



**IFAR 2007 Professional Development Program
Completion Report**
[800 words]

Instructions:

Please submit the completion report by email, using this form, through the sponsoring CGIAR Center to ifar@ifar4dev.org within three months after the completion of the fellowship.

Please check if Thalwitz Scholarship: IFAR small grants

Yes

Name of Applicant ----- *James Kinyua Mutegi* -----

Sponsoring CGIAR Center ----- ICRAF -----

I. Work Program goals achieved (maximum length: 200 words)

Through the IFAR grant we have been able to characterize the magnitudes of N pools, N oxides, processes, turnovers and soil carbon dioxide (CO₂) emission from undisturbed forests and croplands once under forestry. We are currently using the acquired results to parameterize the "Hole in the Pipe" (HIP) model and develop models linking nitrogen pools to processes, pathways and to nitrogen oxide trace gases. We intend to report these results through scientific papers in international journals and papers presented in international conferences. The trend of greenhouse gas emission as a function of time lapse following deforestation was established and results presented at ICRAF in October 2007. Basically forests were consumers of methane (CH₄) while agricultural lands were producers. Younger farms were better consumers than older farms; with eldest farms tending to be producers (P<0.01). Forests produced more N₂O than agricultural farms (P<0.01); with agricultural farms exhibiting almost an exponential decay pattern of N₂O emission with age of agricultural land. A similar pattern was observed for most of the N availability indices.

This program also provided a rare opportunity for scientists from ICRAF, KARI, KEFRI, Kenyatta University and KWS to work together and enabled training of two research fellows from KARI on gas sampling and analysis protocols.

II. Plans for follow-up (maximum length: 200 words)

ICRAF through the department of soil fertility and climate change has embarked on a more detailed characterization of greenhouse gas emissions as a function of land use change. The current and future activities, in addition to Kakamega forest will target other Kenyan forests like Nandi, Mau and Mt Kenya because these indigenous forests vary in terms of soil types and floral composition. I have currently enrolled for a PhD and through the program wish to establish the level of greenhouse gas emissions as a function of various land uses in Kenya and other parts of the world. This is especially important because climate change is a global problem with solutions that are also global in extent. In future, in addition to studying tropics for greenhouse gases I intend to study temperate ecosystems, so as to gain a more holistic understanding and improve on currently scanty climate change knowledge base. One of the GEF projects in ICRAF is looking at ways of utilizing results emanating from this IFAR and similar programs in implementation of clean development mechanisms (CDM) to benefit farmers sequestering carbon through agroforestry interventions.

III. Report budget utilization including whether budget was spent as planned (maximum length: 100 words)

We tried as much as possible to spend the budget as we had planned. We however spent more on soil analysis and purchase of gas calibration gases. This overspending was basically because the Kenyan shilling/dollar exchange rates were unstable over the project period. Basically grant was spent as follows

Item	USD
Soil analysis	5,800
Soil and gas sampling	1,429
Purchase and delivery of calibration and standard gases	2,773
Others	1,000
Total	11,000

A more detailed report on how the funds were spent will be sent to IFAR by the ICRAF finance department (the department that managed the grant).

IV. Assessment of the fellowship experience and general comments. (maximum length: 300 words)

The experience with this fellowship was very impressive. Through this fellowship I was able to meet scientists from many agricultural research institutions in Kenya and abroad. ICRAF provided a very conducive environment for implementation of the program. I would wish to sincerely acknowledge the support I received from my CGIAR supervisor Dr. Louis Verchot in the course of this program. The GEF funded Western Kenya Integrated Ecosystem Project (WKIEMP) based at ICRAF provided equipments required for various types of analysis in the course of this program.