to include the trees outside forest resources and to cover all benefits to all users of forests and trees. Under this project and with the help of the international assistance, FBD will work to develop an innovative approach for resources assessment and monitoring and to introduce new concepts and technologies. FBD will work to set up a permanent specialised unit and lasting programme of resources monitoring and information management on the basis of the nationally accepted approach and the developed capacity under NAFOBEDA. FBD will ensure that the trained personnel will remain under the programme and will continue to receive the necessary technical and financial support from the Government.

Through its specialized unit, the FBD will also work with partners and stakeholders to develop and update norms and guidelines for different types of forest and tree inventories whether they are for strategic decision making (strategic inventories) or for operation and management (operational and management oriented inventories). FBD will act to ensure that all actors are aware of the national norms and guidelines for forest inventory and are voluntarily following these norms and guidelines (FAO 2007:21).

9.1 Heavy informational requirement

During our visit we sensed a tendency within the Tanzanian forestry sector to view the REDD mechanism as a source of project finance. Project activities would typically include participatory forest management at community or village level, policing of village forest reserves, early burning, enrichment planting, and establishment of woodlots to substitute for indigenous woodlands. It seemed to be readily understood by most actors in the forestry sector that REDD payments should be linked to actual performance in terms of avoided deforestation or carbon storage. The perception among our Tanzanian informants is that for those payments to be made according to performance in a just and legitimate way, each individual project must be monitored in considerable detail. To manage a large number of such projects over large parts of Tanzania according to this view would require large numbers of disaggregated performance data. We are concerned that this view may put the whole REDD mechanism at risk. The risk is that such a detailed approach will hamper broad implementation of measures to avoid DD in Tanzania as a whole. It is likely that PES projects of limited scope in a few priority areas, e.g., the Eastern Arc of Mountains, may be successfully implemented along those lines, but the danger of leakage within the country is then high.

9.2 Heavy centralization and top-level capture

A core idea of REDD is to use a substantial share of the money Tanzania receives as payment to the local communities in order to provide real incentives for reduced DD. The real risk is that a too large share is being captured by the central government for funding of various forest related activities, as general budget support, or even worse as corruption and misuse. Central level capture is a tendency also observed in other countries for REDD funding (e.g., Brazil), and the move from project to budget (or sector) support in development aid might have led to more funds being used at the central level. Furthermore, the proposed 60-40 distribution of revenue under the CBFM is not yet resolved and may indicate a lack of willingness to share revenue with the local levels.

This risk might be reduced by promoting a clear and broad understanding among all sectors of government about the key principle of REDD. We also see the establishment of a national REDD fund, responsible for handling revenue from REDD at international level and allocate to local levels, as an essential element to avoid that risk. We would see a risk, however, in that several strong organisations and individual bureaucrats at central level are not willing to render control over this flow of income. A protracted struggle might develop over the establishment of such a fund – something that would delay the implementation of payment for REDD.

Elite capture may also take place at the local level. In general, there are no shortcuts for how to minimize such risks. Transparency on information and incentives, spreading power among institutions (“checks and balances”), an active civil society, and strong commitment from the top-level of the national government will all contribute to mitigating the risk and ensure an effective and equitable implementation of the national REDD strategy.

9.3 Lack of local institutions to work with in areas where DD most serious

A REDD system that incentivise local users requires well functioning local institutions. At the same time, DD is most serious in areas where such institutions are NOT in place, creating a discrepancy between the need for action, on the one hand, and the capacity to implement them, on the other.

We see two broad solutions to this dilemma: (i) implement general policies (ref section 11.2) to reduce the pressure in these areas; (ii) tenure and governance reform to move forests out of the 'open access' (public forest) category and into categories with clearer tenure and management responsibilities.

9.4 Lack of coordination among ministries/sectors

In our discussion on causes for deforestation and forest degradation in Tanzania we point at a number of social factors and broad policies that influence the speed of forest destruction. Only few of them are within the responsibility of the two ministries now working on the National REDD Strategy, MNRT and DoE, VPO. We see a number of examples of actions taken by other ministries that may undermine the attempts at avoiding deforestation. Agriculture policies may be designed to increase cropland area in view of increasing food priced in the world market. New road construction projects may be started in vulnerable forest areas in order to enhance rural development. Electricity prices may be raised considerably as a consequence of increasing oil prices, leading to increased consumption of charcoal. This illuminates the need for broad co-ordination between sectors for the country to be able to capture potential revenues from REDD. If various sector policies are not co-ordinated, much effort may be spent by the two main ministries without significant result. The MoE between Tanzania and Norway has mentioned the need to carry out a policy study to reveal such policy conflicts.

10 Conclusion and recommendations

Developing and implementing a REDD strategy is an extremely challenging task, but can be highly rewarding for the government of Tanzania and the rural population. The REDD strategy should prepare the country for the full participation in the future international REDD regime as well as for the voluntary markets, and establish a national system for transferring incentives down to local level. Due to the short assignment our conclusions must be preliminary, and we foresee a number of detailed studies on particular aspects of REDD in Tanzania in the near future. Recognising these limitations, however, we still feel confident that the main tasks ahead will be in the following areas:

- 1. Developing a national REDD strategy:** The work underway to develop a national REDD strategy is very pertinent, and the government should be commended for its quick actions in this area. The strategy needs to involve a broad set of stakeholders, including all relevant ministries in the government, different levels of government, and civil society and private sector. The plan also needs to have operational component with identified sources of funding, in order to avoid becoming just a 'paper strategy'.
- 2. Initiating REDD pilot activities:** A variety of pilot projects should start as soon as possible to test out key elements of a future REDD system and gain experience. The pilots should be closely linked to research to maximize learning and produce insights that can be generalized.
- 3. Strengthening the national forest information system:** A new national forest inventory is to start soon, and this should form an important pillar in building a system which produces reliable, annual information on changes in forest biomass. This will form the backbone of a future REDD system. Building an independent, competent, and reliable National Forest Inventory Service that is capable of serving buyers and sellers of carbon credits, as well as the Tanzanian society at large, is a paramount priority in this field.

4. **Establishment of REDD fund:** A national REDD fund should be established soon. The funds will receive regular funding from donors and global carbon fund and/or markets as part of a new global climate agreement. Over time these flows will be based on achieved REDD results. The funds will be channelled through a national PES system with direct payment to local users, to support broad policies for reduced DD, and to cover costs of running the forest information system. A study on the experiences on similar funds is being prepared in Norad.

5. **Tenure and land use planning on public (general) lands:** The policy change implicit in the Village Lands Act (URT 1999) is an important step in the direction of sustainable forest management in Tanzania. Development of village land use plans and establishment of Village Forest Reserves represent an opportunity to put general land that has hitherto been *de facto* open access under localized collective management. Unfortunately, the process of expanding such plans and reserves to all vulnerable forest and woodland areas takes time; however about 11 % of the forest land is under such arrangements up to now, and the figure is growing steadily. We would recommend that additional effort is spent on trying to speed up this process, particularly in areas where deforestation rates are high and forest degradation is rampant.

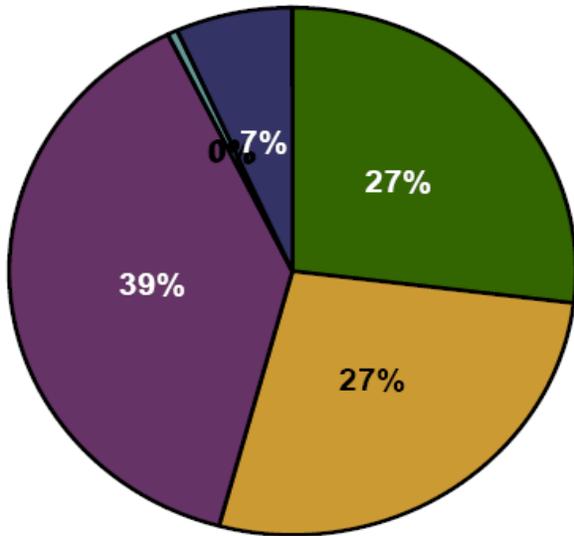
11 Annexes

11.1 Annex I: Deforestation and REDD in Tanzania

Forest cover in Tanzania

Forest Area and Change	Tanzania	Sub-Saharan Africa	World
Total forest area, 2000 (000 ha)	38,811	486,571	3,869,455
Natural forest area, 2000 (000 ha)	38,676	478,576	3,682,722
Plantations area, 2000 (000 ha)	135	6,210	186,733
Total dryland area, 1950-1981 (000 ha) {a}	X	1,120,649	5,059,984
Change in forest area:			
Total, 1990-2000	-2%	-9%	-2%
Natural, 1990-2000	X	X	-4%
Plantations, 1990-2000	X	X	3%
Original forest {b} as a percent of total land area {c}	22%	X	48%
Forest area in 2000 as a percent of total land area {c}	41%	20%	29%
Forest Area by Crown Cover (000 ha), 2000			
<i>Note: Crown cover data are gathered using different methodologies than the forest area calculated above. The two estimates may differ substantially.</i>			
Area of forest with crown cover:			
Greater than 10%	75,474	1,238,077	6,537,209
Greater than 25%	45,571	837,730	4,842,071
Greater than 50%	9,841	421,190	3,143,720
Greater than 75%	1,340	225,239	1,945,916
Ecosystem Areas by Type			
Total land area	94,509	2,429,241	13,328,979
Percent of total land area covered by:			
Forests	27%	15%	24%
Shrublands, savanna, and grasslands	27%	50%	37%
Cropland and crop/natural vegetation mosaic	39%	15%	20%
Urban and built-up areas	0.0%	0.0%	0.2%
Sparse or barren vegetation; snow and ice	0%	18%	16%
Wetlands and water bodies	7%	2%	3%
Forests certified through the Forest Stewardship Council			
Natural forests, 2002 (hectares)	0	85,980	11,457,393
Plantations, 2002 (hectares)	0	983,936	3,324,996
Mixed forests, 2002 (hectares)	0	0	11,461,154

Source: FAO (2000)



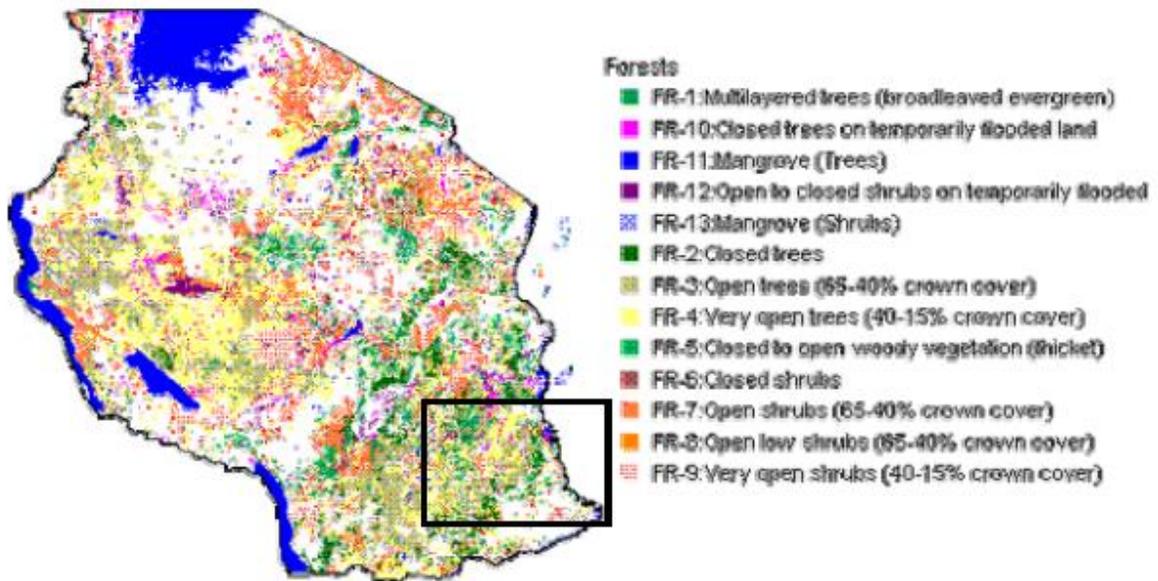
Ecosystem areas by type, Tanzania 1992-93

Dark green: Forests; Yellow: Shrubland, savanna, and grassland; Purple: Cropland and crop/natural vegetation mosaics; Light green: Sparse or barren vegetation; Blue: Wetlands and waterbodies.

Source:

Country Profiles of the Food and Agriculture Organization of the United Nations, Forestry Sector:
<http://www.fao.org/countryprofiles/index.asp?subj=5&iso3=TZA>

Map showing vegetative cover of Tanzania



Source: Milledge, Gelvas and Ahrends (2007).

11.2 Annex II: Broad non-forest policies to reduce demand for forest products and forest land

11.2.1 Causes of deforestation and degradation (DD)

In order to reduce emissions from deforestation and forest degradation, an understanding of the causes of these processes is required. A number of studies have been undertaken to understand why deforestation and degradation (DD) take place (e.g., Angelsen and Kaimowitz 1999). It has become standard practice to distinguish between proximate and underlying causes. Proximate causes refer to the activities involved in DD, and include agricultural expansion, infrastructure extension, and wood extraction. Underlying causes are demographic, economic, technological, policy, institutional, and cultural factors (Geist and Lambin 2002).

In the case of Tanzania, two major proximate causes of DD have been pinpointed: agricultural expansion and harvesting of wood for fuel and charcoal production. While the Tanzanian population has been growing at high rates for decades, agricultural productivity has not. Yields per hectare have been largely stagnant apart from some shift from shifting to permanent agriculture. The obvious result has been an expansion of cropland. This has mainly occurred along the fringes of forests and woodlands. This process is the main explanation for deforestation in Tanzania.

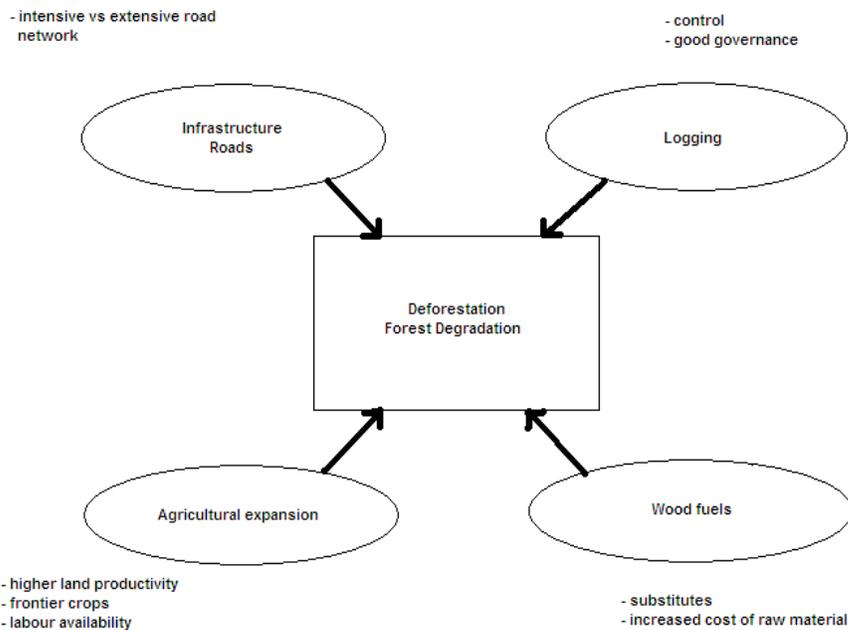
Meanwhile, the rural population has been reliant on firewood for cooking and other domestic energy consumption. In rural districts in sub-Saharan Africa firewood consumption has been recorded between 0.5 and 1 m³ capita⁻¹ year⁻¹ (Gaafar 1994), or 0.3 – 1.0 tonne capita⁻¹ year⁻¹ (Kituyi et al. 2000)¹⁰. The fast growing urban population, on the other hand, has continued using charcoal for the same purpose. This has not changed in spite of the availability of alternative energy bearers such as kerosene, gas and electricity. These have been too expensive to take significant market shares due to high costs both of the energy itself and the technical installations required. Harvest rates of wood have been much higher than the increment, and therefore unsustainable, in many areas, particularly in the vicinity of population centres.

The supply of charcoal from vast woodland areas around major cities has contributed to easily observed degradation, particularly along trunk roads (Monela et al. 1993, Hofstad 1997, Luoga et al. 2002). A high proportion of the total wood energy content is lost during charcoaling, but the energy content per tonne is increased considerably compared to fuelwood. Therefore, transporting charcoal to town is much more economical than hauling firewood. Charcoal burning by consumers is also less polluting than firewood. Improved energy efficiency can be achieved by employing better kilns in the forest and better stoves in town. The latter has been adopted to some extent, but improved stoves still represent a considerable investment to the poor. Technically superior kilns are much more expensive than the traditional earth kilns and will not be employed as long as wood is as good as free in the forest. Several attempts have been made to establish peri-urban plantations of fast growing trees (mainly eucalyptus) around Tanzanian and other African cities in order to produce woodfuel for urban consumption. It has been sufficiently demonstrated that this is not profitable as long as wood is available at low (or no cost) cost from indigenous woodlands.

¹⁰ 1 m³ of air dry wood of indigenous Tanzania trees has a mass of 0.3 – 0.9 tonne depending on species.

In addition to these two main drivers of forest destruction a number of less important activities may be included in an analysis of causes of DD, such as overgrazing and logging of industrial timber. Construction of new roads, railroads, or bridges also opens up new forests for exploitation.

In view of the complex interplay of social forces driving DD in Tanzania, it becomes evident that reducing emissions from these processes cannot be achieved through activities in the forest sector alone. Cropping patterns in agriculture are determined by prices of inputs and outputs, as well as labour availability and ecological factors. Energy use in urban households and workshop industries is determined by prices of both energy itself and technical installations. Construction of new roads is planned well outside the forest sector. These examples show that several sector policies must be modified in order to achieve significant reductions of emissions from deforestation and forest degradation (REDD). Tanzania as a country may earn considerable sums from a global system REDD payments, and some proportion of that might be used on broad policies that affect the demand for forest land and products (and not only direct payments to rural people altering their land-use). Subsidising the use of improved charcoal kilns and stoves, or the price of alternative energy bearers, may be just as effective in reducing woodland degradation. Subsidising chemical fertiliser may reduce the expansion of cropland into forests, depending on yield effects and market conditions.



11.2.2 Agriculture

Crop Production

Agriculture in Tanzania is dominated by smallholder farmers cultivating an average farm size of between 0.9 hectares and 3.0 hectares. About 70% of Tanzania's crop area is cultivated by hand hoe, 20% by ox plough and 10% by tractor. Agriculture is basically rain fed. Women constitute the main part of agricultural labour force. The major constraint facing the agriculture sector is the falling labour and land productivity due to application of poor technology, dependence on unreliable and irregular weather conditions. In 2005, the

agriculture sector grew by 5.2% compared to 5.8% in 2004. The decrease in the growth rate was caused by drought in some parts of the country. Considering that the overall GDP growth target for halving abject poverty by 2015 is in the range of 6-7 percent, this performance falls short of the needed growth. The macro economic reforms have and continue to have a significant impact on the agricultural sector. The economic reforms have led to opening up of the sector to private investment in production and processing, input importation and distribution and agricultural marketing. Most of production and processing and marketing functions have been assigned to the private sector. The Government has retained regulatory and public Support functions or facilitation role.

Grazing and Livestock Keeping

Livestock production is one of the major agricultural subsectors in Tanzania. The subsector contributes to national food supply, converts rangelands resources into products suitable for human consumption and is a source of cash incomes and *inflation-proof* store of value. It provides about 30% of the agricultural GDP. Out of the sub sector's contribution to GDP, about 40% originates from beef production, 30% from milk production and another 30% from poultry and small stock production. Commercial ranching accounts for about 2% of the total cattle herds. Private Commercial ranching exists in different regions of the country with small stock numbers. Pastoralism is concentrated in the northern part of the country's plains and is practised in traditional grazing areas, where climatic and soil conditions do not favour crop production. The main roles of livestock in this system are subsistence, store of wealth and source of cash incomes. The livestock numbers have been increasing steadily in recent decades at roughly the same rate as the human population growth. Out of 3.7 million households in the country, 3% are pastoralists and 7% are agro-pastoralists. Cattle are dominant, they account for about 75% of total livestock production. There are sheep, goats and poultry. Approximately 99% of livestock sub-sector belongs to traditional small owners. The big ranches and dairy farms constitute the remaining 1%. Carrying capacity of the rangeland is estimated at 20 millions animal units, but currently there are only 16 million animal units.

11.2.3 Energy

Biomass-based fuels, namely fuelwood, charcoal and bio-residues, dominate the energy balance in Tanzania. These fuels account for about 90 percent of the primary energy supply. About 40.4 million m³ (95%) out of total estimated 42 million m³ of wood consumption in Tanzania in 1999 were consumed as woodfuel. Out of this, 26 million m³ were consumed in rural areas as fuelwood (24 million m³ for households cooking, 2.03 million m³ for rural small and medium enterprises (SMEs)), and 14.4 million m³ in the urban areas mainly as charcoal (World Bank 2008). The most predominant use of woodfuel is in household for cooking and heating. Other uses are in social centers (schools, hospitals, prisons, etc) and SMEs (beer brewing, bread baking, fish smoking and frying, pottery, food vending/small restaurants, brick making, lime production and processing of beeswax). In order to reduce negative environmental effects of woodfuel extraction the following projects are being promoted:

- Biogas production for cooking, improved technologies (cook stoves and kilns).
- Solar thermal applications for water heating and cooking.

Electricity generation, transmission and distribution in Tanzania are through Tanesco. The company is 100% government owned and is responsible for 98% of the country's electricity supply. Petroleum, hydropower and coal are the major source of "commercial" energy in the country. The electricity sub sector contributes

about 0.6 per cent of total energy consumption. Two thirds or 381 MW of Tanzania's installed capacity is hydro powered. It is reported that Tanzania has an estimated 3800 MW of economic hydro potential capacity. Projects to address problems of electrification in remote areas are also promoted. Supply of hydro-electric power at subsidised prices for the first few kWh consumed by households might substitute for a significant mass of woodfuel.

11.2.4 Logging

FAO (2008) estimated total production of industrial roundwood (harvesting) in Tanzania to be around 2.3 million m³ in 2006. Only 317,000 m³ of sawlogs were produced. These estimates have been constant for the last decade and are hardly based on reliable statistical data, but are best guesses. Official statistics of harvesting licenses are kept by FBD, but Milledge, Gelvas and Ahrends (2007) have shown that actual harvested volumes exceed official records.

Indigenous Tanzanian timber species do not occur in pure stand, but dispersed among several other species of much lower commercial value. Logging of valuable species has been termed "creaming", since the largest trees of the most valuable timber are harvested first. When these specimens become rare, loggers shift to lower grade species. This is a well known development in both closed high forest and in open woodlands, and can be termed forest degradation.

Regeneration of such species is by seed and shoots from stump (coppice) or roots. Grazing and fire often kill or damage seedlings. Harvesting rates in accessible locations are regularly higher than natural regeneration and increment. The only growth model known for East-African open forests is from *combretum* woodland in Uganda (Namaalwa et al. 2005). Therefore, it is difficult to calculate sustainable harvest rates for most indigenous forests in Tanzania. Valuable timber species are not in real danger of extinction, however. When sizeable trees are very far between, loggers leave them because transport costs become prohibitive. Since regeneration is still present, the forest will revert to its previous state if left alone for some decades.

11.2.5 Roads and infrastructure

It may easily be observed how vegetation degradation spread outwards from trunk roads in Tanzania (Luoga 2002). Exploitation of natural resources and sale of agricultural crops become less expensive when a new road is constructed. The combination of increased Chinese demand for timber, better FBD control in Tabora and other areas, and opening of the new Mkapa Bridge across Rufiji River in August 2003 led to a boom in industrial timber logging in South-Eastern Tanzania (Milledge, Gelvas and Ahrends 2007).

Therefore, it may be important to consider deforestation and forest degradation effects when new investments in infrastructure are planned. This is not to imply that all new road construction in rural areas should cease, but sensitive vegetation types of relatively high biomass density (> 50 T/ha) should not be opened up for exploitation without thorough consideration of alternative development plans.

11.2.6 Protected areas

According to the National Forest Policy (1998) document there are 9.7 million ha of protection forests, mainly catchment areas, in Tanzania. In addition about 2 million ha of forest or woodland are classified as National Parks. Finally, some 12.5 million ha of Forest Reserves exists, but these are not fully protected against logging or other harvesting of forest produce. In the former categories, i.e., Catchment Reserves and National Parks,

wood harvesting is *de jure* prohibited. Parks and reserves have been successful instruments in conserving forest ecosystems in most parts of the world (Naughton-Treves et al. 2005). However, there is a risk of leakage, i.e., forests that are not gazetted as reserves are deforested (or degrade) faster as a consequence (Ewers and Rodrigues 2008).

Recent studies have revealed a considerable level of human disturbance also inside reserved forests in Tanzania (Frontier-Tanzania 2005, Malimbwi *et al.* 2005, Forestry and Beekeeping Division 2005). To avoid further degradation of protected areas, better control by central authorities and/or local communities is necessary. Policing by central authorities is expensive, but may be warranted in case of reserves with high biomass density and a high degree of bio-diversity. In forest reserves where some harvesting is allowed, joint forest management (JFM) is an alternative. Under JFM, forest ownership remains with the government while local communities are duty bearers and in turn get user rights and access to some forest products and services. Implementation of JFM in Tanzania has been hampered by reluctance on part of central authorities to render control, particularly over income from sale of timber or non-wood forest products.

11.3 Annex III: Development of pilot project activities

11.3.1 Selection of pilot areas

Two criteria have been put forward in the selection of REDD pilot areas:

Existence of Community Based Forest Management (CBFM), and possibly also the existence of NGOs with experience with working in the area.

Deforestation and deforestation (DD) is a serious problem. Although there is currently no systematic evidence on where DD is currently most serious, there should be sufficient case based evidence to make a broad selection.

These criteria would typically be negatively correlated, and therefore make it harder to identify suitable pilot areas. Yet, in order to test if the pilot project will reduce DD, an absolute requirement is that DD is a problem in the first place. In order to have local institutions to work with, it is suggested that the pilot projects is limited to village forests and Catchment Reserves.

11.3.2 Experimental design to maximize learning

Variation in the design of the REDD pilots will be essential to test hypotheses about what model might work best in terms of forest conservation and maximizing local benefits and ensuring an equitable distribution of the benefits.

Natural variation in socioeconomic conditions, forest type, and market access/forest abundance/population density (these tend to go together). In addition, one might introduce some variation along different dimensions:

1. Forms of payment (recipient, and conditions)
2. Methods for collection information
3. Methods of setting baselines
4. Level of payment, e.g. making the pay dependent on the quality of information (generate incentives for providing high quality data).

As for the first point, the table below suggest some different forms of payment that is feasible.

Recipient of payment	Conditions attached to payment		
	Earmarked for REDD/forest activities	Earmarked for village/com. dev.	No conditions attached
Villages (VC, NRC)	Used on activities that reduce DD	Used on projects like roads, schools, etc.	Decide freely on use, including giving to hh
Communities (CBO)	As above	As above	As above
Households	na	na	Cash to households

11.3.3 Linking pilot activities to research

The pilot activities are essentially an experimental research project, thus they should involve close collaboration with the research institutions in Tanzania, Norway and elsewhere. A working group is suggested to oversee the activities and provide advice. Among the task would be to produce the following:

- a overall plan for how different actors (e.g. NGOs) involved should use different REDD model, along the lines suggested above
- a protocol of socioeconomic and forest data to be collected before the pilots start (and also to be used periodically and at the end of the project)
- a framework for assessing the pilot activities, e.g., the triple E criteria (effectiveness, efficiency, equity) (see Angelsen et al., 2008)
- a training model for the involvement of villagers in participatory monitoring

The project should also attract and provide incentives for Master and PhD students to undertake research in REDD pilot areas. Some highly relevant topics for study include: leakage, land rights, distribution of REDD benefits, biases in participatory reporting.

11.4 Annex IV: Terms of Reference (TOR)

TERMS OF REFERENCE

GLO-2035 GLO-08/076 Frame agreement Norad - Noragric/UMB 2008.
Assignment to contribute to developing a national REDD strategy in Tanzania

Background

Norway has recently signed an agreement with Tanzania on supporting increased efforts concerning climate and deforestation. This assignment is to engage in a supporting role in the planning process concerning REDD (*Reduced emission from deforestation and degradation*). The embassy in Dar has started planning programmes for up to 100 MNOK under the new climate/ deforestation effort. The embassy is engaged in dialogue with several local parties, and is currently in touch with the authorities on what measures to prioritize within this new field. The donors in Tanzania are actively coordinating their efforts, and several of the measures to be financed by Norwegian funds could be organized as a joint venture with the other donors. Among others, the World Bank and FAO are engaged in discussions on cooperation.

The “Letter of Intent” signed by Minister Erik Solheim during the Prime Ministers visit contains the following issues, among others:

1. Establishment of pilot activities for the promotion of a national REDD process with the aim of developing incentive schemes that provide equitable benefit sharing mechanisms particularly at local levels, capacity building, provision of technical assistance, facilitate transfer of technology to improve, *inter alia*, data collection, estimation of emissions from deforestation and forest degradation, baseline studies, monitoring and verification systems.
2. A policy review process to reveal possible needs for development or improvement of policies to ensure an overall policy environment conducive to the climate change agenda.
3. A comprehensive research and methodology development programme for climate change adaptation and mitigation. The programme will involve universities and research institutions in Tanzania and Norway, as well as other relevant global or regional scientific institutions
4. Development and undertaking of training and education programmes of relevance for the climate change challenges at all level.
5. Promote investments from and partnerships with the private sector, NGOs and research institutions and facilitate the access to formal and informal carbon markets by Tanzanian entities.

Terms of reference

These terms of reference are applicable for the first visit to Tanzania and the total amount of one week in Tanzania and two weeks of work in Norway prior to and after the visit. This assignment will primarily focus on point 1, but also opens for synergies to the other four points. For measure number 1, which in reality

represents the core of the pilot programme against deforestation, the embassy has started planning in cooperation with local consultants who have expertise in this area. This assignment will consist of an assessment of the types of mechanisms and measurement systems necessary to handle incentive systems that will reward reduced deforestation. Furthermore, the assignment will consist of detailed planning of a few chosen areas of demonstration, testing of methods for carbon measurement and implementing baseline studies which will be the measure point goal achievement. The intention is for the team to be in close cooperation with the local consultants and advise them. In the following are specific points that the embassy wants illuminated. Some of these points will only partly be looked at during the first visit, and may return in a revised version for later work and visits.

The team should address the following issues:

- To review what has been done so far in relation to the planning of REDD in Tanzania. This will include reviewing the consultancy report developed in preparation of the national REDD strategy process, the R-PIN for FCPF submitted to the WB, as well as other key documents. It will also include assessing proposed activities, actors, capacity to support the process in local, national and international institutions, coordination needs with other donors and other ongoing processes (e.g. FCPF and UN Quick Start)
- To assess the interests and expectations of key stakeholders as well as available competence, technologies, institutions and experience in relation to the promotion of a national REDD process and implementation of REDD in Tanzania (if time allows)
- To assess opportunities for establishment of demonstration activities for REDD. This includes assessment of possible incentive schemes that would provide equitable and sustainable benefit (cost) sharing mechanisms that include the local levels. In relation to equitable benefit (cost) sharing at local level, particular emphasis should be given to including women, poor segments of the population as well as pastoralists in the benefit (cost) sharing systems.
- To assess alternatives for establishment of national level institutions that would be suitable for managing incentive schemes, and advice on how these should be designed for smooth incorporation into a possible future global REDD scheme.
- To advice on the possible implication of tenure rights and user rights of men, women and pastoralists for the development of incentive schemes. Comment on possible local institutions that may facilitate equitable benefit (cost) sharing.
- To advice on the relationship between REDD programmes and A/R activities that are eligible under the CDM mechanism, including the role of tree planting as an element in REDD programmes
- To advice on how to organize data collection including estimation of emissions from deforestation and forest degradation, baseline studies, monitoring and verification systems. In this regard, participatory and locally based monitoring systems as well as satellite photos, aerial photography and laser technology (LiDAR) should be commented upon in relation to appropriateness and cost-effectiveness for measurement of biomass and changes in deforestation rates. Also to advice on what actors (e.g. MNRT, SUA, FAO) should be involved and responsible for laser measurements.
- To give advice on how to ensure transparency and accountability in relation to management of funds, including identification of REDD activities in other countries where Tanzania may collect experiences.
- To advice on the needs for capacity development and technical assistance that would be necessary at different levels to implement the national REDD strategy.
- To comment on possible risks in implementation of a REDD strategy, and advice on opportunities for risk mitigation.

Team

The team put together for this assignment consists of Arild Angelsen, Ole Hofstad and a representative from NORAD. They will visit Tanzania during the first week of September 2008. The team might be asked to visit once more during the fall and next year. Another possibility is to include others from Aas (UMB) in this work. What the next step will be is not yet decided; as that is dependent on the experiences and knowledge reaped from this first REDD assignment. The embassy envisions that the local consultants will work continuously gathering the necessary data and launching the pilot activities. The Forest project (Dept. of Environment) will probably be involved in the launch meeting and concerning professional assessments and tactical considerations along in the process.

11.5 Annex V: Programme

Date	Time	Activity	People met
Mon 1 st Sept	1000 - 1100	Internal briefing at the Embassy	Mr Jørgensen, Ms Sandvand-Dalen
	1100 - 1230	Meeting with Embassy of Finland, World Bank, and Development Associates	Mr Jørgensen, Mr Vihola, Mr Batulaine, Mr Peter, Dr Otsyina
	1400 - 1500	Meeting with FBD, MNRT	Dr. Kilahama
Tuesday 2 nd Sept	0800 - 1500	Trip to Sokoine University, Morogoro	Prof. Iddi, Prof. Malimbwi, Prof. Matovelo, Mr Zahabu
	1500 - 1630	Visit EAMCEF HQ	Mr Sabuni
Wednesday, 3 rd Sept.	0800 – 0900	Visit TAFORI HQ	Mr Sabas
	0900 - 1500	Trip to Kitulangalo Forest REDD case study on way to Dar es Salaam	Mr Zahabu, and WWF
Thursday 4 th Sept	0830 - 0930	Meeting with IRA	Prof. Yanda, Prof. Ngana, Ms Simon
	1100 - 1200	Meeting with CARE	Mr Barker, Mr Thapa, Mr Masoud, Ms Mbaga
	1430 - 1500	Meeting with TaTEDO	Mr Sawe,
Friday 5 th Sept.	0900 - 1100	Meeting with DoE, VPO	Mr Muyungi
	1200- 1400	Wrap up meeting at the Embassy	Mr Jørgensen, Ms Damhaug, Ms Sandvand-Dalen, task force members from DoE and FBD

11.6 Annex VI: References

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