

Topic Research Information

World Agroforestry Centre

Southeast Asia Programme



World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

May 2004

TOPIC RESEARCH INFORMATION

1. Agronomic and economic performance of *Adansonia digitata*

Summary : Agronomic and economic performance of *Adansonia digitata* as a vegetable in the peri-urban garden systems of Bamako. The objective is to assess the production of leaves used as vegetable from baobab gardens when fertilized and irrigated and to assess the profitability of the technology

Expected outcomes :

Available data and resources :

Profile of student : have a MSc degree;

Duration : 2 - 36 months

Supervisors : Dr. Amadou Niang

Location : Bamako (Mali)

2. Agronomic and economic performance of *Tithonia diversifolia*

Summary : Agronomic and economic performance of *Tithonia diversifolia* applied as green manure on various vegetables in the urban production systems of Bamako, Mali. *Tithonia diversifolia* is found in several pockets in certain malian cities like Bamako and Koutiala where vegetable is produced. This species was introduced long time ago from Ivory Coast as an ornamental.

Expected outcomes : The objective of this study is to assess the agronomic response of the application of various quantities of *Tithonia* in combination with inorganics on the major vegetable crops produced in Bamako and to assess the profitability of the system.

Available data and resources :

Profile of student : have a MSc degree;

Duration : 2 - 36 months

Supervisors : Dr. Amadou Niang

Location : Bamako (Mali)

3. Commercialization of fodder

Summary : Investigation of the commercialization of agroforestry based fodder in the urban and periurban systems of 4 Malian cities: Bamako, Segou, Sikasso and Mopti and strategies for improving the system.

Expected outcomes : A list of species commercialized, inventory of the chain from production to consumption, observation of prices and their fluctuation throughout the year, quantification of revenues from this activity and opportunities for improvement.

Available data and resources :

Profile of student : have a MSc degree;

Duration : 2 - 36 months

Supervisors : Dr. Amadou Niang

Location : Bamako, Segou, Sikasso, Mopti (Mali)

4. Rooting juvenile cuttings versus mature ones: case of Irvingia gabonensis

Summary : Factors affecting rooting ability of Irvingia gabonensis (one important indigenous fruit tree of humid lowland of west Africa) have been identified. However no study has been done on the selection using cuttings from mature trees.

Expected outcomes : Identify factors affecting rooting of cuttings from mature trees.

Available data and resources :

Profile of student : have a MSc or PhD degree; Background in biology or forestry

Duration : 12 - 24 months

Supervisors : Dr. Zac Tchoundjeu

Location : Mbalmayo (Cameroon)

5. Development of vegetative propagation techniques in village nurseries

Summary : Farmers in West and Central Africa have identified indigenous fruit trees and valuable medicinal plants important in their daily life. Moreover they have expressed the characteristics they will like to see improved in these species. The present study aims at transferring the vegetative propagation techniques at village level, as this will help farmers to undertake the domestication of high value species.

Expected outcomes :

Available data and resources :

Profile of student : have a MSc or PhD degree; Background in biology or forestry

Duration : 12 - 24 months

Supervisors : Dr. Zac Tchoundjeu

Location : Yaounde (Cameroon)

6. Improving Irvingia gabonensis through vegetative propagation techniques: case of air layering

Summary : Propagation of many tropical trees from cuttings from mature trees has been proven difficult. The best way of capturing desirable traits expressed by farmers seems to be the aird layering. The present study assesses the main factors affecting the success of marcotting I. gabonensis.

Expected outcomes : Identification of the most important factors affecting marcotting of I. Gabonensis

Available data and resources :

Profile of student : have a MSc or PhD degree; Background in biology or forestry

Duration : 12 - 36 months

Supervisors : Dr. Zac Tchoundjeu

Location : Yaounde (Cameroon)

7. Vegetative propagation of West and Central Africa priority species: case of *Dacryodes edulis*

Summary : *D. edulis* is an important indigenous fruit tree of West and Central Africa. The fruits are consumed raw or boiled in water. Many farmers derive big income from the sale of fruits. Diverse oils have been identified in *dacryodes* fruits. Despite the high diversity observed in *D. edulis*, little work has been done on improvement of this important species. The present study aims at determining main factors affecting rooting ability of *D. edulis*.

Expected outcomes : Determination of main factors affecting rooting success of juvenile cuttings of *D. edulis*.

Available data and resources :

Profile of student : have a MSc degree; Background in biology or forestry

Duration : 3 - 6 months

Supervisors : Dr. Zac Tchoundjeu

Location : Yaounde (Cameroon)

8. Various topics in design and analysis

Summary :

Expected outcomes :

Available data and resources :

Profile of student : have a BSc, MSc or PhD degree; Background in biometrics

Duration : 1 - 36 months

Supervisors : Mr. Richard Coe

Location : ICRAF HQ Nairobi (Kenya)

9. Computerized graphic agroforestry clip art

Summary : The main objective of the attachment is: To produce a collection of computerized clip art images that can be used for a wide range of agroforestry training materials. The student attachment will be expected to work in close collaboration with ICRAF's Training Materials Coordinator and with the Centre's Graphics Unit.

Expected outcomes : 1. A series of 150 to 250 agroforestry clip art images; 2. A catalogue of these images

Available data and resources : Computer hard and software is available.

Profile of student : have a Diploma degree; Knowledge of illustration graphics design packages like e.g. Adobe Illustrator, Adobe Photoshop, Corel Draw, Macromind Freehand.

Duration : 3 - 6 months

Supervisors : Ir. Jan Beniest

Location : ICRAF HQ Nairobi (Kenya)

10. Analysis of educational programmes in agriculture and natural resources to establish their relevance to small-holder agricultural production: The case of Eastern Africa

Summary	: Much of the agricultural and natural resources education offered at African universities has been borrowed from peer institutions in Europe and North America. Despite the high quality of education offered by these universities, there is little evidence that the knowledge and skills learned are being applied effectively to improve the well being of small-holder farmers. While there are some social and political issues that impede the translation of knowledge and skills to practice, we believe that there is also a need to study the relevance of existing curricula. This study will foccuse on how small-holder farmers' issues are addressed. Results will allow a better formulation of agricultural and natural resource education policies and curricula
Expected outcomes	: An analysis of programmes offered on forestry and agriculture in five African universities to better understand their relevance in the context of needs for agricultural sustainability and improved natural resources management.
Available data and resources	: Operational expenses will be covered by the ANAFE project.
Profile of student	: have a MSc or PhD degree; Strong familiarity with forestry, agriculture or natural resource management is necessary. Experience in Africa is an advantage
Duration	: 6 - 12 months
Supervisors	: Dr. August Temu
Location	: ICRAF HQ Nairobi (Kenya)

11. Tree canopy shapes in the context of models of forest dynamics

Summary	: A 'functional branch analysis' scheme has been proposed which makes use of self-repeating (fractal) properties of branched systems to predict total biomass on the basis of stem diameter. This new method for deriving 'allometric' relations has to be field-tested on as wide a range of trees as possible. Applications can be found, for example, in estimates of above- and below ground carbon stocks of agro-ecosystems
Expected outcomes	: Test of applicability of the functional branch analysis scheme; data base of tree parameters based on this scheme
Available data and resources	:
Profile of student	: have a BSc or MSc degree; MSc student in biology, forestry or statistics. Must be prepared to live in rural conditions.
Duration	: 6 - 36 months
Supervisors	: Dr. Meine van Noordwijk
Location	: Indonesia

12. Analysis of smallholder timber production systems

Summary	: Often smallholder farmers cultivate marginal infertile soils. These soils are of questionable utility for the production of annual (and seasonal) crops. Smallholders in some parts of the country have increased the productivity of their farms by diversifying into timber production. Observations indicate that areas where successful smallholder timber production has developed share the following characteristics: i) local natural forests are of limited size; ii) timber markets are accessible; and iii) adequate timber tree germplasm is available. To facilitate the development of smallholders timber production systems in other areas it would be useful to analyze the socio-economic and infrastructural conditions that exist in the areas where successful systems occur.
Expected outcomes	: Profile of the socioeconomic conditions of successful smallholder timber farmers. Compile a list of the major timber species grown by smallholders and the socioeconomic or market conditions that favor their production. A summary of the market channels utilized by smallholders. Silvicultural overview of the smallholder timber production systems studies. Review of smallholder timber production literature.
Available data and resources :	
Profile of student	: have a BSc or MSc degree; Field visits to appropriate areas.
Duration	: 4 - 6 months
Supervisors	: Mr. James Roshetko
Location	: Bogor (Indonesia)

13. Developing, testing and calibrating a carbon allocation model of forest tree seedlings

Summary	: An extensive data set on growth and physiology of seedlings was collected in a series of controlled experiments, under a varying set of light intensities and water stress. Five tropical species of different successional status were studied. The results should be integrated into a functional water and carbon balance model (using the Stella modeling environment) which should then be calibrated and tested. The topic revolves around data analysis and modeling as all useful data have yet been collected.
Expected outcomes	: A model of tropical tree seedling growth applicable to a range of environmental conditions.
Available data and resources :	Computer and environmental modeling software
Profile of student	: have a BSc degree;
Duration	: 6 - 12 months
Supervisors	: Dr. Gregoire Vincent
Location	: Bogor (Indonesia)

14. Tree reaction to light - Scaling up from leaf to tree

Summary : A dynamic model of Damar agroforest has been developed. Specific inputs are required in terms of light response of trees. Classically these are based on light response curve which are established at leaf level. Scaling up from leaf level to tree level is tricky, because leaves adapt to the light environment in which they grow, thus we expect to find a high variability in photosynthetic potential within the whole crown. Thus the sampling design is of crucial importance. Another short coming of the physiological approach is that it does not consider architectural adaptation to light level even though a good deal of the plasticity might come from changes in carbon allocation within crown and thus not be limited to leaf morpho-physiology. The specific objective of this work will be to assess for one target species to what extent physiological and morphological changes (both at leaf and tree level) contribute to tree adaptation to different light conditions. The job will consist in both ecological surveys and experimental work to characterise architectural adaptation to different light environments and photosynthetic potential variability inside crown. Data will be used to develop a model simulating carbon acquisition and allocation at whole tree level.

Expected outcomes :

Available data and resources : All operational costs will be covered by the project. A small living allowance can be provided for

Profile of student : have a BSc degree; Background in forestry or plant biology with strong interest in eco-physiology. Interest in modelling is desirable.

Duration : 6 - 12 months

Supervisors : Dr. Meine van Noordwijk, Dr. Gregoire Vincent

Location : Bogor, Krui, Jambi (Indonesia)

15. National study on the productivity of smallholder timber systems and the market sectors served by smallholders

Summary : Timber production plays an important role in the national economy of Indonesia. Commercial timber production is largely based on the harvesting of natural forests and is dominated by large commercial corporations. However, in certain areas of Indonesia smallholder timber production plays an important role in the livelihood strategies of farm families. As the area of natural forest in the country continues to decrease and regulatory measures to protect the remaining forest areas gain strength smallholder timber production systems could become important at the national level also. It would be illustrative to implement a study that would identify: i) the total productivity of smallholder timber systems across the country; ii) the major species produced through smallholder systems; and iii) the market sectors served by smallholder timber production systems.

Expected outcomes : Compilation of the major smallholder timber producing areas of Indonesia. Statistics on the total productivity of smallholder systems across Indonesia. List of the major species components of smallholder timber production systems. Identification and comparison of the market sectors served by smallholder timber producers, timber plantations and harvesting of natural forests.

Available data and resources :

Profile of student : have a BSc or MSc degree;

Duration : 4 - 6 months

Supervisors : Mr. James Roshetko

Location : Bogor, Lampung (Indonesia)

16. Land use change in the riparian strips in the Sumberjaya watershed in Lampung, Sumatra

Summary	: In the Sumberjaya watershed - a zone of about 50.000 ha- there is major conflict between coffee farmers on one hand and guardians of state forest land on the other hand. Coffee farming and the past conversion of forest to coffee is blamed to cause major erosion and change in hydrology of the Way Besai watershed. A land use change study was carried out using MSS 1973, 1986 and ETM 2000 imagery. The riparian areas are crucial with respect to waterquality and sediment load in the rivers. A preliminary study focusing on the riparian areas was done using an IKONOS image covering a subwatershed. This study will cover the whole watershed using a SPOT5-image of 2.5 m resolution. A special focus will be given to the classification of riparian forest, rice paddies and other potential 'sediment filter' or highways along the riverine system. Analysis will be done using PCI and e-Cognition as software.
Expected outcomes	: Land use maps of 1976, 1993, and 2002 and the respective change detection maps
Available data and resources	: in chronological order: Digital aerial photographs of 1976 and 1993, SPOT-image: pan with 10 m resolution of 1999 and 2.5 m resolution of 2002, e-Cognition software
Profile of student	: have a BSc or MSc degree; have a BSc degree; BSc or MSc student with a background in Remote Sensing and preferably also GIS. Knowledge of the national language is an advantage.
Duration	: 2 - 6 months
Supervisors	: Ir. Bruno Verbist, Mrs. Atiek Widayati
Location	: Bogor, Sumberjaya, Lampung (Indonesia)

17. Water quality monitoring in the Sumberjaya watershed in Lampung, Sumatra

Summary	: In the Sumberjaya watershed - a zone of about 50.000 ha- there is major conflict between coffee farmers on one hand and guardians of state forest land on the other hand. Coffee farming and the past conversion of forest to coffee is blamed to cause major erosion and change in hydrology of the Way Besai watershed. To confirm/reject this hypothesis research needs to be carried out along the river to identify 'hot spots' of sediment influx with a specific interest in the spatial and temporal pattern. When and where does this happen? Indicators will likely include sediment load and visual clarity of water. The fact that quite some communities depend on river water for domestic use opens perspectives to work jointly on a diagnosis and remedy scheme as local people have a direct interest.
Expected outcomes	: Location of 'hot spots' of sediment influx in the Way Besai river system and develop a suggested set-up (location, density) of a measuring network in the watershed which ultimately will be monitored by villages themselves using a calibrated set of test tubes or using a calibrated visual method.
Available data and resources	: Digitized topographic map, recent land use map, soil map, climatic data
Profile of student	: have a BSc, MSc or PhD degree; Background in hydrology. Knowledge of the national language is an advantage.
Duration	: 2 - 18 months
Supervisors	: Dr. Meine van Noordwijk, Ir. Bruno Verbist
Location	: Bogor, Sumberjaya, Lampung (Indonesia)

18. Development of a river model for the Sumberjaya watershed in Lampung, Sumatra

Summary	: In the Sumberjaya watershed - a zone of about 50.000 ha- there is major conflict between coffee farmers on one hand and guardians of state forest land on the other hand. Coffee farming and the past conversion of forest to coffee is blamed to cause major erosion and change in hydrology of the Way Besai watershed. In order to quantify how much sediment, which ends up in the river, is actually transported downstream to the dam a river model needs to be developed.
Expected outcomes	: Development of a (preliminary) river transport model based on available field data and literature.
Available data and resources	: Digitized topographic map, DEM, recent land use map, soil map, climatic data
Profile of student	: have a MSc or PhD degree; Background in hydrology. Knowledge of the national language is an advantage
Duration	: 2 - 18 months
Supervisors	: Dr. Meine van Noordwijk, Ir. Bruno Verbist
Location	: Bogor, Sumberjaya, Lampung (Indonesia)

19. Development of a biological water quality indicator system in the Sumberjaya watershed in Lampung, Sumatra

Summary	: In the Sumberjaya watershed - a zone of about 50.000 ha- there is major conflict between coffee farmers on one hand and guardians of state forest land on the other hand. Coffee farming and the past conversion of forest to coffee is blamed to cause major erosion and reduce water quality in the river system. In an effort to assess how strong the link is between land use and water quality the use of biological indicators, like macro-invertebrates and fish will be invaluable. In contrast to indicators like sediment load and visual clarity of water, which can vary rapidly, biological indicators are more stable and can give insight into longer term variations. In the Sumberjaya watershed – quite some farmers use river water for their domestic use. There is often a problem with water quantity and quality. Setting a good diagnosis first is primordial and mapping the baseline water quality situation will be invaluable in the ongoing negotiations and assess the need for and effect of possible interventions.
Expected outcomes	: An easy to use indicator tool that farmer groups, NGO's and local governments can use to assess water quality. Location of 'blue' and 'black' spots in some subwatersheds and along the Way Besai
Available data and resources	: Digitized topographic map, recent land use map, soil map, climatic data, aerial photographs
Profile of student	: have a BSc or MSc degree; Background in biology, or related science. Knowledge of the national language is an advantage.
Duration	: 2 - 18 months
Supervisors	: Ir. Bruno Verbist
Location	: Bogor, Sumberjaya, Lampung (Indonesia)

20. Tree cover change analysis in the Sumberjaya watershed in Lampung, Sumatra

Summary	: In the Sumberjaya watershed - a zone of about 50.000 ha- there is major conflict between coffee farmers on one hand and guardians of state forest land on the other hand. Coffee farming and the past conversion of forest to coffee is blamed to cause major erosion and change in hydrology of the Way Besai watershed. A land use change study was carried out using MSS 1973, 1986 and ETM 2000 imagery. It suggests that there is a trend of "Less forest, but more trees in the landscape". The latter would be important to quantify and localise in the current perspective of community forestry based land tenure right scheme (HKM) in coffee gardens in protection forest. What are factors that would be related to it from a spatial perspective (Protection forest vs. private land, distance to roads, time of conversion, ...)? This study will cover the whole watershed using a recent SPOT5-image of 2.5 m resolution and a set of digital aerial photographs. A special focus will be given to the differences in land status: State forest land versus private ownership. Analysis will be done using PCI and e-Cognition as software. The work will involve a lot of image processing and some field work. The field work will consist out of an inventory whereby tree cover and species diversity is assessed using a stratified sampling.
Expected outcomes	: Land use/crown cover maps of 1976, 1993, and 2002 and the respective change detection maps.
Available data and resources	: in chronological order: Digital aerial photographs of 1976 and 1993, SPOT-image: pan with 10 m resolution of 1999 and 2.5 m resolution of 2002, software; an earlier bio-diversity study of coffee agroforests by CIFOR
Profile of student	: have a BSc or MSc degree; BSc or MSc student with a background in Remote Sensing and preferably also GIS. Knowledge of the national language is an advantage.
Duration	: 2 - 6 months
Supervisors	: Ir. Bruno Verbist, Mrs. Atiek Widayati
Location	: Bogor, Sumberjaya, Lampung (Indonesia)

21. Evaluation and design of a water supply system for domestic use in a rural community in the Sumberjaya watershed in Lampung, Sumatra

Summary	: In the Sumberjaya watershed - a zone of about 50.000 ha- there is major conflict between coffee farmers on one hand and guardians of state forest land on the other hand. Coffee farming and the past conversion of forest to coffee is blamed to cause major erosion and change in hydrology of the Way Besai watershed. Quite some communities depend on river water for domestic use. There are often problems with insufficient quantity and quality (high sediment load) of the supplied water. An evaluation will need to be carried out about the appropriateness of current and potential schemes, identify bottlenecks and propose alternatives e.g. how to reduce the influx of sediment at 'hot spots' to increase the quality of the 'raw' water, evaluation of sediment pits or roughing filter before the water is piped, ... the possible use of solar water disinfection to increase the water quality to drinking water level, ...
Expected outcomes	: A list of bottlenecks in the current domestic water supply to rural communities. A list of possible options to remedy the current problems An improved design for water supply for domestic use to a 5000 people village from a 1500 ha watershed
Available data and resources	: Digitized topographic map, recent land use map, soil map, climatic data, DEM, aerial photographs, past study on local knowledge and perceptions on water and watershed functions, ongoing turbidity measurements in the river
Profile of student	: have a BSc, MSc or PhD degree; Background in hydrology or civil engineering. Knowledge of the national language is an advantage.
Duration	: 2 - 18 months
Supervisors	: Ir. Bruno Verbist
Location	: Bogor, Sumberjaya, Lampung (Indonesia)

22. Representing tree-tree interactions in dynamic models

Summary	: Complex agroforests can be rejuvenated either at field level (usually using slash and burn land clearing methods) or by 'gap rejuvenation' or 'enrichment planting'. A better understanding of tree-tree interactions is needed to assess practical opportunities for farmer management of these systems. ICRAF's research is based on a combination of inventorying farmer's ecological knowledge of such systems, on-farm experiments to better understand constraints and opportunities and the use of simulation models. As we deal with a large number of potential components of agroforests, a functional classification system has to be developed. A proposed scheme ('functional branching analysis') is ready for field-testing and probably improvement as a result of this. Data can be coupled to a spatially explicit tree-tree interaction model.
Expected outcomes	: An efficient functional classification system for trees which are components of complex agroforests; A method for extrapolating results from one agroforest to another, by linking models and observational systems
Available data and resources	: Fieldwork costs, computer
Profile of student	: have a MSc degree;
Duration	: 24 - 36 months
Supervisors	: Dr. Meine van Noordwijk, Dr. Gregoire Vincent
Location	: Jambi, Lampung, Sumatra (Indonesia)

23. Analysis of national fruit germplasm pathways

Summary : Many smallholder farmers cultivate marginal infertile soils. These soils are of questionable utility for the production of annual (and seasonal) crops. Converting part of these holdings to tree crop production can complement annual crop production and enable smallholders to improve their livelihoods better than annual cropping systems alone. In many parts of Indonesia smallholders are interested in and have initiated tree farming systems. Fruit and other horticultural species are priority species for smallholder systems. Most smallholders use local available germplasm because they lack knowledge of and access to improved quality fruit germplasm. Even agroforestry professionals lack a thorough understanding of the national horticultural resources. To address this problem it is necessary to: i) identify, visit and interview the major agencies and commercial organization involved in fruit species research and production; ii) identify the key species and varieties these species have available and the major distribution pathways they use to distribute their products or research finds; and iii) evaluate the supply of this material to the local level horticultural nurseries.

Expected outcomes : Compilation of the fruit germplasm resources available from the formal horticultural sector. Identification of the major pathways that distribute these resources. Analysis of the supply of these resources to local level horticultural nurseries. Recommendations for improving the supply of these resources.

Available data and resources :

Profile of student : have a BSc or MSc degree;
Duration : 4 - 6 months
Supervisors : Mr. James Roshetko
Location : Java and Sumatera

24. Identifying priority zones for biodiversity conservation in the Sumatran peneplaine

Summary : Direct payment for biodiversity conservation services is another pathway to increasing the profitability of the system. Potential donors have been identified who are interested in cooperating with smallholders to conserve biodiversity. Such funds would be available on a short-term basis and/or for a limited area. Therefore the land rent approach should be backed-up by a series of longer-term wider applicability mechanisms to boost profitability. Along with latex eco-certification that could allow for a premium in price of rubber produced in those systems (see topic Feasibility study on rubber eco-certification), sustainable exploitation of high value timber is another promising pathway. There has been a preliminary study and this study needs to be expanded in order to be able to select the most promising zones for long-term conservation. Those zones should be selected based on · Present levels of biodiversity (which will depend mostly but not only on age of rubber agroforest) · Present levels of threats (land ownership recognition, competing alternative landuses) · Current potential for timber production (present standing volume) which will determine the production level of sustainable timber extraction The study would combine satellite imagery analysis (to select old growth rubber agroforests), GIS techniques (overlay with available information from land-use planning agency to assess predictable land-use change), field inventory of timber resources in the pre-selected areas. The study should lead to a list of geo-referenced areas to preserve in priority with detailed argumentation of strength and weaknesses of each candidate zone. More info can be retrieved at IRD-ICRAF

Expected outcomes :

Available data and resources : A preliminary study has looked into the potential of limited areas of old rubber agroforest in part of the MuaraBungo district (Jambi province).

Profile of student : have a MSc degree; MSc in ecology or forestry

Duration : 3 - 6 months

Supervisors : Dr. Gregoire Vincent

Location : Muara Bungo, Jambi, Bogor (Indonesia)

25. Role of community forestry and indigenous land and tree tenure systems in improved resource management in park buffer zones or Imperata grasslands

Summary : This component of the policy research aims at synthesizing the policy implications of recent experience with various community forestry and indigenous land and tree tenure schemes. Its central objective is to assist Government and non-government partners to develop and strengthen regulatory decrees, legislation and implementation guidelines for programs that enable forest dependent communities to continue to derive livelihoods from forests and to sustainable manage areas of the state-defined forest zone.

Expected outcomes : Policy memoranda and/or research reports & papers regarding improvement of regulatory decrees, legislation and implementing guidelines for government resource management programs.

Available data and resources :

Profile of student : have a BSc or MSc degree; BSc or MSc student in economic or social sciences or public policy, working knowledge of national language

Duration : 4 - 12 months

Supervisors : Dr. Thomas Tomich, Mr. Chip Fay, Dr. David Thomas

Location : Indonesia, Philippines and Thailand

26. Financial and economic profitability, production and marketing risks, agronomic sustainability and environmental impacts of agroforestry and other land use systems

Summary	: See topic on 'Effects of land use change at the forest margins on global public goods', however here measurements will be made of the effects of land use change linked to financial and economic profitability, production and marketing risks, agronomic sustainability and environmental impacts of agroforestry and other land use systems.
Expected outcomes	: Policy memoranda and/or research reports & papers regarding effects of land use change on financial and economic profitability, production and marketing risks, agronomic sustainability and environmental impacts of agroforestry and other land use systems.
Available data and resource :	
Profile of student	: have a BSc or MSc degree; BSc student in agricultural economics or public policy, preferred working knowledge of national language, farming systems background.
Duration	: 3 - 6 months
Supervisors	: Dr. Thomas Tomich, Dr. David Thomas
Location	: Indonesia, Philippines and Thailand

27. Economics of environmental externalities involving soil and water resources, biodiversity, fires and smoke

Summary	: The environmental effects of land use change on a larger scale than the plot level in the form of smoke, siltation, fluctuations in water supply, water quality, and biodiversity, need to be assessed in economic and financial terms.
Expected outcomes	: Policy memoranda and/or research reports & papers regarding economic and financial implications of environmental effects of land use change.
Available data and resources :	
Profile of student	: have a BSc or MSc degree; PhD student in economics, agricultural economics, natural resources economics or public policy. Preferred working knowledge of national language.
Duration	: 12 - 24 months
Supervisors	: Dr. Thomas Tomich, Dr. David Thomas
Location	: Indonesia, Philippines and Thailand

28. Measurement, valuation and policy implications of environmental impacts (siltation, flooding, etc.) resulting from land use change at the watershed/regional scale

Summary	: This policy research component concerns the assessment of environmental externalities in the form of sedimentation and hydrology entailed by selected land use forms at the forest margins. It aims at acquiring a scientific basis for the formulation of soil conservation strategies, not only at the plot level under different land use types, but also at the landscape and watershed level.
Expected outcomes	: Policy memoranda and/or research reports & papers containing soil conservation strategies at the various level under different land use types.
Available data and resources	: Geographic information system and remote sensing
Profile of student	: have a BSc or MSc degree; PhD student in economic or social sciences; preferred background in economic demography; preferred working knowledge of Indonesian language.
Duration	: 12 - 12 months
Supervisors	: Dr. Thomas Tomich, Dr. David Thomas
Location	: Indonesia, Thailand

29. Effects of land use change at the forest margins on global public goods

Summary	: Alternative land uses at the forest margins differ significantly in their ability to substitute for the economic outputs and environmental services of forests. In this policy research component measurements will be made of the effects of land use change linked to global public goods (i.e. carbon stocks, greenhouse gas emissions, and biodiversity) and policy implications will be formulated. A geographic information system (GIS) integrating spatial data on land use with biophysical measurements will be used in translating the environmental impact measurements into meaningful indicators at the landscape and global scale.
Expected outcomes	: Policy memoranda and/or research reports & papers constituting effects of land use change on global public goods and implications for policy strategies.
Available data and resources	: Geographic information system and remote sensing
Profile of student	: have a BSc or MSc degree; PhD student in economics, agricultural economics, natural resources economics or public policy. Preferred working knowledge of national language.
Duration	: 12 - 24 months
Supervisors	: Dr. Thomas Tomich, Dr. David Thomas
Location	: Indonesia, Thailand

30. Valuation of environmental services from agroforestry systems

Summary : To assess the different societal values of natural resource degradation problems as well as the values of alternative agroforestry interventions to address such problems. Examples would be the value of soil erosion at a watershed scale or the value of biodiversity saved through on-farm tree planting. This would involve skills in natural resource economics or a similar science and modeling.

Expected outcomes :

Available data and resources :

Profile of student : have a BSc or MSc degree; working towards a MSc or Phd thesis in social sciences

Duration : 6 - 36 months

Supervisors : Dr. Frank Place

Location : Kabale (West Kenya)

31. Patterns and factors of adoption of agroforestry systems

Summary : Assessment of plot, household, and community factors associated with the adoption and adaptation of agroforestry systems such as contour hedges, high valued trees, and soil fertility replenishment systems. The effect on adoption of alternate dissemination strategies is an additional important area of interest. This may involve quantitative or qualitative analyses

Expected outcomes :

Available data and resources :

Profile of student : have a BSc or MSc degree; working towards a MSc or Phd thesis in social sciences

Duration : 6 - 36 months

Supervisors : Dr. Frank Place

Location : Kabale, Maseno (Kenya)

32. Economic and social impact assessment of agroforestry systems

Summary : Assessment of the economic and social impacts of agroforestry systems or other innovations such as policy changes at household, community, and watershed scales. This may be ex ante, to predict the extent of adoption and impact of promising agroforestry technologies or policies or ex post to measure and assess change that has already taken place

Expected outcomes :

Available data and resources :

Profile of student : have a BSc or MSc degree; working towards a MSc or Phd thesis in social sciences

Duration : 6 - 36 months

Supervisors : Dr. Frank Place

Location : Kabale, Maseno (Kenya)

33. Evaluation of the integrated effects of local phosphate rock and organic sources of nutrients on crop yields

Summary : Inputs of phosphorous (P) are essential for many soils in the East Africa highlands that are phosphorous deficient. One of the options for P inputs is direct application of phosphate rocks (PR). The objectives of this research are to evaluate some of the PR in the region as sources of P for crops and identify the benefits of integrating them with organic materials such as biomass transferred from hedges on farm boundaries and in improved fallows.

Expected outcomes : An understanding on the comparative effects of different PR when integrated with organics on crop yields on different soil types.

Available data and resources :

Profile of student : have a MSc degree; Background in soil science or biology. Student will be part of interdisciplinary team (economist, fodder scientist, soil scientist) of ICRAF scientists and NARS collaborators assessing adoption potential and impact

Duration : 2 - 36 months

Supervisors : Dr. Bashir Jama

Location : Maseno (Kenya)

34. Institutions for innovation of marketing and natural resources management

Summary : studies on institutions that manage trees in the landscape, that facilitate the trading and processing of agroforestry products and that facilitate the production and distribution of tree seed and germplasm in eastern and central Africa. This would involve market analysis, political economics, financial analysis, investigating incentive structures and performance of different organizational structures, and determining who wins and loses under different institutional arrangements.

Expected outcomes :

Available data and resources :

Profile of student : have a BSc or MSc degree; working towards a MSc or Phd thesis in social sciences

Duration : 6 - 36 months

Supervisors : Dr. Frank Place

Location : To be discussed

35. Commercialization of 4 fruit species

Summary : Investigate the commercialization of *Tamarindus indica*, *Adansonia digitata*, *Parkia biglobosa* and *Vitellaria paradoxa* fruits as well as *Adansonia digitata* leaves in the 4 Sahelian countries (Senegal, Mali, Burkina Faso, Niger): Quantity and form of products commercialized, fluxes of commercialization within and between countries and outside the region

Expected outcomes :

Available data and resources :

Profile of student : have a MSc degree;

Duration : 2 - 36 months

Supervisors : Dr. Amadou Niang

Location : Senegal, Mali, Burkina Faso, Niger

36. Water use by agroforestry systems in Miombo

Summary : The objective is to determine the water balance of promising agroforestry systems in the Miombo in order to satisfy both productivity and environmental benefits. The fellow will collaborate with on-farm economists and soil scientists to assess the constraints to adoption of improved land use options such as rotational woodlots and boundary plantings in deforested landscapes.

Expected outcomes : Assessments of the hydrological impacts of land use change brought about by extensive deforestation and re-afforestation through agroforestry interventions.

Available data and resources : Experiments and equipment are available.

Profile of student : have a PhD degree; Background in soil science or plant physiology

Duration : 18 - 36 months

Supervisors : Dr. Chin Ong

Location : Chipata (Zambia)

37. Agroforestry practices: assessment of adoption, impact, farmer-to-farmer extension, and knowledge transfer

Summary : Assessment through informal (PRA) and formal (questionnaire) surveys of whether farmers who have or are participating in on-farm trials actually adopted (took up and expanded) fodder trees for feeding livestock. Also may involve economic analysis of the profitability of the technology, surveys of neighbours to find out their assessments and whether they have also adopted, impact assessment, effectiveness of different extension approaches, and farmer-to-farmer dissemination.

Expected outcomes : Documentation of progress in dissemination of Calliandra, feedback to research and extension on problems and researchable issues.

Available data and resources :

Profile of student : have a BSc/Ba or MSc/MA degree; Background in economy, agroforestry, sociology or anthropology

Duration : 6 - 12 months

Supervisors : Dr. Steve Franzel,

Location : East Africa