



# World Agroforestry Centre

TRANSFORMING LIVES AND LANDSCAPES

## **Indicative Programme of Work & Budget 2010**

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**Presented to the Board of Trustees  
November 2009**

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**INTERNATIONAL CENTRE FOR RESEARCH IN AGROFORESTRY (ICRAF)**

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## Abbreviations

AAMPS	Association for African Medicinal Plants Standards
ADG	Assistant Director General
AEZ	Agroecological zones
AF	Agroforestry
AFSP	Agroforestry Food Security Programme
AGM	Annual General Meeting
AHI	African Highlands Initiative
AI	Amazon Initiative
AIDS	Acquired Immuno Deficiency Syndrome
APAARI	Asia Pacific Association of Agricultural Research Institutions
ARARI	Amhara Regional Agricultural Research Institute
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
ASB	Alternatives to Slash-and-Burn
ASNAPP	Agribusiness in Sustainable Natural African Plant Products
ATFP	Agroforestry Tree Products
BOT	Board of Trustees
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CAPRI	Collective Action and Property Rights
CAWT	Conservation Agriculture with Trees
CBO	Consumer Based Organization
CCER	Centre Commissioned External Review
CDM	Clean Development Mechanism
CDT	Capacity Development and Training
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIFOR	Center for International Forestry Research
CIMMYT	International Maize and Wheat Improvement Center
CIP	International Potato Center
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CORAF/WECARD	West and Central African Council for Agricultural Research and Development
CP	Challenge Programme
CPWILD	Commercial Products from the Wild
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DG	Director General
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária
EPMR	External Programme and Management Review
ES	Environmental Services
ESA	East and Southern Africa
ETFRN	European Tropical Forest Research Network
FAO	Food and Agricultural Organization
FARA	Forum for Agricultural Research in Africa
FASID	Foundation for Advanced Studies on International Development
FORNESSA	Forestry Research Network for sub-Saharan Africa
FORRI	Forestry Resources Research Institute
GCARD	Global Conferences on Agricultural Research for Development
GDP	Gross Domestic Product
GFAR	Global Forum on Agricultural Research
HIV	Human Immunodeficiency Virus

HR	Human Resources
ICRAF	International Centre for Research in Agroforestry
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IER	Institut d'Economie Rurale du MALI
IFPRI	International Food Policy Research Institute
IPCC	Inter-Governmental Panel on Climate Change
IISD	International Institute for Sustainable Development
ISPC	Independent Science and Partnership Council
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
INERA	Institut de l'Environnement et Recherches Agricoles
INRAN	Institut National de Recherches Agronomiques du Niger
IPG	International Public Good
IPGRI	International Plant Genetic Resources Institute
IRAD	Institutional Research and Application Development
IRD	Institut de recherche pour le développement
IRRI	International Rice Research Institute
ISAR	Institut des Sciences Agronomiques du Rwanda
ISRIC	International Soil Reference Information Centre
IT	Information Technology
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
IWMI	International Water Management Institute
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
LADA	Land Degradation Assessment in Drylands
LP	Land and People
LULUCF	Land Use, Land-Use Change and Forestry
MTP	Medium Term Plan
NARO	National Agricultural Research Organisation
NARS	National Agricultural Research Systems
NASA	National Aeronautics and Space Administration
NEPAD	The New Partnership for Africa's Development
NGARA	The Network for Natural Gums and Resins in Africa
NGO	Non Governmental Organizations
NRM	Natural Resource Management
ODA	Overseas Development Assistance
PGR	Plant Genetic Resources
R&D	Research and Development
RAEZ	Regional Agro Ecological Zone
RUPES	Rewarding Upland Poor for Environmental Services
SADC	Southern African Development Cooperation
SGRP	Systemwide Genetic Resources Programme
SI	Strengthening Institutions
SLT	Senior Leadership Team
SO	Systems Office
SPIA	Standing Panel on Impact Assessment
SRF/MP	Strategy and Results Framework and the Mega Programs
STCP	Sustainable Tree Crops Program
SWEP	Systemwide and Ecoregional Programmes
THETA	Traditional Health for the Treatment of AIDS
TM	Trees and Markets

TMT	Transition Management Team
TOFNET	Trees on Farm Network
TSBF	Tropical Soil Biology and Fertility Institute
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USA	United States of America
USDA	United States Department of Agriculture
WARDA	Africa Rice Center
WCA	West and Central Africa

## 1. Introduction and Overview

### 1.1. Programmatic Highlights Overview

The single most important highlight in 2009 was without doubt the World Agroforestry Congress. An intense 18-month planning and preparation phase paid off during the Congress week in Nairobi from 23 to 27 August 2009. Special aspects of the Congress included: (i) six high level science speakers including two Nobel laureates; (ii) high host country interest with the delivery of a Presidential Address and the Vice-President in attendance; (iii) securing US\$800,000 from already over-subscribed donors for supporting developing country participants; (iv) 1,200 participants in attendance; (v) 200 journalists in a news crowded region to attend a press briefing and get articles in Time, Economist, Reuters and other avenues; (vi) receiving a significant pledge from one donor at the conference and requests to submit proposals from three other donors; (vii) arranging four top interest and over-subscribed field trips across 2 countries; and (viii) high participation from former staff and board members (and five current board members). Efforts are underway through a committee chaired by the Director General to strategize on capitalizing the Congress achievements and profiling in 2010.

Aside from the Congress, the calendar year 2009, represented the first full operational year of our new strategy. The two main dimensions of our research programme, namely Global Research Projects (GRPs) and Regions evolved significantly and interdependently in this period. In 2009 Quarter 1, the GRP Outlooks were developed by GRP teams to show: (i) GRP overview; (ii) Generic International Public Goods (IPGs); (iii) Scientific successes and constraints; (iv) Forward looking changes; (v) Opportunities; and (vi) Impact orientation. These represent the programmatic content of what we currently do, and where we feel our future roles and advantage may lie. Later with the GRP Outlooks in place during Quarters 3 and 4 in 2009, we have developed parallel Regional Outlooks to show: (i) Regional context (including agro-ecological zones); (ii) Regional successes and constraints; (iii) Situational analysis (GRP links, staff, funds, capital and partnerships); (iv) Regional perspective to 2012 (approach and opportunities). These two sets of Outlooks are a rich source of information for managers and partners, but are equally meant as *aide memoires*, for proposal ideas and as monitoring checks for all staff throughout the year. They connect the strategy with the annual business processes (POWB, World Bank Performance Monitoring, MTP submission, staff Performance Evaluations). The outlooks will from 2010 henceforth, be updated on an annual basis with a continuing three-year forward view.

In addition to greater connectivity at the content level, to ensure better coherence of planning, aggregation and expenditure at the GRP level with the day to day implementation at the regional level, all work was undertaken in 2009 under new budget codes that recognized the GRP categorization (MTP output) and the specific research output target. In addition, the regional administrative support was all coded under an Administration category to distinguish it and enable calculations on proportionate costing across countries and regions. Although perhaps largely hidden, this innovation was adopted to align our business processes more and reduce separate reporting, systems and logic. In 2010, we have tightened up the system even more with fewer output targets and excluded thematic work not endorsed by the GRP leaders. The market place core allocated by GRP leaders is also now differentiated from general core with the label CORE - 01.01.

A new strategy implies new thinking and new directions, and it was recognized that new staff were vital to this. In 2009, an impressive 14 new international staff were recruited (including 5 new female post-docs) with four more recruitments in process. Of the 14 new staff, eight are global and six are regional staff. Further positions for strategic hires were identified during our centre-wide middle management meeting in September 2009. These positions will focus on the areas of: climate impact, quantitative socio-economics, soil fertility, production ecology, production economics, tree

physiology, hydrology, geoinformatics, policy and scaling up. In 2010, a more formal workforce planning exercise will also be undertaken across the centre.

The year 2009 (reporting on 2008 success), was also the most successful in the centre's history in terms of scientific publishing. We had an average of 3.2 refereed articles per scientist (1.2 Thomson and 2.0 non-Thomson journals) which was the highest in the CGIAR. We were rated only 7<sup>th</sup> highest in the CGIAR though in Thomson journal ranking and more emphasis will be placed in these journals in 2010. All scientific staff must now set publishing targets with their supervisors in the performance evaluation forms. At the motivation end, we have incorporated a publication award ceremony in our annual Science Forum, and at the warning end we have included publication rate as a filtering criteria in contract renewals. Some staff failed to get contract renewals in 2009 due to low publication rates and this monitoring will be further strengthened in 2010. Support for writing has been stimulated by the Chief Scientist who organized several write shops in 2009 with more planned for 2010. Average expectations for scientists for 2010 are:

Senior scientists:	3-4 publications (with at least 1-2 as lead author)
Scientists:	2-3 publications
Junior scientists:	1-2 publications

A preview of upcoming articles for 2010 reporting (2009 publication year) shows a very pleasing aspect with two articles published in Science (Impact Factor 28.1) and one in Global Change Biology (Impact Factor 4.34).

To bring middle managers and other staff more into decision making two new changes took place in 2009. Firstly to accompany our new GRP x Region structure we have also introduced three new Senior Advisor positions, on Partnerships, Science and Impact. Secondly, we have created a Management Team which is a reincarnation of Programme Committee (PC) with three significant changes: (i) greater focus on business meeting type approach (i.e. less housekeeping and more business); (ii) more of a advisory/decision making group; and (iii) more limited membership to middle managers, senior advisers and SLT. The MT is to enable these middle managers and Senior Advisers to be more engaged and involved in Centre Decision Making beyond SLT. In addition, two Town Hall Meetings were held during 2009 where SLT updated staff, solicited feedback and reacted to questions posed by staff. These meetings were co-convened with the ICRAF Staff Association (ISA), and involved HQ staff in one meeting room interacting with staff teams in the regions by teleconference.

## **1.2. Financial Highlights**

The 2010 indicative POWB reflects a total income of US\$32.45 million (including Gender and Diversity Programme) and a total planned expenditure of US\$33.1 million resulting in a draw from reserves of US\$650,000 (see [Table A](#) below for details). The draw from reserves is a deliberate strategic decision and does not set up recurrent obligations beyond 2010. US\$450,000 of these funds have been allocated to cover salaries and benefits as well as to provide modest operating budgets to the new international strategic hires (including Climate Change Specialist Scientist, Socio-economist, Biodiversity Scientist and Integrated Soil Fertility Management Scientist) who will be on board in 2009/2010. It is expected that new grants will be secured by the strategic hires in 2010 to contribute to fully covering their staff costs and operating expenses in 2011 and beyond. An allocation has been made for US\$150,000 to meet the initial costs of an External Programme and Management Review (EPMR) which is expected to commence in late 2010 and continue into 2011. An additional allocation for US\$50,000 has been made for the Female Post-Doctoral Programme which was initiated in 2009, and the first round of these end in 2011 where by then we hope to retain some who are successful in getting project cover.



As a step towards ensuring full costing of projects and activities from 2010, the Centre has implemented the following innovations:

1. The computation of total cost of employment for staff based at the WorldAgroforestry campus in Nairobi will now include the cost of the office space occupied by staff and the costs of network connectivity. Hence, when staff costs are charged to restricted projects a proportion of these fixed costs will automatically be recovered. Previous attempts to recover these costs as direct/indirect costs from restricted grants have had limited success.
2. Depreciation charge for assets purchased from the capital fund will be budgeted under the units that have possession and use of such assets. Previously annual depreciation charge was financed by top-slicing it from the available unrestricted income for the year. In instances where capital assets purchased from capital funds are being used in restricted projects, units have been encouraged to levy a use charge to the project and save on the unrestricted allocation to cover other operational costs.

The key financial highlights of this comparison are given in [Table A](#):

- Unrestricted grant income increases by 8%
- Restricted grant income decreases by 1%
- Other income decreases by 12%
- Overhead recovery increases by 7%
- Total income increases by 2%
- Expenditure in the Regions decreases by 1%
- Expenditure in Global Research Projects increases by 2%
- Expenditure in System wide and Ecoregional programmes increases by 8%
- Expenditure in Global Support Units decreases by 6%
- Expenditure on Management and Essential Services increases by 10%. This is because of the depreciation which has been reallocated to the units and the increase in the office space charges to include full costs (US\$16 per square metre per month to US\$20 per square metre per month).
- A special allocation of US\$350,000 is earmarked for the continuation of the Female Post Doctoral Programme. US\$215,880 has been allocated to the regions where the Post-Docs are located and US\$134,120 has been earmarked for their operational expenses as well as to hire an additional Female Post-Doctoral Fellow in 2010.
- US\$250,000 is allocated for staff job market alignment for WorldAgroforestry staff globally, pending local job market surveys.
- An allocation of US\$250,000 has been made to meet WorldAgroforestry contribution to the Alliance, Centre transition costs and to meet direct operating expenses of WorldAgroforestry staff inputs to the change process.
- Total expenditure increases by 1%.

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### 1.2.1. Unrestricted grant income

According to the indicative figures, the unrestricted income for 2010 reflects an increase from 2009. Some key points to note about the Centre's unrestricted income include:

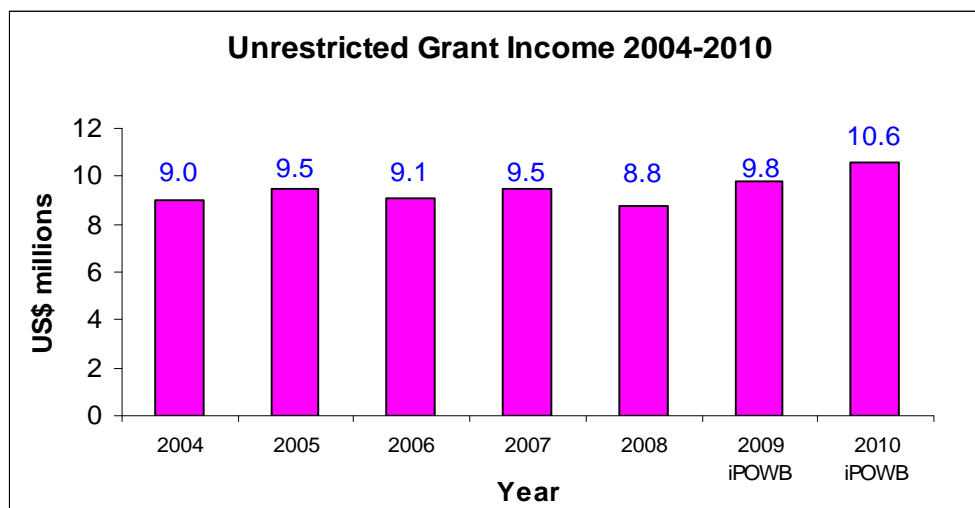
#### *Increases*

- Belgium increased their unrestricted core contribution to WorldAgroforestry for the period 2009 to 2011. The increase for 2010 is EUR265,000 bringing the total contribution for 2010 to EUR465,000
- United Kingdom has increased their contribution by 15% from GBP630,000 to GBP661,500.
- Norway has increased their contribution to the centre over the last four years. We have included their contribution at NOK6.0 million which is NOK0.5 million higher than the 2009 indicative budget figures. This is based on the actual 2009 funding level.
- Finland increased their contribution from EUR336,376 to EUR650,000 in 2009. We have maintained the same level of unrestricted funding for 2010.
- Germany has increased their unrestricted funding contribution from EUR317,000 to EUR380,000 in 2009. The same level of funding is anticipated in 2010.

#### *Reductions*

- A decrease in contribution of US\$216,500 from the World Bank in line with the new fund allocation framework for all CG centres. This is on the assumption that WorldAgroforestry will be rated as "superior" in 2009 based on the performance indicators.
- We expect that the Government of Ireland may have to reduce its unrestricted contribution further over 2009 level. We have included this at EUR750,000 down from EUR800,000. Current reassurances from Irish Aid may wipe out this reduction, but as their 2010 budget is not yet finalised we recommend caution.
- We received intelligence that Sweden will be cutting down Overseas Development Assistance (ODA) funding in 2010 by 20%. We have therefore reduced Sweden's contribution by 20% to SEK2,720,000.

The graph below shows the trend in WorldAgroforestry unrestricted grant income from 2004 to 2010.



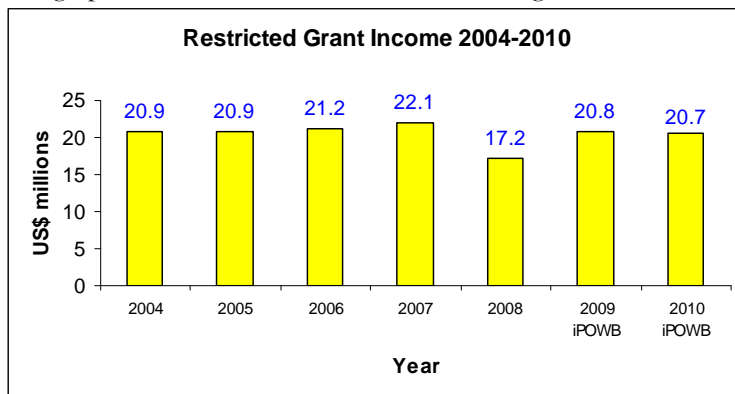
### 1.2.2. Restricted grant income

Restricted grant income for 2010 is projected to decrease by 1% when compared with the 2009 indicative budget. When projecting restricted income for 2010, we have included proposals amounting to US\$ 1.8 million that have a high probability of being approved in late 2009 and in early 2010. The corresponding figure in the 2009 indicative budget was US\$4.24 million. These proposals represent only 9% of total restricted funding compared to 18% in 2009. This reflects a significant drop in the value of proposals included in the iPOWB 2010 with the same level of restricted funding indicating that WorldAgroforestry has been more successful in 2009 in securing restricted grants that rollover in to the following year (2010) than at the same time in 2008. This also gives us confidence that WorldAgroforestry is moving into 2010 with a much less uncertainty in regard to restricted funding. Some significant highlights relating to new proposals included in the indicative budget:

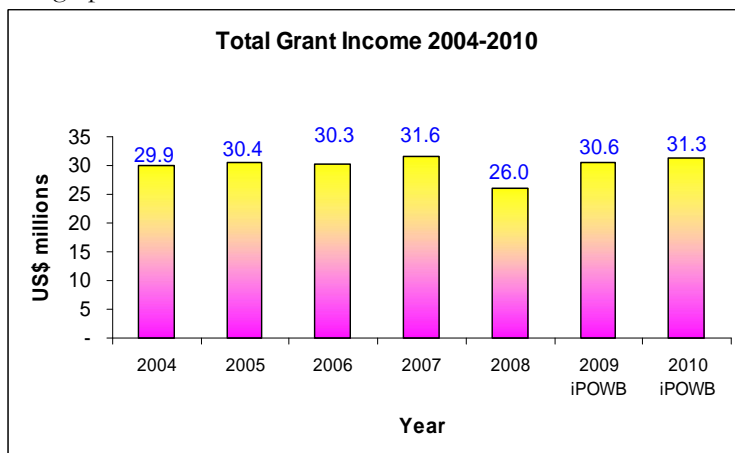
- **Conservation Agriculture with Trees:** This is an Eastern Africa Region Program. US\$235,518 has been included in this indicative budget
- **David and Lucille Packard Foundation:** Received notification of approval of a grant for Fair, Efficient and Sustainable Emission Reduction from Land Use in Indonesia (FESERLU). US\$249,184 has been included in this indicative budget.

The above proposals have been scrutinized and passed as having all the criteria for inclusion in the indicative budget for 2010. There are also other high probability grants which are not included in this budget, but will be included in the Final 2010 POWB after confirmations have been received.

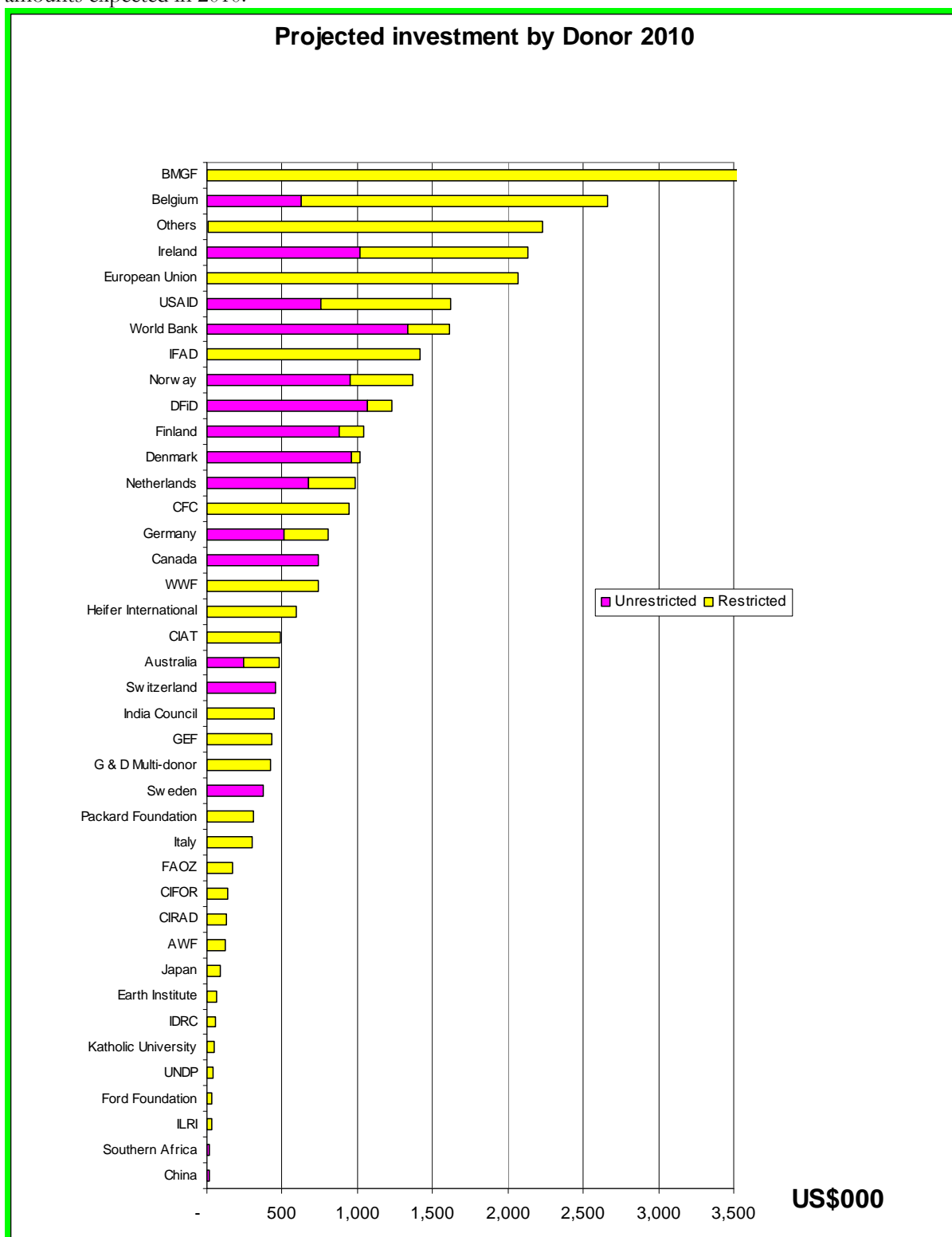
The graph below shows the trend in restricted grant income from 2004 to 2010.



The graph shows the trend in our total income from 2004 to 2010.

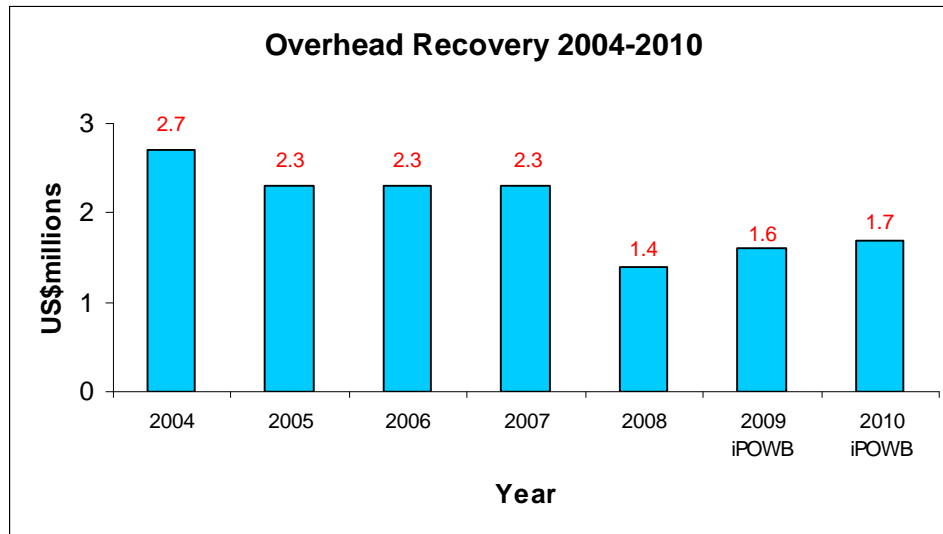


The graph below shows the individual contributions from donors in descending order of total amounts expected in 2010.



### 1.2.3. Overhead income

Overhead grant income has been on a decreasing trend since 2004. The 2010 projections show a minimal increase in overhead recovery. This is partly due to the introduction of the Grants Acceptance Policy and the gradual adherence to the project full costing culture during the proposal development stage. We anticipate that overhead recovery will improve further as the high probability proposals included in these estimates get approved. When confirmation of these grants is received during 2009 and 2010, the related overhead will be channelled through the buffer fund.



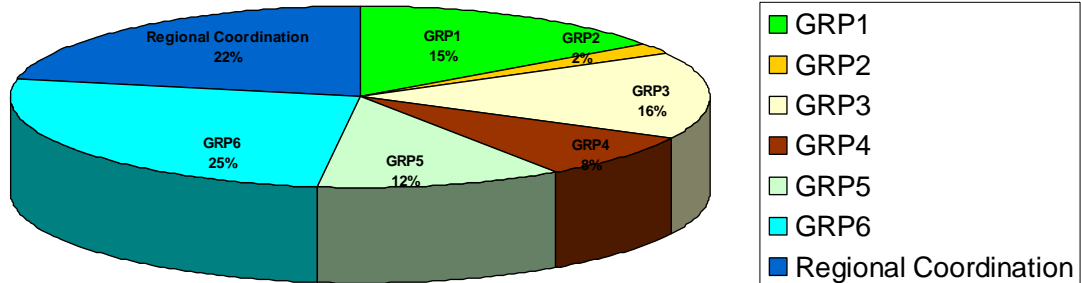
### 1.2.4. Expenditures

As reflected in [Table A](#) above, total expenditure is expected to increase by 1% in 2010 over the 2009 iPOWB budget from US\$32.861 million to US\$33.099 million. The total allocated to the regions, Global Research Project leadership and Amazon Initiative in 2010 is US\$19.437 million. This is a slight decrease over the 2009 indicative budget which was at US\$19.467 million. The tables and charts below show how funds have been allocated to the Global Research Projects and for Regional Coordination. The detailed allocation of the budget to the Centre's enterprise units is included in the tables [Annex 2](#).

**Regions and GRP matrix**

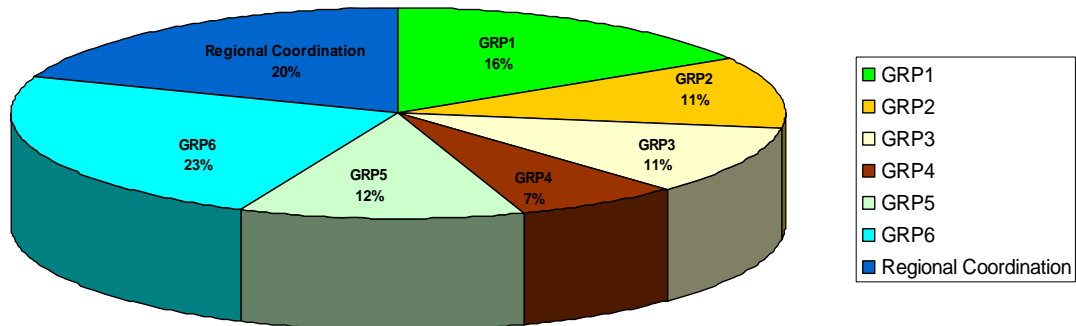
<b>2009</b>								
Regions	Global Research Projects							
	GRP1	GRP2	GRP3	GRP4	GRP5	GRP6	Regional Coordination	Total
	US\$	US\$	US\$	US\$	US\$	US\$	US\$	US\$
Amazon Initiative	81,398	58,953	176,267		91,382	371,552	139,639	919,191
Eastern Africa	395,627	230,039	664,031	868,985	119,942	973,347	408,826	3,660,797
South Asia	30,000	14,377	71,138	10,000	42,000	62,000	215,391	444,905
Southeast Asia	299,164	264,389	49,925	49,669	930,031	1,315,756	664,577	3,573,511
Southern Africa	156,069	601,197	71,406	92,367	190,370	208,997	771,536	2,091,942
West and Central Africa	568,459	1,698,582	1,213,708	20,210	90,477	376,056	1,440,371	5,407,863
GRP Leadership	973,366	321,209	336,369	270,000	445,170	1,022,671		3,368,785
	<b>2,504,083</b>	<b>3,188,746</b>	<b>2,582,844</b>	<b>1,311,231</b>	<b>1,909,372</b>	<b>4,330,378</b>	<b>3,640,340</b>	<b>19,466,995</b>

**2009 iPOWB Distribution of GRP and Regional Budgets**



2010								
Regions	Global Research Projects							
	GRP1	GRP2	GRP3	GRP4	GRP5	GRP6	Regional Coordination	Total
	US\$	US\$	US\$	US\$	US\$	US\$	US\$	US\$
Amazon Initiative	122,551	96,330	130,809	31,000	171,980	137,235	216,312	906,217
Eastern Africa	255,218	754,703	401,470	859,667	292,290	941,038	533,421	4,037,806
South Asia	35,000	72,552	46,139	20,000	464,888	35,000	389,997	1,063,576
Southeast Asia	248,213	92,816	67,700	31,000	237,386	2,235,600	943,970	3,856,686
Southern Africa	327,101	471,162	66,368	50,243	153,822	201,725	901,623	2,172,045
West and Central Africa	1,455,265	344,225	928,420	28,000	141,568	255,694	816,736	3,969,907
GRP Leadership	733,557	284,002	425,473	340,516	839,707	807,278		3,430,533
	3,176,904	2,115,790	2,066,378	1,360,426	2,301,642	4,613,570	3,802,060	19,436,771

**2010 Distribution of GRP and Regional Budgets**



### 1.2.5. Staff-to-operating costs ratio

The Centre's staff-to-operations ratio for the year 2010 is 43:57, which is the same level as it was in the 2009 indicative budget. Additional details on the ratio are given in the Financial Tables [Annex 2](#). When pending proposals are approved and operational funds are fully allocated, we expect more operational funds to be available to the GRP's and Regions.

### 1.2.6. Unrestricted net assets

With the CGIAR system moving towards full compliance with International Financial Reporting Standards (IFRS), the term "operating surplus" should be interpreted to mean changes in net assets. The changes in net assets represent the increase or decrease in the net assets of the organization from one period to another. The operating fund (or the operating reserves), which we have been using in the past to measure the financial stability of the Centre, is now measured by the level of unrestricted net assets. The relationship between the operating reserves, the capital fund, and the unrestricted net assets can be expressed as follows:

$\text{Operating Fund} + \text{Capital Fund} = \text{Unrestricted Net Assets} - \text{Net Value of Property, Plant and Equipment}$
--

The number of days of operating expenses (excluding depreciation) in unrestricted net assets is one of the indicators the CGIAR is using to measure the Centre's capacity to manage financial changes in the event of shocks effecting income and expenditures. The CGIAR's financial guidelines recommend 75-90 days for this long-term stability ratio. At the end of 2010 the Net assets of WorldAgroforestry is projected to decrease to US\$13.7 million (2009 estimate is US\$14.73 million) representing 155 days (2009 – 158 days) of operating expenses in net assets. This is still significantly above the range recommended by the CGIAR Secretariat. The marginal reduction is due to the projected draw of US\$650,000 from reserves in 2010 and on the assumption WorldAgroforestry will invest US\$500,000 from the capital fund for capital asset replacements.

**Table B: Movements in net unrestricted assets 2004-2010**

Year	Unrestricted Net Assets	Days of expenditure
	Million US\$	
2004	6.88	92
2005	7.54	93
2006	7.01	82
2007	10.29	128
2008	13.48	178
Projected 2009	14.73	158
Proposed 2010	13.70	155

### 1.2.7. Risk Analysis of the 2010 Indicative Budget

As in prior years, the indicative budget for 2010 is prepared using incomplete data and best available estimates in the uncertain and volatile funding environments of the CGIAR centers. Because WorldAgroforestry's 2010 indicative budget is compiled earlier than usual, our reliance on uncertain information is greater than ever. The level of uncertainty is heightened even more for 2010 than in the past years due to ongoing change process in the CGIAR.



The following table summarizes the risk-mitigating measures we have adopted in order to address WorldAgroforestry's income uncertainties in year 2010.

Risk	Risk Mitigation Measures
5. How donors will disburse unrestricted funds in 2010. i.e. bi-laterally to individual Centre's as in the past, allocate as "Institutional" funding through the "Fund" or allocate to the "Programs" window of the "Fund" and how much of the unrestricted funding disbursed/committed in 2009 will be made available to Centre's as unrestricted/institutional funding.	2010 is a transitional year where donors will decide whether to allocate funds through the Fund. The position of our unrestricted funding is uncertain. We have estimated the unrestricted income very conservatively based on best available intelligence from donors, staff and other sources. In addition, management is examining different funding scenarios and developing strategies to mitigate the risks in the event of a significant reduction in unrestricted funding.
6. Restricted funding life span.	Of the restricted funding amounting to US\$17.2 million only US\$5 million continues after 2010. There is a substantial shortfall that will need to be plugged if the operations of the organization are not to be materially negatively impacted. To this end WorldAgroforestry has a healthy pipeline of proposals and management is actively monitoring the pipeline.
7. In the indicative budget for 2010, WorldAgroforestry's dependence on unconfirmed proposals to cover staff costs is US\$0.943 million (US\$1.8 million of unconfirmed proposals.)	We have ensured that staff are covered for at least the minimum notice period. Seven months for IRS and four months for NRS. Notices for termination will be issued to all personnel whose staff costs (salary/benefits) depend on unconfirmed proposals. The terminations will coincide with the dates on which the confirmed funding for the positions expires.
8. In several units, the funds to meet operating expenses are less than optimal. These units cover their staff costs, but do not show adequate funding for support.	All unfilled positions included in the budget will be reviewed to determine if they are crucial positions. If they are not crucial, their funds will be re-allocated towards operations. All unit heads will re-examine their budgets to balance between staff and operations, making necessary internal adjustments.

### 1.3. Science Council Commentary on the MTP

The World Agroforestry Centre submitted its 12<sup>th</sup> Medium Term Plan (2010 to 2012) to the Science Council for Review in June 2009. A three page commentary (1,500 words) was received in late September, to which we had one week to provide a response. A summary of their main points is:

- WorldAgroforestry is in better financial health in 2009 with a slightly improved core/restricted ratio than in 2008. The prospects for 2010 seem good.
- The Center is seeking to diminish its portfolio of strictly development activities.
- In general, a delicate balance is found in the Center attaining the CGIAR's development goals and maintaining scientific objectivity.
- In general, there is high demand for the kind of research results WorldAgroforestry proposes to deliver.
- As WorldAgroforestry's mandate is in the larger issues of land/resource management, it is important that strong linkages are made, integral to impact pathways, with those policy-making and development bodies such as FAO.
- On the other hand, capacity of the intermediate organizations needed for delivering the research results to the end users is a problem.
- WorldAgroforestry needs stronger analysis of how it can be more strategic in its capacity building (moving away from the traditional training, including of farmers) targeting also private small and medium-size enterprises.
- Overall the WorldAgroforestry portfolio is improving and well presented.
- The research orientation in the portfolio could be more clearly presented. Due to questions remaining on the Center's comparative advantage, capacity and partnerships in some areas of planned research, an assessment of the MTP next year would be warranted in the context of re-organizing research in the Mega-programs.
- **GRP 1** deals with a spectrum of species. As a result, it is difficult to assess how relevant the work is and for whom. Emphasis seems to be on information compilation, capacity and dissemination rather than on research *per se*. For 2010, the output targets are more substantive, verifiable and appropriate for a project of US\$6.5 million annually. The efforts to move agroforestry germplasm from Asia to Africa are welcome and important and this could extend to LAC.
- **GRP2** – the SC encourages WorldAgroforestry to strengthen the component of scientific investigation. Also a better understanding is needed of constraints to adoption. The IPGs to be delivered by this program are deemed not to come from the individual farm experiences but from the scaling-up exercise.
- **GRP3's** plan presents the research questions intended to be applied at multiple sites, providing comparative results and possible solutions that can be taken up in project implementation. Action research on small scale seed vendors may yield interesting results relevant for adoption. The output targets appear a bit thin for a budget of nearly US\$5 million and several are very vague and difficult to verify.

- **GRP4** is the only one where the SC does not see a clear comparative advantage for WorldAgroforestry. The rationale for GRP4 appears to be that we do not know enough and we need better tools to assess land health. However, the direct link to agroforestry is largely artificial and the SC does not see much that is new and innovative added to what numerous other institutions have done. New IPGs are not evident. There are no obvious agents who could deliver the agroforestry interventions coming from this work. It does not seem realistic to expect that governments or even international agencies will do that. *(N.B. WorldAgroforestry management strongly disagrees with this assessment)*
- **GRP5** research hypotheses are well stated and address important questions about the role of trees as diversification options to reduce risks, including those related to climate shocks. These approaches provide a strong and valuable research framework for addressing the broader land management and livelihood questions that are the mandate of WorldAgroforestry and relevant for CGIAR priorities. The SC however doubts whether WorldAgroforestry has sufficient in-house capacity to carry out the very ambitious climate modeling work and urges WorldAgroforestry link up with the new Challenge programme (CP) on climate change. There should also be strong links to the various REDD pilots proliferating over the tropics which ought to be natural clients for WorldAgroforestry's agroforestry technologies.
- **GRP 6** firmly establishes the new emphasis on landscape management, ecosystem services and the role of trees in multi-functional landscapes and addresses timely and perplexing questions on trade-off at different levels. The logic of the project is convincing and builds on considerable experience that was gained in two different earlier GRPs. The project is likely to generate IPGs, although the project write-up could be improved in that aspect. It would be desirable to broaden the almost singular focus on carbon sequestration to other functions of agricultural systems. The CIFOR-WorldAgroforestry biodiversity platform is mentioned only in connection with this GRP, which hopefully is not a sign of insufficient funding to the platform work.
- **ASB** remains much as last year and it is not a strong research portfolio; rather it builds on previous work to carry out analyses and development guidelines and recommended mechanisms and methods for implementation of policy decisions. There is a long tradition with sentinel sites but the ASB seems to be fading overall, with only a small proportion of its partnerships active. Some activities are more suited for a development agency, in providing direct backstopping for country or regional input into negotiations. The program is strongly orienting itself towards climate change and should coordinate its activities with the Climate Change CP (or maybe have its viable part merged with that CP?). *(N.B. WorldAgroforestry management strongly disagrees with this assessment)*

#### **Our response was:**

The Science Council's commentary contains some useful and well intentioned advice. In particular, comments on our need for better articulation of priority setting, being more explicit on impact pathways and explaining the evolving capacity building needs will help us reflect and improve our documentation and internal planning systems. In addition, we look forward to continuing to engage with the Science Council to enhance their understanding of the few areas where we differ in perspective. This is perhaps most evident in better explaining our comparative advantage and innovative research in land health surveillance and its relationship to agroforestry.

We accept that WorldAgroforestry is not intending to specialize in climate change modeling. However, the agroforestry related capacity in our own recent hires in this area as well as new research partners (Michigan State University, Colorado State University, Tyndall Climate Change Centre, etc) should not be underestimated. Here the tree-related aspects are significant as we develop higher resolution scenarios of tree cover, agroforestry system water usage and tree intervention opportunities, and relate these to the global circulation models.

The perceptions of the ASB programme changing its focus to climate change are accurate, although this is still in the context of its linkages to avoided deforestation and environmental service provision and not just climate change *per se*. The near tripling of ASB's research funding also would not appear to indicate a fading phase.

#### **1.4 CGIAR Processes and Consortium Developments**

There are two aspects of the CGIAR reform processes that are particularly relevant for the 2010 iPOWB. The first is the issue of stability of financing, and the second is the implications of the introduction of Mega Programmes.

##### **1.4.1 Stability of Financing**

This iPOWB was developed at a time when the CGIAR transition is ongoing but not yet advanced enough to project with any confidence the outlines of the CGIAR financing picture for 2010. However, some of the key elements of the new CGIAR have begun to take shape. A recent analysis of donor intentions towards the new CGIAR Fund by the CG Secretariat indicates that, conservatively, almost half of CGIAR funding (based on 2009 estimated effort) could flow through the Fund in the first year of its establishment.

The most recent (September) estimate of 2009 funding for the System by the Secretariat indicates that the financial crisis has not had the negative impact on CGIAR contributions that was feared at AGM08. Several major donors have indicated (formally or informally) plans to increase their contributions in 2010 if key elements of the reform program are in place. However, the Mega Programs are far from being in place and could not conceivably be operational until late 2010 or even early 2011.

There is great anxiety with respect to institutional support as the system moves towards a programmatic approach. The following is a summary of current knowledge of investor commitments beyond 2009 based on CG Secretariat intelligence:

- United Kingdom plans to double its current annual level of support (of £20 million) by 2013;
- USA additional core contribution of \$10 million expected, plus new project contracts signed;
- European Commission plans a scheduled increase of approximately €1.5 million in 2010, the final year of the current 3-year funding envelope;
- Australia announced plans to provide AUD 25 million in 2013;
- Japan Ministry of Finance decision to provide \$20 million over 5 years for the development of heat and drought resistant rice seeds in Africa through a World Bank-managed Trust Fund;
- Bill & Melinda Gates Foundation projected increase to \$68.3 million;

- Canada has announced a 3 year commitment of CAD\$ 32.5 million to two challenge programs.

Reductions are being projected for the following donors:

- Denmark: has not yet announced a new three year funding envelope beginning in 2010;
- Sweden: At the global level, a significant (20%) decrease in ODA was announced. Specific decisions about the CGIAR have not yet been announced.

Most major donors plan to (a) increase their contributions and (b) join the CGIAR Fund. However, only a few have provided specific information about the planned increases, and some are making their confirmation of funding contingent of satisfactory development of the CGIAR Reform elements, especially the Strategy and Results Framework and the Mega Programs. World Agroforestry and other Centres are assuming that the 2010 core funding would be made available largely through existing arrangements (donor autonomy in allocation decisions). The recent analysis shows that close to half of the total member contributions could flow through the CGIAR Fund requires a reconciliation of the center assumptions and donor intentions.

A key concern of Centres is whether the financial stability that is afforded by institutional (unrestricted) funding will be protected in 2010 (and during a transition period of several years). Specifically, the issue is what will be the distribution of these contributions between window 1 (unrestricted system contributions), and window 3 (institutional support). The Transition Management Team (TMT) has recommended that donors participate in the new CGIAR Fund in 2010 under the assumption that it will be completely operational (i.e. funds are able to flow into as well as out of the Fund). The TMT is encouraging donors to allocate their Fund contributions as follows:

- *Window 1*: for incremental (i.e., new from 2009 funding level) unrestricted funding. The Fund Council would have the responsibility to allocate these resources. The Council's decisions would be based on its assessment of critical needs across the system during this transition year, and could conceivably include seed money for mega program development (beyond any that may be earmarked by donors for window 2, additional funding needs by challenge programs, transition costs, and additional unrestricted funding needs by Centers) critically needed but not met by window 3. It is expected that allocations to this window will be relatively light in this transitional year.
- *Window 2*: Earmarked funding for mega program development, Challenge Programs and/or other system level programs. It is expected that allocations to this window will also be a relatively small proportion of donor contributions this year until mega programs are ready to go operational.
- *Window 3*: Earmarked funding for Centers based on donor decisions, which would be expected to follow current practices. It is expected that allocations to this window will be the largest proportion of the unrestricted funding from donors in 2010.
- *Support to System Office Units*: It is recommended that the current arrangement for funding system office units be maintained in 2010. The World Bank is committed to this arrangement, and Centers are expected to do the same. This would enable the SO units to continue their valuable work during the transition until the Consortium office is established.

- *Transition Management Costs:* The critical work of establishing the Mega Programs and other elements of the new CGIAR will continue into 2010. The cost of continued management of the transformation, as well as those of the entities themselves (Consortium and Consortium office, Fund Council and Fund Office, GCARD, Funders' Forum, Independent Science and Partnership Council (ISPC), the independent evaluation function, and other ad hoc processes/events not easily foreseen) need to be factored in the financial transition plan.

The challenge will be to reconcile the institutional approach assumed in Centers' projections with the harmonized approach through the Fund that donors seem to be already planning for 2010. The Centres will be exerting strenuous efforts to ensure that there is serious attention to ensuring financial stability across the system in 2010. Therefore, management considers that it is reasonable to assume a steady-state level of unrestricted income for the Centre during the coming year.

#### 1.4.2 The Strategy and Results Framework and the Mega Programs (SRF/MP)

The draft final report of the SRF/MP task team led by Joachim von Braun was released on 21 October, 2010. The full report is attached to Agenda Item 19 on CGIAR Reform Processes. The Strategy and Results Framework serves the overall CGIAR system goal and builds on the three CGIAR system objectives (sub-goals):

1. Create and accelerate sustainable increases in the productivity and production of healthy food by and for the poor. (— Food for People)
2. Conserve, enhance, and sustainably use natural resources and biodiversity to improve the livelihoods of the poor in response to climate change and other factors. (— Environment for People)
3. Promote policy and institutional change that will stimulate agricultural growth and equity to benefit the poor, especially rural women and other disadvantaged groups. (— Policy for People)

#### Seven Interlinked MPs

The building blocks of the Strategy and Results Framework are a set of seven interlinked MPs and two platforms—gender and capacity strengthening—that serve cross-cutting purposes for all MPs. The Strategy Team went through a process that began with long-listing of MPs produced by CGIAR and Global Forum on Agricultural Research (GFAR) teams and moved toward assessments and short-listing of concept notes for MPs. The identified MPs are the following (with indicative percentage shares of the overall CGIAR investments in parentheses):

1. ***Agricultural Systems for the Poor and Vulnerable***—Research that integrates promising crop, animal, fish, and forest production with innovative policy and natural resource interventions to improve food security in those domains that are home to high concentrations of the world's poor and that offer agricultural potential. (28 percent)
2. ***Institutional Innovations and Markets***—Knowledge to inform institutional changes needed for a well-functioning local, national, and global food system that connects small farmers to agricultural value chains through information and communications technologies and facilitates efficient policy and institutional reforms. (11 percent)

3. ***Genomics and Global Food Crop Improvements***—Joint genomics research in the CGIAR serving all crops and animal products, providing for the needed innovation capacity of the CGIAR and genetic improvement of the world’s leading food crops (rice, wheat, maize) that builds on the success of the CGIAR with commodity research, including its crucial role in conserving genetic resources. (21 percent)
4. ***Agriculture, Nutrition, and Health***—Improvement in the nutritional value of food and diets, enhanced targeted nutrition and food safety programs, and changed agricultural commodities and systems in the medium term to enhance health outcomes. (8 percent)
5. ***Water, Soils, and Ecosystems***—Harmonization of agricultural productivity and environmental sustainability goals through policies, methods, and technologies to improve water and soil management. (18 percent)
6. ***Forests and Trees***—Technical, institutional, and policy changes to help conserve forests for humanity and harness forest ecosystem services, including forestry and biomass production potentials, for sustainable development and the poor. (6 percent)
7. ***Climate Change and Agriculture***—Diagnosis of the directions and potential impacts of climate change for agriculture and identification of adaptation and mitigation options for agricultural, food, and environmental systems. (7 percent)

Our preliminary analysis indicates that agroforestry would contribute to all seven of the MPs, with particular emphasis on MP6, which is the most likely MP that the Centre could lead or co-lead. Thus, our greatest concern is not that parts of the Centre’s strategy would be devalued or lost in the MP approach, but that our agenda will have linkages to so many MPs that the transactions costs to management and scientists taking part in them will be overwhelmingly excessive. We are not alone in holding this fear. Many other centres have expressed the same concerns.

## 2 Strengthening Our Science (Strategic Goal 1)

As stated in the strategic plan, high quality research at WorldAgroforestry is interpreted as being based on *context*, *mechanism* and *outcome potential*.

High quality research at ICRAF is...

### **Context (Legitimacy)**

...built on understanding of local context from multiple perspectives (geographic, environmental, biological, social, gender, cultural, historical, economic and political);  
 ...responsive to local and national needs; acknowledges multiple stakeholders and their knowledge, expectations, ambitions and interests;  
 ...set within clear boundaries of the systems we study, while taking in broader.

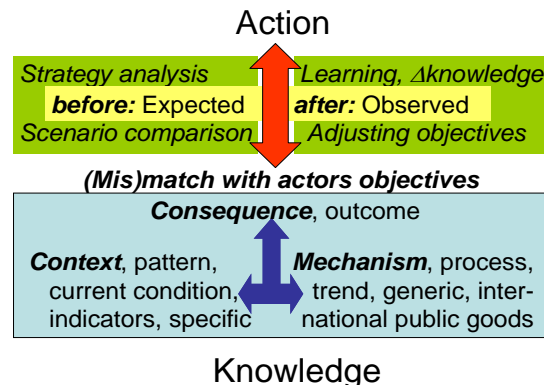
### **Mechanisms (Credibility)**

...contributing to long term research goals that exist beyond short-term project objectives and planned deliverables;  
 ... about processes that are applicable in multiple contexts;  
 ... framed by a clear conceptual framework that defines the boundaries and focus of exploration, problem definition, hypotheses, models and research questions;  
 ...challenging current understanding, exploring new contexts for testing mechanisms and contributing to new thinking;  
 ... built on rigorous and repeatable methods: protocols, peer reviews, valid and efficient design and analysis, verifiable data;  
 ...flexible, taking advantage of unanticipated results, stopping fruitless avenues of research and experimenting with new ones.

### **Outcomes (Salience)**

... planned with identified outcomes and a strategy for reaching them, while not ignoring unplanned opportunities.  
 ... planned with communication and use part of the design,  
 ...designed to meet policy needs at different scales, from local to global systems perspective.

The GRP's through their *outlooks* and support for *innovative methods* provide perspectives on problem framing and conceptual analysis that can set the stage for outcome potential, and use of up-to-date and innovative methods. The regional outlooks<sup>1</sup> focus on the context (legitimacy) and outcome potential (Salience) dimensions, by analysis of the current links and weaknesses in the links between agroforestry knowledge and agroforestry action in regional, national and sub-national contexts of current work, spotting opportunities for new involvement and sharing results of past research.



<sup>1</sup> Available on request for all 6 regions



## 2.1 Providing Focus with GRP Outlooks

The MTP 2010-2012 summarized the current GRP outlooks. A further summary is provided here, detailing the problem analysis that underlies current research in each of the 6 GRP's.

### 2.1.1 GRP 1: Domestication, utilization and conservation of superior agroforestry germplasm.

This GRP aims to increase farmers' access to improved germplasm of priority tree species and ensure better functioning of tree seed and seedling supply systems.

Knowledge gaps addressed include the following constraints to characterization, domestication and the dissemination of information:

- a. *Limited biological understanding of useful tree species*: the absence of previous research on a range of target taxa; the perennial nature, life history traits (e.g. dioecy) and long generation intervals involved in tree propagation and growth; the need to modify and update priority species lists due to changing requirements influenced by markets, niche availability, climate change, biotechnology, etc.; a limited understanding of performance and productivity differences between exotic, indigenous and naturalized species.
- b. *Absence of tools and protocols for understanding genetic diversity levels and for conserving tree germplasm*: the lack of suitable measures of genetic variation and the absence of the interdisciplinary approach needed for proper characterisation; the poor genetic quality of founder populations being released by development projects.
- c. *Scarcity of innovative tools and methodologies for tree propagation and management*: the lack of generic protocols for participatory priority-setting of target species in different agroecological zones, taking emerging global issues (e.g., climate change adaptation) into consideration; a lack of global guidelines for researchers and stakeholders on domestication approaches.
- d. *Requirement to regularly update information on the domestication, distribution, use, management and conservation of genetic resources of agroforestry trees*: the lack of approaches developed with stakeholders to appropriately present updated research information, in different formats and with the right amount of detail, to guide farmers, scientists, CBOs, NGOs and others in the management and use of a wide range of different agroforestry tree species; the absence of accessible databases to allow users to select species for specific functions based on current and emerging challenges (e.g., to mitigate and adapt to climate change, to promote micronutrient security, to provide medicines); the lack of methods for recording current activities on the distribution, domestication and on-farm management of agroforestry tree genetic resources, with therefore a lack of learning from ongoing work.

### 2.1.2 GRP 2: Enhancing productivity of agroforestry systems

Under this GRP, we explore how farmers manage and benefit from tree species diversity and interactions, and we develop a better understanding and new approaches for nutrient and water productivity in land use with trees, animals and crops.

#### *Rationale*

Smallholder farmers around the world have seen little improvement in their welfare because prices for basic necessities are higher, agricultural productivity has stagnated, and input costs have increased faster than revenues, while production and market risks remain high. Most farmers in the tropics are not insured and operate in an environment of high uncertainty. They rely on local social networks – that may well share the same exposure to risk factors – for this function. Following the recommendations of agricultural advisors, many farmers have also become less insulated from risk because they now focus on monoculture production or on only one dominant farming enterprise.

Rainfall variability (and possibly climate change) as well as land degradation and desertification are among the most important obstacles to the achievement of food and/or income security. Yet, reduction of the planned, established and managed diversity of agricultural systems has impacted negatively on the stability of ecosystems, rendering them less able to cope with environmental shocks. At the same time, fragmentation of tropical landscapes has resulted in reduced availability and increased costs of products and services that could previously be obtained from natural ecosystems adjacent to farming areas. Whereas agroforestry systems can play an important role by providing new sources of ecosystem products and services, there is lack of information on the best ways to diversify agroforestry systems for optimal benefits for both the small-scale producers as well as the global community. This also includes the role of trees and agroforestry in mitigating the vulnerability of rural communities and their resilience to recover from natural and man-made disasters (e.g. excessive droughts, earthquakes, tsunamis and political conflicts). At the same time, it is expected that there is a marketing niche for small and medium-scale tree production systems that can offer greater livelihood options to farming communities than some well-established global monoculture cash crop production systems such as coffee, tea, rubber, cashew nut or cocoa.

Inadequate water supply is major constraint to agricultural production in dry lands. In many cases, however, rains provide adequate quantities of water for optimal crop production but this water is lost, usually by overland flow, before the vegetation can use it. Water is also lost through poor tree management and landscape planning. For example, some fast growing tree species such as eucalyptus, pines and acacias are increasingly depleting the environment because their fast growth is matched by higher water and nutrient consumption.

Documented local and ‘scientific’ ecological knowledge on tree selection and management on farms is hardly available or non-existent for most native tree species. There is therefore a dire need to generate such information, which could be used in strategies for integrating trees on small farms for increasing food and tree crop productivity. Information is also lacking on the tradeoffs between economic and environmental benefits of indigenous tree species that are presently over-exploited in the wild and underutilized in agricultural systems.

### **2.1.3 GRP 3: Improving tree product marketing for smallholders**

Research under this GRP is focused on expanding smallholders’ access to value chains for Agroforestry tree products and improving their incomes and livelihoods through better marketing.

#### *Rationale*

Small-scale farmers and entrepreneurs usually lack business skills, have limited access to agroforestry tree product markets, and have little access to information on market demand. They are poorly organized and lack assured and stable markets. It is therefore not surprising that they face high marketing risks and costs, and earn low returns from marketing their tree products.

Governmental and non-governmental organizations seeking to facilitate smallholder marketing, also face critical problems. There are few tools available to assess market opportunities, or to help farmers exploit available opportunities like adding value to products from the farm. These facilitating organizations also find that there are few market demand assessments and few business investment models for tree product investors.

To make matters worse, both sets of actors face problems in the enabling environment that act as disincentives to marketing produce. The inadequate institutional support for marketing (e.g. credit, market information) and skewed policies, barriers and disincentives make it difficult for smallholders to market their produce. There is an absence of quality assurance schemes for Agroforestry tree products and services production and marketing. Trade for some products is over-regulated (e.g. on-farm timber) while in other cases it is under-regulated (e.g. herbal medicines). Many policy makers

still view private traders as a parasitic class rather than as a resource that can generate wealth in rural areas. Also, they do not often perceive the potential for tree products to generate significant incomes for smallholder farmers.

#### **2.1.4. GRP 4: Reducing land health risks**

This GRP is developing multi-scale and widely usable methods of land health surveillance and will quantify and map major risks to land health at different scales. Efforts are made to evaluate the cost effectiveness and outcomes of intervention programmes and agroforestry practices as well as to develop national capacity in operational methods and tools of land health surveillance.

##### *Rationale*

Land degradation is a global threat to habitat, economy and society, and is the overarching environmental issue of concern in Africa, threatening food security, ecosystems and livelihoods. Soil degradation and fertility decline is a major concern for food security in developing countries. However, current measurement and information systems on land degradation in developing countries are grossly inadequate for the task of planning and evaluating land health<sup>2</sup> and Agroforestry policy and practice. In particular, there is a lack of systematic data on land health risks to enable efficient targeting of land management and Agroforestry interventions<sup>3</sup> and to answer questions such as:

- What are the socioeconomic and biophysical determinants of land degradation (land health risks) and how are they geographically distributed?
- How much future land degradation can be avoided or reversed through targeted action to reduce risks?
- What is the impact of preventative and rehabilitation Agroforestry intervention programmes under different conditions?

#### **2.1.5. GRP 5: Climate change adaptation and mitigation through agroforestry**

The research aims to improve the stability of farming systems and livelihood strategies of smallholder farmers in light of current climate variability and long-term climate change. The focus is on the potential contribution of farmers' increased use of trees for intensifying, diversifying and buffering farm systems. The focus is on vulnerability assessments, the impact of climate change on agroforestry systems, and adaptation to climate change in line with synergies in agroforestry systems between climate change adaptation and mitigation.

##### *Rationale*

Developing countries are going to bear the brunt of climate change and suffer most from its negative impacts. Mitigation efforts will only provide a partial softening of the effects of climate change. Local climate and terrestrial ecosystems will change, threatening biota and human livelihoods. Yet, even as climate changes, food and fiber production, environmental services and rural livelihoods must improve and not just be maintained.

Climate change is increasing inter-annual rainfall variability and the frequency of extreme events, leading to accelerated rates of degradation of soil and water resources upon which farming communities depend for their livelihoods. These changes are threatening development advances such as the achievement of the Millennium Development Goals. Appropriate response strategies

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<sup>2</sup> Land health is the capacity of land to sustain delivery of essential ecosystem services (the benefits people obtain from ecosystems). Ecosystem services are defined by the Millennium Ecosystem Assessment.

<sup>3</sup> Intervention means any promotive, preventive, curative, or rehabilitative activity where the primary intent is to improve land health and human well-being. GRP4 focuses on targeting and evaluations of programmatic interventions (as distinct from individual technology interventions).

must therefore take account of the expected future impacts to develop more robust and resilient systems for smallholders. Agricultural systems most vulnerable to climate change are those already affected by unsustainable management, and land and resource degradation. Trees have an important role in reducing vulnerability, increasing resilience of farming systems and buffering households against climate related risks. Agroforestry systems are therefore ideally placed to provide the additional resilience of agro-ecosystems to future climate change for a number of reasons.

There are two hypotheses at the centre of this project:

- (Some) trees are deep rooted, have large reserves, and are less susceptible than annual crops to inter-annual variability or short-lived extreme events like droughts or floods. Thus, trees offer diversification options that can reduce production risks for small holder farmers.
- Trees are a perennial resource that can be exploited to provide increased income during difficult periods, thereby reducing income risks associated with climate related shocks for small holder farming families.

The challenge for this global project is to evaluate these two hypotheses in different farming systems, different cultural contexts, and in different landscapes. In conjunction with developing knowledge about the potential for trees to help facilitate adaptation, a number of supporting research questions will be addressed.

The international policy framework for reducing net emissions from energy use, land cover change and land use is rapidly evolving. Effective ways to involve smallholders and the trees that they manage in the global mitigation efforts have been scarce. Regulation is often based on a forest - agriculture dichotomy that does not match the agroforestry reality of smallholders. Institutional mechanisms have high transaction costs, as issues of additionally, leakage, permanence, rights to land and monitoring of emissions have yet to be resolved in generic ways.

#### **2.1.6. GRP 6: Supporting multi-functional landscapes with trees for environmental services**

Through this GRP, we support better policies and the creation of incentives for maintaining the multifunctionality of landscapes with trees. This work is based on improved understanding of the roles trees play in securing watershed services, storing carbon and maintaining biodiversity in landscape mosaics. It identifies opportunities for suppressing negative incentives and strengthening positive ones for agroforestry solutions. Finally, studies of the ‘tree cover transition’ focus on the relationships between local and global drivers of land-use change and the return of trees to landscapes after stages of deforestation.

##### *Rationale*

One of the most significant challenges that humans face is trying to maintain or increase the supply of ecosystem services—e.g. water, soil health, and biodiversity - especially under changing climates that will continue to support both human needs and the functioning of natural ecosystems. The management of these multifunctional landscapes requires research tools and management mechanisms that strike the balance between (a) ‘goods’ and ‘services’, (b) short (efficiency), medium (persistence) and long-term (change) objectives, and (c) ‘efficiency’ and ‘equity’ in the pursuit of sustainable development.

From the perspective of trees – the oldest, largest, and most provisioning living organisms -- there are increasing conflicts and trade-offs between tree plantations, natural forests and trees on farms. Tree systems that generate the highest returns to land often generate lower levels of ecosystem services, while old-growth natural forests usually generate high levels of environmental services but relatively little income for farmers. In this context, Agroforestry can emerge as an intermediate land use with potential to balance these two-generate good economic returns and acceptable levels of critical environmental services.

The incentives and disincentives that farmers face when deciding to establish and maintain Agroforestry systems are defined by policies emanating from the agricultural, forestry and environmental sectors. For example, the national and local policies put in place to protect forests and environmental services often have the consequence of reducing incentives for Agroforestry. Multi-lateral environmental agreements establish objectives, obligations and opportunities for national policies and strategies, but rarely harness the potential of Agroforestry to advance environmental objectives.

The role of the different configurations of trees in the provision of environmental services needs to be realistically assessed so that appropriate incentives, property rights arrangements and regulatory approaches can be negotiated and updated through learning. Past World Agroforestry Centre research shows that institutions and arrangements for management of multi-functional landscapes should be assessed in terms of their efficiency (realistic, conditional, voluntary), fairness (pro-poor, pro-women, pro-untitled landholders) and sustainability. Existing results show that there is potential for using new property rights arrangements and flexible policy instruments, often implemented through decentralized forms of government, to strengthen farmers' incentives to invest in Agroforestry. Mechanisms and contracts that provide conditional rewards for environmental services have potential to provide farmers with incentives to adopt Agroforestry systems and other land uses associated with environmental stewardship or restoration.

There has been considerable study of so-called forestry (= tree cover) transitions: the tendency for increasing population pressure to cause dramatic reduction in tree cover, followed by a period of either stable or increasing cover. Since rural population continues to grow in many areas in the world, assessing whether the promotion of agroforestry can alter the pattern of deforestation is very timely. This is all the more salient given the attention to REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) in current climate change debate.

The research undertaken in GRP6 will examine:

1. How do landscape-scale watershed and biodiversity services depend on the attributes of Agroforestry systems across climatic, biogeographical, ecological and socio-economic contexts?
2. How realistic are expectations that regulation of and incentives for enhancing tree-based watershed and biodiversity services can enhance these environmental services from the perspective of external stakeholders?
3. What are the tradeoffs between efficiency, fairness, and poverty reduction associated with alternative prototype mechanisms for environmental service rewards involving small farmers?
4. How can cross-sectoral policies and community based forest policy limit or enhance the potential for environmental service rewards, as well as tools, methods, and approaches that enhance the sustainability of financial flows and institutional change in environmental service reward mechanisms?
5. What are the drivers of forest (tree cover) transitions and agroforestry transformations, and where can environmental services-based incentives play a role in these various contexts?

## **2.2 Regional Contexts, Progress and Future Risks and Opportunities**

The regional outlooks developed in 2009 contain a perspective on the context, risks and opportunities.

### **2.2.1 Latin America**

WorldAgroforestry in the Amazon faces the challenge of contributing to research and development interventions that concurrently meet the short- and long-term needs of environmental conservation and the economic wellbeing of local populations. In order to do so, it needs to work towards the

identification, development and dissemination of agroforestry systems that avoid further deforestation and sequester carbon dioxide; while supporting local governments and civil society in their goals related to welfare, environmental services, and improved governance. Over the last few decades, more than 80 million ha of natural ecosystems have been lost in the Amazon. As an overwhelming amount of research has shown in the past three decades, this expansion is associated with losses of regionally and globally valuable ecosystem services. As such, the Amazon clearly contrasts with resource poor and high population areas in that even relatively few and poor settlers can exert considerable and increasing pressure on natural resources. Negative effects of land use change in the Amazon are related to convoluted political processes, clearly expressed in Amazonian socioeconomic contexts. The Amazon is home to some 380 ethnic groups that have been drastically affected by frontier expansion and biodiversity loss resulting from land use transformations. Likewise, riverine, peasant and other traditional rural populations throughout the region rely on food, fibre, fodder, fuel, and medicinal plants locally extracted. Both transitions and clashes occur between indigenous production systems and market-driven systems, jeopardizing the existence of several of these groups. Skyrocketing land prices and concentration of wealth and land ownership further exacerbate this situation, increasing rural-urban migration and augmenting social stress in the region's urban and peri-urban areas. Moreover, the regions' unique socio-cultural setting and the diverse forms in which local livelihoods depend on its ecosystem services (in both sustainable and unsustainable ways), makes it a particularly relevant region for the implementation of WorldAgroforestry's research strategy towards integrated and sustainable agroforestry options for the Amazon with the stated objective of maintaining ecosystem service provision and preventing aspects of poverty associated with their loss.

Agroforestry expertise in the Americas is found both in countries of the North and South. As an institute with global mandate in agroforestry research, and taking advantage of its geographical location, WorldAgroforestry-LA should take a leading role in seeking the collaboration of such expertise by constituting a regional scientific steering group, selected to act during a four-year period, who would meet annually for 3-day scientific conference of excellence. As part of these annual meetings, the steering group will attend a workshop to review and provide guidance for the enhancement of the contexts (legitimacy), mechanisms (credibility) and outcomes (salience) of WorldAgroforestry-LA. These high level scientific events will be an important component of the 2010-2020 regional strategy to guide innovative science and expose regional scientist to state of the art methodologies. Each conference and workshop will take place in one of the Amazonian contexts where agroforestry is a relevant option for present and future conditions. The scientific events will generate high quality peer reviewed publications on selected topics that are linked to one or more of WorldAgroforestry GRPs and are part of the regional program. Senior scientists from headquarters and other WorldAgroforestry regional offices will be invited to attend and contribute to the events, which will serve for scientific cross-fertilization.

### **2.2.2 Southeast Asia**

SEA has made major progress in dealing with rural poverty and achieving economic growth rates that exceed population growth. Throughout the region, growth is not equally shared and pockets of rural poverty remain. In 2005 *gross national income* (GNI) per capita varied between US\$290 for Laos to US\$4,970 for Malaysia, with an average of US\$1450. Pressure on natural resources is high. Between 1995 and 2010 SEA is projected to lose 32.8 million hectares of its *forests and woodlands* and 18.2 million hectares of its *natural exploitable forests*, those losses equal 11% and 14% respectively of the 1995 area. The demands and expectations of lowland capitals and economic centres for regular flows of clean water from uplands cannot be realistically met. Inconsistent or contradictory policies and conflicts over rights of use and access are a main determinant of unsustainable natural resource management and poverty in the uplands and forest margins.

The geographical domains and countries have huge differences in population density, characteristics of the rural economy and accessibility. Different phases of the forest/degraded lands/agroforestry transition can coincide in space and time, linked to the history of access (shifts from rivers to roads as main transport means) and the spontaneous and government-sponsored migration of people from high to low population density areas. Large parts of the countries are claimed to be forest, under control of state forest agencies that were very profitable at the time logging concessions could be sold, but that currently struggle with the change in societal roles. Conflicts over access to land are an important impediment to rural livelihoods and agroforestry systems.

Smallholder farmers in many parts of SEA see tree farming as a means to diversify their production, reduce risk, and build assets to enhance family incomes and security. Smallholder agroforestry systems are generally successful. The trees they plant represent a conscious investment for which other options have been forfeited. Farmers generally restrict plantings to the number of trees that can be maintained and integrate *tree growing* with their crop and animal production activities. In summary, smallholder agroforestry systems benefit from intensive management over limited areas and vested self-interest – the desire of the farmer to profit from her/his investment of time and resources.

WorldAgroforestry's SEA experience demonstrates that under the right conditions smallholder farmers can and will cultivate a wide range of tree species as a component of their efficient, integrated and risk-averse land-based livelihood systems. Smallholders can effectively respond to the increased demand for wood and other tree products. To harness the potential of smallholder farmers, a *paradigm shift* is required in the forestry and agriculture sectors, to recognize and support farmer-led approaches to tree-based farming systems as part of the solution to achieve sustainable forest management objectives.

Intensive research on 'negotiation support' on issues of watershed has been conducted by WorldAgroforestry and Collaborators in SEAsia, both on biophysics and social economic aspects. The results have been published in international as well as national for a, with the Rapid Hydrological Assessment as a spinoff to less-researched watersheds, that is picked up by other institutions. Research by WorldAgroforestry shows that agroforestry system provides a livelihood option to farmers and also control erosion similarly to natural forest. The agroforestry system provides a complex canopy that protects the soil surface from heavy raindrops that cause erosion. The system creates tree litter on the garden floor that also helps weaken the erosive force of water. This type of scientific evidence starts to be recognized by policy makers and the use of conditional land tenure for farmers to growth agroforestry in state forest land is included in a new GEF funded watershed rehabilitation program. This completes the cycle of problem analysis to widespread 'outcomes' for this part of our agenda.

### **2.2.3 South Asia**

The S. Asia region is home to 40 percent of the World's poor, and predominantly has hilly and mountainous areas, semi-arid and arid zones, the Indo-Gangetic Plain and the sub-continent's coastal fringes. Although only 13% of the region is forested, wooded areas provide food and income for more than 200 million people.

In recent years, economic expansion, coupled with rapid population growth, has placed considerable pressure on the region's natural resources. Ironically, these same forces have also created opportunities for agroforestry practitioners to produce a range of high-value consumer products and support watershed protection and biodiversity conservation.

Agroforestry is a traditional system throughout South Asia region and is recognized as an optimal multifunctional land use system that provides a variety of important benefits. It is the only

multifunctional agricultural system that produces a variety of economically important products and global environmental services. In addition to producing fruits, fodder, fuel, fibre, paper, timber and medicines, the trees used in agroforestry systems help to replenish and conserve the soil, improve watershed management, create the shading effects needed to establish micro-climates that support activities such as coffee growing and home gardening, and offer practical options for mitigating the ill effects of climate change. Agroforestry is recognized by millions of the region's farmers as crucial to achieving sustainable livelihoods.

Increasingly, agroforestry is viewed as a business and is attracting the attention of the private sector. It is treated as a specialized way of farming of trees with field crops outside forests in a variety of designs, configurations and combinations to optimize the use of natural resources, leading to the sustainability of systems. Being ecology specific, and natural resource domain bound, there are considerable variations in agroforestry systems of the region. Here in the choice of tree and the field crop combination varies with local preference, market demand and the experience and resources of the producer to invest in it.

The South Asia Regional Program makes a clear commitment to understanding and addressing gender inequalities and releasing women's potential as agents of innovation and impact. Specifically, all projects undertaken within the context of the program do:

- Assess *ex ante* the impact of agroforestry innovations on gender equality and women's empowerment;
- Develop and promote innovations that contribute to gender equality and women's empowerment;
- Engage with women's organizations to ensure that women's perspectives are understood and acted upon; and
- Support the advancement of women through training, education and collaboration opportunities.

Engagement in South Asia spans the research-development continuum to maximize impact and sharpen the focus and relevance of the research agenda. We acknowledge, however, that the major focus of collaboration in South Asia is on strategic and applied research. WorldAgroforestry engages with South Asian institutions with a view to identifying principles and processes that are transferable and adaptable both within the region and across regions.

In direct cooperation between S. Asia and SE Asia region and ASB, the global analysis of emission reduction options (REDD++ /REALU) in now included Nepal in collaboration with the International Center for Mountain Development (ICIMOD). The invitation to work on REDD issues on Nepal particularly in preparation for COP 15 with ICIMOD and the government of Nepal stems from WorldAgroforestry's previous and existing work on PES from RUPES project in Nepal and the credibility of WorldAgroforestry's scientific research. Work now consists of: i) the analysis of current discussions and preparation for REDD, REDD+ and future REDD ++ review in Nepal; ii) analysis of drivers of land use change, resource rights, and CO2 link/emission reduction effectiveness; iii) policy briefs; and iv) opportunity costs under RED, REDD, REDD+, and REDD++ scenarios.

#### **2.2.4 Southern Africa**

Much of the southern Africa is caught in the downward spiral of food and nutrition insecurity, and poverty, which is largely the result of soil fertility depletion, population increase, land degradation and natural resource degradation.



Over 75% of the people in these countries live in rural areas with low access to basic health and education services. On the Human Development Index, the countries rank very low (<0.600). Poverty is both widespread and severe. The undernourished population accounts for 35-46%, with the global hunger index ranging between 22 and 29 rated as alarming. Figure 1 indicates that most of the countries we work in the region are categorized as within the hunger hotspots of Africa. Agricultural production accounts for a substantial share of the GDP, although varying across the region (Table...). These conditions, combined with the high incidence of HIV/AIDS and malaria, make the poor highly vulnerable to effects of natural disasters and food insecurity. Other key development challenges in the southern Africa region include weak national R&D structure, low human resource capacity, inadequate policies, and gaps in research coordination. There is generally lack of long-term vision for R&D impact and planning, perceived inertia in developing innovative solutions, and weaknesses in cross-sector coordination.

Most the countries are net food importers, and occupy the zones known as 'hunger hotspots' in sub-Saharan Africa, and sometimes rely on food aid in hungry seasons. At the centre of the imminent food catastrophe is maize, one of the main inputs in global bio-fuel production as well as a staple food in most parts of Africa. While maize is the main staple food crop in the region, its price has risen by 44% in the past 15 months. The trends in southern Africa are worse than that in other part of sub-Saharan Africa (SSA) as population growth, dietary change and land use pressures have driven prices of food and agricultural inputs to new heights. In addition to the above, the situation in most countries in southern Africa is compounded by the absence of a strong extension and input supply service; and counter-productive policies that are biased against agriculture and less favourable to resource-poor smallholder farmers.

In spite of these challenges, there is a tremendous opportunity for Agroforestry solutions. The lack of livelihood alternatives for much of the regions poor means that their future is tied to the land and its ability to sustain them.

The fundamental problems being addressed in WorldAgroforestry-SA were on:

- Food insecurity
- Poverty and income security
- Deforestation and land degradation and
- Adaptation to climate change.

The fertilizer tree portfolios represent a new paradigm because it involves the adoption of different approach to land use management by smallholder farmers. First, by capitalizing of biological nitrogen fixation (BNF) by tree legumes, the system accumulates organic matter and nutrients in to the soil system, thereby initiating a host of biological processes that ensure sustainable soil health and crop production. Secondly, it permits growing of trees in association with crops in space or time to benefit from complementarities in resource use and diversification of livelihood options. Thirdly, the fertilizer tree systems address most of the biophysical and socio-economic limitations identified with the earlier technologies based on using N-fixing tree legumes as green manures.

The region emphasis quality research and publication of results in good outlets. According to the Research method Group, such quality research are recognized through: 1) Publications that get noticed, 2) recognition by science community, and 3) new methods and tools that are used by others. To carry out quality research, among other things there was a need to have: Connections to current thinking, sound conceptual framework. Innovation, rigorous, appropriate and up-to-date methods.

In the coming years, the region will aim at steadily building its capacity in all the six GRP areas, but emphasis will continue to be placed on areas with regional needs such soil fertility and health, income generation, biodiversity and environmental resilience.

#### **2.2.5 East Africa**

The region is facing multiple political, socio-economic, and environmental challenges which are having significant implications to agriculture and sustainable development. Most of these countries are among the poorest in the world characterized by a high rural population (80 %) and an economy largely dependent on agriculture. The region contains one of the highest proportions of people in the world living below the poverty line (less than 1 USD per day) and frequently experiencing food insecurity. Meanwhile, it is also a region with one of the highest growth rates in the world at an average of 2.5 % per year (ACT, 2008). Most of the countries have low annual GDP growth rate (at an average of 3%) and income per capita has been declining since 1990. Agricultural production is not keeping pace with increasing population which is expected to rise to 347 (43 % increase) million by 2025. Agricultural expansion to forests and marginal areas, and increasing dependency on forests as a major source of energy for rural and urban communities is witnessing an irreversible destruction of biodiversity. The situation is exacerbated by climate variability and change, of which poor agricultural methods is a major contributor (Hobbs 2006) and whose effects in the form of variable water supplies, lengths of growing season, extreme weather events and changing habitats are now more common in the region.

Sustainable agricultural intensification is one of the promising strategies in curbing the increasing rural poverty, food insecurity and natural resource degradation in the region. Agroforestry technologies have a major role to play in achieving this. Current trends shows an increasing appreciation of the important role trees can play in promoting sustainable land management and enhancing agricultural productivity in the region. The 2009 – 2012 East Africa Regional Outlook emphasize on working closely with all the GRPs and partners in member countries in taking up this challenge for improved sustainable agro-ecosystem productivity, increased rural incomes and reduction of rural poverty.

The development of teamwork among scientists in the EA programme and between them and GRP scientists in enhancing multi-disciplinary knowledge generation based on set principles and criteria will ensure improved science quality. The region will make use of its privileged position to be closer to the majority of the GRP scientists to ensure mentorship for improved science standards. More efforts will be directed towards attracting qualified scientists including post docs. One of the biggest challenges observed in the 2008 POWB is the failure by the region to publish the body of knowledge that has been generated in the region. More efforts will be directed towards realization of more IPGs including refereed journal papers. The regional strategy will be revisited to ensure priority and emerging agroforestry issues in the region are adequately addressed.

#### **2.2.6 West and Central Africa (WCA)**

In WCA region, the agriculture sector is characterized mostly by smallholder farms with limited access to markets. Farmers rely primarily on rain-fed production systems and natural/traditional methods of soil fertility maintenance. Shifting cultivation is the predominant practice on 5–10 ha per household in the more humid zones and <1 ha per household in the semi-arid zones. Migration of younger people to urban areas, mostly in capital cities, continues to reduce the farm labour pool; ~50% of rural incomes come from non-farm sources, and many farmers in the region are net purchasers of food. The rural poor must, therefore, significantly raise the productivity of their existing enterprises and diversify income generation in order to meet the challenges of high poverty, population growth, and competitive markets.

The region, however, has a rich agricultural base (diverse production) spread over its agro-ecological zones, so there is significant potential to increase agricultural productivity. The main food crops are roots, tubers, cereals, legumes, plantain/banana, fruits and vegetables; and the major export agricultural commodities include coffee, oil palm, cocoa, rubber, cotton, timber and shea tree nuts. Emerging indigenous tree crops and their products are becoming increasingly important for food security and income generation.

Trees comprise the longer-term component of the agricultural system and require less labour investment over their life cycle than crop plants. This is particularly important because poor households in WCA are becoming increasingly labour constrained, and there is an increasing tendency for women to become heads of households. Increasing the number of tree species and their genetic diversity, and enhancing their productivity, cannot only increase revenue and diversify products, but also provide significant environmental services. Diversity in agroforestry systems, both biological and economical, is a key strategy to minimize risks to rural livelihoods in a changing and uncertain environment. Diversification using improved high value trees with early fruiting characteristics such as marcotted or grafted trees is becoming increasingly important considering the anticipated climate change (increased frequency and severity of extreme weather conditions, coupled with increasing fire hazards, pest and disease problems). Thus, scientists will enhance the better understanding of costs, benefits and risks of agroforestry technologies and farming systems under WCA varying conditions.

Land resources of many poor smallholder farmers in WCA have degraded over time through increased nutrient depletion and soil erosion. Trees can increase productivity of farming systems by providing key ecosystem services such as improved soil fertility, nutrient cycling, soil and water conservation, and erosion control. This is especially important for poor households with limited resources to purchase inputs that substitute these services. The ever increasing population will put additional pressures on the natural resource base, and agroforestry will play an increasingly significant role in maintaining or increasing the provision of these ecosystem services.

The challenges posed by climate change, and the need to increase the productivity, sustainability and diversity of agroforestry systems offer an opportunity for WCA scientists from all six GRPs to develop a concerted, multi-dimensional research/development approach that helps rural poor communities to pro-actively adapt to climate change. Some specific opportunities include enhancing multifunctional agricultural landscapes that balance increased productivity with sustainable natural resource management; maintaining and enhancing ecosystem services within agricultural landscapes, particularly water, soil health, carbon sequestration, carbon-neutral firewood production, and biodiversity conservation; increasing genetic adaptation and productivity of priority tree species in response to projected climate change; facilitating changes in natural resource and land/tenure policies and “agriculture versus forestry” sectoral thinking in institutions in order to promote sustainable agroforestry development.

WorldAgroforestry-WCA science is based on set of principles and criteria taking into account the context (articulation of problems), the mechanism (research process and achievement of outcomes or impacts). As main donors in the region and development-oriented, it usually believed that WCA do more development than research. It is true that the wide adoption of PTD tends to support this line of thinking, but it important to always remember that PTD is based on solid science which results are amply used now by practioners of PTD. However tremendous had already being done to boost science quality of the region: one female Post Doc posted in Mali is working on innovative of wood quality of important trees of the Sahel while strategy of developing quantitative genetics is in process. Above all it will be urgent to develop policy and land rehabilitation using the conservation agriculture generating great results in other regions

### **2.3 Strategic New Hires and Female Post-Doc Recruitments**

WorldAgroforestry's primary consideration in the employment of the staff and in the determination of the conditions of service is based on securing the highest standards of professional expertise and experience; and the selection of staff is made on a competitive basis, as far as practicable and is made without distinction as to race, gender, religion or age.

We see additional opportunities for operational efficiency but rigorously checking that we provide equal opportunities to all persons who have appropriate qualifications, skills and experience. By attracting and recruiting motivated professionals and support staff of the standard required by the institution to deliver a high quality of service to stakeholders.

HRU aims, in the coming year to pay substantial attention to recruitment to ensure continuous improvement to the staff selection process and extra support and guidance on the various recruitment activities, including developing the interviewing skills of panel members.

The calendar year 2009, has been the most progressive in terms of new staff hired and bringing on board new skills. Fourteen (14) new international staff members were hired with four others in process. Internationally Recruited Staff (IRS) and Regionally Recruited Staff (RRS) grades (C5-C8) have been boosted with the following new individuals:

- Henry Neufeldt (Climate Change Leader)
- Kamini Balram (Head of HR)
- Idah Ogozo (HR Coordinator)
- Fergus Sinclair (Co-leader GRP2 – Production Ecologist)
- Thomas Gumbrecht (Landscape Ecologist/Hydrologist)
- Dagmar Mithofer (Marketing Specialist)
- Delia Catacutan (Socio-economist)
- Eike Luedeling (Climate Change Scientist)
- Kate Langford (Communication Specialist)
- Carmen Sotelo (Female Post-Doc)
- Tracy Beedy (Female Post-Doc)
- Jeevika Weerahewa (Female Post-Doc)
- Aster Afwork (Female Post-Doc)
- Kristina Marquardt (Female Post-Doc)

In addition, four other IRS positions have been approved/interviewed for (Resource Mobilization, Biodiversity Specialist, Integrated Soil Fertility Management, Head Research Methods Group), and announcements should be forthcoming soon.

During the recently concluded Management Team Meeting (MT), 11 new positions for strategic hire for 2010 were proposed (and another two for 2011). No immediate decisions have been made on these but they have been ranked in terms of strategic importance and managers have been encouraged to include them in new grant proposals.

### **2.4 2010 Publication Targets and 2008/9 Achievements**

One of the key metrics for us to track science quality and output is our publication record. Publication output is also one of the major elements in the World Bank Performance Monitoring side.

The year 2009 (reporting on 2008 success), was also the most successful in the centre's history in terms of scientific publishing. In total 270 articles were published of which 102 were journal articles (43%). We had an average of 3.2 refereed articles per scientist (1.2 Thomson and 2.0 non-Thomson journals) which was the highest overall in the CGIAR. We were rated only 7<sup>th</sup> highest in the CGIAR though in sole Thomson journal ranking, and more emphasis will be placed in this category of journals in 2010. We also have to be careful not to bias against our open access policy also.

	Number published in 2005	Number published in 2006	Number published in 2007	Number published in 2008	Number published to date in 2009
Books	24	26	22	18	7
Book Chapters	42	51	50	64	8
Conference Papers	15	46	36	50	1
Conference Proceedings	10	6	4	0	0
Journal Articles	58	90	86	102	30
Scientific Series	31	55	29	36	7
<b>Total</b>	<b>180</b>	<b>274</b>	<b>227</b>	<b>270</b>	<b>53</b>

In relation to impact factor (Thomson ISI), our top 5 articles in 2008 had an average of 3.75 with the maximum being achieved being 4.34. Our minimum impact journal published in was 0.23. Our overall average for Thomson journals was 1.47, which is above the global average (i.e. 1.0) for all journal articles, and way above the agriculture category average (0.6).

During 2009 an innovative writeshop was held in Shangri-la, China by Meine Van Noordwijk. Here the focus of the meeting was "Water, carbon, biodiversity aspects of landscape mosaics with trees under climate change". Nearly 30 manuscripts were discussed, reviewed, improved and now have a clear target journal and date for submission. Core funds from GRP 4, 5 and 6 plus modest restricted project funds were used for the travel. Overall the extra investment of US\$1400 per manuscript seems well justified. Additional writeshops are planned for 2010.

All scientific staff must now set publishing targets with supervisors in their performance evaluation forms. At the motivation end we have incorporated a publication award ceremony in our annual Science Forum. At the recently concluded WorldAgroforestry Science Forum the following individuals were recognised:

- 1<sup>st</sup> Place Award - Festus Akinnifesi 44 refereed papers (19 journal articles)
- 2<sup>nd</sup> Place Award - Sileshi Weldesamayrat 31 refereed papers (14 journal articles)
- 3<sup>rd</sup> Place Award - John Weber (high impact factor) & Olu Ajayi (9 journal articles)

At the other end, of warning low-publishing staff, we have included publication rate as a filtering criteria in contract renewals. Some staff failed to get contract renewals in 2009 due to low publication rates and this monitoring will be strengthened further in 2010. Below are indicators of average expectations of publishing targets (refereed papers) for various grades of scientists:

Senior scientists: 3-4 publications (with at least 1-2 as lead author)  
 Scientists: 2-3 publications

Junior scientists: 1-2 publications

Currently, 2009 publications are still quite few although we expect many more by January 2010 when most of the papers submitted this year will have been published. Indeed some journal volumes for 2009 do not come out until mid the following year. It may be below 2009 levels though depending on acceptance rates for submitted articles. One reason for possibly lower journal articles in 2009 would be the attention given to World Congress on Agroforestry. Staff who produced papers, posters and presentations for this are now being encouraged to publish these as journal articles. A preview of upcoming articles for 2010 reporting (2009 publication year) shows a very pleasing aspect with two articles published in *Science* (Impact Factor 28.1) and one in *Global Change Biology* (Impact Factor 4.34).

In 2009/2010, a CCER on Research Quality – Metrics, Bibliometrics and Data Management is proposed. Amongst other things this will look at suitable measures and targets for publication, authorship, impact factors, citations and other indices (e.g. H-Factor).

One important centre publication produced this year was a Working Paper 88 on scientific fraud (Preventing and Identifying Scientific Fraud in Tree Science Research). During the past 12 months we have had one case of confirmed scientific fraud (data fabrication) which resulted in summary dismissal, two cases of alleged scientific fraud (data manipulation by one staff member and one NARI partner) under investigation, and one case of plagiarism (albeit unintentional) that warranted a brief suspension.

It was recognized that the centre may have put inadequate attention to raising awareness, research induction and reinforcing policies and practice. Whereas our staff seem to have inadvertently (and occasionally deliberately) breached accepted standards of ethics and professionalism.

## **2.5 Global Support Units**

The Global Support Units (GSUs) located at WorldAgroforestry Headquarters in Nairobi provide assistance to all research undertaken throughout our regions, partner locations and headquarters, as well as institutional obligations. They do this largely on a demand-driven basis although some functions are corporate responsibilities (e.g. tree germplasm conservation). A mixed model, even within single units, for service costing exists of: (i) user pays; (ii) subsidized service; and (iii) core provided. Some regions and regional scientists perceive that the GSUs over-serve headquarters work and under-serve some regions.

### **2.5.1. Research Methods Group and GIS Unit**

The Research Methods Group (RMG) is a joint unit with WorldAgroforestry and ILRI. It has 11 staff in total (2 IRS and 9 NRS) all based in Nairobi. A recruitment process is currently underway for a Head of this Group to replace Ric Coe. The general goals of the Research Methods Group are to:

1. Develop and promote the use of research planning and implementation systems and procedures that enhance overall quality.
2. Assist with technical advice, skills and tools needed to design and analyze high quality research studies.
3. Support research information, data management and knowledge sharing policies and practices that maximize the long term value of research data.
4. Improve capacity for quality research with staff and partners.

The specific targets for RMG in 2010 include:

- Strategic support on research design, data management and analysis provided to large and small projects in all WorldAgroforestry GRP's and Regions, contributing to MTP targets. Pre-determined projects include: UNEP/GEF Carbon Benefits, AfSIS and Sub-Saharan Africa CG System-wide Challenge Programme.
- Reference/training resources for project and study design, data management & analysis available on website ( $\geq 20$  publications), regularly updated & promoted.
- Research Data Management Policy standards fully implemented in all WorldAgroforestry projects – updated and aligned to CG-wide initiatives.
- Provision of both basic GIS service support (e.g. data manipulation, mapping etc.) and spatial analysis support (e.g. site characterisation, spatial modelling etc.) to projects in all WorldAgroforestry GRP's and Regions, contributing to MTP targets. Pre-determined projects include: GRP 6 – PRESA (W&CA), GRP 5 – Carbon Benefits project (ECA), CAWT (ECA), Water Management (ECA).
- Website resources providing the key support to WorldAgroforestry and ILRI scientists, back-stopped by specific face-2-face courses in when required.
- Contribution to methods for linking knowledge with action. Extending the set of approaches developed and tested under the TUL-SREA project to a WorldAgroforestry-wide inventory, description and analysis of methods.

#### **2.5.2. Soil-Plant Analytical Facilities**

During 2009, WorldAgroforestry invested US\$400,000 in a transformation of its soil-plant analytical facilities to create a new Soil-Plant Spectral Diagnostics Laboratory. The new laboratory capitalizes on WorldAgroforestry's success in the development of infrared spectroscopy techniques for rapid soil and plant analysis and their application to large area surveillance of land health. Maintaining the theme of using only light to analyze soil, plant and liquid samples, the new laboratory extends the infrared techniques to include recent breakthroughs in application of x-ray and laser technology with use of minimal sample preparation and chemicals. The new laboratory strategy and business plan was based on a thorough analysis of WorldAgroforestry's opportunities and comparative advantages. The centre has outsourced its traditional wet chemistry to commercial certified laboratories and redirected its core funds and human capital into research and support to WorldAgroforestry's core projects on land health. The infrastructural improvements include partitioning the laboratory into modern instrument rooms, improving and re-organizing the soil and plant preparation facilities as a joint resource shared with other CGIAR centres (mainly TSBF-CIAT and ICRISAT), and consolidation of TSBF's soil microbiology laboratories.

The overall goals of the World Agroforestry Centre's Soil-Plant Spectral Diagnostics Lab are to: (i) develop soil-plant spectral analytical methods and diagnostic tools for rapid and reliable assessment of soil and plant health; and (ii) demonstrate their application for evidence-based agroforestry and land management policy and practice in developing countries. The nearer term goals are to:

1. Develop high-throughput spectral analytical methods requiring minimal use of sample preparation and chemicals.
2. Apply spectral analytical techniques in decision support tools for diagnosis of soil and plant health problems in the tropics.
3. Provide high quality spectral analytical services for the Globally Integrated African Soil Information Service (AfSIS) and other CGIAR research projects, including serving as a spectral reference laboratory.
4. Strengthen national capacity in spectral diagnostic methods and their application for improved land management at technical, graduate and postgraduate levels.

Now resourced with these new facilities, in 2010 we see the laboratory becoming recognized as a global centre of excellence in soil science, and in addition is initiating new research on tree genetic x environment interactions and tree nutrition and product quality for key agroforestry species.

### **2.5.3 Genetic Resources Unit**

The Genetic Resources Unit (GRU) at WorldAgroforestry provides global support to WorldAgroforestry regional staff and partners for tree germplasm and tree information needs. It holds separately and/or in conjunction with national programmes collected and procured germplasm in both live and seed gene banks around the world. At headquarters, a centralized facility for storage, testing, characterization (including molecular) and dispatch for orthodox species exists. GRU also undertakes long term conservation efforts of orthodox tree species with external gene-banks. In Kenya, it also maintains a nursery at the headquarters and a field facility at Meru for quarantine, testing and dispatch of introductions to all regions in Africa. Databases which compile information on tree taxonomy, uses, suitability and sources of seed are developed and regularly updated by the unit. The GRU also contributes significantly to capacity building through various training workshops. Collectively these are part of the genetic resource activities of WorldAgroforestry. The GRU also actively participates within the CGIAR's System-wide Genetic Resources Program (SGRP) contributing significantly towards generation of knowledge on trees and sharing information on specificities of tree germplasm in comparison to non-perennial crops.

The specific targets for GRU in 2010 include:

1. Continued support for procuring germplasm for WorldAgroforestry projects and scientists.
2. Policy for germplasm exchange using Standard Materials Transfer Agreements (SMTA) fully implemented and aligned to CG-wide initiatives for all relevant WorldAgroforestry projects e.g. CAWT, AFSP, etc.
3. Centre-wide database on transfer and dissemination of seed and seedlings through WorldAgroforestry's projects within regions.
4. Policy brief for germplasm exchange.
5. Development of South-South protocol for movement of germplasm (especially to Africa from Asia).
6. Undertake a pilot for transferring mango, guava and pomegranate scions and seeds from India to Kenya.
7. Seed source classification and documentation initiated with partners in Kenya with hope to extend to other African countries.
8. Initiate development of a regional database on location and characteristics of mother-blocks (public and private) that have been established for high priority agroforestry species.

### **2.5.4 Training Unit**

The Training Unit (TU) has for the past decade or more been a combination of two things, namely: (i) the focal point for all of the Centre's Capacity Development and Training (CDT) work; and (ii) implementation team for restricted Dutch-funded Capacity Strengthening projects (DSO, SII). It has also benefitted substantially from secondment of VVOB Associates. The work of the TU includes guiding and offering facilities to students at both undergraduate and postgraduate level; conducting learning research jointly with partners from other organisations, including the NARS; supporting tertiary education institutions by providing networking facilities, teaching resources, specialist co-supervision of students, and opportunities for staff sabbaticals; group training at various levels and different contexts, from fellow researchers to farmers; helping with curriculum development; preparing and distributing learning resources, information booklets, and other guidance materials; developing and delivering online learning resources; and contributing to the education of future farmers through formal education support at the primary and secondary education levels.



In 2008, a Centre Commissioned External Review (CCER) was conducted to begin to chart a new way forward for the Centre's capacity development and TU work based on the likely non-continuation of Netherlands project funding; as well as developments in the demand and supply of capacity building within the field of agroforestry. Currently, the TU is developing a new CDT plan that will both support the new strategy as well as provide compelling investment opportunities for new donors. The TU budget is more modest in 2010 as it relies on contracted work from grant holders and core support for its mainstream institutional functions. The CGIAR reform process appears to be placing more emphasis on CDT and thus it is important in 2010 that we maintain high output and visibility in this area.

## **2.6 New directions, continuities and risks in 2010**

### **2.6.1 New directions**

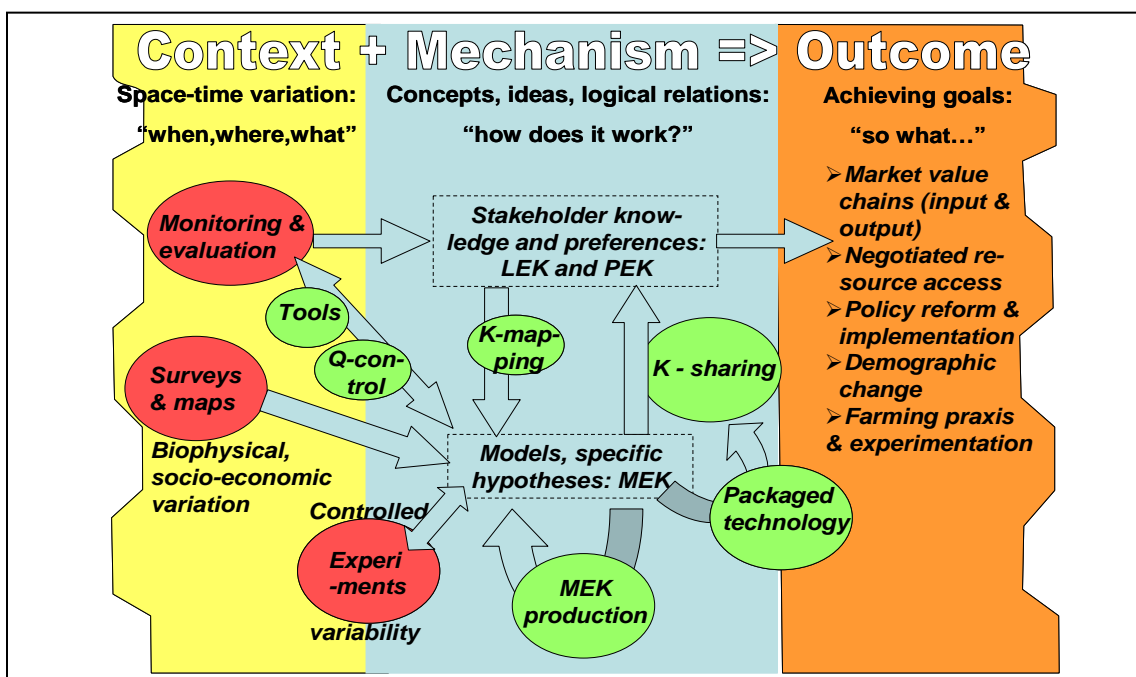
The real value of WorldAgroforestry research emerges where different aspects can be jointly studied and multiple interventions compared. The landscapes where previous investments in interdisciplinary work have been made (including but not restricted to the ASB benchmark areas) continue to provide opportunities to contribute to new global debates, as we are 'grounded', have partners and a deep understanding of local context. Benchmark areas, however, need to be embedded in spatial analysis of the broader domains, to avoid a  $n=1$  declaration of general validity of the results. During 2010, all GRP's + regions will explore the merits of a set of WorldAgroforestry-wide benchmarks that will allow a stronger focus in the work, and set the stage for other work at national or 'outreach'/comparison types.

A number of cross-GRP topics have been identified for 'generic proposals'. These include

- Co-adapt: Change-oriented adaptation and development of agriculture, people and trees,
- Agroforestry as high carbon stock sustainable development: REDD/REALU,
- Fruit-Africa and Fruit-Asia,
- Woody biofuels: value chains for solid and liquid fuels from multipurpose or specialized sources,
- Linking knowledge with action through effective boundary organizations.

### **2.6.2 Continuity**

One of our main IPG's is our contribution to methods for linking knowledge with action and carry out research in the context of the complexity of real landscapes. Extending the set of approaches developed and tested under the TUL-SEA project, an WorldAgroforestry-wide inventory, description and analysis of methods will be undertaken in 2010, which may form the basis for new rounds of 'demand analysis' for capacity enhancement.



### 2.6.3 Risk

While efforts are being made to strengthen a 'science culture' in all we do at the centre, there are constant challenges at the interface of science and communication. Where new directions are identified that appear to offer substantial benefits to our prime stakeholders, the temptation is to directly spread the 'news', as research takes long and rarely provides non-ambiguous conclusions. As a knowledge and science-based institution, however, we need to breath a culture of science in all we do, communicating the benefits of 'complexity', the reality of tradeoffs in a world where real win-win's are scarce (and mostly restricted to turning around current lose-lose situations), and the type and level of remaining uncertainty. This balance between our science and our communication needs attention up to the highest level.

Increased awareness of 'scientific fraud' has, unfortunately brought a number of past and recent cases to the light, involving staff, students and partners. The zero-tolerance policy is applied for staff and students, but in case of partners requires additional diplomacy. Yet, we want to be known for rigorous science that questions and provides new insights that may be 'desirable' (fertilizer trees that reduce poverty, new biofuel options) or 'politically incorrect' (fertilizer trees require subsidies for adoption, current biofuels aren't good enough), without prejudice. Compromises in the name of 'enhancing impact' will backfire and damage our reputation.

### 2.7 Emerging partnerships in the CGIAR to enhance science quality of the centres

Impending changes in the CGIAR may lead to a realignment of WorldAgroforestry research with that of other centres in the CGIAR. In a proposal for a 'forest and trees' mega-program that is still on the negotiation table, the work of the World Agroforestry Centre would align with that of CIFOR and components of IFPRI, Bioversity, IITA, ICRISAT, CIAT and ILRI. All existing GRP's would find their recognizable place if this proposal were to be followed, but other options are likely to emerge as well.

Goal 1: To improve the contribution of trees and forests to livelihoods		
Project (1.1) on <b>enhancing production and marketing methods for smallholder and community tree products.</b>		
	Output 1: Identification of enhanced technical practices that improve smallholder and community tree product cultivation	Component research: CIFOR (RD 3), <b>ICRAF (GRP 3),</b> IITA (Horticulture and Tree Systems) ICRISAT (7.4)
	Output 2: Marketing strategies that improve smallholder and community access to tree product value chains	
	Output 3: Recommendations for policies and development strategies that promote sustainable livelihoods and empower women through smallholder and community forestry	
Project (1.2) on <b>using trees on farms to improve the productivity of agricultural systems.</b>		
	Output 1: Enhanced agronomic practices that effectively use trees to improve agricultural productivity	<b>ICRAF (GRP 2, GRP 4),</b> Some pollination related work from CIFOR RD4.
	Output 2: Appropriate technology targeting through gender disaggregated analysis of the costs, benefits and risks of agroforestry technologies and systems under varying conditions	
Project (1.3) on <b>conserving, domesticating and improving superior tree germplasm.</b>		
	Output 1: Methods and policy options for conservation of wild tree species diversity	<b>ICRAF (GRP 1)</b> Bioversity (F06), IITA (Horticulture and Tree Systems)
	Output 2: Tree germplasm domesticated and enhanced for higher productivity of products and services.	
	Output 3: Sustainable tree seed and seedling supply systems developed using appropriate partnerships.	
Goal 2: To preserve and enhance environmental services to the urban and rural poor by managing pressures on tree-based landscapes		
Project (2.1) on <b>improving modalities for identifying, conserving and enhancing key environmental services in landscapes with forests and trees</b>		
	Output 1: Development of improved empirical methods for assessing and monitoring environmental services at the landscape level	CIFOR (RD 4) <b>ICRAF (GRP 4 and 6)</b> ILRI (Reducing Vulnerability of Livestock-Based Livelihoods, Ecosystem Goods & Services in Pastoral and Agropastoral Systems)
	Output 2: Identification of principles, methods and processes for optimizing conservation and livelihood values from the allocation of land use rights within landscape mosaics	
	Output 3: Identification of improved modalities and approaches to effectively support conservation and enhancement of environmental services provided by forests and trees	
Project (2.2) on <b>enhancing the governance of drivers of land-use change in agroforestry and forested landscapes.</b>		
	Output 1: Analysis of current patterns, future trends and development pathways for globalized forest	CIFOR (RD 5), <b>ICRAF (GRP 6.3)</b> IFPRI Subtheme 3.2
	Output 2: Analysis of governance options to optimize the economic, social and environmental impacts of major trends in forestry	
	Output 3: Analysis of the forest/agroforestry transitions at landscape scale and the options at international and national level to modify the drivers and the non-linear baselines of change	
Project (2.3) on <b>fostering sustainable management of tropical production forest concessions.</b>		
	Output 1: Identification of efficient public policies and market-based instruments to improve the social and environmental footprints of harvesting from production forests	CIFOR (RD6)
	Output 2: Development of tools, methods and guidelines for better monitoring and management of tropical production forests	
	Output 3: Tools and methods to resolve conflicts about land use and resource rights in the use of tropical production forests	
Goal 3: To manage the risks posed by climate change		
Project (3.1) on <b>enhancing the role of forests and agroforestry in adaptation to climate change.</b>		

	Output 1: Identification of strategies for adapting forest and tree management to the context of climate change, through diversity for risk reduction and directional change aligned with local climate change scenarios	CIFOR (RD 2) ICRAF (GRP 5.1 and 6)
	Output 2: Identification of roles and potentials of forests and trees to contribute to reduced human vulnerability	
Project (3.2) on <i>enhancing the potential of forests and agroforestry for mitigating climate change.</i>		
	Output 1: Improved procedures and practices for estimating and managing carbon stocks of tropical landscapes	CIFOR (RD 1) ICRAF (GRP 5.2 and 6)
	Output 2: Identification of policy approaches, governance conditions, and payment mechanisms that lead to effective implementation of national REDD and agroforestry sequestration schemes	
	Output 3: Identification of political economic barriers that are likely to limit the pursuit of global REDD and afforestation/reforestation regimes	

### 3. Building partnerships (strategic goal 2)

#### 3.1. Progress on 2009 in partnerships

2009 was the first year for the implementation of the new partnerships strategy. Our primary goal was for all staff to better understand and embrace partnering as a way of doing WorldAgroforestry business. This was achieved through two approaches:

The first approach was to gather information on the partnership arrangements and partners for each of WorldAgroforestry's six regions (Amazon Initiative included). The information was used to generate a database which is able to provide useful support to all staff, especially on (but not limited to):

- Partner information, including address, contact persons.
- The number and type of partnerships we have, by region and GRP
- Partners involved in the various stages of the value chain – from needs analysis, technology development, testing of interventions, adoption, implementation of projects, to monitoring and evaluation/impact.
- Existing project-based partnerships, their duration and the substance of collaboration, expiry.
- All the activities carried out by a partner in collaboration with WorldAgroforestry.
- Available experts in various fields (e.g. forestry, ecology, climate change, marketing etc.)

The searchable database has been uploaded into the intranet and is accessible to all staff. The Partnership Office's administrator is the curator. The development of the database was in itself an excellent example of collaboration between the Partnerships Office, the Research Methods Group, the Information and Communications Unit, Contracts and Grants Office (DDG) and the Resource Mobilization staff. It is now available as a tool for managing and monitoring partnerships and grants, and to provide useful contacts for staff. The database has simplified monitoring of partnerships at WorldAgroforestry thus minimizing risks and improving efficiency. Through the database, accurate information is now available to Senior Leadership and the Board of Trustees. Reports can be developed from it.

The second strategy was to link partnering with resource mobilization; in vogue with current funding trends which are targeted at regional and national institutions. Within the office of the Director General, the responsibilities were rationalized to ensure efficient coordination of donor intelligence, rapport, partnering, resource mobilization and reporting. New funding proposals are being scrutinized to ensure that opportunities to work with national and regional partners as well as ARIs are fully exploited.

Further, tangible progress was made on the following:

- **China – Africa research collaboration** – WorldAgroforestry will serve as a platform for the communication and implementation of activities once the partnership becomes operational.
- **German Academic Exchange Programme (DAAD)** a concept note for a joint proposal involving 4 German Universities, African Universities and WorldAgroforestry was submitted.
- **African Forest Forum** – this forum whose secretariat is hosted at WorldAgroforestry is active in many policy and institutional reforms. It is joining hands with WorldAgroforestry in the area of policy innovations.
- **ANAFE** – There are promising opportunities to expand WorldAgroforestry's work with national African Universities.

- **FONASO** – This EU funded programme within the Erasmus Mundus Scholarships arrangements will involve PhD students doing thesis research. WorldAgroforestry has joined the European university partners in this effort.
- **India-Africa Partnership** – due to some political changes following recent election in India, activities under this partnership slowed down as resources could not be released.

### 3.1.1. Strengthening Regions

The East Africa Region was identified as needing special attention. Following intensive scrutiny and communication with partners, the following gains were made:

- **ASARECA** – Preliminary partnering contacts were made.
- **Kenya** – Partnership activities with KARI and KEFRI were revitalized. The two partners played key roles in the 2<sup>nd</sup> WCA, especially in the field trips and in posters.
- **Uganda** – WorldAgroforestry office moved from a separate location to being hosted by NARO
- **Rwanda** – New arrangements were made for WorldAgroforestry to be hosted by the Institute for Scientific and Technological Research (ISTR)
- **Ethiopia** – A Roundtable was supported jointly by WorldAgroforestry and CIFOR to identify priority research in Agroforestry and woodlots.

More work is underway to enable greater partnership among the countries in the region. In WCA, new arrangements were made in Burkina Faso, where national scientists were formally seconded to WorldAgroforestry. The new arrangement was found to be compatible with the national system. WorldAgroforestry also initiated discussions on intensive collaboration with CORAF.

In all WorldAgroforestry regional and GRP outlooks the Partnerships Office contributed towards the text on partnerships. The Amazon Initiative, S. Asia and SE-Asia regions continued to excel in their partnership arrangements.

### 3.1.2. New initiatives

- **Meso America** – Contacts were initiated with CATIE in which it was agreed to collaborate on coffee and cocoa research. GRP2 will lead the effort. CATIE's work in Meso America (e.g. Silvo-pastoral systems) will be better communicated in WorldAgroforestry media; and linked to the Amazon Initiative where appropriate. WorldAgroforestry and CATIE co hosted two sessions and the World Forestry Congress in Buenos Aires, Argentina, 19-24 October 2009.
- **Intensifying collaboration with CIRAD, IRD and INRA** – A preparatory meeting was held with these French institutions and it was agreed to intensify our collaboration. Work will start with shade coffee research in Eastern Africa, and may extend to WCA. Recognition was given to current collaboration with CIRAD in SE Asia.
- **The University of Dublin (Ireland)** – established a PhD level collaborative programme with WorldAgroforestry, with funding from Irish Aid.
- **An informal forum dubbed the Nairobi Science-Policy forum** – was jointly initiated by WorldAgroforestry, ILRI, UNEP, RF, and AGRA. It is expected to grow into an arrangement for achieving good communication and better utilization of science for agricultural development.

### **3.1.3. International links**

- WorldAgroforestry continued to work with FAO, IUFRO, CPF, UNFF, UNFCCC, UNEP, UNCCD and CIFOR and participated in COPs to advance the tree, livelihood and environmental agenda.
- WorldAgroforestry also worked with regional institutions particularly COMESA, NEPAD, FARA, ASARECA, CORAF and CATIE to advance Agroforestry in regional agenda. The work with COMESA was particularly significant as WorldAgroforestry was contracted to build capacity for 21 countries involved in the climate change negotiations in Copenhagen, December 2009.

### **3.2. Plans for 2010 in creating new and maintaining existing partnerships**

Our goal is to sustain the achievements and enhance strategic links. The following activities will be undertaken:

- Operationalizing the India-Africa and China-Africa initiatives, with concrete activities and results.
- Consolidating cooperation with regional partners, particularly CATIE, NEPAD/AU, FARA, CORAF, ASARECA, AGRA and SADC/FANR, particularly in context of expected CGIAR changes.
- Extending and updating the partnerships database to improve its content and utility.
- Supporting SEANAFE to secure a new grant and transform into several national networks with a regional coordination mechanism.
- Making inputs into the CGIAR change process particularly regarding GCARD (March 2010) and partnership forums and operational modes.
- Strengthening resource mobilization to enliven partnerships, especially for Ethiopia, Rwanda, Tanzania, Meso America, and the WCA region.
- Reviewing and strengthening partnering efforts in S Africa, particularly with the emerging sub-regional research body (CARDESA - Council for Agricultural Research and Development for Southern Africa)
- Overall strengthening of WorldAgroforestry's partnership management including monitoring, evaluation and reporting.
- Steering the Nairobi Science – Policy Forum towards concrete outputs and outcomes.
- CGIAR Partnership discussions - During the year, WorldAgroforestry will continue to participate fully in the electronic discussions on partnerships. In February 2010, WorldAgroforestry will co-host with ILRI the Partnerships Forum which is expected to produce recommendations for the whole CGIAR consortium.

## 4. Increasing operational efficiency (strategic goal 3)

### 4.1. Policy Overhaul Process

The SLT decided to review and if necessary revise all WorldAgroforestry's policies in light of: (i) our new strategy and structure; (ii) outdated approaches in some cases; and (iii) the impending Consortium. As it is the Board who approve Centre Policies we are attempting to limit board policies *per se* to documents on substantive issues that:

1. Indicate our intent and principles
2. Provide legal protection or reference
3. Explain logic to staff to help in understanding
4. Promote the centre values and positions externally
5. Are generic for HQ and regions

As required these can then be backed up by supporting documents – broadly, guidelines - which enforce, reinforce or promulgate the relevant Board Policy, and where information may change more frequently, and which Centre Management can handle without reference to the BoT. These may be:

- Policy Guidelines
- Tools
- Practices
- Manuals
- Protocols

As part of the overhaul process, a listing of the centre's policies was drawn together. The DG is responsible overall, and Board Policies and guidelines are divided into five policy series each under a Director:

1. General – DG – includes the BoT manual, partnerships, risk management, etc.
2. Communications and ICT – DCO- individual learning, ICT guidelines
3. Financial and Operational – DFO – Investment, budget finance, etc.
4. Human Resources – DDG – HR manual, staff guidelines, etc.
5. Research – DDG – Research Quality, grants, ethics, IP, genetic resources, etc.

Within each series, the Director responsible may delegate responsibility for maintaining and monitoring the policy to other staff members as appropriate. The overall monitoring system approved by the SLT requires that that person reports on the status of the policy or guideline to the Director on an annual basis and thence each policy series is reported to the SLT.

The list of policies has been discussed extensively with ILRI, as part of ongoing due diligence with other centres, and also linked to the shared services approach with ILRI. A number of policies under revision are joint ones with ILRI and this makes additional sense where the person monitoring the policy or guideline is a shared staff member – as is the case with ICT guidelines and some research policies. We further recognize that the CG Consortium is also likely to standardized policy guidelines in the future which centres will adopt or modify if necessary.

The policy overhaul process and accompanying guidelines is ongoing, with a number already revised and passed by the SLT, some under revision, and some earmarked for future revision, and it is our intention to present the revised draft Board Policies to the BoT in 2010.



## 4.2. New Policy Revisions

As explained above, the process of revising all WorldAgroforestry Board Policies and related guidelines is ongoing. The following have been revised since April 2009:

**Board Policies** - to this November BoT for approval

- General Series - Manual for Board of Trustees
- Financial and Operational Series - Investment Policy

**Guidelines** – approved by the SLT since April this year

- HR Series - Revision to Educational Allowance for Nationally Recruited Staff in Nairobi
- Procedures for Seconded Associate Scientists
- Policy and Procedures on the Engagement of Consultants
- Research Series - Donor Reporting Guidelines

## 4.3. Business Process Integration

### 4.3.1 Overview

Different units at WorldAgroforestry are working together to improve operational efficiency by streamlining the movement of information between systems residing within the organization through the identification of commonalities in processes managed by each unit. This has been necessitated by the generation of duplicate data by the different units from their own independent business processes resulting in the lack of data integrity as it is difficult to identify which unit has the most recently updated data. It also results in increased costs for vendor licenses and maintenance fees for various information systems due to similar systems being created in different units or even regions.

### 4.3.2. Current Status

Several financial and administrative business processes span across various units within the four directorates. The ICT team has been at the core in giving guidance on the best systems in the market to procure based on the current technology platform and compatibility with existing systems.

The major financial and administrative processes in place include:

- Financial Management
- Fixed Assets Management
- Procurement
- Travel Management
- Payroll
- Human Resources Management
- Grant Management
- Medium Term Plan Management
- Partnerships Management
- Donor Contacts and Intelligence Management
- Proposal Development Management
- Publications Management

The different units work together to identify areas where there are processes sharing common data. They further identify opportunities to leverage existing business processes and technology across units as well as look for opportunities to build new shared business processes or technology to improve on the existing ones. This ensures the efficient allocation of common resources and skills across the shared efforts. The integration efforts have also resulted in increased data integrity and accountability as well as increased communication amongst the units.

Staff are now shielded from the complex relations of the various systems and are provided with a user-friendly web enabled set of information which is accessible through the centre's intranet site.

[Table 4.3.1](#) shows the currently integrated processes and systems.

#### **4.3.3 Plans for 2010**

In 2010, various units will continue working together to identify opportunities to leverage existing business processes and technology as well as identify opportunities for new ones.

Key to note is that a Travel Authorization Module will be launched in 2010 as part of the Travel Management System and this will enable staff and supervisors to apply and authorize travel online. This module will be integrated with the Travel Expense Claim module currently running as a stand alone module in the system.

Currently staff apply for their leave and access payroll information from two different systems. Plans are underway to integrate the HR4U and Per Pay systems such that staff use the HR4U system to access all their staff data including payroll information.

The development of a Proposals Database is currently underway to management the proposal development process. It is anticipated that the system will be ready for testing by December 2009 and launched in January 2010. It will then be integrated with the GMIS and HR4U systems during the first quarter of 2010.

The Partnerships Database is also currently being tested and will be launched by December 2009. The system will be integrated with the HR4U system, the GMIS and the Contacts Database.

The Publications Database is also scheduled to be integrated with the HR4U system in 2010 for the retrieval of staff names.

The Contact Management System currently being developed by both the DG's Office and will be integrated with the Grants Management, Proposal Development Management and Partnerships Database Systems.

[Table 4.3.1](#) reflects 2010 plans for further integration.

The understanding and documentation of the integration of these various processes and systems is a key component in the development of the Business Continuity Plan which is currently a draft document awaiting approval for implementation. This will enable the ICT Unit to efficiently plan for backup and disaster recovery in case of any eventualities.

**Table 4.3.1: Overview of Business Process Integration (Current and Planned in 2010)**

Business Operational Processes	Information System	Unit Managing Process and System	Current integrated processes/systems	Planned Integration in 2010
<b>Director of Finance and Operations</b>				
1 <b>Fixed Assets Management</b>	Fixed Assets System <i>(New system currently being tested and set to be launched by December 2009)</i>	FSU	<u>Retrieves data from:</u> <ul style="list-style-type: none"> <li>○ <i>HR4U</i>: Retrieves staff names.</li> <li>○ <i>Sun Systems</i>: Retrieves data on capital equipment.</li> </ul>	
2 <b>Procurement Management</b>	Procurement System	Procurement Office	<u>Retrieves data from:</u> <ul style="list-style-type: none"> <li>○ <i>HR4U</i>: Retrieves names of staff related to each grant.</li> <li>○ <i>Sun Systems</i>: Analyses grant expenditure.</li> </ul>	
3 <b>Travel Management</b>	Travel Management System	Travel Office	<u>Retrieves data from:</u> <ul style="list-style-type: none"> <li>○ <i>HR4U</i>: Retrieves staff names</li> <li>○ <i>Sun Systems</i>: Retrieves budget information for Travel Authorization</li> </ul>	Travel Authorization Module will be integrated. It will provide data to: <ul style="list-style-type: none"> <li>○ <i>Sun Systems</i>: Update with Travel Expense Claims</li> </ul>
<b>Deputy Director General</b>				
4 <b>Human Resource Management</b>	HR4U System	HRU	<u>Provides data to:</u> <ul style="list-style-type: none"> <li>○ Procurement System</li> <li>○ Grants Management Information System (GMIS)</li> <li>○ Fixed Assets System</li> </ul>	It will be integrated with: <ul style="list-style-type: none"> <li>○ Per Pay System to retrieve Payroll related data.</li> <li>○ Intranet staff list and staff directory – Once formatting and presentation issues are ironed out, then staff list will then also be published on WorldAgroforestry's website</li> <li>○ ICT Active directory (AD i.e. network accounts) and Outlook address book. E.g. when staff contact, title, location or contract date details are amended on HR4U, they automatically update the AD</li> </ul>
5 <b>Payroll Management</b>	Per Pay System	HRU/FSU	This is currently a stand alone system.	<u>Provision of data to:</u> <ul style="list-style-type: none"> <li>○ HR4U</li> </ul>

6	<b>Grant Management</b>	Grants Management Information System (GMIS)	CGO/FSU	<u>Retrieves data from:</u> <ul style="list-style-type: none"> <li>○ <i>HR4U</i>: Retrieves names of staff related to each grant.</li> <li>○ <i>POWB</i>: Used for budget preparation.</li> <li>○ <i>Sun Systems</i>: Analyses grant expenditure.</li> </ul> <u>Provides data to:</u> <ul style="list-style-type: none"> <li>○ Partnerships Database</li> </ul>	<u>Will retrieve data from:</u> <ul style="list-style-type: none"> <li>○ <i>Proposals database</i>: To give history of grant</li> <li>○ <i>Contacts database</i>: To retrieve donor contacts.</li> </ul> <u>Will provide data to:</u> <ul style="list-style-type: none"> <li>○ <i>Proposals database</i>: To show follow up to successful proposals.</li> <li>○ <i>CGIAR East and Southern Africa Map</i>: Gives brief synopsis of WorldAgroforestry grants running in the ESA region.</li> </ul>
7	<b>Medium Term Plan Development</b>	EasyMTP and Online MTP Financial System	CGO/FSU	These are stand alone systems which are integrated to create the CGMap system from which Centre MTPs can be accessed via internet.	There are plans to further upgrade the system at the CG level.
<b>Director General</b>					
8	<b>Donor Contacts and Intelligence Management</b>	Contacts Database	Director General's Office	This system is currently being tested.	<u>Provides data to:</u> <ul style="list-style-type: none"> <li>○ <i>GMIS</i>: To extract donor contact information for each grant.</li> <li>○ Partnerships Database</li> </ul>
9	<b>Partnerships Management</b>	Partnerships Database <i>(new system currently being tested and set to be launched in 2009)</i>	Partnerships Office	<u>Retrieves data from:</u> <ul style="list-style-type: none"> <li>○ <i>HR4U</i>: Provides staff names</li> <li>○ <i>GMIS</i>: Provides project related data</li> <li>○ <i>Contacts database</i>: Provides information on donor contacts</li> </ul>	
10	<b>Proposals Management</b>	Proposals Database <i>(new system to be launched by January 2010)</i>	Project Development Office		<u>Provision of data to:</u> <ul style="list-style-type: none"> <li>○ <i>GMIS</i></li> </ul> <u>Retrieval of data from:</u> <ul style="list-style-type: none"> <li>○ <i>HR4U</i>: Provides staff names</li> <li>○ <i>GMIS</i>: Provides project related data</li> </ul>
<b>Director of Communications</b>					
11	<b>Publications Management</b>	Publications Database	Library	<u>Retrieves data from:</u> <ul style="list-style-type: none"> <li>○ <i>Southeast Asia Region publications database</i>: Downloads updates from SEA database.</li> </ul>	<u>Will retrieve data from:</u> <i>HR4U</i> : For retrieval of staff names

## **4.4. Regional Management Indicators and Outlooks**

### **4.4.1. Management Indicators**

We are in the process of developing regional management indicators in line with our strategic goal of improving operational efficiency, as part of the process of monitoring the operational and scientific research 'health' of the regions and country offices. These, we believe, will both assist headquarters to monitor the regions, and the regions themselves to monitor their 'health' and also individual country offices. We are aiming to use these indicators as ways of monitoring both improving and declining trends of performance. As 'early warning' tools they may ring an 'alarm bell' where problems appear to be developing and so that management can analyze the situation more closely and recommend necessary actions; this will also hopefully help minimize some of the 'pain' experienced in the recent past. We also intend to use it for monitoring indicators of success in a consistent objective manner.

From the analysis and discussion of a long-list of possible indicators, including the CGIAR Centre Performance Indicators, a shorter list of initial indicators is in the process of being defined. These fall into two groups: those that it is either possible to 'system-generate' or that are easy for regions to report on a quarterly basis, and those that involve greater preparation and analysis or are otherwise only practicable to monitor on an annual basis. The short-list of indicators has also been selected on the basis of those that result from routine and regular processes carried out by the regions already and therefore do not constitute a heavy additional operational burden. The indicators will be first reported to the BoT in April 2010 to allow preparation of 2009 annual regional figures. They include:

1. Unfunded Staff – probably for staff of C2 and above, disaggregated into scientific and non-scientific staff and inline with funding trends in 2 below and expressed in person-months and US\$.  
Current staff threatened by reducing funding in the future, and  
Future staff for which positions have been created on a funding-dependent basis.
2. Funding – an analysis from the present quarter, of trends 18 months to 36 months in the future based funds received and on highly probable proposals submitted, to give amounts of probable core vs. restricted funding
3. Budget expended year to date, percentage and amount.
4. The number of un-actioned audit recommendations in the present quarter greater than 6 months old
5. The value of all infrastructure, capital, equipment and materials - based upon the annual valuation for insurance purposes (rather than book values). This effectively will be a detailed annual report also indicating the age and operational state of cars and computers, for example. This will be rolled-out late this year.
6. Numbers and percentage of scientific papers that are published annually with developing country partners in refereed journals, conference and workshop proceedings (CGIAR 4C)
7. Numbers of peer reviewed publications annually per scientist (CGIAR 4A & 4B) per US dollar.
8. The number of training-days annually per staff member grade C3 and above, by staff category, and by scientific and non-scientific staff.

These will be further defined and refined as the process rolls out in early 2010 in an iterative process.

#### **4.4.2. Regional Outlooks**

In April 2009, the BoT requested a review of our regional operations. We reviewed the previous Regional Operational Plans, and decided to develop a new format for Regional Outlooks which would be of greater utility for the staff of the regions, and which could, amongst other factors:

- Indicate how regions will implement our new strategy
- Show how regions integrate work on GRPs to provide local, national and regional context
- Assist in resource mobilization
- Recognize and attract regional partners
- Anticipate staffing and other resource needs in the coming five years
- Acknowledge existing achievements, and forecast future achievements and impact
- Promote cross-regional learning, studies and syntheses
- Better connect all staff in that region, other regions and HQ
- Flag risks, concerns, opportunities
- Update our thinking with the new CGIAR Consortium being created

A number of discussions were held, and HQ and the regions developed a standard format, drawing on the GRP Outlooks and the previous ROP. The draft Regional Outlooks were developed in a consultative manner and a number of planning meetings held in the regions. They were presented at the post-Congress Science Week by the Regional Coordinators and used in the resource allocation process for 2010 and for the 2010 planning processes during the Management Team Meeting, and then revised based on feedback received. One relevant finding of those meetings is that with their current content, the Regional Outlooks are suitable only for internal circulation; publication of them for external circulation would require a slightly more formalized content.

##### **4.4.2.1. East Africa**

EA is working closely with all GRPs on research for development to improve agro-ecosystem productivity and maintain healthy ecosystems through use of agroforestry and NRM innovations. There are many exciting new opportunities in responding to the multiple challenges the region is facing; these include agricultural expansion into forests and marginal areas, increasing climate variability and change, poor agricultural practices, and impaired ecosystems to mention but a few. The transitional aspects of our new strategy continued to have effects on funding and staffing into the year, but a revitalization programme began in 2009 aiming to build a coherent, well-regarded regional programme in line with the WorldAgroforestry vision and mission.

The regional budget will remain a little under \$3 million in 2010, a stable level from which growth is anticipated. The majority of present restricted funding (currently covering 24 projects) is from AUSAID, IDRC, Netherlands, Italy, EU, Japan, Germany, Heifer International, and UNDP. The main flagship projects for the EA programme are the Integrated Natural Resource Management (INRM), Landcare, Rainwater Harvesting, and Bioenergy. Our strengths - in ecosystems services and environmental management, agroforestry watershed functions, rainwater harvesting, coffee agroforestry systems, and Conservation Agriculture With Trees (CAWT) – are well established, and a number of projects begun in 2009 extend from these: ReACCT on climate change in Tanzania, the Clinton Climate Change Initiative, and the Carbon Benefits Project on measurement of smallholder carbon which also links to the last phase of the Western Kenya Integrated Ecosystem Management Project (WKIEMP). New projects starting now include the Integrated Catchment Management of the Lake Tanganyika Basin in Burundi (GEF \$570,000), Sustainable Land Management in Rwanda (RADA \$213,000; Concern Worldwide \$321,000).

Large longer-term projects proposals ( $\geq$  \$1 million,  $\geq$  4 years) are being developed aiming to ensure economies of scale, stability in staffing, and enhanced research outputs. These include Conservation

Agriculture with Trees (CAWT) to SIDA and NORAD, Institutional Strengthening for Sustainable NRM to IFAD, Evaluation and documentation of rainwater harvesting to the EU, Retention, Recharge and Reuse of rain water to the Netherlands MFS 2 and Enhancing soil health and assessing functions and resilience of dryland ecosystems to UNEP. Overall 6 projects are being developed for 2010 – 2013. The main areas of focus for the region in the next 4 years include:

- Collective action and institutional strengthening for enhanced uptake of agroforestry technologies;
- Improved (rain)water use efficiency for increased production of agroforestry systems;
- Bio-energy and greater efficiency of use of fuelwood to mitigate forest destruction;
- Research on mitigation and adaptation options for climate change from agro-ecosystems;
- Scaling up CAWT for increased productivity and improved landscapes; and
- Research on afforestation /deforestation systems.

In terms of staffing, there are currently 24 staff, mostly at HQ, but also spread across offices in Western Kenya, Uganda, Tanzania, and Rwanda (where WorldAgroforestry's profile is rising). Most of them are research assistants working under GRP projects, and the majority of scientific staff are biophysical scientists; women make up 1/3 of staff overall and the majority of post-docs. Four junior scientists (Agroforester, social scientist, soil and water, environmental engineer), 1 female post doc (Forrester), a senior administrator and an Assistant Accountant joined the programme during 2009. There is a need for greater capacity across a range of research expertise to address emerging agroforestry research and development needs, capacity in communicating research results, and a need to retain experienced scientists. Specifically these gaps presently include a NRM specialist for Rwanda, and an anthropologist working with GRP 6 on landscape impacts. Other needs include a coffee-systems agroforester, a GIS analyst in water management, an irrigation agronomist, and a research methods specialist.

Opportunities for agroforestry research and development in EA are increasing, due to improved awareness by governments and civil society of the importance of trees in poverty alleviation and improved environmental sustainability, an increasing donor focus on agriculture in Africa, and the need to build smallholders' capacity in climate change adaptation and mitigation.

#### **4.4.2.2. Southern Africa**

The Southern Africa regional programme is coordinated from Malawi with work going on in Mozambique, Tanzania, Zambia and Zimbabwe. The focus of the regional programme is addressing third generation research questions, facilitating and building synergy among stakeholders for a more coordinated and systematic application of agroforestry science to achieve accelerated impact on smallholder farmers. This is done by forging strategic partnerships with national and international institutions, and development agencies, through research, training and capacity building and ensuring quality germplasm supply.

The refreshed strategy of the region has been aligned with the global strategy, dove-tailing the essentials of each of the Global Research Priorities, and is based on addressing the fundamental regional problems of food insecurity, poverty and income security, deforestation, land degradation, and the effects of climate change. The strategic objective of WorldAgroforestry-SA is to generate agroforestry knowledge and foster its use and impact on smallholder farmers and environment.

From less than 1 million USD in 2007, the region reached a budget of 2.5 million in 2009, and plans to reach 3.5 million per annum by 2012. Important current donors and projects include – notably the Food Security project funded by Irish Aid in Malawi, Protracted Relief Project funded by DFID in Zimbabwe, Sustainable Land Management in Malawi and Tanzania funded by GEF/UNDP,

Community Agroforestry Tree Seeds project in Malawi and Mozambique funded by Flemish Government; others include BMZ funded project on Biofuel value chain in Tanzania, and globally funded projects by the EU on germplasm and domestication, and policy work in the region. The staff strength increased from 20 persons in 2007 to nearly 30 currently (including a few temporary staff and consultants). It is hoped that new positions will be filled as the region increases its resource mobilization portfolio in the coming years, and intends to attract expertise from South Asia to facilitate knowledge exchange. In terms of scientific achievement, the number of peer reviewed articles per scientist from the region topped the list of publishers in WorldAgroforestry in 2007 and 2008. On invitation of the USAID Administrative General, WorldAgroforestry-SA Regional Coordinator was invited among three international experts to speak at the United National General Assembly side event at New York, on “Innovative Solutions linking Food Security and Climate Change,” during 24<sup>th</sup> October, thereby providing an excellent opportunity to showcase the centre’s work on fertilizer trees to the world and donor community at this high profile event.

The region has been engaging very proactively with the national governments and the development community especially in the last three years, such that impact on livelihoods is becoming more substantial and increasing. Based on our experience with the research, development and scaling up of agroforestry in southern Africa, some important lessons have been learnt. The biophysical performance of fertilizer tree fallow systems is vital but on its own, just as many proven innovations, may be insufficient to guarantee massive uptake of the technology by smallholder farmers without promotion. The extent to which local and national policy-making processes accept and institutionalize agroforestry play an important role for the sustained adoption of agroforestry. There is a major opportunity for us to facilitate the process of institutionalizing AF through an evidence-based research, with sound science supporting impact at scale.

WorldAgroforestry-SA has witnessed both extremes of ease and austerity in funding and staffing in the recent past. The greatest challenge we face is limited financial resources with which to accomplish greater impact. However, new opportunities are opening up from new and non-traditional funding sources, including interests in Conservation Agriculture with Trees (CAWT) and climate change (Norway), Carbon sequestration and biofuels (Belgium), and sustainable food security (Ireland), and linking food with the environment (GEF, World Bank, USAID, DFID). These opportunities will warrant some adaptation of strategies and approaches, and in how we market our work, so that we continue to be relevant to the R4D agenda of the countries where we work in the region. Our stronger partnerships: with NEPAD, COMESA, FARPAN, and national governments - brightens the prospect of accelerating the resource mobilization process.

#### **4.4.2.3. West and Central Africa**

WorldAgroforestry-WCA is now fully integrated and headquartered in Yaoundé, Cameroon, covering 25 countries and comprised of three nodes reflecting distinct agro-ecological zones: the Sahel Node from Bamako, Mali; the Humid Tropics Node from Yaoundé, and the emerging coastal-savannah Upper Guinea Node from Conakry, Guinea. Integration was supported by the maintenance of an appreciable level of funding, mobilized from a diverse group of donors including Belgian Cooperation (DGDC), CFC, EU, IDRC, IFAD, RRI, UNEP/GEF, USAID and USDA. Key partners include universities and related networks (ANAFE, AAU), and regional bodies including CORAF, COMIFAC, ECOWAS, and ECCAS.

Mostly smallholder farmers rely on rain-fed production systems and natural/traditional methods of soil fertility maintenance, with limited access to markets. There is significant potential both to intensify and diversify productivity with agro-forestry as a prime delivery mechanism of multi-functional agriculture for both food and export markets. WorldAgroforestry-WCA is known for Participatory Tree Domestication (PTD), an innovative approach developed with partners to select and multiply high-value and lesser-known indigenous trees for fruits, medicines and wood products.



Research activities were carried out under all GRPs, though focus has in the past been more on GRPs 1, 2 and 3, as illustrated by the selection of co-leaders for GRP 1 and 2 from the WCA region, and the recognition that the base of the GRP 3 team is made up of scientists in the region. There are 11 key scientific staff at present, and there is a need to diversify both in terms of gender, and in GRPs 4, 5, & 6 in order to respond to the needs and opportunities of the region.

There are presently 15 ongoing projects in the region, funded by the donors listed above, plus the Rockefeller Foundation, DFID, Government of Finland, ACDI, African Development Bank, Islamic Development Bank, and the Bill and Melinda Gates Foundation, and contributing towards an annual budget just over \$3 million.

AF research needs to contribute towards the generation of strategies, technologies, practices and policies, to help meet objectives of poverty reduction, increased agricultural and forest production, and environmental sustainability. The challenges posed by climate change, and the need to increase the productivity and sustainability of agroforestry systems offers an opportunity for WCA scientists from all six GRPs to develop a concerted, multi-functional agricultural research/development approach that helps poor rural communities to adapt to climate change including NR, watershed management, and improved water-use efficiency - with links to WorldAgroforestry experience in SEA and EA. Further priority regional projects will include increasing economic assets through agroforestry (environmental services, certification mechanisms, and land tenure), and scaling up PTD in a package delivering multi-functional agriculture.

There are many opportunities for the further development of agroforestry science in the region. Hosting the Congo Basin Forests (the second largest continuous forest in the world after the Amazonia forest), many believe that considerable attention should be given to this region in order to address global environmental issues such as climate change, conservation of biodiversity and combating desertification.

#### **4.4.2.4. Amazon Initiative**

WorldAgroforestry-LA, approaching the completion of its second decade, has re-emerged from a period in which its activities were implemented only by two scientists; total staffing is now at 10 persons of whom 6 are scientists including 2 women. During its long transition phase, while maintaining tree domestication activities in Peru, WorldAgroforestry invested in the structuring of the AI platform for regional partnerships, which has been set with human and social capital suitable for the implementation of collaborative research. Significant increases in the regional budget occurred in 2008-2009, when restricted funds fundraised regionally increased four fold, and now represent more than two thirds of a budget that has reached the \$1 million mark. This suggests that it is time to consider the development of a new strategy for the centre's operations in the years to come.

The Regional Outlook provides elements to assess recent developments and reflect about the next steps for the continuity of WorldAgroforestry activities in Latin America, and more specifically, in the Amazon region. It summarizes recent programmatic, administrative and financial developments of the centre in the region. Moreover, the outlook suggests the reassessment of 2006 decisions resulting from WorldAgroforestry's EPMR and related Program Office assessments that have downgraded the regional presence.

Within Latin America, the Amazon region poses several challenges. It contributes to global climate change and will become its victim. Human poverty is linked to undeveloped market chains; insufficient financial mechanisms for the poor; conflicts over resource access; and weak policy foundations. The Amazon basin including its Andean catchments is rich in globally valued ecosystem services (ES) and probably at a comparative advantage in providing these at low costs. However, very

few tangible benefits resulted so far for poor smallholders and indigenous inhabitants. Part of the reason lies in the unequal distribution of land and in the lack of well-defined land-tenure, a frequent requirement to channel indirect benefits of global ES. That said, the Regional Outlook indicates strategic entry points for greater integration of WorldAgroforestry's science in the Amazon and with the recently created CGIAR Amazon Eco-regional Program, through the GRPs' agenda..

Except for GRP1, which benefits from a long-term regional engagement with WorldAgroforestry's broader Tree Domestication research agenda, activities and achievements in the other GRPs still need greater engagement: in part this has been due to HR, time, and administrative constraints, language barriers, and a need to harmonise AI and WorldAgroforestry research priorities. Work currently being implemented through a World Bank grant in the interface of Amazon livelihoods, environment, and governance can significantly contribute to a revitalized livelihoods' agenda for the centre, providing greater links among GRPs 2, 5 and 6. This will be particularly relevant when accessing the high-carbon stock and high-biodiversity potentials of key agroforestry systems in the region: cocoa and coffee-based multi-storey; silvopastoral; palm-based systems; traditional home-gardens; as well as the continued need to provide alternatives to slash-and-burn.

A reinvigorated regional collaboration between the ASB program and the AI will be one of the pillars for such integration, with a focus on agroforestry contributions to climate change adaptation and mitigation. A stronger AI-ASB collaboration will position WorldAgroforestry well to respond to the forthcoming UK call for a £35 million global Ecosystem Services and Poverty Alleviation programme, which features the Amazon as one of the priority areas. The integration of socioeconomic data at community level and available regional spatial data on deforestation and land degradation can enhance and validate to broader socio-environmental contexts the tools and methodologies currently developed by GRP4. Finally, the strong and active social and grassroots organizations that operate in the region can strengthen GRP3 approach of fostering partnerships for greater integration in the market, in particular when considering regionally relevant issues of benefit-sharing from the traditional knowledge related to private companies' access to genetic resources.

The AI inter-centre concept still remains as a valid approach furthering sustainable land-use systems. WorldAgroforestry's greater contributions for the AI inter-centre are in understanding and fostering mechanisms for an enhanced role of trees in the provision of environmental services and for local livelihoods, promoting the use of such knowledge in ways that benefit the rural poor while safeguarding or improving the environment. The progress evidenced in the past two years should be seen as achievements to capitalise on for further expansion in the delivery of international public goods by a team that needs sufficient critical mass to fully engage with WorldAgroforestry GRPs and the entire research agenda of the centre, reflecting countries', regional and global priorities.

#### **4.4.2.5. South East Asia**

Southeast Asia (SEA) is diverse at all fronts – geographically, biologically, socially, and politically. While the region has witnessed dramatic economic progress, growth is unequal between and within countries. Large proportions of rural people depend on forest and tree resources; environmental deterioration remains a major challenge. The situation is further exacerbated by inconsistent or contradictory policies and conflicts over rights of use and access to natural resources that contribute to unsustainable management and poverty in the uplands and forest margins. Such issues play a major role in the WorldAgroforestry agenda. From the regional planning meeting in Kunming in May 2009, three research priorities were identified for 2009-2012: (i) climate change mitigation and adaptation through AF, including biofuels; (ii) climate-biodiversity-rural livelihoods; and (iii) ecosystem functions and services.

Climate change is a present reality in Southeast Asia. The prediction is that it will get worse and that it will hinder pursuit of sustainable development and the eradication of poverty. Smallholder and

subsistence farmers are especially vulnerable to the impact of climate change. The search for effective and efficient ways to reduce the speed and impact of climate change, and strategies to deal with inevitable aspects of climate change remains high in the agenda of SE Asian countries as well as of WorldAgroforestry SEA. The new focus on climate is reflective of the comparative advantage of the WorldAgroforestry SEA as well as for potential synergies between the offices and our partners. However, addressing climate issues are seen in conjunction with other long standing priorities pertaining to biodiversity, livelihoods, and productive and profitable agroforestry, with the continued relevance of the broader complete GRP agenda; WorldAgroforestry SEA will strive to have a balanced approach. To seize the synergy at SEA, the country offices have agreed to devote more collective efforts to work on regional/cross-country publications and proposal development.

WorldAgroforestry **Indonesia** currently focuses on agroforestry for farm productivity, agroforestry for environmental benefits and climate change. These themes address the archipelago's agricultural intensification, deforestation and land degradation, and the current debate on REDD. The priorities for the **Philippines** are on community-based natural resources management through the Landcare approach, improving farming and governance systems in the uplands, climate change mitigation and adaptation strategies, and rewards for environmental services. In the **Vietnam** case, the focus is on capacity building and partnerships emphasizing research on payments for environmental services, the role of trees on farm and landscapes, and agroforestry as a distinct entry point for climate change adaptation and mitigation strategies. **China** focuses research on the science bases of biodiversity and carbon assets, tradeoffs among different land use options, and national capacity development of the agriculture and forestry sectors. These activities address the country's environmental problems such as land degradation in dryland ecosystems, the effects of climate change, and deforestation. The **Thailand** office is currently in transition but in its last decade of research, it has focused on improving sustainable management of environmental services while also improving livelihoods of poor and marginalized upland households and communities in the context of three major ongoing transitions: demographic (aging, urbanizing), economic (restructuring, integrating, volatile), and environmental (water, biodiversity, energy, climate change mitigation & adaptation). The emphasis of our Chiang Mai-based operations will be to build on emerging cross-country partnership and networking relationships among key colleagues and institutions in the region by helping strengthen research, education, and information exchange.

Overall there are 110 WorldAgroforestry staff in SEA, with closer to gender parity at 45% female, 65% work on scientific and programmatic aspects. For the past 7 years, SEA funding levels have been stable at an average US\$5 million p.a. with 38 grants under management in 2009. The key country and bilateral donors have been the European Union, SIDA, CIDA, Germany, and IFAD from the international and multilateral agencies, and the Ford Foundation and the David and Lucile Packard Foundation from within the philanthropy sector. We are aiming to maintain this level, and will expect to increase once the resource mobilization activities pick up in the Philippines, Thailand and Vietnam while maintaining funding for Indonesia and China with potential increases. Conservative estimates are that the budget will increase to US\$5.5 million per annum.

SEA region including SW China collaborates with a range of partners and institutions at the national, regional and international level. The regional office has promoted and facilitated the Southeast Network of Agroforestry Education (SENAFE), and WorldAgroforestry was the nodal organization facilitating work on post-tsunami in Aceh along with the World Fish Center. To seize the synergy in the region, the SEARO will promote cross-country and transboundary activities banking on the institutional arrangement of country coordinators and GRP focal persons to anchor global priorities with empirical work on the ground. It will also continue to contribute and learn from other regions such as the IFAD funded PRESA project and also with the South Asia region in exploring REDD and climate change concerns. Furthermore, it is committed to promoting the emerging China Africa exchange initiative.

Given WorldAgroforestry SEA's long standing history in research on agroforestry, it is well poised to carry out effective consolidation of past work, linking this body of knowledge to potential partners and clients and at the same time exploring meaningful avenues to be engaged in the current discourse on climate change to ensure that agroforestry and tree based landscapes form a fundamental conduit to reducing poverty, enhancing livelihoods and environmental integrity.

#### **4.4.2.6. South Asia**

South Asia region comprises Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, and has 40% of the World's poor population. The five key strategic research issues in this region – defined as are those fundamental policy questions or critical challenges that are truly important for the survival, prosperity and effectiveness of WorldAgroforestry in South Asia; these relate to who we are, what we do, and why we do it – are: hunger, poverty, poor health, and environmental degradation; gender equality and women's empowerment; strategic applied and adaptive research; an ecosystems focus; and institutional strengthening.

In recent years, economic expansion, coupled with rapid population growth, has placed considerable pressure on the region's natural resources. Ironically, these same forces have also created opportunities for agroforestry practitioners to produce a range of high-value consumer products and support watershed protection and biodiversity conservation. Agroforestry is a traditional system throughout South Asia region and is recognized as an optimal multifunctional land use system that provides a variety of important benefits, and the only one that produces a variety of economically important products and global environmental services.

The region as a whole has considerable institutional strength in agroforestry, and the entire regional program is implemented through the national agricultural research systems (NARS), by drawing on the national capacity strengths in trained manpower, experience, infrastructure, facilities and other resources – and achieving significant cost-savings. Previous difficulties which had affected partner's confidence and enthusiasm resulting from poor consultation during the EPMR have been overcome, but the CG Reform process seems to be starting to affect national pledges.

Research is organized, within the context of both a Regional Agroforestry Alliance and bilateral agreements, according to agro-ecosystem-based, or a product/theme/mission-based consortia or networks. The program is built through a series of regional consultations with the key stakeholders, including the senior bureaucrats, donors, private sector and the civic bodies. The program is streamlined with the national agricultural priorities and focus in each of the member countries, and the regional priorities and specific activities have been articulated to fully match and fit in the expected output frame work of each of the GRPs reflected in the MTP. South Asian institutions are also involved in WorldAgroforestry global and multi CG-centre research initiatives including PRESA and ASB.

The program has made significant strides in its short lifespan of five years, as can be seen from an increased achievement of success indicators, including: recognition of agroforestry in strategic national planning documents, national and state budgetary allocations; recognition of agroforestry in the strategies, work plans, and budgets of research, development and education institutions; and increased number of refereed publications on agroforestry research and development; amongst others. South Asia region is unique as it represents a whole range of global agro-ecological situations, and ecologically connects well with all other WorldAgroforestry regions, building collaborative alliances between researchers, development practitioners and policy makers in South Asia and their counterparts in Africa, South East Asia and Latin America.

Confidence in high returns is encouraging the NARS in the region, donors, HQ, and the GRPs, to make increased investment of resources in South Asia. The region has an assured budget of over \$1.5 million for 2010; this is expected to be a stable level, rising to \$2.5 million by 2012. External donor confidence is improving and there are clear indications of improved fiduciary position of the South Asia region. We have a couple of regional proposals at 85% success probability in the pipeline, and there are new funding opportunities folding up. For example, JIRCAS, IFAD, DFID, SDC, the World Bank and ADB are enlarging their portfolios in South Asia. Renewed commitment of the NARES in agroforestry doubly assures the future of the program. All the in-country expenses of collaborative research, including the cost of human resources in India are met from national sources up to the end of 2011; and a similar support is developing in Sri Lanka and Bangladesh.

The South Asia strategy also calls for the establishment of one or more ambitious “new frontier” initiatives through which the countries of the region could make a major global contribution to human well-being: including possibly Evergreen Agriculture, Dry land Management, Climate Change, and Agroforestry Agribusiness. This would build on vast regional experience and, through WorldAgroforestry, would provide a platform for advancing and sharing the science and practices world-wide.

#### **4.5. Operations Unit**

Operational efficiency and cost effectiveness continues to be the foundation on which all activities within Operations are based. In 2009, the Unit implemented results from the Business Processing Reengineering exercise carried out in 2008. The Unit has been revitalized, is more service oriented and customer focused. These two aspects will further be strengthened in 2010 through training, team building exercises and adoption of global best practices. Results from a customer satisfaction survey will be used to give further directions to the overall Operations team.

In its efforts to improve on processes and systems, the Unit has developed/updated several institution wide policies, procedures and guidelines. These include the Travel, Motor vehicle, procurement and Assets Management Policies'. As we continue on improving processes and systems, the Unit will monitor the implementation and compliance of these policies and procedures which are expected to further contribute towards enhancing efficiency and cost effectiveness. The Unit will particularly work closely with the Financial Services Unit (FSU) to update the Assets Register and eventually fine tune the asset tracking instruments. The objective of this exercise will be to ensure that WorldAgroforestry has an up to date assets register which is essential particularly when it comes to insurance and general risk management.

In the last several years, the Unit has been drawing more than 60% of its total budget from core funding. This draw on core has dropped significantly in the last two years. As the Unit continues to embrace and implement the principles of full costing for services rendered, this draw on core is expected to drop further by about 25% in 2010. The Unit will continue to critically examine some of the services that in the past have been offered “freely” and subsequently cost them in order to recover part of its operational costs. An example of a service that is now fully costed includes the Centre's Mail Management Service. Travel services have also been partially costed to recover operational costs. Other services such as security, grounds maintenance, electricity, water, equipment maintenance, janitorial and insurance will be fully costed in 2010. Further candidates for full/partial costing will also be identified in 2010.

The WorldAgroforestry campus continues to experience an unprecedented growth in its population. This has grown from about 200 persons in 2000 to about 450 persons in 2009. This growth in numbers has had an impact on our fixed infrastructure and has raised several Occupational Health and Safety (O H&S) issues. The Unit will in 2010 develop some space utilization guidelines (including parking) particularly on office occupancy based on the OH&S principles. In addition, part

of the WorldAgroforestry infrastructure i.e. WorldAgroforestry House is now over 20 years old and needs rehabilitation. As part of its maintenance plans in 2010, the Unit will embark on major works to renovate/refurbish WorldAgroforestry House. Preventive Maintenance Schedules (PMSs) including general grounds improvements will be developed for all plant and equipment for 2010.

The Operations Unit is fully committed to making the WorldAgroforestry Centre a healthy and safe working place. Towards this end, the OH&S committee will in 2010 organize at least two courses on health and safety as part of capacity building. Compliance of the Health and Safety policy will also be closely monitored to ensure that all statutory requirements are met. In terms of safety, the Security Officer together with the Crisis Management Committee will also work with the regions to help them realize their evacuation plans. In terms of creating security awareness, the security office will seek to strengthen the existing warden system, improve communication through installation of additional receivers and whenever necessary hold regular “Town Hall” style meetings with staff to openly discuss security issues.

In terms of Protocol, besides dealing with the regular issues, this office will be reviewing all the host country agreements in 2010 with a view to advising the institution on the appropriate action given the impending CGIAR consortium exercise.

Support to the regions by the HQ based Operations team in terms of improving on systems and processes and achieving cost effectiveness and efficiency will be high on the agenda for 2010. This will be a follow up on a recommendation made by the Board of trustees, and requests by the regional administrators.

The Unit will also continue to work closely with ILRI on common support services which at the moment include security, insurance and plant and equipment maintenance. In particular, both Centres will be moving to fully implement their shared procurement policy on some of the most commonly used stock items. Both Centres will be looking at other areas that they can work on together in 2010.

The Operations Unit will continue identifying additional areas that need improvement in order to enhance operational efficiency and cost effectiveness. For example, the proposal to use the rain water harvesting techniques to reduce WorldAgroforestry’s water bills is now complete and is expected to be implemented in 2010. The Unit will join the other Units in the development of the institutional Business Continuity Plan (BCP). The establishment of an Operations “Help Desk” will enable the Unit service its clients more effectively. Creating an enabling environment for the physically challenged will be a continuous process and the Operations Unit will be seeking to improve on the relevant facilities. Other areas will be on improved management and control systems, including monitoring of Hosted Institutions MOUs and Service Level Agreements (SLAs) for all outsourced/contracted services.

The Operations Unit will therefore, in 2010 aim at delivering to its clients services that are beyond the obvious.

## **4.6. Financial Services Unit**

### **4.6.1. Achievements - 2009**

In 2009 the financial services team identified several areas of concentration geared at improving financial processes that would increase operational efficiency in the unit and the centre in general. Details of some of these areas are summarized below.

In 2008, WorldAgroforestry joined other companies and institutions operating in Kenya, in the Financial Reporting Award (FiRe Award) processes organized by the Institute of Certified Public Accountants of Kenya (ICPAK). The review of 2007 audited financial statements by the judges did not find WorldAgroforestry financial reporting exemplary and WorldAgroforestry did not receive any award in 2008. The team preparing the annual financial statements redoubled their efforts when preparing the 2008 financial statements by focusing on areas that were found deficient in the previous year. The outcome of these efforts was that WorldAgroforestry was placed 1st runner up in the Not for Profit Category and received the FiRe award at a ceremony held in October 2009 in Nairobi.

We have completed the documentation of all financial and finance related planning processes. We have identified gaps that exist in these processes and necessary changes made to improve delivery of services to both internal and external clients. These processes including the relevant flow charts will be available in the Financial Services Unit (FSU) web page before end of this year.

One of the major areas of concern for the Centre is adherence to donor reporting requirements. This is considered a high risk area with high impact to the Centre. The donor financial reporting was assessed at below 50% in 2008. The Financial Services team together with other colleagues in the regions have vigorously been addressing this issue in 2009. A recent assessment now indicates that donor reporting has improved significantly with compliance level at around 71% as at end September 2009. We expect to achieve a compliance level of above 90% by the end of 2009.

A comprehensive revision of the investment policy was done and will be presented to the Board for approval. The current policy was designed to handle an investment portfolio of US\$3 million in a very stable financial market. The year 2008 saw a global financial crisis which negatively impacted both on security and yield on investments. The Centre is now carrying surplus funds of US\$18 million. Given the global economic recession and growth in the investment portfolio, we critically appraised our current investment policy with a view to adapting it to the current operating environment.

The financial information team was able to successfully install and implement SUN system in West and Central Africa including the African Humid Tropic node in Cameroon which has greatly enhanced financial management capacity of the region as a whole. The team also implemented a user friendly travel expense reporting module that has increased efficiency in travel expenses reporting and saving scientists considerable time previously used in filling manual returns. Other process scheduled to be completed and launched before the end of 2009 are: the upgrade of SUN system and the introduction of Sun Collect module, upgrade of the payroll system and the launch of web based fixed assets management module.

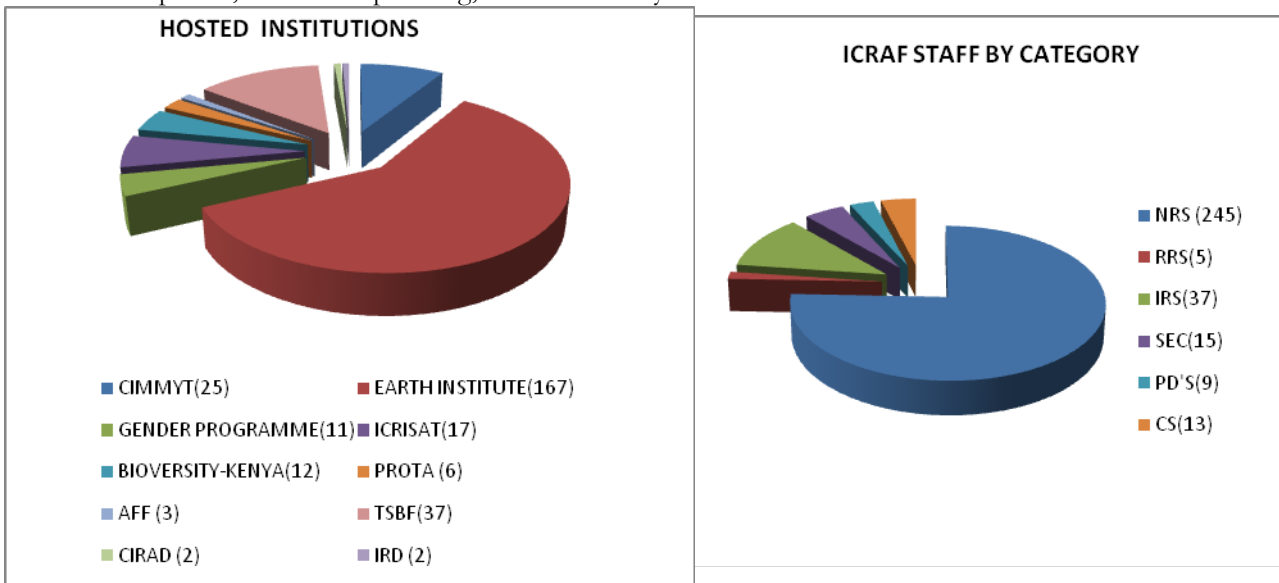
The FSU team was actively involved in the successful organization of the second World Congress of Agroforestry. The team provided the processes that facilitated payments by credit cards, processing of reimbursement and refunds, and banking services to more than 500 participants.

#### 4.6.2. Work Plans - 2010

- FSU will continue to improve the content and presentation of the annual financial statements and hopefully emerge as the winner of the FiRe awards for the 2009 financial statements.
- We also expect to achieve and maintain the donor financial reporting compliance level of 90% and above in 2010 and further ensure that the grant management information system is promptly updated.
- We will continue to identify areas that require automation and reduce the level of paperwork and manual processes. Areas already identified for implementation in 2010 are payment voucher processing, bank reconciliations, travel authorization, online stores management and automation of selected internal administrative forms.
- Jointly with the contracts and grants office we plan to have a web based module for developing the programme of work and budget to improve on the time taken by budget holders.
- FSU also plans to install and implement the SUN system in the Southern Africa regional office in 2010 subject to availability of funds

#### 4.7. Human Resources Unit

The Human Resources Team comprises six HQ based staff and a designated person in each regional office. The Unit provides a range of professional services to the 324 staff (regular, secondments, consultants, contract of service, attachments) of WorldAgroforestry at headquarters and country offices and to 282 staff of hosted institutions (as reflected below), in all areas of human resources management, including recruitment, staff development and training, performance management and career development, succession planning, and the delivery of benefits and entitlements.



##### 4.7.1. Policies and Procedures

The Personnel Policy Manual had its last major revision in 2006. Based on new strategy, changes in operations and issues that have emerged it was decided with other major policies to undertake a substantial revision. The ongoing revision to the Human Resources Policy Manual is scheduled to be completed in the first quarter of 2010. The revised manual would then ideally be presented to the BOT at its April 2010 meeting. All country specific manuals will subsequently be reviewed and updated, as required. Several other policy initiatives would be addressed during the reporting year, as well.



#### **4.7.2. Training and Staff Development**

During the past few years staff development has been carried out largely on an individual basis with the exception of Women's Leadership and HIV/AIDS training. In 2010, we wish to be more strategic in the use of the Staff Development Fund and emphasis will be placed on collectively and individually enhancing the skills, expertise and competence of staff members, in order to fulfill the mandates of the organization in a cost effective and efficient manner. As learning and development is the shared responsibility of the institution and staff; and links the Performance Evaluation system and work programme of the institution we will use PE forms to capture individual needs. . The following training events are proposed for 2010, some of which would be conducted in partnership with other international organizations:

- Leadership and management development
- Effective supervision
- Women Leadership Course
- Results Based Management
- Organizational development
  - Maximizing team performance
  - Effective Communication (and development of rapporteur skills)
  - Decision making
  - Ethics and integrity
  - Gender and Diversity
  - Time management
  - Language skills
- Technical Training
  - Project management
  - Graphic Design and website development
  - Microsoft course: Access, Excel, Power Point, Word, and Visio

#### **4.7.3. Performance Management**

A revised Performance Evaluation system will be implemented in 2010, which would cater for *inter alia*, the setting of individual objectives that are more clearly aligned with the business objectives of WorldAgroforestry, providing feedback and making adjustments during the year, appraising performance, supporting learning and development and to inform career development decisions. The Performance Evaluation system will also evolve to better link with performance merit awards, since this is a cost effective way to motivate staff to achieve business targets and to align reward with business performance.

#### **4.7.4. Staff Welfare**

HRU will continue to work in close collaboration with the Staff Association, managers and staff members to ensure that WorldAgroforestry is a better place to work for all staff members. The welfare and well being of staff are of critical importance to WorldAgroforestry. Several new guidelines and procedures are envisaged to be introduced such as induction processes.

#### **4.7.5. Benefits and Compensation**

Comprehensive surveys will be ongoing as they relate to the Job Market Competitiveness policy of WorldAgroforestry and to determine the appropriate salary scales for all countries and to ensure that remuneration packages are indeed competitive. Generally, conditions of employment will be reviewed on a regular basis.

#### **4.7.6. Human Resources Management Information System**

In 2008/2009 WorldAgroforestry implemented two modules of the HR4U Software application – Leave and Staff Data management. The e-recruitment module is now being explored with a view to commence development and customization based on WorldAgroforestry/ILRI's recruitment requirements and to begin implementation in early 2010. The electronic archiving of HR records would also be addressed in the year to guarantee maximum and secure storage and retrieval of data.

#### **4.8. Information Communication Technology Unit**

The Common Service Unit for ICT provides services to the World Agroforestry Centre and ILRI. It has been in operation for over two years and the benefits of this arrangement are beginning to be seen with very positive feedback from the recent Customer Satisfaction Survey.

East Africa became the final region of the world to be connected to the Internet by fibre optic cable through the SEACOM and TEAMS sub-marine cables. The Centre has taken advantage of the huge improvement in speed and increased our bandwidth to 10Mbps at a reduced cost. The challenge for 2010 is to make effective use of the additional bandwidth to improve our communication, collaboration, research and management systems.

Regional offices now have much improved access to resources and systems (Finance, HR, Procurement, Intranet) hosted on the Nairobi campus. In 2010 we expect video-conferencing from the desktop and from meeting rooms to be used more frequently offices. This will help the Centre to reduce travel, reduce costs and reduce our carbon footprint.

ICT will put our full support behind the One Corporate System (OCS) initiative of the CGIAR as a platform for common services. It is planned that the OCS will support the key business processes of the Centre, primarily project management.

A new storage system has been implemented at the Centre with a similar system installed at ILRI providing an off-site online backup of information and research data that forms a critical part of the business continuity plan. The capacity of the system can be easily upgraded to meet the ever growing volumes of data that we generate. We will take this to the next stage in 2010 by virtualising the server environment. Virtual servers can be configured to make more efficient use of the hardware, typically 12 virtual servers fit on a single physical server, which in turn saves power and cooling, saving costs and reducing our carbon footprint.

The team has worked closely with the CGIAR ICT-KM group to integrate our Active Directory with the CGIAR Google Apps collaboration platform (CGXchange). As part of the communication and collaboration strategy the Centre will upgrade its email system to Exchange 2010, a system that can be run on lower specification equipment while providing many more communication and collaboration feature. Customised training materials have been and will continue to be developed to help staff collaborate with partners both inside and outside the CGIAR.

#### **4.9. Alignment with ILRI and shared services approach**

The alignment of common services between ILRI and WorldAgroforestry continued in 2009, though with reduced impetus. Budget constraint is one of the major reasons for the slow pace. However, despite this obstacle, the two Centres have continued to forge ahead in the last two years, thus achieving significant results.

Within Corporate services for example, the two Centres have identified and engaged common service providers in the areas of Security, Insurance and Plant and Equipment maintenance. In 2010, both

Centres will be moving to fully implement their common Procurement guidelines. In particular, the procurement Units of both Centres will identify the most commonly used items with a view to developing a “call off” system. This system will ensure that Centres only buy the quantities of items that they actually need. In addition, this will also ensure that they enjoy economies of scale when it comes to price negotiations. Other common services targeted for joint tendering in 2010 include Janitorial, Grounds Maintenance and plant and equipment.

WorldAgroforestry has also developed and submitted a proposal to ILRI on the management of travel services for both Centres. In summary, WorldAgroforestry which has a fully professionally staffed Travel Office has the comparative advantage to manage travel services for both Centres. ICIPE which has recognized this advantage and has requested WorldAgroforestry to manage its travel services beginning January 2010. Should ILRI accede to this proposal, then WorldAgroforestry will have a financially self sustaining travel office in terms of funding in 2010 and beyond.

WorldAgroforestry and ILRI have in the last one year also been sharing information and knowledge on investment opportunities and options. For example, the Hong Kong and Shanghai Banking Corporation (HSBC) private banking group based in Geneva has been managing part of WorldAgroforestry’s investments. Based on the success that WorldAgroforestry has had with this venture, ILRI has also entered in to partnership with HSBC to manage part of their investment portfolios in 2010.

Other joint activities between WorldAgroforestry and ILRI planned for 2010 include:

- Sharing of accounts related computer applications/systems such as Over the Counter Payment (OTCP), Purchase Order Processing (POP) and the electronic Travel Authorization and Expense Claim forms. These systems were developed by WorldAgroforestry and are now in use and will be shared with ILRI.
- A joint recruitment of the Head of the Research Methods Group (RMG).

The two human resources will continue with the task of improving on the human resource management system, HR4U. This will now include a recruitment module. Both Centres are also planning a joint salary survey for Kenya.

## **5. Accelerating Use and Impact of our IPGs (Strategic Goal 4)**

### **5.1. Impact Assessment Achievements and Plans**

The Impact Office aims to undertake and support several types of activities at the World Agroforestry Centre:

- Development of monitoring and evaluation systems for projects
- Collection of baseline and follow up data
- Analysis of the impacts of Centre research
- Analysis of the impacts of agroforestry systems
- Determination of constraints and success factors for agroforestry impact
- Development and dissemination of best practices in impact assessment methods/tools
- Capacity building on impact assessment for staff and partners
- Proposal development and Centre performance reporting

Hence, the sections on 2009 highlights and plans for 2010 will refer back to this list of topical areas.

#### **5.1.1 Highlights from 2009**

The most visible output in the impact assessment area was the ‘Global assessment of trees in agricultural land’ analysis and working paper, which was presented and distributed at the World Congress on Agroforestry and eventually cited in dozens of media reports. The assessment was meant to provide an estimation of the global ‘reach’ of agroforestry and to also serve as a baseline reference from which future changes can be assessed. A key finding was that 46% of agricultural land had greater than 10% tree canopy cover, which is a conservative estimate of agroforestry. Agroforestry was found to be important in almost all regions, was more prevalent in the more humid areas, and was common in all population density classes.

Another global activity that was launched was the Agroforestry Policy Initiative (based in GRP6), whose key link to the impact office is in the understanding of constraints and success factors for agroforestry impact. A session was set aside to discuss this at the Congress, and several other outputs were underway, including a background issues paper, a second paper for presentation at the World Forestry Congress, and a compilation of relevant national policies and laws.

In East Africa, the main activity has been work on an assessment of the impact of fodder shrubs in the region. This is part synthesis of previous work on dissemination and adoption and part new research conducted to measure more accurately the effects of the shrubs on milk yields, given the wide variety of feeding strategies used by farmers. A second activity starting towards the end of the year is a re-engagement with KARI in the Western Kenya Integrated Ecosystem Management project where a modified monitoring and impact assessment framework is being designed to accommodate the shift in intervention strategy.

In West and Central Africa, two synthesis studies were undertaken. The first was to pull together all the impact related information available related to tree domestication in the humid tropics. This is intended to identify research gaps which will be supported by Impact Marketplace funds in 2010 and 2011. A second synthesis was done to compile quantitative results from studies of the impacts of parklands systems. This was done to provide inputs into design and planning of new initiatives in the region. The impact office is also working with 3 projects to develop their M&E systems and design of baselines (SCAP, IFAD, Belgium).

In Southern Africa, a more formalized and rigorous M&E system was developed and implemented for the Irish Aid project and the baseline data analysis for the same project was completed.

In South Asia, new data collection efforts were completed to assess the impact of widely adopted smallholder agroforestry systems. The first focuses on the smallholder timber systems dominant in the northwest of India. This was a follow up to household surveys completed 4 years earlier and will enable the study of the dynamics of the system and a longer term perspective on the income contribution of this agroforestry system. A second data collection effort is focusing on smallholder mango growing areas in the north and south of India. In both cases, while there is a dominant agroforestry system in the sites, all agroforestry practices are being captured in the analysis. These studies will provide much needed information on assessing the national level impacts of agroforestry and as well are providing key insights into investments and policies required to achieve impact at scale.

In Southeast Asia, a major undertaking is related to rubber agroforestry systems. Building on previous work, a new project in collaboration with the Standing Panel on Impact Assessment of the CGIAR was launched. This focuses on enriching existing impact analysis with valuation of environmental impacts and the research will be completed in 2010. Also, a baseline was completed on work related to smallholder timber – to understand better its comparative advantages vis-à-vis alternative means of producing timber.

Apart from these global and regional research activities, the impact office has conducted a number of seminars within WorldAgroforestry (Malawi, Cameroon, headquarters) and outside of WorldAgroforestry (ASARECA, ICIMOD) to raise awareness and to disseminate good practices on impact assessment. The engagement with ASARECA was to support its development of an M&E system and equally support has been given to NEPAD and TerrAfrica, continued support to monitoring of the Millennium Villages Project, and discussions are underway to review the M&E system for AGRA's Soil Health Programme.

Lastly, a student attachment from UK arrives at WorldAgroforestry for the 4<sup>th</sup> quarter to help in assembling useful tools, methods, examples of best practice in impact assessment and this will be carried on to 2010 with dedicated staff support.

2009 impact assessment Marketplace funds were given to: rubber agroforestry impact assessment in SEA, smallholder timber baseline in SEA; synthesis of tree domestication impacts for WCA, synthesis of parkland agroforestry impacts in Sahel; support collaboration in the assessment of ASB, analyses of impacts of agroforestry systems in India.

### **5.1.2 Plans for 2010 and beyond**

In 2010, marketplace funds have been allocated to 3 research efforts: analyses of agroforestry impacts in India, impact of WorldAgroforestry's research on rubber agroforestry in Indonesia, and the impact of WorldAgroforestry's research on tree domestication in Cameroon. The latter two form the short-term pipeline of major ex post impact assessment studies that the center is obligated to submit on an annual basis to the CGIAR. In future, we anticipate major studies emerging from our work in western Kenya and Malawi.

At the global analysis level, there will be more coordinated and expanded efforts in terms of the Agroforestry Policy Initiative (in collaboration with GRP6). There is need to establish a strong partnership for moving the initiative forward and for more systematic analysis of policy constraints and identification of good policy practices.

There will also be follow ups on the global agroforestry assessment where relationships between trees, population, market access, and land degradation will be explored. Higher resolution research on agroforestry systems will also be further developed in the case of India and Indonesia where national assessments of agroforestry have been made.

There will be continued improvement of project M&E systems as well in 2010, with continued support to the major projects underway in Africa. We also anticipate a stronger collaboration with the TerrAfrica programme (through UNEP) in which WorldAgroforestry would become a technical partner to design and backstop the implementation of the system. This would be quite an opportunity for WorldAgroforestry to generate and utilize data on sustainable land management projects from more than 20 countries.

The Impact Office will have an improved financial outlook for 2010 also and it is planned to have a full time assistant to help in analyses and support for staff/projects. This will enable the development of a useful webpage and greater sharing of methods within the organization. One particular area for improvement is in the stewardship of baseline data and the Impact Office will work closely with Research Methods Group on this.

## **5.2. Research-Development Continuum**

A number of issues remain contentious, confusing and unresolved in the roles of international agricultural research. Foremost amongst these is likely the topic of the *research to development continuum*. To several, this is synonymous with debates on *research for development (R4D)*, *science boundaries*, forms of *international public goods*, *technology transfer*, *impact pathways*, *knowledge to action* and distinctions between *knowledge and technology*.

In its 3<sup>rd</sup> EPMR, the Science Council and EPMR drew strong attention to our development work. In the presentation of the report at AGM 2006 donors even called for a CGIAR –wide review of the research to development continuum. Unfortunately, in our last EPMR the Science Council and Panel posited a false dichotomy of WorldAgroforestry needing to choose between research **versus** development. This legacy will continue, but hopefully fade, as it entered into two of the EPMR recommendations that will require reporting on.

The paradox is that whilst we are mandated by many to be the global research provider in both scope and scale, we are also largely funded by Ministries of Foreign Affairs, Overseas Development Budgets and Food or Environment Agencies. We are not financed significantly by Ministries of Science or Research or Technology in the North. These development donors (or investors) have global, regional and bilateral aims, and from them we source global, regional and national level funding. This leads to some confusion on the nature of International Public Good (IPGs). Even if we were able to strictly adhere to non-rival and non-competitive access knowledge generation, there is no research laboratory, field site, watershed or community living in international territory.

Hence much of our research is context specific. It is grounded in the problem definitions, realities and feasibility of options of multiple bio-geo-social-political domains (communities, watersheds, countries, regions). There are exceptions to these present in our research agenda, such as tree germplasm conservation, soil analytics, climate models, databases, survey instruments, market appraisal tools, approaches to environmental service reward schemes, etc.

In 2009, we took steps to reduce misunderstandings amongst staff, partners and donors on the role of the centre in work with a development delivery component. Grant proposals were vigorously scrutinized to ensure high research content. The WorldAgroforestry self-help checklist for proposal developers also orients proponents to verify the balance of research and development. Here staff are prompted to answer the following questions:

### Science

- Will the project contribute to development of relevant theory or scientific principles?
- Are socio-economic dimensions of the research well included, and undertaken by social scientists (staff or partners)?
- Have clear, useful and testable hypotheses been defined?
- Have methods for data collection, analyses, accessibility and archiving been described?
- Have scientific outputs been stated?
- Is the balance between strategic research, applied research and development activities appropriate for the overall objectives?

### Development

- Has a demand for the project been identified among potential beneficiaries?
- Are the beneficiaries among WorldAgroforestry's priority target groups?
- Have realistic impact pathways of the project been described?
- Will the development activities result in useful feedback to WorldAgroforestry's research activities?
- Are the development activities in the project themselves the subject of research?
- Is data collection to address the above 3 issues an integral part of the proposal?

Furthermore, several proposals, requests from donors and grants reconstituted or stopped. These included USAID in Madagascar, Clinton Foundation in Tanzania, CFC Rubber in West Africa, FAO in Nigeria, INBAR in Cameroon.

In 2010, we plan to extend our review of R&D connections in the following areas:

- Impact office review of Impact Assessment Tools to help take decisions on role of research, exit strategy, etc
- Document approaches to research the development process, including the science of scaling up
- Co-locating multiple GRP and development work in longer-term benchmark sites under the Chief Science Adviser
- Extending the knowledge generation and proof of concept studies to research on proof of application (especially in conservation agriculture, fodder shrubs, tree crops and Payments for Environmental Services)

### **5.3. Communications performance and new opportunities**

The Centre's communications strategy has the following key objectives:

1. To convey science-based messages about the key role trees and agroforestry systems play in meeting livelihood and environmental challenges;
2. To help raise the profile of agroforestry in the global development and environment for a, including those relating to climate change, the Millennium Development Goals, biodiversity conservation and desertification;
3. To increase the profile of the World Agroforestry Centre as a credible science organization that undertakes International Public Goods (IPG) research for development;
4. To assist Centre scientists to proactively think about effectively communicating their research outputs to achieve better outcomes and impacts;
5. To help integrate communications into the planning, budgeting and implementation of research projects;

6. To enable the Centre to manage its knowledge assets more effectively;

### 5.3.1 Highlights for 2009

#### 2<sup>nd</sup> World Congress of Agroforestry

One of our main objectives in taking the lead role in organizing the WCA2 was to raise the profile of agroforestry as a key land use for addressing global challenges of food security, climate change and environmental degradation. With close to 1,200 participants from 96 countries and an array of high-level speakers, the Congress held in Nairobi in August 2009 brought together premier scientists, educators, practitioners and policy makers. The Congress generated numerous substantial outcomes in the form of declarations, alliances, partnerships and policies, and saw unprecedented media attention focused on agroforestry and related issues. An intensive effort was invested by the Communications Team over several months to attract speakers and participants, highlight the successes of agroforestry and provide reporting during and after the Congress.

#### Media Outreach

Much of the media outreach conducted during 2009 was geared towards the 2<sup>nd</sup> World Congress of Agroforestry. Media events, field trips and ongoing liaison were designed to attract media interest in the event and the issues it sought to highlight. A total of 110 journalists registered to attend the Congress and according to Google Trends, the number of times ‘agroforestry’ appeared in English-language online stories during the week of the Congress spiked dramatically. Particular attention was given to the *Trees on Farm* study which documents the extent of trees on agricultural land worldwide and the potential of *Faidherbia albida* to provide natural fertilizers to improve crop yields. Media coverage appeared in 10 languages: English, Dutch, French, Hungarian, Icelandic, Italian, Korean, Spanish, Portuguese, and Vietnamese.

Media coverage highlights of the Congress included stories by Inter Press Service, *New Scientist*, *El Pais* (Spain), Voice of America, Discovery News, Xinhua News Agency (China), several Kenyan newspapers, and a story by *TIME* magazine, which featured the Trees on Farms study and called it “a rare bit of green good news.” In addition, the Reuters story also appeared in print in several major newspapers, including *Le Monde* (France), *Shanghai Daily* (China), and numerous Canadian papers. Radio interviews aired on BBC Afrique and Radio France Internationale on the opening day of the Congress. The *Faidherbia* story was picked up by Discovery News, *National Geographic* News, *El Pais* (Spain), SciDev.net, Treehugger.com, Mongabay.com, and EcoWordly, amongst others. News of the conference was also distributed on the official UNFCCC COP15 website; Treehugger.com and Mongabay.com, two influential and widely-read climate blogs; and Greenwire, a leading news source for US policymakers, think tanks, governments, and environmental groups on climate change and energy policy issues.

Other stories gaining media coverage during the year included the Billion Tree Campaign, the India-Africa collaboration, the Centre’s work with COMESA on the African Biocarbon Initiative and the launch of the Carbon Benefits Project.

#### Revamping our Web site

Work began in mid 2009 to develop a more user-friendly structure for the Centre’s website and improve the site’s navigation and content. A concerted effort has been made to update content, centralize Centre-wide resources and publications, make databases available online and develop new content which better highlights the work of the Centre.

A new content management system was developed, which allows for different (and remote) areas of the organization to more easily upload information without the need to be proficient in web programming.



## **Multimedia**

The Communications Team has been actively engaged in producing videos and multimedia exhibits to highlight the Centre's research. A seven minute film, entitled *Trees for Life*, was produced for the 2<sup>nd</sup> World Congress of Agroforestry to raise awareness about the plight of rural families in Southern Africa and the role agroforestry research plays in providing solutions.

In collaboration with a number of CGIAR centres, we produced a set of multimedia outputs including a video, mural, photo exhibits, soundtracks and posters showcasing the role of agricultural research in improving rural livelihoods in a Malawian village. The exhibit, launched at the Irish Aid media centre in October 2009 was a huge success.

We also developed and launched a photo exhibition showing various aspects of agroforestry at the Centre's headquarters in time for the 2<sup>nd</sup> World Congress of Agroforestry.

## **Publications and Library Services**

We have developed a number of publications series to facilitate communication of our research outputs to various target groups. These include Policy Briefs, *Trees for Change* booklets, Occasional Papers, Technical Manuals, Working Papers, the Annual Report, books, posters and brochures. Most of our publications are peer-reviewed and made available in print and electronic form on our web site.

Our library staff have been actively promoting the accessibility of our books and other publications on the web. They finalized digitization of older publications and posted them on the web for wider dissemination. A total of 590 publications are now available in full text on the web. Access to the Centre's books on the web has increased significantly after they were submitted to Google Books project. The library also added the Centre's Economics working papers to the RePEc (Research Papers in Economics) website to give them worldwide visibility amongst economists.

We completely revamped our mailing list to make it more efficient and up-to-date. We have designed a new online form so that users can select the publications that they would like to receive regularly. We have also streamlined our publications distribution system with more emphasis on electronic distribution and targeted mailing of printed publications. During the 2<sup>nd</sup> World Congress of Agroforestry, we distributed close to 600 publications in addition to Congress publications.

The library provided online access to key journal publications and supported our scientists to publish in high quality journals. In addition, the library tracked all publications by Centre staff and produced a list of most prolific authors for recognition during the Science Week.

## **Strengthening the Global Communications Team:**

Following the team building meeting held in 2008 in Nairobi for all communications staff across the Centre, a more concerted effort has been made to create greater synergy among staff in the regions and headquarters. The Communications Team has been strengthened by the recruitment of an IRS Senior Communications Specialist at headquarters.

### **5.3.2 Plans for 2010**

#### **• Media Outreach**

The challenge for 2010 will be to build on the progress made in establishing media contacts and generating media interest during the 2<sup>nd</sup> World Congress of Agroforestry. With a strengthened Communications Team, the ability to service media enquiries and more proactively engage the media in our research activities will be greatly enhanced.

It is intended to run media training for senior Centre staff and media spokespeople to provide them with enhanced interview skills as well as a better appreciation of how the media operates.

- **Web site**

With a solid platform now implemented for the Centre's website, the focus for 2010 will be on supporting various research areas and regions to develop audience-focused content. Training will be provided for staff on the new content management system. We will also enhance our web site with a new design and integration of different media types: video, audio and presentations.

A social media strategy will be developed to integrate blogs and other social media tools into our online communication framework.

We will undertake a major effort to upgrade the Intranet as a major platform for workflow management and online collaboration, improving access to digital resources to headquarters and region-based staff.

- **Publications and Library Services**

Through the active involvement of the Publications Committee, we will continue encouraging and supporting the Global Research Projects to identify key strategic topics and publish occasional papers, policy briefs and books. We will promote key strategic publications through media outreach and dissemination.

We will continue our effort to provide maximum exposure for Centre publications through the web using facilities such as Google Scholar. We will also introduce and encourage use of social media in dissemination of agroforestry information.

#### **5.4. Progress, opportunities and risks with major development initiatives**

The World Agroforestry Centre is involved in several major development initiatives and even should the financing of the CGIAR system significantly change towards more unrestricted funding, it is anticipated that there will be continuing need to partner with major development initiatives in order to demonstrate salience and to produce impacts.

While all the development oriented projects have their own peculiarities, an important consideration is the management structure of the project. There are those which are managed by the Centre: Irish AFSP in Malawi, IFAD& Belgium in Cameroon; those managed by a research partner: AFSIS (TSBF, this is both a research and development project); those which are managed by a development partner: Millennium Villages project (Earth Institute), Smallholder Conservation Agriculture Promotion in western and central Africa (ACT), and the East Africa Dairy Development project (Heifer Project International); and those which may be directly reporting to a government: Rwanda National Irrigation Master Plan project.

A major risk with projects that we do not directly manage is the lack of production of international public goods. This can come about when the budget is not fully under our control or if the quality of research is compromised by the short term development objectives of the project (e.g. lack of interest in testing different approaches, lack of variation in site selection). There is this risk with the Millennium Villages project which has taken a very long time to have ready its baseline data and which has continued to underfund the science side versus the development side. However, WorldAgroforestry has not invested much staff time (and no operational costs) in this endeavor and the data are finally ready to be analyzed. This is less of an issue with the East African Dairy Development project in that a budget allocation to WorldAgroforestry and for research had been

made for each year. It does not allow expansion into new interesting research areas, but still provides us with a modest research output for modest funds. On the other hand, WorldAgroforestry is in a strong position to identify, design, and fund international public good research in all those projects it manages.

There is also potentially more risk of project delays or failure where other partners lead project implementation. AFSIS is an example whereby the lead institution has much less experience in managing large projects across as many countries as does WorldAgroforestry. On the other hand, there is greater reputational risk for the Centre if the projects we manage ourselves fail to deliver intended development impacts as opposed to those in which we are mainly a technical scientific partner on. Hence, we are deemed much more accountable for delivering development impacts in the AFSP project in Malawi than in the EADD project in East Africa.

Apart from these more systemic risks, there are also others associated with specific projects. WorldAgroforestry has been hosting the Millennium Villages project's Kenya site and has facilitated its capital purchases and staff hiring pertaining to the country. This has been found to expose the center to legal claims in areas such as health care provision and hence the Centre will cease such support in 2009. Some of the development grants are from some of WorldAgroforestry's largest donors, like Ireland. This means that poor project performance could have multiplier effects on unrestricted grant support too. It is imperative that the Centre take all measures to ensure that such projects do succeed.

In terms of progress, all the projects mentioned above made considerable progress in 2009 and are on track. AFSIS had been behind due to delays in hiring of staff in countries and procurement of vehicles, but is now catching up with the timetable. WorldAgroforestry M&E support to the Millennium Project has been timely but access to the data had been delayed longer than anticipated.

In terms of opportunities, two major ones are related to a growing partnership with NEPAD in Africa, a flagship development initiative on conservation agriculture with trees and a larger development initiative called TerrAfrica (more than \$1 billion has been committed for this initiative). The latter was noted in section 5.1, and would involve WorldAgroforestry supporting TerrAfrica principally in monitoring and impact assessment. There are many positive elements of this, not the least being generation and access to a huge dataset of relevance to the Centre. The conservation agriculture flagship is gaining momentum with support from Norway, Sweden, and World Bank and WorldAgroforestry is being viewed as a key technical partner. Since the role of trees in conservation agriculture is thought to be promising, but not well documented, we anticipate significant IPG research to emerge from such a collaboration. Another huge opportunity, this one of a global nature, will be the Center's engagement in biocarbon projects. WorldAgroforestry is already collaborating with development NGOs such as the Clinton Foundation and WWF and have held talks with World Vision and CARE. It is likely that major partnership will arise, especially if REDD is approved and a go ahead is given to explore AFOLU at Copenhagen.

## Annex 1 – Project Portfolios

### Global Research Project 1: Domestication, utilization and conservation of superior Agroforestry germplasm

#### Project Overview and Rationale

##### *Project Goal*

Smallholder farmers, researchers and their public and private service supporters have the increased knowledge and capacity needed to improve rural livelihood options through the use of well-conserved, properly characterized and suitably enhanced tree genetic resources, via well functioning seed and seedling production and distribution systems.

##### *Project Objectives*

1. Resolve underlying constraints to the effective conservation and enhanced performance of tree genetic resources, through tree domestication by and for smallholder farmers, of germplasm that provides solutions to the fundamental problems that restrict the productivity of agroforestry systems.
2. Ensure the better functioning of tree seed and seedling supply systems, with easy access to improved germplasm of priority tree species.

##### *Rationale*

Fundamental problems that constrain the effective management and delivery of tree genetic resources for smallholder farmers include:

1. Constraints to characterization, domestication and the dissemination of information.
  - e. *Limited biological understanding of useful tree species*: the absence of previous research on a range of target taxa; the perennial nature, life history traits (e.g. dioecy) and long generation intervals involved in tree propagation and growth; the need to modify and update priority species lists due to changing requirements influenced by markets, niche availability, climate change, biotechnology, etc.; a limited understanding of performance and productivity differences between exotic, indigenous and naturalized species; the limited knowledge available on the nutritional and medicinal values of indigenous species; a lack of understanding on the potential invasiveness of introduced agroforestry species.
  - f. *Absence of tools and protocols for understanding genetic diversity levels and for conserving tree germplasm*: the lack of suitable measures of genetic variation and the absence of the interdisciplinary approach needed for proper characterization; the poor genetic quality of founder populations being released by development projects; the potential risks of losses in vigour, resulting from inbreeding depression and dysgenic selection due to poor management practices; the limited available knowledge on adaptive responses to climate change, land degradation and other challenges; the absence of information on the phenotypic plasticity (flexibility to environmental changes) of priority species; the absence of impact assessments for genetically modified trees in agroforestry landscapes; a lack of knowledge on appropriate *ex*, *circa* and *in situ* conservation strategies, with current methods often ineffective, fragmented and unnecessarily costly; the impracticality of maintaining live gene banks of taxa with large growth forms; the wide range of diversity between species in life history traits, e.g., recalcitrance, reproductive biology, phenology, etc.; the different conservation approaches needed for the alternative niches in which trees grow.
  - g. *Scarcity of innovative tools and methodologies for tree propagation and management*: the lack of generic protocols for participatory priority-setting of target species in different agroecological zones, taking emerging global issues (e.g., climate change adaptation) into consideration; a lack of global guidelines for researchers and stakeholders on domestication approaches; the absence of methodologies for clonal selection and development of indigenous tree species cultivars,

- with a tendency therefore to focus on a few exotic taxa; the limited knowledge available concerning the trade-offs between different (biotechnology, traditional breeding, participatory, etc.) approaches to domestication; the lack of case studies to help extrapolate generic technologies; the need for continuous monitoring and improvement of tree genetic resources based on management practices and niche allocation; the current inadequate research on pests and diseases; the lack of a range of tested alternatives for farmers to plant that minimize market risks and maximize potential market gains.
- h. *Requirement to regularly update information on the domestication, distribution, use, management and conservation of genetic resources of agroforestry trees:* the lack of approaches developed with stakeholders to appropriately present updated research information, in different formats and with the right amount of detail, to guide farmers, scientists, CBOs, NGOs and others in the management and use of a wide range of different agroforestry tree species; the absence of accessible databases to allow users to select species for specific functions based on current and emerging challenges (e.g., to mitigate and adapt to climate change, to promote micronutrient security, to provide medicines); the lack of methods for recording current activities on the distribution, domestication and on-farm management of agroforestry tree genetic resources, with therefore a lack of learning from ongoing work.
2. Constraints to tree germplasm supply and availability.  
Tree seed and seedling supply systems are poorly developed because of the difficulties in delivering a wide range of species to decentralized growers that each requires only small volumes. Furthermore, as markets for agroforestry tree products are often poorly developed, so too are the markets for delivering germplasm. Access to tree seed and seedlings of good genetic and physiological quality is often cited by farmers as a constraint to production, resulting in a narrow range of tree species being adopted that do not adequately address market risks and realize productivity benefits from diversification. Demand has been largely un-quantified, however, with scant economic data on the sale of germplasm, and current practices of transfer across landscapes not well documented. There is an absence of a proper analysis of the cost effectiveness, required incentives, and quality and quantity considerations at a farm and landscape level. There is lack of appropriate models for germplasm supply to farmers that involve a wide range of possible actors, and little emphasis has been placed on the nursery production of tree seedlings in meeting demand. The current International Treaty for Plant Genetic Resources (ITPGR) is not relevant for most tree genetic resources because they are transferred informally and/or locally.

GRP1 has two research outputs:

- GRP1.1: Improved agroforestry tree germplasm available with associated information on potential use, benefits and conservation while considering climatic constraints and risks of invasiveness.
- GRP1.2: Prototypes available for sustainable tree seed and seedling supply systems that promote the use of diverse and productive germplasm by small holder farmers in different social, economic and cultural settings.

## **Outputs Description**

### ***Changes from previous MTP:***

Minor changes in wording

### ***Description (Output level)***

GRP1.1: *Improved agroforestry tree germplasm available with associated information on potential use, benefits and conservation while considering climatic constraints and risks of invasiveness.*

GRP1.1 addresses the following three research questions:

1. What innovative approaches can be developed and used to domesticate, promote and conserve high-value tree species in partnership with smallholder farmers, taking into consideration emerging challenges and opportunities such as global warming, urbanization, increased international trade, biotechnology, hidden hunger and land degradation?
2. What are the most appropriate technologies for characterizing and selecting genetic variation in agroforestry trees, taking into consideration factors such as cost effectiveness, adoption potential and tradeoffs?
3. What are the optimum *ex, circa* and *in situ* conservation strategies for managing and utilizing agroforestry tree genetic resources, in light of current and emerging global challenges and opportunities?

*GRP1.2: Prototypes available for sustainable tree seed and seedling supply systems that promote the use of diverse and productive germplasm by small holder farmers in different social, economic and cultural settings.*

GRP1.2 addresses the following two research questions:

1. What are the most appropriate pathways and modalities for supplying tree germplasm to farmers, taking into account role allocation, cost effectiveness, incentives, and quality and quantity considerations, at the farm and landscape levels?
2. What are the best systems and methodologies for procuring, storing and producing high-quality germplasm of priority tree species? What are the opportunities and limitations for private sector involvement? What types of incentives are needed?

### **Alignment to CGIAR System Priorities (Output Level)**

GRP1.1 aligns to CGIAR System Priorities:

- 1B: Promoting conservation and characterization of under-utilized plant genetic resources to increase the income of the poor
- 2D: Genetic enhancement of selected species to increase income generation by the poor
- 3A: Increasing income from fruits and vegetables

GRP1.2 aligns to CGIAR System Priorities:

- 3A: Increasing income from fruits and vegetables

And has secondary links with:

- 1B: Promoting conservation and characterization of under-utilized plant genetic resources to increase the income of the poor
- 5B: Making international and domestic markets work for the poor
- 5C: Rural institutions and their governance
- 5D: Improving R&D options to reduce rural poverty and vulnerability

### **Countries of Planned Research (Output Level)**

*GRP1.1:* Kenya, Malawi, Tanzania, Zambia, Cameroon, DR Congo, Gabon, Burkina Faso, Côte d'Ivoire, Equatorial Guinea, Ghana, Mali, Niger, Nigeria, Senegal, India, Sri Lanka, China, Indonesia, Philippines, Thailand, Bolivia, Peru

*GRP1.2:* Kenya, Malawi, Tanzania, Zambia, Cameroon, DR Congo, Gabon, Burkina Faso, Côte d'Ivoire, Equatorial Guinea, Ghana, Mali, Niger, Nigeria, Senegal, India, Sri Lanka, China, Indonesia, Philippines, Thailand, Bolivia, Peru

### **Impact pathways by Output**

GRP1 outputs provide a foundation for conservation and the profitable use of appropriate tree germplasm on farms, with further exploration of agroforestry interactions, climate change impacts, markets links and policy contexts in other GRPs.

The primary impact that GRP1 targets is: The increased access enabled to quality germplasm will enhance tree species and genetic diversity within agroforestry systems, resulting in more resilient, productive and valuable farming landscapes that also contribute to the long-term conservation of tree genetic resources in both farmland and forest.

Output GRP1.1 is expected to contribute to this impact via the outcomes specified below for various stakeholders:

1. Increased ability among agroforestry research, development and policy stakeholders to efficiently use and promote improved knowledge on suitable multidisciplinary approaches for tree domestication.
2. Farmers and other stakeholders domesticate and conserve a broader range of important tree species.

Output GRP1.2 is expected to contribute to this impact via the outcomes specified below for various stakeholders:

1. Efficient operational models of decentralized tree seed and seedling delivery systems will be adapted and applied by national and international partners.
2. Informed decisions by national development programs in tree germplasm supply will improve access to quality planting material by smallholders, with enhanced cultivation and diversity in farm landscapes being the result.
3. National institutes, developmental organizations and policy makers will increase support for small-scale seed and seedling retailers as entrepreneurs as part of a commercial commodity chain in germplasm delivery.
4. Nursery operators, national partners and smallholders contribute to widespread cultivation of quality germplasm of improved tree varieties.

Through GRP1.1 outputs, there will be an increased ability among agroforestry research, development and policy stakeholders to efficiently use and promote improved knowledge which will be captured in strategies produced, databases upgraded, new manuals developed, etc., on appropriate approaches for tree domestication. The impact of research on and development of improved methodologies and technologies – while concurrently enhancing capacity in genetic diversity analysis, propagation technologies and multiplication skills of regional nursery operators, national partners and smallholder farmers – will result in widespread cultivation of quality germplasm of improved varieties, increasing productivity and resilience. Greater availability of updated and well-presented information on key tree species will also contribute towards increased species diversity in farmland.

Through GRP1.2 outputs, operational models supporting tree germplasm supply will increase efficient dissemination of and access to quality tree germplasm by smallholder farmers. Reaching more smallholders more efficiently has vast developmental potential, as more stable and productive tree germplasm will contribute to improved livelihoods, enhanced food security and protection of the environment. Enhanced tree diversity within agroforestry systems will result in more resilient and productive farms and long term conservation of tree genetic resources.

For both GRP1.1 and GRP1.2, developing capacity for generating and applying technical know-how will strengthen the national and global networks promoting tree planting and germplasm supply programs, which is essential to meet current and emerging international challenges.

Target ecoregions for GRP1 are:

### *Sub-Saharan Africa*

RAEZ 1. Warm arid and semi-arid tropics (AEZ 1):

- West Africa: Burkina Faso, Guinea, Mali, Niger, Nigeria and Senegal
- East Africa: Ethiopia, Kenya, Tanzania and Sudan
- South Africa: Angola, Botswana, Madagascar, Malawi, Mozambique, Zambia and Zimbabwe

RAEZ 2. Warm sub-humid tropics (AEZ 2):

- East Africa: Kenya, Uganda, Tanzania
- South Africa: Malawi, Mozambique, Zambia and Zimbabwe

RAEZ 3. Warm humid tropics (AEZ 3):

West Africa: Cameroon, DR Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Sierra Leone

### *Asia and the Pacific*

RAEZ 8. Warm arid and semi-arid tropics (AEZ 1):

- Parts of India and Thailand.

RAEZ 9. Warm sub-humid tropics (AEZ 2):

- India, Sri Lanka and Thailand.

RAEZ 10. Warm humid tropics (AEZ 3):

- Indonesia, Philippines, Vietnam, Kampuchea, Laos, Thailand, South West China, Bangladesh, Sri Lanka

RAEZ 11. Warm arid and semi-arid subtropics with summer rainfall (AEZ 5):

- China, India.

### *Latin America*

RAEZ 17. Warm humid tropics (AEZ 3):

- Brazil, Bolivia, Peru

RAEZ 18. Cool tropics (AEZ 4):

- Bolivia, Peru

### ***Beneficiaries and end users***

That interface directly with WorldAgroforestry: national tree seed agencies, tree nursery operators, national forestry and agroforestry research institutes, NGOs, universities, international research institutes, policy makers, regional bodies and the private sector.

Interfaced through partners: community based organizations, development agencies, extension agents, farmers, inter-governmental bodies involved in germplasm transfers, local and national policymakers, non-governmental organizations, and producer associations, regional bodies involved in germplasm regulation, tree seed marketers and the private sector

### **International Public Goods (IPG)**

International public goods (IPGs) produced by the project include generic and species-specific information in the form of strategies, guidelines, domain recommendations, template agreements (e.g. Indo-Africa germplasm exchange) to facilitate international transfers of e.g. fruit materials covered by plant breeding rights practices, methods and protocols for tree management and domestication, as well as tree germplasm. Specific research IPGs will include:

- Manuals and guidelines on participatory tree domestication, propagation, nursery establishment, on-farm germplasm management and appropriate silvicultural practice for fruit, timber, medicine, biofuel, fodder and other categories of functional use of tree species.



- Models for international organisations, national governments and NGOs to facilitate the sustainable supply of agroforestry tree seed and seedlings, for development organizations and farmer groups, for a massive scaling up in tree planting.
- High quality germplasm of key agroforestry tree species maintained as seed and/or established in field genebanks, clonal orchards and mother blocks, available for demonstration and as founder material for further use by national and international programs.
- Publications on the best strategies for sustainable conservation of agroforestry tree germplasm, considering issues including climate change, natural forest loss, land degradation, the need for dietary diversification and the importance of traditional healthcare systems
- Knowledge (morphological, physiological and genetic) on germplasm of key agroforestry species, with an advanced understanding of the desirable traits of priority species under different environmental conditions.
- High-resolution maps of African countries linked to selection guidelines for tree species and populations for present and future climates.
- Development of expressed sequence tag (EST) libraries for key agroforestry tree species, to support regional efforts in upstream research for selection of high quality germplasm.
- Publication on the potential and pitfalls of biotechnology in promoting agroforestry trees, at genetic and landscape levels

Additional IPGs beyond research include:

‘Action research’:

- Assisting small-scale seed producers and nursery operators to form associations, in order to assess the advantages, disadvantages and requirements of such groups in delivering germplasm, and generate key lessons for promoting them
- Assisting small-scale seedling vendors to market seedlings using a range of possible methodologies, in order to test the advantages and disadvantage of various approaches.

Capacity building:

- Conducting training courses and developing training curricula to assist in widely disseminating best- practice to research and development partners, universities, schools and other teaching institutions.

Development-support:

- Facilitating the dissemination and use of founder quantities of tree germplasm, and providing online and printed decision-support tools and training materials to a range of end users.

### **Elaboration of Partners’ Roles**

Our international partners primarily assist in:

- a) The development of strategies, databases, international policy formulation, multilateral conservation efforts, and advocacy for conservation and use of tree genetic resources.
- b) Molecular genetics work for understanding genetic diversity and for marker-assisted selection

International partners include: University College Dublin (UCD), ARCS Siebersdorf, Australian Tree Seed Centre, CAB International, CIFOR, CIRAD, Forest Landscape Denmark (FLD), European Forestry Institute, Food and Agricultural Organization of the United Nations (FAO), Ghent University, International Centre for Under-utilized Crops, IIITA, Bioversity International, International Society Horticultural Science, Unilever, Scottish Crop Research Institute (SCRI) Dundee, UK .

The developmental and private sector partners mainly collaborate and desire research findings linking directly into development projects or private investments. These partners include: Netherlands

Development Organization. SNV, Technoserve, IUCN/SECO, Mars Inc., Syngenta International AG and Unilever.

Regional partners that assist in regional networking and conservation efforts include: CORAF, COMIFAC, APAARI, ASARECA, Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), the Forum for Agricultural Research in Africa (FARA), FORNESSA, and the SADC Tree Seed Centre Network.

National partners include: various national tree seed centres; national agricultural, forestry and horticulture research institutes; universities; national health authorities (for fruit and medicinal species); national extension systems; and quarantine authorities. The national partners primarily engage with in developing and testing methods, developing improved germplasm and propagation methods, conservation of individual tree species, and assembling range-wide collections. In addition, nationally-based NGOs and CBO partners are engaged in scaling up research.

## Global Research Project 2: Enhancing productivity of agroforestry systems

### Project Overview and Rationale

#### *Project Goal*

Smallholder farmers benefit from the combination of local and science-based knowledge on managing the interactions between trees, animals, crops, soils and climate, within the constraints of labour, capital, markets and prevailing policies.

#### *Project Objectives:*

1. Analyze economic and ecological opportunities of diversified and intensified agroforestry systems, including use of tree crops, and develop principles and guidelines for improved agroforestry management and integration of agroforestry on tropical smallholder farms.
2. Assess the efficiency of nutrient and water and use of agroforestry systems for smallholder farmers and support pathways for increasing these efficiencies and maintaining soil fertility.
3. Identify sustainable management options for tree diversity on farms based on tradeoffs between economic, environmental and cultural benefits, local (gender specific) resource availability and in the context of biotic, abiotic and economic stress factors and uncertainty.

#### *Rationale*

Although it is generally recognized that agroforestry practices can contribute to increased productivity and provision of environmental services in many ways – through diversified tree products, secured soil health, and enriched livestock feeds, for example --, there are major gaps in knowledge and between knowledge and its use.

Smallholder farmers around the world have seen little improvement in their welfare because prices for basic necessities are higher, agricultural productivity has stagnated, and input costs have increased faster than revenues, while production and market risks remain high. Most farmers in the tropics are not insured and operate in an environment of high uncertainty. They rely on local social networks – that may well share the same exposure to risk factors – for this function. Following the recommendations of agricultural advisors, many farmers have also become less insulated from risk because they now focus on monoculture production or on only one dominant farming enterprise.

Rainfall variability (and possibly climate change) as well as land degradation and desertification are among the most important obstacles to the achievement of food and/or income security. Yet, reduction of the planned, established and managed diversity of agricultural systems has impacted negatively on the stability of ecosystems, rendering them less able to cope with environmental shocks. At the same time, fragmentation of tropical landscapes has resulted in reduced availability and increased costs of products and services that could previously be obtained from natural ecosystems adjacent to farming areas. Whereas agroforestry systems can play an important role by providing new sources of ecosystem products and services, there is lack of information on the best ways to diversify agroforestry systems for optimal benefits for both the small-scale producers as well as the global community. This also includes the role of trees and agroforestry in mitigating the vulnerability of rural communities and their resilience to recover from natural and man-made disasters (e.g. excessive droughts, earthquakes, tsunamis and political conflicts). At the same time, it is expected that there is a marketing niche for small and medium-scale tree production systems that can offer greater livelihood options to farming communities than some well-established global monoculture cash crop production systems such as coffee, tea, rubber, cashew nut or cocoa.

Inadequate water supply is major constraint to agricultural production in dry lands. In many cases, however, rains provide adequate quantities of water for optimal crop production but this water is

lost, usually by overland flow, before the vegetation can use it. Water is also lost through poor tree management and landscape planning. For example, some fast growing tree species such as eucalyptus, pines and acacias are increasingly depleting the environment because their fast growth is matched by higher water and nutrient consumption.

Documented local and ‘scientific’ ecological knowledge on tree selection and management on farms is hardly available or non-existent for most native tree species. There is therefore a dire need to generate such information, which could be used in strategies for integrating trees on small farms for increasing food and tree crop productivity. Information is also lacking on the tradeoffs between economic and environmental benefits of indigenous tree species that are presently over-exploited in the wild and underutilized in agricultural systems.

GRP2 has two research outputs:

GRP2.1: Decision support tools for diverse and resilient integration of tree resources on farms developed, in the face of climate change and economic uncertainty, based on consideration of costs, benefits, risks and trade-offs at farm level.

GRP2.2: Principles, methods and practices for enhanced growth, productivity and efficiency of water and nutrient use of farming systems.

### **Outputs Description**

#### ***Changes from previous MTP***

This GRP includes most of the research activities and outputs of GRP2 (Improved on-farm productivity of trees and Agroforestry Systems) mapped out in the previous MTP 2009-2011. However, there are some changes in the grouping of project outputs following the Centre’s new Research Strategy 2008-2015 and developments in our science. The current GRP2 research outputs could be more clearly regrouped under two headings: 1) intensification and diversification (associated with resilience and adaptation to climate change) linked to integration of components through design and management of AF practices (in the light of costs, benefits and risks). 2) Enhanced growth, productivity and efficiency of water and nutrient use of farming systems. Thus the two previous output areas GRP2.1 (costs, benefits and risks of Agroforestry technologies and systems under varying conditions), GRP2.2 (principles, methods and practices developed for improved tree and Agroforestry management) were regrouped.

#### ***Output Description***

*GRP2.1: Decision support tools for diverse and resilient integration of tree resources on farms developed, in the face of climate change and economic uncertainty, based on consideration of costs, benefits, risks and trade-offs at farm level.*

GRP2.1 helps to better understand the system resilience through increasing agro-biodiversity and microclimates studies through mixed agroforests at farm level, including bio-fuels. The potential for Agroforestry to enhance farmers’ adaptive methods and strategies that are effective in coping with current stresses need to be investigated. Agroforestry options on-farm level may provide a means to diversify and intensify production of smallholder farming systems. The subproject addresses specifically climate change adaptation strategies for ecosystems and rural communities, land degradation issues and desertification.

GRP2.1 also addresses the need to understand the principles of managing integrated systems, including the identification and evaluation of options, testing of scaling up approaches, and the synergies or tradeoffs between improved economic returns, short-term market production, pest and diseases risks and long-term sustainability of the systems. The costs, benefits and risks of such intensified and diversified systems have to be understood and synthesized into management principles for smallholder farmers.

Partners contributing to GRP2.1 include:

- ◆ CGIAR Centres: ICRISAT, ICRISAT, ILRI, Biodiversity International and CIAT, TSBF
- ◆ Advanced research institutes (ARIs) and other centers: CIRAD, ICIPE
- ◆ UN institutions: UNFCCC, UNEP, FAO and partners (Sahel Eco).
- ◆ Universities: University of Hohenheim, Germany; University of Gottingen, Germany; Ghent University, Belgium; University of Copenhagen, Denmark, Bogor Agricultural University, Indonesia; University of Malawi, Malawi; University of Nairobi, Kenya; Jomo Kenyatta University of Agricultural Sciences, Kenya; University of Rwanda; Universidade Federal Rural do Rio de Janeiro, Brazil and Universidade Federal do Paraná, Brazil.
- ◆ National agricultural research systems (NARS) representing national agriculture, forestry and livestock research.
- ◆ Development agencies, Local governments and NGOs.
- ◆ Private bodies: Mars Inc.
- ◆ Networks: SearNet, etc.

**GRP2.2: Principles, methods and practices for enhanced growth, productivity and efficiency of water and nutrient use of farming systems.**

GRP2.2 addresses specifically the role of Agroforestry in enhancing the performance of smallholder farming systems by increasing the productivity of associated crop and livestock systems, enhancing water and nutrient productivity and use efficiency by trees, leading to more diverse and intensive production systems and generating income through medium- and high-value tree products. Prime examples of how Agroforestry can contribute to rural livelihoods include rubber-based Agroforestry systems in Southeast Asia and West Africa, shea and baobab tree-based parklands in West and Central Africa, cacao production system in West Africa and Southeast Asia, coffee systems in Latin America, Africa and Southeast Asia and smallholder timber production in all three continents, especially where accessible forest resources have been depleted. There are also vast opportunities for Agroforestry to have wider poverty reduction impacts through market-driven and locally led tree cultivation systems, but these openings are not well understood by policy makers and shapers, development planners, researchers and donors. Hence, there is need for more research to demonstrate the existing use and impacts of these systems.

Partners contributing to GRP2.2 include:

- ◆ CGIAR Centres: International Water Management Institute (IWMI), ICRISAT, ILRI, Biodiversity International and CIAT, Tropical Soil Biology and Fertility Institute (TSBF)
- ◆ Advanced research institutes (ARIs) and other centers: ICIPE
- ◆ UN institutions: FAO and partners
- ◆ Universities: University of Hohenheim, Germany; University of Gottingen, Germany; Ghent University, Belgium; University of Copenhagen, Denmark, Bogor Agricultural University, Indonesia; University of Malawi, Malawi; University of Nairobi, Kenya; Jomo Kenyatta University of Agricultural Sciences, Kenya; University of Rwanda.
- ◆ NARS representing national agriculture, forestry and livestock research.
- ◆ Local governments and NGOs.
- ◆ Water productivity and use partners (FAO, IWMI, Rainwater Partnership, International Rainwater Catchment Systems Association, Southern and Eastern Africa Rainwater Network (SEARNET), International Rainwater Harvesting Alliance).
- ◆ CFC, IFAD
- ◆ Private bodies: Mars Inc.

***Alignment to CGIAR Priorities (Output Level)***

GRP2.1 aligns to CGIAR System Priorities:

3D: Sustainable income generation from forests and trees  
 and has secondary links with:  
 3A: Increasing income from fruits and vegetables  
 4A: Integrated land water and forest management at landscape level  
 4D: Sustainable agro-ecological intensification in low and high-potential areas  
 5D: Improving R&D options to reduce rural poverty and vulnerability

GRP2.2 aligns to CGIAR System Priorities:

4C: Improving water productivity  
 and has secondary links with:  
 3A: Increasing income from fruits and vegetables  
 4A: Integrated land water and forest management at landscape level  
 4D: Sustainable agro-ecological intensification in low and high-potential areas  
 5D: Improving R&D options to reduce rural poverty and vulnerability

### ***Countries of Planned Research (Output Level)***

GRP2.1 and GRP2.2 work is applicable to all regions where the centre is working including Latin America region, but the priority countries are:

*GRP2.1:* Ethiopia, Kenya, Rwanda, Uganda, Malawi, Tanzania, Zambia, Zimbabwe, Cameroon, DR Congo, Burkina Faso, Gambia, Ghana, Guinea, Niger, Nigeria, Senegal, Sierra Leone, India, China, Indonesia, Philippines, Thailand, Vietnam, Brazil, Peru, Mauritania,

*GRP2.2:* Ethiopia, Kenya, Malawi, Tanzania, Zambia, Zimbabwe, Cameroon, DR Congo, Burkina Faso, Niger, Nigeria, Senegal, Sierra Leone, India, China, Indonesia, Philippines, Thailand, Brazil, Mauritania,

### **Impact Pathways by Output**

GRP2 will focus on the farm scale interactions between trees and livelihoods, in between the tree germplasm quality issues, selection and participatory tree domestication work including biofuels of GRP1, the market forecasting and market chain analysis including certification systems value chain aspects of GRP3, the dynamics and drivers of land use change and rehabilitation of degraded lands of GRP4, and the landscape-scale interactions of GRP6. Adaptation and vulnerability to climate change with GRP5 is a cross cutting area and will be closely linked to GRP2 as a part of the context for Agroforestry systems research. The work conducted in GRP6 on policies and environmental services will be in part informed by GRP2 outputs.

The primary impact that this GRP targets is: Agroforestry management and tree-based intensification options on farm are understood and used by smallholders to match livelihood strategies and available resources

Output GRP2.1 is expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are:

1. More diverse Agroforestry principles and options for smallholder farmers to will be adapted and applied by research and development organizations in face of climate change.
2. Development programs for smallholder farmers include Agroforestry management options among intervention choices they consider, and use improved tools and knowledge to make more informed choices on integrating Agroforestry into farming systems.
3. Researchers targeting Agroforestry systems for smallholder farms have access to and use improved methods of system analysis, experimentation and support of farmer-level learning, as well as information critical for adjusting research agendas.

4. Smallholder farmers across the tropics maintain and enhance intensified and diversified farming systems with more productive and sustainable tree-based options for the supply of products for local use and markets, and the provision of local services.

This output is expected to enhanced use of knowledge and economic decision support systems in agroforestry praxis. The intended users include researchers in NARS, ARIs and universities, project developers, planners in government, Ministries of agriculture and natural resources and other development institutions, extension systems, NGOs, CBOs, private sector, land users and smallholder farmers. Policy makers and policy shapers concerned by large-scale scale development will benefit from the output of this subproject.

Output GRP2.2 is expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are development organizations and policy makers use principles and techniques (for nutrient, water, pest and disease, etc.) for more effective Agroforestry development.

The beneficiaries of the outputs generated in this project include researchers in NARS, ARIs, universities, UN institutions, Ministries of agriculture and natural resources and other development institutions. Policy makers and policy shapers, extension systems, NGOs, CBOs, private sector, land users and smallholder farmers will benefit from theses outputs. I think it is best to say that land users and farmers are the end users – they will not directly use the outputs as will the other organizations listed above. The end beneficiaries of the information will be smallholder farming communities, benefiting from the uptake of the project's outputs.

Target ecoregions for GRP2 are:

*Sub-Saharan Africa*

RAEZ 1: Warm arid and semi-arid tropics (AEZ 1):

- West Africa: Burkina Faso, Guinea, Mali, Niger, Nigeria and Senegal;
- East Africa: Ethiopia, Kenya, Tanzania and Sudan;
- South Africa: Angola, Botswana, Madagascar, Malawi, Mozambique, Zambia and Zimbabwe.

RAEZ 2: Warm sub-humid tropics (AEZ 2):

- East Africa: Kenya, Uganda, Tanzania;
- South Africa: Malawi, Mozambique, Zambia and Zimbabwe.

RAEZ 3: Warm humid tropics (AEZ 3):

- West Africa: Cameroon, DR Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Sierra Leone

RAEZ 4: Cool tropics (AEZ4):

- East Africa: Rwanda, Ethiopia, Kenya and Tanzania.

*Asia and the Pacific*

RAEZ 8: Warm arid and semi-arid tropics (AEZ 1):

- Parts of India and Thailand.

RAEZ 9: Warm sub-humid tropics (AEZ 2):

- India, Sri Lanka and Thailand.

RAEZ 10: Warm humid tropics (AEZ 3):

- Indonesia, Philippines, Vietnam, Kampuchea, Laos, Thailand, South West China, Bangladesh, Sri Lanka

RAEZ 11: Warm arid and semi-arid subtropics with summer rainfall (AEZ 5):

- China, India.

#### *Latin America*

RAEZ 17: Warm humid tropics (AEZ 3):

- Brazil, Bolivia, Peru

RAEZ 18: Cool tropics (AEZ 4):

- Bolivia, Peru

GRP2 will collaborate with the reformulated African Highlands Initiative and ASB Partnership for the Tropical Forest Margins in evaluating impacts and tradeoffs of agroforestry-based farming systems. It also works closely with Program 4 ‘Poverty alleviation and sustainable management of water, land and forest resources’ of the CGIAR MTP for West and Central Africa.

#### ***International Public Goods (IPGs)***

Key IPGs generated by GRP2.1 are:

1. Strength-weakness analysis and appraisal of intensification options for agroforestry systems linking local and scientific ecological knowledge and cost-benefit analyses.
2. Management principles enhancing tree diversity and conservation agriculture on small farms developed.
3. Experiences synthesized and lessons learnt on the adoption, promotion and impact of agroforestry and natural resource management technologies on rural income and welfare, linking farmer management decisions to dynamics of local knowledge and roles for information providers.
4. Analysis of options to increase bioenergy/biofuel production on farm as part of diversification and self-reliance.
5. Analysis of farmer decision making and trade-offs between economical, environmental and cultural benefits of changes in tree species richness and evenness within tropical farming systems.

Key IPGs generated by GRP2.2 are:

1. Modeling approach linking tree architecture, allometry and mixed stand models (FBA and SeXI-FS) to tree diversity and agroforest management options.
2. Tree-soil-crop interaction model (WaNuLCAS) for evaluating water and nutrient management in the context of intercropping design and tree management in agroforestry in relation to soil and climate conditions.
3. Strategies on agroforestry based soil fertility practices developed for smallholder farmers: trees supporting soil fertility for crops, crops supporting nutrient management for trees.
4. Impacts quantified and compared of agroforestry systems on nutrient balance, including water conservation and productivity assessed in Africa and Asia.
5. Lessons learnt from user acceptability of agroforestry and national policy design with implications for scaling up the practices in Africa and Asia

Through this global project, World Agroforestry Centre will focus more on understanding the constraints and opportunities at larger scales (and not about individual farmer circumstances) such as major farming systems to be able to set priority research and development agendas in the development of productive Agroforestry systems for smallholders. World Agroforestry Centre is well placed to deliver IPGs based on their experience in analyzing lessons learnt on systems, strategies, approaches and methods for increasing agricultural productivity.

This global project will focus on developing principles and strategies for improving farming systems through tree diversification and intensification, and on identifying the attributes of species that can play useful functional roles while protecting the environment on-farm. It will also invest in the development of tools, databases, simulation models, guidelines, maps, practices and materials that regional, national and local researchers and development practitioners can use to help identify



Agroforestry solutions appropriate to their respective conditions. Moreover, the information on the management, nutrient and water use and productivity of various exotic and indigenous tree species occurring on-farm in various tropical sites have a critical IPG value as diverse natural and traditional farming systems are replaced by monoculture systems at very high rates in many agricultural systems.

Beyond research, this GRP will be an advocate for national policies that facilitate the adoption and adaptation of new and integrative approaches. GRP2 will also be involved in capacity building of scientists from key institutions on research approaches/methods and principles of Agroforestry in its specific area of expertise. The public will also be better informed about tradeoffs, costs and risks and synergies between ecological and economical benefits of growing different mixtures of tree species within farming systems for their improved livelihoods and sustainable environment.

### ***Elaboration of Partners' Roles***

The GRP will collaborate with the following key institutions as per their respective expertise contributing to the project outputs:

- IARC International Agricultural Research Centers: IWMI, ICRISAT, ILRI, Bioversity International, CIAT, TSBF
- ARIs Advanced Research Institute and other centers: CIRAD, ICIPE
- Development institutions: FAO, UNFCCC, Common Fund for Commodities (CFC), International Fund for Agricultural Development (IFAD); ACIAR and SANREM CRSP
- Universities: University of Hohenheim (Germany); Ghent University (tree diversity on farm); University of Copenhagen (Fruit trees on farm in WCA/Sahel), Bogor Agricultural University, Indonesia; University of Malawi; University of Rwanda; Universidade Federal Rural do Rio de Janeiro, Brazil and Universidade Federal do Paraná, Brazil.
- NARI National Advanced Research Institute, representing national agriculture, forestry and livestock research.
- Local governments for Ministries and governmental organizations and agencies
- NGOs Non-governmental institution (e.g. Sahel Eco, World Vision etc).
- Water productivity and use partners (FAO, IWMI, Rainwater Partnership, International Rainwater Catchment Systems Association, Southern and Eastern Africa Rainwater Network (SEARNET), International Rainwater Harvesting Alliance).
- Private sector and Foundations: Mars Inc.

The following table shows the strategic roles of different partners:

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
IARC	ICRISAT	Assist in improved water productivity and diversifying agriculture into high-value crops in the dry lands.	GRP2.1, GRP2.2 & GRP 2.3	Global
IARC	Bioversity International	Offer expertise on methods of assessing and in-situ conservation of the agro-biodiversity for developing strategies of tree genetic conservation on small farms within diversified farming	GRP2.2 & GRP 2.3	Global

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
		systems.		
IARC	IWMI	Collaborative research in improved water productivity in Agroforestry systems and upgrading rain fed agriculture at basin level	GRP2.2	Global
IARC	TSBF	Provide expertise on nutrient cycling and soil fertility issues.	GRP2.2 & GRP 2.3	Global
IARC	CIAT	Assist in assessing constraints and opportunities of Agroforestry systems for improved food security.	GRP2.2 & GRP 2.3	Gobal
IARC	ILRI	Assisting the integration of fodder trees and shrubs into livestock systems particularly on farm level.	GRP2.2 & GRP 2.3	Global
ARI	CIRAD	Give expertise on some tree-based farming systems such as coffee, cocoa and palm oil would facilitate analyzing the potential to integrate Agroforestry in smallholder high-value tree crop systems, and assess various values and trade-offs of such systems.	GRP2.2 & GRP 2.3	Global
ARI	ICIPE	Give expertise on pests associated with farming systems in the tropics for their enhanced management.	GRP2.2 & GRP 2.3	Global
Universities	University of Hohenheim (Germany); Ghent University (tree diversity on farm); University of Copenhagen (Fruit trees on farm in WCA/Sahel), Bogor Agricultural University, Indonesia; University of Malawi; University of Rwanda,	Assisting on the research of various aspects on the adoption and impact of integrating indigenous fruit trees, timber trees, medicinal and pesticidal plants on small farms; and assessing tree diversity on-farm; research tools and methods and results mainstreamed into university curricula.	GRP2.1, GRP2.2 & GRP 2.3	Southeast Asia, West and Central Africa, Eastern Africa, and Southern Africa

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
	Queensland University; Universidade Federal Rural do Rio de Janeiro, Brazil and Universidade Federal do Paraná, Brazil.			
Development organization	FAO	Approaches in market analysis for non-forestry products and taking the developed science and technologies to beneficiaries at multiple levels.	GRP2.2 & GRP2.3	Global
Development organization	UNFCCC	Meetings for international policy formulation	GRP2.1	Global
Development organization	IFAD, CFC, ACIAR, SANREM CRSP	Providing resources for research on economical cultivation on smallholdings through adoption of improved technologies and diversified farming systems	GRP2.1, GRP2.2 & GRP 2.3	Global
Regional Organization	Coffee Network (CAFNET)	Participate in the assessment of coffee-based Agroforestry systems in East Africa.	GRP 2.3	Eastern Africa
Government	Local governments for Ministries and governmental organizations and agencies	Participate and facilitate action research and extension of new technologies to farmers and field workers, and policy/decision makers; scaling up of research output; facilitation in policy review and improvements.	GRP2.1, GRP2.2 & GRP 2.3	Southeast Asia, West and Central Africa, Eastern Africa, and Southern Africa and
NARI	National Advanced Research Institutes for various countries	Nutrient and water productivity and use partners: Rainwater Partnership, International Rainwater Catchments Systems Association (IRCSA), Southern and Eastern Africa Rainwater Network (SEARNET).	GRP2.2 & GRP2.3	National and Global levels
Private Foundation	Mars Inc	Providing resources and	GRP23	West and

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
		intelligence for research on the cultivation and trade of cocoa.		Central Africa

## Global Research Project 3: Improving tree product marketing for smallholders

### Project Overview and Rationale

#### *Project Goal*

Smallholder benefit from tree product and service value chains and strengthened marketing systems, by improved skills and access to markets and information.

#### *Project Objective*

1. Enhance smallholders' access to value chains for agroforestry tree product (AFTP)
2. Improve government and NGO support for marketing strategies and market performance for increased rural incomes and improved livelihoods.

#### *Rationale*

Small-scale farmers and entrepreneurs usually lack business skills, have limited access to agroforestry tree product markets, and have little access to information on market demand. They are poorly organized and lack assured and stable markets. It is therefore not surprising that they face high marketing risks and costs, and earn low returns from marketing their tree products.

Governmental and non-governmental organizations seeking to facilitate smallholder marketing, also face critical problems. There are few tools available to assess market opportunities, or to help farmers exploit available opportunities like adding value to products from the farm. These facilitating organizations also find that there are few market demand assessments and few business investment models for tree product investors.

To make matters worse, both sets of actors face problems in the enabling environment that act as disincentives to marketing produce. The inadequate institutional support for marketing (e.g. credit, market information) and skewed policies, barriers and disincentives make it difficult for smallholders to market their produce. There is an absence of quality assurance schemes for Agroforestry tree products and services production and marketing. Trade for some products is over-regulated (e.g. on-farm timber) while in other cases it is under-regulated (e.g. herbal medicines). Many policy makers still view private traders as a parasitic class rather than as a resource that can generate wealth in rural areas. Also, they do not often perceive the potential for tree products to generate significant incomes for smallholder farmers.

GRP3 has two research outputs:

GRP3.1: Approaches for improving smallholder access to tree product value chains

GRP3.2: Improved marketing strategies to enhance the performance of tree product value chains and smallholder livelihoods.

### Outputs Description

#### *Changes from previous MTP*

In GRP 3.1, we broadened the focus on certification systems to include quality assurance systems for production and marketing. In GRP 3.2, we dropped a research question, in order to better focus on the three remaining questions. We also clarified the distinction between the two outputs in terms of research questions, partners, and audiences. There is still some overlap but also greater distinction between the two than previously.

#### *Description (Output level)*

GRP3.1: *Approaches for improving smallholder access to tree product value chains*

The development of approaches for improving smallholder access to tree product value chains focuses on three research issues:

- How and under what circumstances can quality assurance systems for production and marketing of Agroforestry products help the poor? How can the poor gain better access to certified markets? The demand for products that have been produced under quality assurance systems is rising rapidly, offering poor farmers potentially high returns. But research is needed to assess how farmers can access these high-return enterprises. Our research compares and analyzes three certification opportunities for farmers, eco-certified jungle rubber in Indonesia, Shea products in the Sahel, and shade coffee in East Africa.
- How can collective action improve farmers' access to markets, enhance livelihoods and help market performance (e.g. outgrower schemes)? What are the drivers and triggers, and how can barriers be overcome? Collective action can help farmers sell produce in bulk, solving a key constraint that smallholders face in marketing their produce. Collective action also helps farmers to reduce input costs, access external assistance, and foster learning and experimentation. Our research focuses on the role of farmer groups in improving market access and how Land Care, farmer organizations for promoting sustainable farming and livelihoods, can improve market access. Areas of research are East Africa and Southeast Asia.
- What key factors contribute to successful and sustainable linkages between farmers and the private sector? How do they vary over space, time, and product type? Here we test approaches for implementing public private partnerships and how to build trust and market arrangements that are mutually beneficial for both smallholders and private enterprises.

Key partners include the Coffee Research Foundation, Kenya, Coopérative pour la Promotion des Activités Café (Rwanda), National Agricultural Research Organization (Uganda), Land Care Australia, and Unilever Ltd.

*GRP3.2: Improving marketing strategies to enhance the performance of tree product value chains and smallholder livelihoods.*

Our research focuses on three strategies for enhancing value chain performance and improving livelihoods:

- What are the opportunities and constraints of linking smallholders directly to traders and agribusinesses versus promotion of cottage industries? The answer depends on a range of factors: product characteristics, farmer capacities, resource availabilities, and social capital. Guidelines and decision support tools can help facilitating agencies to make informed decisions so as to help farmer organizations to market products in the most beneficial manner. We are conducting research in this area on fruits in central Africa and southern Africa.
- Can vouchers and other innovations help strengthen private seed and seedling markets? Instead of receiving seedlings for free, farmers exchange a ticket (voucher) for seedlings from nursery owners; the nursery owner then receives compensation for the voucher from a project. This system helps promote private supply systems, in that the farmer gets used to procuring seedlings from the nursery and private nurseries are supported instead of project nurseries. We will test the system at three sites, Cameroon, Malawi, and in Kenya.
- How can organizations and entrepreneurs decide which enterprises are most viable in their area? How can models be used to assess ex-ante feasibility and profitability of such enterprises? We are developing a model to assess the feasibility of leaf meal enterprises for marketing fodder; such enterprises are very common in Asia but are found at only one site in Kenya. The model will be tested in Mali and in Rwanda.

#### ***Alignment to CGIAR System priorities (Output level)***

GRP3.1 aligns to CGIAR System Priorities:

3A: Increasing income from fruits and vegetables  
and has secondary links with:

5C: Rural institutions and their governance

5D: Improving R&D options to reduce rural poverty and vulnerability

GRP3.2 aligns to CGIAR System Priorities:

3D: Sustainable income generation from forests and trees

and has secondary links with:

3A: Increasing income from fruits and vegetables

5B: Making international and domestic markets work for the poor

5C: Rural institutions and their governance

5D: Improving R&D options to reduce rural poverty and vulnerability

### **Countries of Planned Research (Output Level)**

GRP3.1: Ethiopia, Kenya, Rwanda, Uganda, Malawi, Tanzania, Cameroon, DR Congo, Mali, Indonesia

GRP3.2: Malawi, Cameroon, DR Congo, Mali

### **Impact pathways by Outputs**

GRP3 is at the interface of the farm and the value chain, and is thus closely linked to the trees and agroforestry systems that produce the outputs that are to be marketed. Actual income from tree products is also a major consideration in the success of land health and landscape services concerns of GRP's 4, 5 and 6.

The primary impact that this GRP targets is: Smallholders have greater access to existing and emerging markets for Agroforestry products

Key outcomes of this output include increased smallholder access to and participation in more cohesive and sustainable farmer organizations, more effective public-private partnerships, and better targeting of certification interventions to smallholders, the rural poor and women. These in turn will lead to increased marketing, better negotiating power, and higher prices, which will all help smallholders to improve their livelihoods. Output GRP3.1 is thus expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are:

1. Quality assurance interventions that is more accessible and beneficial to smallholder farmers.
2. More effective farmer organizations that negotiate higher prices for farmers, lower transaction costs and facilitate flows of market information.
3. Women's organizations and organizations supporting women use improved approaches for engaging women in collective action for marketing.
4. Private companies and public organizations make more informed decisions and enhance collaborative actions.

Main users include organizations facilitating improved smallholder access to markets including non-governmental organizations, government extension services, and policy makers as well as farmer organizations trying to help their members. Outputs will be written up in the form of guidelines, manuals, and policy briefs and capacity building of staff of the facilitating organizations will be an important means of communicating the findings. Other key audiences include private corporations seeking to increase tree product marketing and certification bodies seeking to benefit the poor. In addition to distributing manuals and guidelines to them and conducting capacity building events, we will also communicate our findings directly to such groups via workshops and consultations.

Output GRP3.2 is expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are:

1. Farmer organizations, private companies and entities supporting them making sounder investment and marketing decisions on Agroforestry products.
2. Greater understanding and use of vouchers in seed and seedlings supply systems.

### 3. Improved policies to support development of Agroforestry related enterprises.

Our main outcomes include stronger linkages between smallholders and the private sector, improved policies to support smallholder marketing and enterprises, more effective farmer organizations, more numerous and more equitable, profitable and sustainable farmer enterprises, including nurseries. Other outcomes include improved representation of smallholder associations in policy making, strengthening of the private sector in seed/seedling marketing, and enhanced entrepreneurial capacity-building among partner organizations such as NGOs and government extension services. These will help farmers improve the prices they receive, reduce transactions costs, improve their incomes and enhance sustainable livelihoods.

Main users include organizations facilitating farmer enterprises including non-governmental organizations, government extension services, and policy makers as well as farmer organizations trying to help their members. Outputs will be written up in the form of models, guidelines, manuals, and policy briefs and capacity building of staff of the facilitating organizations will be an important means of communicating the findings. Other key audiences include private corporations seeking to increase tree product marketing. In addition to distributing manuals and guidelines to them and conducting capacity building events, we will also communicate our findings directly to such groups via workshops and consultations.

Target ecoregions for GRP3 are:

#### *Sub-Saharan Africa*

RAEZ 1: Warm arid and semi-arid tropics (AEZ 1):

- West Africa: Burkina Faso, Guinea, Mali, Niger, Nigeria and Senegal
- South Africa: Angola, Botswana, Madagascar, Malawi, Mozambique, Zambia and Zimbabwe

RAEZ 3: Warm humid tropics (AEZ 3):

- West Africa: Cameroon, DR Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Sierra Leone

RAEZ 4: Cool tropics (AEZ4):

- East Africa: Rwanda, Ethiopia, Kenya and Tanzania.

#### *Asia and the Pacific*

RAEZ 10: Warm humid tropics (AEZ 3):

- Indonesia, Philippines, Vietnam, Kampuchea, Laos, Thailand, SW China, Bangladesh, Sri Lanka

### **International Public Goods**

IPGs produced by GRP3.1 are:

1. Decision support tools to assist facilitating agencies and farmer organizations decide whether to seek value adding activities or to link with private sector operations that do so.
2. Guides for governmental and non-governmental organizations to facilitate the establishment and effectiveness of farmer groups and associations; best institutional innovations for collective marketing
3. Diagnostic and analytical tools for identifying market opportunities and assessing the performance of Agroforestry tree product value chains
4. Decision support tool to help farmer groups and organizations decide whether and how a certification scheme can benefit smallholders.
5. Model for assessing the viability of leaf meal enterprises in different locations in Africa as basis for impact studies

IPGs produced by GRP3.2 are:



1. Guidelines on the use of vouchers to promote effective private sector seedling supply systems. . Conceptual framework and decision support tools for guiding different types of partnerships, such as public-private partnerships, and assessing tradeoffs among options.
2. A synthesis of the impacts of different types of farmer enterprises on community structures
3. Publication on best practices for equitable and effective farmer enterprises, considering issues of social stratification, gender and economic differentiation.
4. Action research experience with assisting small scale seed vendors and nursery operators to form associations so as to assess the advantages and disadvantages of such associations and generate lessons (international public goods) for promoting them.

Additional IPGs beyond research include:

'Action research':

- Assisting small scale seed vendors and nursery operators to form associations so as to assess the advantages and disadvantages of such associations and generate lessons (international public goods) for promoting them
- Assisting small scale seedling vendors to market seedlings using vouchers, in order to test the advantages and disadvantage of this system relative to other approaches

Capacity building: Conducting training courses and developing training curricula assists in disseminating best practices and assuring that lessons and international public goods are disseminated to a wide range of partners as well as to teachers and students in educational institutions.

Development-support: Facilitating the dissemination and use of training materials and decision-support tools by beneficiaries and end users

### Elaboration of Partner Roles

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
University	Univ of Ghent	Expertise on non-forest timber product research in west and central Africa. Build capacity of national research staff.	GRP 3	Central Africa
NARS	IRAD, INERA	Assist in generating research outputs and wide diffusion of research methods and results	GRP 3.1 and 3.2	Central Africa
NGOs	FONJAK, ADEAC, MIFACIG, OPFCR, SNV, WWF,	Wide diffusion of research results; Feedback from communities/clients	GRP 3.1 and 3.2	Central Africa
Government	Ministries of Forest, Commerce, Small and Medium Enterprises	Wide diffusion of research results; joint generation of policy recommendations	GRP 3.1 and 3.2	Central Africa
Dev Org	UNCTAD	Assist in developing and disseminating policies and assist in generating research outputs	GRP 3.1	Global
IARC	ILRI	Expertise in livestock	GRP 3.2	East Africa

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
		systems		
University	Bunda College	Research capacity and knowledge of Malawi	GRP 3.1	Malawi
NGO	Malawi Agricultural Commodity Exchange	Capacity building in market information systems	GRP 3.1	Malawi
NGO	National Small Farmers Association of Malawi	Capacity building and grass roots organizational capacity	GRP 3.1	Malawi
NGO	Technoserve	Business Development Services; Strategies for enterprise development	GRP 3.2	East Africa
Private sector	Unilever	Product development and marketing	GRP 3.1	Africa

We seek to strengthen the science and practice of Agroforestry tree product marketing based on the guidance of a centre-commissioned external review on marketing and the Centre's third External Programme and Management Review (EPMR). We envision strengthening our teams through working more closely with partners. We have already initiated partnerships with national public institutions in southern Africa and South Asia. At the international level, we will work with certification bodies, advanced research institutions, and international NGOs (e.g. Landcare, Technoserve). Our main CGIAR partners are IFPRI, ICRISAT, CIFOR, and the Collective Action and Property Rights Initiative. At the national and local level, we work with agricultural research institutions (NARS), universities, NGOs, (including micro-finance institutions) community based organizations, private businesses and farmer associations.

Key partners with whom we conduct collaborative research on certification include the Coffee Research Foundation, Kenya, the Rwandan Coffee Office, and the Coopérative pour la Promotion des Activités Café (Rwanda) in East Africa. The Kunming Institute of Botany, Yunnan (China) is collaborating on Shea product research, conducting laboratory analyses of Shea products. Concerning collective action, key partners include National Agricultural Research Organization (Uganda) and Land Care International. On public-private partnerships, Unilever Ltd. and SNV (Netherlands) are key partners.

On issues of adding value vs. linking with private sector, we work with Bunda College of Agriculture and Dariboard Ltd. in Malawi and IFPRI, Technoserve and Sunny Industries in Kenya. On vouchers, our main research partner is ICRISAT. On equitable enterprises, we work with Tschang University of Agriculture (Cameroon) and with CIFOR. On models for assessing the viability of leaf meal, we work with the Institut de l'Economie Rurale in Mali and the National University of Rwanda.

Presently, at the multinational private sector level we work with Unilever, Mars Inc., AAK and ITC, and expect other private sector actors and policy makers to use our tools for improving linkages with farmers and certification bodies, and to adopt recommendations for increasing smallholder access.

## Global Research Project 4: Reducing land health risks

### Project Overview and Rationale

#### *Project Objectives*

GRP4's objectives are to:

1. Develop multi-scale and widely usable land health surveillance methods that can provide information on where land problems exist and where the major risks are.
2. Quantify and map these major risks to land health in the tropics, target land management and Agroforestry interventions to reduce and reverse these risks at different scales, and evaluate outcomes of intervention programmes
3. Develop national capacity in operational land health surveillance methods and tools.

#### *Rationale*

Land degradation is a global threat to habitat, economy and society, and is the overarching environmental issue of concern in Africa, threatening food security, ecosystems and livelihoods. Soil degradation and fertility decline is a major concern for food security in developing countries. However, current measurement and information systems on land degradation in developing countries are grossly inadequate for the task of planning and evaluating land health<sup>4</sup> and Agroforestry policy and practice. In particular, there is a lack of systematic data on land health risks to enable efficient targeting of land management and Agroforestry interventions<sup>5</sup> and to answer questions such as:

What are the socioeconomic and biophysical determinants of land degradation (land health risks) and how are they geographically distributed?

How much future land degradation can be avoided or reversed through targeted action to reduce risks?

What is the impact of preventative and rehabilitation Agroforestry intervention programmes under different conditions?

GRP4 has two research outputs:

GRP4.1: Effective land health surveillance methods developed

GRP4.2: Land health risks assessed and Agroforestry interventions to reduce and reverse land degradation well targeted

### Outputs Description

#### *Changes from Previous MTP*

None

#### *Description (Output Level)*

GRP4.1: *Effective land health surveillance methods developed*

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<sup>4</sup> Land health is the capacity of land to sustain delivery of essential ecosystem services (the benefits people obtain from ecosystems). Ecosystem services are defined by the Millennium Ecosystem Assessment.

<sup>5</sup> Intervention means any promotive, preventive, curative, or rehabilitative activity where the primary intent is to improve land health and human well-being. GRP4 focuses on targeting and evaluations of programmatic interventions (as distinct from individual technology interventions).

Recent World Agroforestry Centre research advances in land health surveillance<sup>6</sup> are based on principles adapted from public health surveillance, where accurate measuring and monitoring of changes and improvements in the health of populations is closely integrated with statistical methods to form a scientific basis for policy development, priority setting and management. GRP4.1 builds on these advances and tackles the key methodological question: How can land health surveillance systems deploy modern science and technology to strengthen evidence-based decision-making on land and Agroforestry management at multiple scales, to help better (i) understand hazardous and protective factors affecting land health risk, (ii) target Agroforestry options, (iii) allocate resources and set priorities, and (iv) learn through quantitative monitoring and impact assessment?

*GRP4.2 Land health risks assessed and Agroforestry interventions to reduce and reverse land degradation well targeted*  
Through application of the land health surveillance methods, GRP4.2 aims to address the following research questions:

1. What are the main environmental and behavioural<sup>7</sup> risk factors associated with land and soil degradation syndromes in the tropics, and how are they distributed in relation to different settings and factors such as ecoregions and poverty levels?
2. What types of Agroforestry interventions can help reduce or reverse key risk factors associated with land degradation and what are the cost efficiencies of alternative preventative and rehabilitation interventions under different circumstances?

***Alignment to CGIAR priorities (output level)***

GRP4.1 aligns to CGIAR System Priorities:

- 4A: Integrated land water and forest management at landscape level
- 4D: Sustainable agro-ecological intensification in low and high-potential areas

and has secondary links with:

- 4C: Improving water productivity
- 5A: Science and technology policies and institutions

GRP4.2 aligns to CGIAR System Priorities:

- 4A: Integrated land water and forest management at landscape level
- 4D: Sustainable agro-ecological intensification in low and high-potential areas

and has secondary links with:

- 3D: Sustainable income generation from forests and trees
- 5D: Improving R&D options to reduce rural poverty and vulnerability

***Countries of Planned Research (Output Level)***

GRP4.1: Kenya, Malawi, Tanzania, Mali

GRP4.2: Kenya, Sudan, Uganda, Angola, Botswana, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe, Cameroon, DR Congo, Gabon, Burkina Faso, Equatorial Guinea, Ghana, Guinea, Liberia, Niger, Nigeria, Sierra Leone, Madagascar, Mauritania, Namibia, South Africa

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<sup>6</sup> The ongoing, systematic collection, analysis, and interpretation of data essential to the planning, implementation, and evaluation of land management policy and practice, and application of these data to the promotion, protection, and rehabilitation of land and ecosystem health. A surveillance system includes a functional capacity for data collection, analysis, and dissemination linked to land health programmes.

<sup>7</sup> Risk factors are attributes that are associated with an increased probability of a specific land health problem or outcome. Risk factors include biophysical and socioeconomic factors or exposures, and include behavioural as well as inherent characteristics. Protective as well as hazardous risk factors are also considered.

### **Impact pathways by outputs**

GRP4 Outputs build on the technology level assessment of trees on agroforestry farms and their market relations, studied in GRP's 1 and 3. GRP4 adds a programmatic perspective to the assessment of land health and the spatial targeting of interventions. GRP4 outputs also interact with those of GRP5 where climate change is an additional risk factor for land degradation, and GRP6 where land health is linked to a broader set of environmental services. The primary impact that this GRP targets is thus the widespread adoption of Agroforestry systems that avoid/revert land degradation problems and risks.

Output GRP4.1 is expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are:

1. Governments, UN agencies and funding agencies aware of benefits of land health surveillance science and technology.
2. Researchers use improved methods for land degradation and soil quality assessment.
3. Development implementers use improved tools and knowledge to make informed choices on improving land management and targeting Agroforestry interventions to enhance land productivity.

We expect that governments will take up the land health surveillance methods as an integral part of land management planning and practice. This assumes investments by Governments in new soil analytical equipment, geoinformatic facilities and staff capacity in associated quantitative techniques. To increase the likelihood of these outcomes, the project will play a key role in building capacity of tropical developing countries in modern scientific and technical approaches and tools for land assessment and management, e.g. geoinformatics and associated statistical analysis. Training and capacity building is needed to support a new generation of soil scientists and natural resource management professionals to ensure that the generated information can be used to improve land management and policy decision-making. The benefits of application of these methods by national programmes are summarized in GRP4.2. The increasing acceptance of the methods by national governments will depend on increasing their recognition by other advanced research institutes and donors in the short term – hence the project aims to integrate the methods into a range of project and programmes.

External partnerships include advanced research institutes such as the Earth Institute and Center for International Earth Science Information Network (CIESIN) at Columbia University in remote sensing, cyber infrastructure and biometrics; Michigan State University on methods development in remote sensing for carbon measurement; and national soil survey institutes and universities in Africa for capacity building in land health surveillance methods. The project is also working closely with the United Nations Environment Programme (UNEP), United Nations Development Program (UNDP), the World Bank, and NEPAD on integrating research and assessment methods into major land management programmes, such as TerrAfrica. Institutions helping to test and further develop soil-testing methods using infrared spectroscopy include Egerton, Jomo Kenyatta and Nairobi universities in Kenya, and with National Agricultural Research (IIAM) in Mozambique, Kenya Agricultural Research Institute in Kenya, Institut d' Economie Rurale (IER) in Mali, and the Tanzanian Agricultural Research Institutes. The same national research organizations and Ministries of Agriculture also help with land health surveillance (GRP4.2). The private sector works with the project on new technological developments, such as low cost infrared spectrometers for soil analysis in developing countries. For example Bruker Optics (Germany) is providing technical support to World Agroforestry Centre's network of near-infrared spectroscopy laboratories in Africa and the development of high throughput mid-infrared soil analysis.

Output GRP4.2 is expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are: 1) Evidence-based management principles and spatially explicit strategies are used to steer land management research and development programmes. 2) National scientists better target Agroforestry based land management options to specific land degradation problems and risks and assess intervention impacts. 3) Improved Agroforestry based land and soil management options applied and adapted by development organizations.

Improved information on land health risks and spatial targeting of Agroforestry interventions is expected to guide intervention priorities at a range of spatial scales. Better land health policy and management in turn results in healthier ecosystems through the enhancement of environmental services on the landscape, and improved rural livelihoods in developing countries through sustainable and productive management of agricultural landscapes. The project aims to achieve outcomes with a range of beneficiaries at different scales:

Regional scale: Policy development, priority setting and resource allocation decisions on land and soil management programmes by inter-governmental organizations, UN agencies, donors, non-governmental development agencies, and the private sector.

National scale: Policy development, priority setting and resource allocation decisions on land management programmes by governments and development agencies.

Local scale: Design of local extension and development programmes and targeting of land management recommendations to farmer communities by government local planners and extension services.

World Agroforestry Centre's role in ensuring outcomes and impacts is through (i) joint application of approaches and methods in large projects with national partners, (ii) capacity building of national programmes through MSc and PhD training, training courses, and hands-on training, (iii) dissemination of guidelines and training materials, and (iv) scientific and technical backstopping through advisory services to national programmes.

The main assumption is that national programmes and donors see the value of adopting scientific and systematic approaches to targeting land management intervention programmes and that they invest in developing sufficient scientific and technical capacity in national programmes for science-based land management. There is increased interest in addressing land degradation and soil fertility problems in tropical developing countries, especially Africa with the launch of TerrAfrica, AGRA and other initiatives. Demonstrating the value of land health surveillance information for sustainable development is also an important objective of this project. A major vehicle for achieving this is the Africa Soil Information Service Project<sup>8</sup>, funded by the Bill and Melinda Gates Foundation and AGRA, which is implementing land health surveillance methods throughout sub-Saharan Africa.

The land health surveillance system is modeled on surveillance approaches used in public health management. At present there are no consistent, large-area mechanisms for testing the efficacy of Agroforestry and other land management interventions in tropical developing countries. The project will (i) enable governments to provide practical, timely, and cost effective information at high spatial resolution about where specific land degradation processes occur in a given region or country, and how these are changing over time, (ii) provide a framework for rigorous scientific testing and implementation of locally relevant preventative and rehabilitative soil management interventions, addressing what works where, and (iii) provide practical policy and management advice to policymakers, scientists, development specialists, and farmers. The approaches and methods are

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<sup>8</sup> <http://www.africasoils.net/>

globally applicable but have greatest potential to accelerate development progress in tropical developing countries, where data on land condition and knowledge on appropriate targeting of land rehabilitation interventions are completely inadequate for the task at hand.

External partnerships include the Earth Institute and Center for International Earth Science Information Network (CIESIN) at Columbia University on land health surveillance in Africa; WWF, Michigan State University and CIFOR on carbon measurement systems; National soil survey institutes in Africa on field survey of land health; UN agencies (UNEP, FAO, UNDP, World Bank) on joint project implementation; the International Soil Reference Information Centre (ISRIC) on global soil information services; and other CGIAR centres, such as TSBF-CIAT on integrated soil fertility management, and ICRISAT and ICARDA on dryland degradation assessment.

Target ecoregions for GRP4 are:

The primary geographic focus is as for GRP4 is Sub-Saharan Africa but more specifically within the agro-ecological zones below the project will primarily target agro-ecosystems, primarily cultivated land and rangeland.

#### *Sub-Saharan Africa*

RAEZ 1: Warm arid and semi-arid tropics (AEZ 1):

- West Africa: Mali, Mauritania, Niger, Senegal, and parts of Burkina Faso.
- East Africa: Parts of Ethiopia, Kenya, Tanzania and Uganda.
- Southern Africa: Parts of Madagascar, Malawi, Mozambique, and Zambia.

RAEZ 2: Warm subhumid tropics (AEZ 2):

- Southern Africa: Parts of Malawi, Mozambique and Zambia.

RAEZ 3: Warm humid tropics (AEZ 3):

- Parts of Kenya and Ethiopia.

RAEZ 4: Cool tropics (AEZ 4):

- Rwanda, and parts of Ethiopia, Kenya, Madagascar and Tanzania.

#### *Asia and the Pacific*

RAEZ 8: Warm arid and semi-arid tropics (AEZ 1):

- Parts of India.

RAEZ 9: Warm subhumid tropics (AEZ 2):

- Parts of India.

#### *Latin America and the Caribbean*

RAEZ 17: Warm humid tropics (AEZ 3):

- Brazil

### **International Public Goods**

IPGs produced by GRP4.1 include:

1. Conceptual framework and measurement protocols for land health surveillance
2. Method for high-throughput diagnosis of soil and plant quality using infrared and X-ray spectral analysis, incl. protocol for wood moisture, density and carbon analysis using infrared spectroscopy and protocol for combined use of infrared and X-ray spectroscopic analysis of soil quality
3. Methods guidelines for satellite image processing and terrain modeling for soil health surveillance
4. Capacity building materials and technical backstopping service and capacity building materials on land health surveillance methods
5. Barrier analysis for adoption of land health improving practices in the context of comprehensive program design and impact studies

The international public goods envisaged by GRP4.1 include: land health surveillance approaches, methods, standards, tools and protocols; and capacity building in land health surveillance methods. Examples include new scientific concepts for evidence-based assessment of risk factors associated with land degradation, methods for low cost, rapid soil analysis using infrared spectroscopy, new statistical methods for digital mapping of land degradation and soil health that link ground observations to remote sensing information.

IPGs produced by GRP4.2 include:

1. Baseline remote sensing and ground data on soil and vegetation condition in sub-Saharan Africa.
2. Assessment of land health risks in sub-Saharan Africa for targeting agroforestry interventions.
3. Soil spectral and reference method library and interpretation models for soil functional properties for Africa Soil Information Service.
4. Baselines for assessing impacts of agroforestry projects in Africa on soil and vegetation health.
5. Comparative assessment of land health risks in Asian (Tibetan Plateau) and African Highlands.

International public goods from GRP4.2 include: land health risk assessments at multiple scales; spatial targeting and evaluation of Agroforestry interventions in relation to major land degradation problems; and co-development of an Africa Soil Information System. World Agroforestry Centre's comparative advantage is in application of infrared spectroscopy methods to large area land health assessment and systematic ground survey of land health risk factors linked to remote sensing and other geoinformatics, and the application of this data to spatial targeting and evaluation of Agroforestry programmes. The land health surveillance framework is being used in a UNEP capacity-building project to guide strategies for land restoration in five West African dryland countries and in a World Bank-GEF project in Kenya, led by the Kenya Agricultural Research Institute, which is designed to tackle land degradation problems in the Lake Victoria basin. Soil health surveillance has been recommended as part of a NEPAD-endorsed strategy for saving Africa's soils and is proposed for Sub-Saharan Africa as a component of the Global Digital Soil Map of the World project. There is increasing interest in using the land health surveillance methods for landscape and project carbon baselines. GRP4 is working with private wildlife ranches in Kenya to help them establish carbon baselines, and will further develop these methods under GEF's Carbon Benefits Project: Modeling, Measurement and Monitoring, executed by UNEP.

#### Elaboration of Partner's Roles

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
IARC	TSBF-CIAT	Joint implementation of the Africa Soil Information Service; integrated soil fertility management; agronomic trials.	GRP4.1 & GRP 4.2	Africa
IARC	ICARDA	Co-development of concept papers for UNCCD CST; dryland management.	GRP4.1	Global
IARC	ICRISAT	Co-development of concept papers for UNCCD CST; dryland management.	GRP4.1	Global
IARC	CIFOR	Co-development of carbon measurement and monitoring system; tree allometry, greenhouse gas measurements	GRP4.1	Global
ARI	Earth Institute,	Joint implementation of land health	GRP4.1	Global



Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
	Columbia University	surveillance methods, Africa Soil Information System, and Digital Soil map of the World; landscape ecology, cyber infrastructure.	& GRP 4.2	
ARI	Michigan State University	Co-development of carbon measurement and monitoring system; remote sensing.	GRP4.1	Global
NARI	National Agricultural Research (IIAM) in Mozambique, Kenya Agricultural Institute and Kenya Forestry Research Institute in Kenya, Institutd' Economie Rurale (IER) in Mali, and the Tanzanian Agricultural Research Institutes.	Capacity building and joint implementation of land health surveillance in Africa; soil science, natural resources management.	GRP4.1 & GRP 4.2	Africa
University	Egerton, Jomo Kenyatta and Nairobi universities in Kenya	Capacity building in land health surveillance methods; education	GRP4.1	Africa
Development Organization	UNEP	Joint execution of projects on land health surveillance and carbon measurement systems in Africa; project formulation, science-policy linkages.	GRP4.1 & GRP 4.2	Africa
Development Organization	UNDP	Joint execution of projects on land health surveillance and carbon measurement systems in Africa; project implementation.	GRP 4.2	Africa
Development Organization	World Bank	Joint execution of projects on land health surveillance and carbon measurement systems in Africa; project implementation.	GRP 4.2	Africa
RO	NEPAD	MOU on capacity building in land health surveillance methods and implementation; policy, advocacy.	GRP4.1 & GRP 4.2	Africa

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
Private Sector	Bruker Optics	Co-development of infrared spectroscopy methods and capacity building; technical expertise.	GRP4.1 & GRP 4.2	Africa
Private Sector	Meridian Institute	Innovations in Soil Health for Sub-Saharan Africa and South Asia; technical and marketing specialists	GRP4.1	Global
NGO	WWF	Co-development of carbon measurement and monitoring system; environmental policy and advocacy	GRP4.1	Global
NGO	Wajibu MS	Field testing of land health surveillance methods for carbon baselines in wildlife ranches; wildlife management, community engagement, carbon trading.	GRP4.1 & GRP 4.2	Africa
Private Foundations	Bill and Melinda Gates Foundation	Co-development of strategies for sustainable soil management in developing countries and implementation of Africa Soil Information Service; philanthropy, agricultural development, networking.	GRP4.1 & GRP 4.2	
Private Foundation	Alliance for a Green Revolution in Africa	Capacity building in soil health surveillance in Africa; philanthropy, agricultural development, networking.	GRP4.1 & GRP 4.2	

## Global Research Project 5: Climate Change Adaptation and Mitigation through Agroforestry

### Project Overview and Rationale

#### *Project Goal*

Improved resilience of farming systems and livelihood strategies of small holder farmers coping with current climate variability, reducing net carbon emissions and adapting to long-term climate change through increased use of trees for intensification, diversification and buffering of farming systems.

#### *Project Objectives*

1. Assess vulnerability and the social, economic, institutional and environmental factors that interact to predispose rural households to climate related shocks and hamper their adaptive response.
2. Assess current and potential impacts of climate change (water availability, temperature, rainfall intensity, inter-annual variability) on trees, agroforestry systems and landscapes, as basis for adaptation strategies to climate change that increase biophysical and socio-economic) buffering and human and social, institutional adaptive capacity.
3. Explore how synergies can be obtained between climate change adaptation and mitigation options for agroforestry, by assessing the carbon sequestration potential of agroforestry systems and the evolving institutional framework for voluntary and mandatory greenhouse gas emission and enhancement of carbon storage.

#### *Rationale*

Developing countries are going to bear the brunt of climate change and suffer most from its negative impacts. Mitigation efforts will only provide a partial softening of the effects of climate change. Local climate and terrestrial ecosystems will change, threatening biota and human livelihoods. Yet, even as climate changes, food and fiber production, environmental services and rural livelihoods must improve and not just be maintained.

Climate change is increasing inter-annual rainfall variability and the frequency of extreme events, leading to accelerated rates of degradation of soil and water resources upon which farming communities depend for their livelihoods. These changes are threatening development advances such as the achievement of the Millennium Development Goals. Appropriate response strategies must therefore take account of the expected future impacts to develop more robust and resilient systems for smallholders. Agricultural systems most vulnerable to climate change are those already affected by unsustainable management, and land and resource degradation. Trees have an important role in reducing vulnerability, increasing resilience of farming systems and buffering households against climate related risks. Agroforestry systems are therefore ideally placed to provide the additional resilience of agro-ecosystems to future climate change for a number of reasons.

There are two hypotheses at the centre of this project:

- Trees are deep rooted and have large reserves, and are less susceptible than annual crops to inter-annual variability or short-lived extreme events like droughts or floods. Thus, trees offer diversification options that can reduce production risks for small holder farmers.
- Trees are a perennial resource that can be exploited to provide increased income during difficult periods, thereby reducing income risks associated with climate related shocks for small holder farming families.

The challenge for this global project is to evaluate these two hypotheses in different farming systems, different cultural contexts, and in different landscapes. In conjunction with developing knowledge

about the potential for trees to help facilitate adaptation, a number of supporting research questions will be addressed.

The international policy framework for reducing net emissions from energy use, land cover change and land use is rapidly evolving. Effective ways to involve smallholders and the trees that they manage in the global mitigation efforts have been scarce. Regulation is often based on a forest - agriculture dichotomy that does not match the agroforestry reality of smallholders. Institutional mechanisms have high transaction costs, as issues of additionally, leakage, permanence, rights to land and monitoring of emissions have yet to be resolved in generic ways.

GRP5 has two research outputs:

GRP5.1: Assessments of vulnerability of, and adaptation options to, climate variability and change through agroforestry.

GRP5.2: Support for negotiations of institutional mechanisms that link carbon sequestration in agroforestry to enhanced and more resilient livelihoods.

### **Outputs Description**

#### ***Changes from previous MTP***

There are only minor changes in wording of outputs.

#### ***Description:***

*GRP5.1: Assessments of vulnerability of, and adaptation options to, climate variability and change through agroforestry.*

Research activities under GRP5.1 include: vulnerability assessment of rural households, assessment of impacts of climate change on Agroforestry systems, and adaptation to climate change. We will assess the social, economic and environmental factors that interact to predispose rural households to climate related shocks. In addition, we will seek to understand the potential impacts of the different dimensions of climate change (water availability, temperature, rainfall intensity, inter-annual variability) at a number of scales: on Agroforestry tree species, on Agroforestry farming systems and on agricultural landscapes. We will determine how tree-based systems can be used to buffer smallholder farmers against climate variability and climate related shocks. Adaptive capacity depends not only on the ability to respond biophysically but also on the economic circumstances and institutional infrastructure.

As yet, the potential for Agroforestry to help solve the problem of climate change is under-appreciated. Agroforestry options may provide a means for diversifying production systems and increasing the resilience of smallholder farming systems. The most worrisome component of climate change from the point of view of smallholder farmers is increased inter-annual variability in rainfall and temperature. Tree-based systems have some obvious advantages for maintaining production during wetter and drier years. First, their deep root systems are able to explore a larger soil volume for water and nutrients, which will help during droughts. Second, increased soil porosity, reduced runoff and increased soil cover lead to increased water infiltration and retention in the soil profile, which can reduce moisture stress during low rainfall years. Third, tree-based systems have higher evapotranspiration rates than row crops or pastures and can thus maintain aerated soil conditions by pumping excess water out of the soil profile more rapidly than other production systems. Finally, tree-based production systems often produce crops of higher value than row crops. Thus, diversifying the production system to include a significant tree component may buffer against income risks associated with climatic variability.

Contributing partners include: United Nations Framework Convention on Climate Change Secretariat; Food and Agriculture Organization of the United Nations (FAO); United Nations Environment Programme (UNEP); Worldwide Fund for Nature (WWF); World Vision; CARE;

Development Agencies in Southeast Asia (Department of Environment and Natural Resources, Philippines; Bureau of Soils and Water Management, Philippines; Ministry of Natural Resources and Environment (MONRE) Vietnam); NGOs in Southeast Asia (Landcare Foundation of the Philippines; Centre for Environment Research, Education and Development (CERED), Vietnam); Universities in Southeast Asia; (University of the Philippines, Institute Pertanian Bogor, National University Lao PDR); Center for International Forestry Research (CIFOR) and Southeast Asian (SEARCA).

*GRP5.2: Support for negotiations of institutional mechanisms that link carbon sequestration in agroforestry to enhanced and more resilient livelihoods.*

GRP5.2 will explore the synergies in Agroforestry systems between climate change adaptation and mitigation. We will assess the carbon sequestration potential of promising adaptation technologies with the view of capturing carbon finance opportunities to scale up adoption of these systems to reduce vulnerability of smallholder farmers. For example, we will explore ways to compensate small farmers for payments of carbon sequestration services under the emerging carbon market.

The advent of carbon markets over the past decade creates new and significant opportunities for scaling up Agroforestry practices for climate change adaptation and sustainable land management. Projections that the carbon market may exceed US\$1 trillion by 2025 (current ODA = US\$85 billion) suggest that significant funds could potentially be available to finance sustainable rural development and adaptation to climate change. For the moment, the focus of this international discussion is on tree-based solutions because of the obvious carbon sequestration potential of these systems. Unfortunately, as the carbon markets have developed over the past several years, projects focused on rural communities, poverty reduction, and climate change adaptation through improved land management have not materialized. While there was a lot of optimism at the beginning of these markets, there are a number of reasons for the lack of contribution to sustainable development in rural areas. World Agroforestry Centre considers these carbon markets to be one of the primary impact pathways for this research. Given this, World Agroforestry Centre will invest considerable effort in overcoming the main obstacles to the mobilization of carbon finance to scale up Agroforestry practices that facilitate adaptation to climate change.

Contributing partners include: United Nations Framework Convention on Climate Change Secretariat; Food and Agriculture Organization of the United Nations (FAO); United Nations Environment Programme (UNEP); Worldwide Fund for Nature (WWF); World Vision; CARE; Development Agencies in Southeast Asia (Department of Environment and Natural Resources, Philippines; Bureau of Soils and Water Management, Philippines; Ministry of Natural Resources and Environment (MONRE) Vietnam); NGOs in Southeast Asia (Landcare Foundation of the Philippines; Centre for Environment Research, Education and Development (CERED), Vietnam); Universities in Southeast Asia; (University of the Philippines, Institute Pertanian Bogor, National University Lao PDR) and Center for International Forestry Research (CIFOR).

#### ***Alignment to CGIAR priorities (output level)***

GRP5.1 aligns to CGIAR System Priorities:

4A: Integrated land water and forest management at landscape level

5A: Science and technology policies and institutions

and has secondary links with:

4D: Sustainable agro-ecological intensification in low and high-potential areas

5D: Improving R&D options to reduce rural poverty and vulnerability

GRP5.2 aligns to CGIAR System Priorities:

3D: Sustainable income generation from forests and trees

4D: Sustainable agro-ecological intensification in low and high-potential areas

and has secondary links with:

4A: Integrated land water and forest management at landscape level

5B: Making international and domestic markets work for the poor

***Countries of planned research (output level)***

GRP5.1: Kenya, Burkina Faso, Bangladesh, India, Sri Lanka, China, Indonesia, Philippines, Thailand, Vietnam, Brazil, Samoa

GRP5.2: Kenya, Malawi, Tanzania, Cameroon, China, Indonesia, Philippines, Thailand, Vietnam, Peru,

**Impact Pathways by Output**

The primary impact that this GRP targets is: Small-holder agroforesters are better able to adapt to current and future climate, and can benefit from participation in efforts to mitigate climate change ('carbon markets')

Output GRP5.1 is expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are: 1) Local knowledge on climate risk adaptation available and used as basis for climate change adaptation practices and strategies. 2) Regional climate modeling allows better mainstreaming of climate related impacts into GRPs and other institutes within the CG system and external agencies. 3) Policy options identified and implemented for mainstreaming climate change adaptation in agriculture and NRM development.

Improved and sustained agroecosystem productivity in the face of climate change, as well as enhanced income generation from smallholder carbon sequestration projects are targeted impacts of this global project. These impacts will be achieved through the following outcomes:

- Stakeholders using knowledge to enhance climate change adaptive capacity of smallholder farmers in developing countries
- Knowledge utilized on the role of Agroforestry and sound natural resource management for enhancing ability of smallholder farmers to adapt to current and future climate change
- Mainstreaming of Agroforestry knowledge in climate change adaptation and mitigation initiatives in agriculture, environment and forestry

Climate change adaptation has increasingly gained recognition as a major factor in agricultural development throughout the world. The recent 4<sup>th</sup> Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) emphasizes the potential risks and vulnerabilities in developing countries, where smallholder farmers are subjected to droughts, delayed onset of rainy seasons, and other perturbations to traditional climatic patterns. There is increasing recognition of the potential role of Agroforestry for addressing such vulnerabilities and development partners as well as international policy makers are calling for major investment by the global community.

Target ecoregions for GRP5.1 are:

*Sub-Saharan Africa*

RAEZ 1: Warm arid and semi-arid tropics (AEZ 1):

- Eastern Africa: Ethiopia, Kenya, Tanzania and Sudan;
- Southern Africa: Angola, Botswana, Madagascar, Malawi, Mozambique, Zambia and Zimbabwe.

RAEZ 2: Warm sub-humid tropics (AEZ 2):

- Eastern Africa: Kenya, Uganda, Tanzania
- Southern Africa: Malawi, Mozambique, Zambia and Zimbabwe.

*Asia and the Pacific*

RAEZ 8: Warm arid and semi-arid tropics (AEZ 1):

- Parts of India and Thailand.

RAEZ 10: Warm humid tropics (AEZ 3):

- Indonesia, Philippines, Vietnam, Kampuchea, Laos, Thailand, South West China, Bangladesh, Sri Lanka

#### *Latin America*

RAEZ 17 Warm humid tropics (AEZ 3):

- Brazil, Bolivia, Peru

Output GRP5.2 is expected to contribute to this type of impact via a number of outcomes, specified for various groups of stakeholders. These are: 1) Smallholder communities have greater opportunities to participate in carbon sequestration projects. 2) Local, regional, national and international agencies, project developers and decision makers have better understanding of how governance tools need to be set up to deliver REDD and A/R CDM schemes to local beneficiaries. 3) There is a clear institutional link between the international carbon markets and carbon-based PES schemes. 4) Agroforestry researchers and supporters have a better understanding how biogeochemical processes and water relations will change as result of climate change.

The advent of carbon markets over the past decade creates new and significant opportunities for scaling up Agroforestry practices for climate change adaptation and sustainable land management. The global carbon market doubled in 2007 to US\$64 billion compared to the previous year (current ODA = US\$85 billion). Projections that the carbon market may exceed US\$1 trillion by 2025 suggest that significant funds could potentially be available to finance sustainable rural development and adaptation to climate change. For the moment, the focus of this international discussion is on tree-based solutions because of the obvious carbon sequestration potential of these systems. Unfortunately, as the carbon markets have developed over the past several years, projects focused on rural communities, poverty reduction, and climate change adaptation through improved land management have not materialized. While there was a lot of optimism at the beginning of these markets, there are a number of reasons for the lack of contribution to sustainable development in rural areas.

World Agroforestry Centre considers these carbon markets to be one of the primary impact pathways for this research. With significant investment in carbon offsets, it is only logical that a significant portion of this investment facilitates adaptation among those who will be most severely affected by climate change, but who have done the least to create the problem – the rural poor. Given this, World Agroforestry Centre will invest considerable effort in overcoming the main obstacles to the mobilization of carbon finance to scale up Agroforestry practices that facilitate adaptation to climate change. These obstacles include:

- Measurement and monitoring of the carbon benefits of improved practices in agricultural landscapes.
- Institutional links between small scale farmers and global carbon markets
- Investor confidence
- Project developer knowledge.

World Agroforestry Centre will develop a toolbox for project managers. This toolbox will synthesize a wide variety of research products into user-friendly tools for carbon sequestration projects. The tools will address measurement of 3 carbon pools in Agroforestry projects (above-ground biomass, below-ground biomass and soil carbon), creation of enabling institutional environments for these projects, sustainable seed supply, biodiversity analysis, social and economic diagnosis and monitoring, etc.

Target eco-regions for GRP5.2 are:

*Sub-Saharan Africa*

RAEZ 1: Warm arid and semi-arid tropics (AEZ 1):

- Eastern Africa: Kenya, Tanzania
- Southern Africa: Malawi

RAEZ 2: Warm subhumid tropics (AEZ 2):

- Eastern Africa: Tanzania
- Southern Africa: Malawi

*Asia and the Pacific*

RAEZ 8: Warm arid and semi-arid tropics (AEZ 1)

- Parts of India

RAEZ 10: Warm humid tropics (AEZ 3)

- Bangladesh, Indonesia, Kampuchea, Laos, Philippines, Vietnam, and parts of Sri Lanka and Thailand.

*Latin America and the Caribbean*

RAEZ 17 Warm humid tropics (AEZ 3)

- Brazil

***Beneficiaries and end users***

For both GRP5.1 and GRP5.2 the key clients and major users of the outputs generated in this project are:

- Funding agencies (World Bank, FAO, DFID, Asian Development Bank, ACIAR, Ford Foundation)
- Development organizations (notably extension systems and international NGOs such as World Vision, CARE)
- Conservation organizations (WWF, Conservation International, The Nature Conservancy)
- National policy makers and programmes
- Research organizations involved in Agroforestry and researchers involved in evaluation
- Global multilateral environmental agreements, specifically the UN Framework Convention on Climate Change (for mitigation options), UN Convention on Combating Desertification (for adaptation in the drylands)

The end beneficiaries of the information will be smallholder farming communities throughout the developing world, benefiting from the uptake and implementation of the project's outputs by the clients noted above.

**International Public Goods**

IPGs produced by GRP5.1 include:

1. Vulnerability analyses in rural landscapes with specific focus on role of trees, linked to climate variability and options for CC adaptation.
2. Tests of hypotheses on specific CC adaptation benefits of deep-rooted trees in the context of best practices for climate change adaptation for small farmers.
3. Methods for dissecting impacts on hydrology of the interaction between regional climate change and land cover change.
4. Policy strategies: Strategies for mainstreaming climate change in agriculture and natural resources management (NRM).
5. Rapid appraisal method for the degree of landslide risk protection provided by deep-rooted trees under climate variability and change.



IPGs produced by GRP5.2 include:

1. Protocols for above- and below-ground carbon measurement in agroforestry landscapes, scaling from plot to landscape and national GHG accounting schemes; optimizing community involvement for reduction of transaction costs and increase in transparency.
2. Protocols for tradeoff analysis and appraisal of abatement cost curves for land use change in tropical forest landscape mosaics.
3. Tool box for design of carbon sequestration projects, incl. prospecting designs, barrier analysis (WNoTree), tenure appraisal, cash flow analyses and auction designs for increased efficiency.
4. Analysis of policy options for emission reduction from any land use ('REALU') as umbrella over REDD+ approach, supporting adaptation co-benefits as Nationally Appropriate Mitigation Actions (NAMA).
5. Landscapes with active learning on emission reduction with and through agroforestry, with analysis of fairness and efficiency of benefit sharing approaches, and quantification of leakage and additionality.

As yet, the potential for Agroforestry to help solve the problem of climate change is under-appreciated. The most worrisome component of climate change from the point of view of smallholder farmers is increased inter-annual variability in rainfall and temperature. Tree-based systems have some obvious advantages for maintaining production during wetter and drier years. First, their deep root systems are able to explore a larger soil volume for water and nutrients, which will help during droughts. Second, increased soil porosity, reduced runoff and increased soil cover lead to increased water infiltration and retention in the soil profile, which can reduce moisture stress during low rainfall years. Third, tree-based systems have higher evapotranspiration rates than row crops or pastures and can thus maintain aerated soil conditions by pumping excess water out of the soil profile more rapidly than other production systems. Finally, tree-based production systems often produce crops of higher value than row crops. Thus, diversifying the production system to include a significant tree component may buffer against income risks associated with climatic variability.

Agroforestry has a particular role to play in mitigation of atmospheric accumulation of GHGs. Of all the land uses analyzed in the Land-Use, Land-Use Change and Forestry report of the IPCC, Agroforestry offered the highest potential for carbon sequestration in non-Annex I countries.

Through this project World Agroforestry Centre is well positioned to generate the knowledge to substantiate the above assertions in agricultural landscapes and provide this information to development agencies and policy makers.

### Elaboration of Partner's Roles

This global research project will build on strong engagement by World Agroforestry Centre in the UN Framework Convention on Climate Change (UNFCCC), and links with major development agencies and non-governmental organizations that will demand and can act upon the information generated in the project. Because of the range of methodological innovations to be employed, major investments in strengthening capacity of partners and target beneficiaries are envisaged.

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
IARC*	ICRISAT	Assist in improved water productivity and diversifying agriculture into high-value crops in the dry lands.	GRP5.1 & GRP 5.2	Global

<b>Group</b>	<b>Name of Partner</b>	<b>Strategic Role/Complementary Advantage</b>	<b>Output</b>	<b>Geographical scope</b>
University	University of the Philippines Brawijaya University (Indonesia)	Assist in research on climate mitigation and adaptation in archipelagic SE Asia; Philippines is one of the most vulnerable countries to climate-related hazards	GRP 5.1 and 5.2	Southeast Asia
Regional organization	The Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)	Assists in policy research, capacity building, information dissemination to partners in the region;	GRP 5.1 and 5.2	Southeast Asia
Ministry/Department of natural resources and agriculture	Department of Natural Resources (DENR), Philippines Ministry of Natural Resources and Environment; (MONRE), Vietnam	Assist in field data gathering and dissemination of research results	GRP 5.1 and 5.2	Southeast Asia
NGOs	Landcare Foundation of the Philippines; Centre for Environment Research, Education and Development (CERED), Vietnam)	Assist in field data gathering and dissemination of research results	GRP 5.1 and 5.2	Southeast Asia

## Global Research Project 6: Supporting multi-functional landscapes with trees for environmental services

### Project Overview and Rationale

#### *Project Goal*

Policies and incentives on the interface of agriculture and forestry are enacted that are effective in maintaining and enhancing the multi-functionality of landscapes with trees and fair in providing benefits that reduce rural poverty.

#### *Project Objectives*

Undertake action research, synthesis, stakeholder engagement and targeted dissemination to improve the understanding of:

1. The roles of trees in securing watershed services, carbon storage and biodiversity maintenance in landscape mosaics;
2. The opportunities for reducing negative incentives, and increasing positive incentives, for pro-poor agroforestry solutions; and
3. The relations and tradeoffs between local and more global drivers of land-use change.

#### *Rationale*

One of the most significant challenges that humans face is trying to maintain or increase the supply of ecosystem services—e.g. water, soil health, and biodiversity - especially under changing climates that will continue to support both human needs and the functioning of natural ecosystems. The management of these multifunctional landscapes requires research tools and management mechanisms that strike the balance between (a) ‘goods’ and ‘services’, (b) short, medium and long-term objectives, and (c) ‘efficiency’ and ‘equity’ in the pursuit of sustainable development.

From the perspective of trees – the oldest, largest, and most provisioning living organisms -- there are increasing conflicts and trade-offs between tree plantations, natural forests and trees on farms. Tree systems that generate the highest returns to land often generate lower levels of ecosystem services, while old-growth natural forests usually generate high levels of environmental services but relatively little income for farmers. In this context, Agroforestry can emerge as an intermediate land use with potential to balance these two-generate good economic returns and acceptable levels of critical environmental services.

The incentives and disincentives that farmers face when deciding to establish and maintain Agroforestry systems are defined by policies emanating from the agricultural, forestry and environmental sectors. For example, the national and local policies put in place to protect forests and environmental services often have the consequence of reducing incentives for Agroforestry. Multi-lateral environmental agreements establish objectives, obligations and opportunities for national policies and strategies, but rarely harness the potential of Agroforestry to advance environmental objectives.

The role of the different configurations of trees in the provision of environmental services needs to be realistically assessed so that appropriate incentives, property rights arrangements and regulatory approaches can be negotiated and updated through learning. Past World Agroforestry Centre research shows that institutions and arrangements for management of multi-functional landscapes should be assessed in terms of their efficiency (realistic, conditional, voluntary), fairness (pro-poor, pro-women, pro-untitled landholders) and sustainability. Existing results show that there is potential for using new property rights arrangements and flexible policy instruments, often implemented

through decentralized forms of government, to strengthen farmers' incentives to invest in Agroforestry. Mechanisms and contracts that provide conditional rewards for environmental services have potential to provide farmers with incentives to adopt Agroforestry systems and other land uses associated with environmental stewardship or restoration.

There has been considerable study of so-called forestry (= tree cover) transitions: the tendency for increasing population pressure to cause dramatic reduction in tree cover, followed by a period of either stable or increasing cover. Since rural population continues to grow in many areas in the world, assessing whether the promotion of agroforestry can alter the pattern of deforestation is very timely. This is all the more salient given the attention to REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) in current climate change debate.

#### *Key Research Questions:*

The research undertaken in GRP6 will examine:

1. How do landscape-scale watershed and biodiversity services depend on the attributes of Agroforestry systems across climatic, biogeographical, ecological and socio-economic contexts?
2. How realistic are expectations that regulation of and incentives for enhancing tree-based watershed and biodiversity services can enhance these environmental services from the perspective of external stakeholders?
3. What are the tradeoffs between efficiency, fairness, and poverty reduction associated with alternative prototype mechanisms for environmental service rewards involving small farmers?
4. How can cross-sectoral policies and community based forest policy limit or enhance the potential for environmental service rewards, as well as tools, methods, and approaches that enhance the sustainability of financial flows and institutional change in environmental service reward mechanisms?
5. What are the drivers of forest (tree cover) transitions and agroforestry transformations, and where can environmental services-based incentives play a role in these various contexts?

GRP6 has the following research outputs:

GRP6.1: Tools for understanding the roles of trees in watershed services and in maintenance of biodiversity in landscape mosaics, and for assessment of the tradeoffs between these services and direct benefits (subsistence and marketed goods).

GRP6.2: Prototypes for, and lessons learnt from, pro-poor policies and incentives for enhancing tree-based environmental services.

GRP6.3: Analysis of the links between the drivers of land use and tree cover change at global-national-local scales and of the opportunities to negotiate and influence agroforestry transformations.

#### **Outputs Description**

##### ***Changes from previous MTP Outputs***

Minor changes in wording

##### ***Description (Output Level)***

GRP6.1: *Tools for understanding the roles of trees in watershed services and in maintenance of biodiversity in landscape mosaics, and for assessment of the tradeoffs between these services and direct benefits (subsistence and marketed goods).*

Trees use water while storing carbon; tree crops often replace natural forest while reducing poverty. Market-oriented monocultures compete with risk-averting poly-cultures, trading off income and risk. Plantations displace smallholders, trading off local rights and income opportunities, while national reforestation programmes use public resources, promising an increase in environmental services that may not happen. Trees in all these examples are closely linked to 'tradeoffs' and 'conflict',

exaggerated expectations and disappointment. Integrated natural resource management (INRM) requires site-specific understanding of tradeoffs and synergies between and among the goods and services that trees in agro-ecosystems can provide. It is thus more complex when compared to simpler, readily scalable green-revolution technologies. Replicable, cost-effective approaches are needed in the hands of local professionals with interdisciplinary skills to help stakeholders sort out positive and negative effects of trees in multi-use landscapes ('Agroforestry') on livelihoods, water and (agro-) biodiversity, associated rights and rewards, and, ultimately, on the Millennium Development Goals (reducing poverty, promoting equitable forms of globalization, building peace). Research from different parts of the tropical world has shown that multifunctional Agroforestry systems such as shade coffee or cocoa and jungle rubber are viable alternative land-use practices. It has been demonstrated that such alternative land-use can deliver livelihood benefits while maintaining and enhancing ecosystem function, including its scope for resilience. As a result, such systems are becoming increasingly valuable in landscape management approaches to biodiversity conservation and watershed management. More recently, they are gaining recognition as potential targets for avoided deforestation strategies in climate change mitigation. Making the most of Agroforestry and other tree-based systems, however, requires good information about the ecosystem service values of various systems and practices, the inevitable tradeoffs among those services, and incentives that farmers have to invest in Agroforestry systems, protect other tree-based systems and engage in tree product enterprises. This information will help reinforce the potential importance of multifunctional Agroforestry systems in degradation avoidance and maintaining ecosystem services.

*GRP6.2: Prototypes for, and lessons learnt from, pro-poor policies and incentives for enhancing tree-based environmental services.*

There is untapped potential to harness market forces and negotiations between ecosystem stewards, intermediaries, and ecosystem service beneficiaries. Mechanisms and contracts that provide farmers and other ecosystem stewards with conditional rewards for environmental services can enhance the adoption and maintenance of Agroforestry systems and other land uses consistent with good environmental stewardship. Over the 5+ years, the World Agroforestry Centre has established an approach to research on rewards for environmental services that has generated both context-specific impact and understanding, a set of field-tested tools and approaches, and well-recognized contributions to the international literature. This work will continue in the 2010-2012 period, with more emphasis on Africa, extension of the tools and approaches to more sites, and more emphasis on the role of the public and private sectors.

*GRP6.3: Analysis of the links between the drivers of land use and tree cover change at global-national-local scales and of the opportunities to negotiate and influence agroforestry transformations.*

GRP6.3 considers Agroforestry and particular policy interventions within a long-term and wide geographic context. Over long time periods, land use systems tend to respond to changes in population pressure, emerging market opportunities, and changes in the public policy context. There has been considerable study of so-called forestry transitions: the tendency for increasing population pressure to cause reducing, stable and ultimately increasing, forest cover. There has been less study of the role of Agroforestry in those transitions. Such an understanding is important for understanding the potential for Agroforestry to enhance livelihoods and ecosystem function both in situ (i.e. offering a better agricultural land use) and ex situ (i.e. reducing pressure for conversion of forest land). This information will be critical for policy processes and development planning.

#### ***Alignment to CGIAR priorities (output level)***

GRP6.1 aligns to CGIAR System Priorities:

4A: Integrated land water and forest management at landscape level

4D: Sustainable agro-ecological intensification in low and high-potential areas

and has secondary links with:

- 1B: Promoting conservation and characterization of under-utilized plant genetic resources to increase the income of the poor
- 4C: Improving water productivity

GRP6.2 aligns to CGIAR System Priorities:

- 3D: Sustainable income generation from forests and trees
- 4A: Integrated land water and forest management at landscape level

and has secondary links with:

- 5B: Making international and domestic markets work for the poor
- 5C: Rural institutions and their governance

GRP6.3 aligns to CGIAR System Priorities:

- 3D: Sustainable income generation from forests and trees
- 4A: Integrated land water and forest management at landscape level
- 4D: Sustainable agro-ecological intensification in low and high-potential areas

### ***Countries of planned research (output level)***

- GRP6.1: Kenya, Uganda, Tanzania, Guinea, Mali, India, Nepal, China, Indonesia, Philippines, Thailand, Vietnam, Brazil
- GRP6.2: Kenya, Uganda, Malawi, Tanzania, Guinea, Mali, Sierra Leone, India, Nepal, China, Indonesia, Philippines, Thailand, Vietnam
- GRP6.3: Kenya, Uganda, Malawi, Tanzania, Mali, China, Indonesia, Philippines, Thailand, Vietnam, Brazil, Peru

### **Impact Pathways by Output**

The primary impact that this GRP targets is: Realistic use of trees for transforming lives and landscapes and attaining critical ecosystem services in multifunctional landscapes with adoption of conditional contracts negotiated and adopted.

Output GRP6.1 is expected to contribute to this type of impact via outcomes that imply that local re-source managers in multi-use landscapes with trees use cost-effective, replicable tools and approaches to appraise the likely im-pacts of changes in land use on watershed functions, biodiversity and carbon stocks, as well as on economic pro-ductivity of the land-scape

Follow through consists of active engagement in capacity building through universities, NGOs and local government agencies, to support them in the development of appropriate training methods and materials. The intended outcome is our project goal: “Local resource managers in multi-use landscapes with trees use cost-effective, replicable tools and approaches to appraise the likely impacts of changes in land use on watershed functions, biodiversity and carbon stocks, as well as economic productivity of the landscape “

This outcome is expected to contribute to the overall impact of the World Agroforestry Centre’s role of improving lives and landscapes, through more knowledge-based negotiations of changes in landscape mosaics and incentive structures.

In the broad context processes of ‘negotiation support’ in multi-use landscapes as developed by the World Agroforestry Centre and partners, a number of conditioning factors have to be recognized before the outputs and outcomes can be achieved:

- Explicit recognition of multiple perceptions and knowledge systems of various stakeholders that informs tradeoff analysis across the interests involved
- Biodiversity conservation within landscapes including that in ‘domesticated forests’ or complex agroforests
- Upland-lowland negotiations to produce rules and reward mechanisms for watershed functions, that are based on site-specific evidence rather than perceptions alone
- Improved local and national level appreciation of the role of diversity and identity of uplands in supporting niche market opportunities and site-specific development pathways rather than being an obstacle to ‘standardized’ development.

Output GRP6.2 is expected to contribute to this type of impact via a number of outcomes, that are make reflect implementation of pro-poor, realistic, voluntary and transparent environmental service mechanisms implemented in a range of sites across Africa and Asia, with an enabling environment facilitated.

Intended users include researchers, project developers/innovators, policy shapers (including civil society groups) and policy makers. Past experience has shown that the World Agroforestry Centre’s research on rewards for environmental services is attracting interest from a broad spectrum of research organizations, non-governmental organizations, UN agencies, donor agencies and businesses. This interest includes South-North transfer of evidence and experiences. Research outputs that are intended to influence multilateral and regional agreements are targeted at key stakeholders who negotiate and influence particular processes.

The project’s outputs will generate distinct outcomes over time: (1) in the near term, the project will enhance the effectiveness of the diverse organizations that are interested in rights, compensation and rewards for environmental services; (2) in the intermediate term, it will support new and more effective programmes — at the local, national and international levels — that recognize, compensate and reward farmers for environmental services; and (3) in the longer term, farmers involved in environmental service mechanisms will plant and maintain significantly more trees and implement other land conserving practices.

The end users (ultimate beneficiaries) are farmers and communities who will benefit from environmental service mechanisms, more coherent approaches to environmental stewardship and poverty reduction, while “mining” of collectively-owned natural resources will be reduced through effective implementation of environmental stewardship.

The expected impacts are enhanced ecosystem services and human welfare in critical ecosystems around the developing world.

Output GRP6.3 is expected to contribute to this type of impact via outcomes that reflect that international and regional conventions, agreements, action plans and national level policy processes are modified to better facilitate the contributions of smallholder farmers practicing agroforestry.

Intended users include development planners in governmental and non-governmental organizations, policy shapers (including civil society groups) and policy makers concerned with the long-term and large-scale rural development.

The expected outcomes are that the project’s outputs will generate inform overall investment and development planning processes, including public investments and strategies in Agroforestry research and development.

The end users (ultimate beneficiaries) are farmers and communities who will benefit from environmental service mechanisms, more coherent approaches to environmental stewardship and poverty reduction, while “mining” of collectively-owned natural resources will be reduced through effective implementation of environmental stewardship.

The expected impacts are enhanced ecosystem services and human welfare in critical ecosystems around the developing world.

Target ecoregions for GRP6 are:

*Sub-Saharan Africa*

RAEZ 1: Warm arid and semi-arid tropics (AEZ 1):

- West Africa: Burkina Faso, Guinea, Mali, Niger, Nigeria and Senegal;
- East Africa: Ethiopia, Kenya, Tanzania and Sudan;
- South Africa: Angola, Botswana, Madagascar, Malawi, Mozambique, Zambia and Zimbabwe.

RAEZ 2: Warm sub-humid tropics (AEZ 2):

- East Africa: Kenya, Uganda, Tanzania
- South Africa: Malawi, Mozambique, Zambia and Zimbabwe.

RAEZ 3: Warm humid tropics (AEZ 3):

- West Africa: Cameroon, DR Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Sierra Leone

RAEZ 4: Cool tropics (AEZ4):

- East Africa: Rwanda, Ethiopia, Kenya and Tanzania.

*Asia and the Pacific*

RAEZ 10: Warm humid tropics (AEZ 3):

- Indonesia, Philippines, Vietnam, Kampuchea, Laos, Thailand, South West China, Bangladesh, Sri Lanka

RAEZ 14: Cool subtropics with summer rainfall (AEZ 8):

- Bhutan, Nepal, and parts of China, India, North Korea
- Latin America

RAEZ 17: Warm humid tropics (AEZ 3):

- Brazil, Bolivia, Peru

**International Public Goods**

IPGs produced by GRP6.1 include:

1. Quantitative indicators and appraisal tools (GenRiver & Spatrain; RHA) for relating changes in land use to watershed functions to land productivity in context of spatial planning and rewards for environmental services.
2. Rapid agrobiodiversity appraisal method (RABA) and its application in dynamic land use mosaics.
3. Analyses of tree life cycles and dispersal modes as basis for conservation effectiveness of agroforestry landscape mosaics.
4. Comparative study of buffering at patch, field, hillslope and (sub) watershed scales in relation to rainfall patterns and tree cover change.
5. Integrative model for the way watershed functions, biodiversity and C stocks co-vary during tree cover transitions

IPGs produced by GRP6.2 include:

1. Negotiation Support System for reducing conflict over land use change in forest margins linked to (presumed) impacts on environmental services.



2. Rapid appraisal method for land tenure claims in dynamic landscapes, as basis for reform of land access under local and national legality perspectives.
3. Sustainability appraisal tools for agroforests and enhancement of associated ecosystem services
4. Analytical tool for the fairness-efficiency tradeoff and poverty impacts in design and practice of rewards/payments for environmental services.
5. Landscapes with active learning on co-investment in and/or rewards for environmental services.
6. Analysis of boundary organizations and roles of intermediaries that link knowledge and practice

IPGs produced by GRP6.3 include:

1. Analytical scheme (DriLuc) for the cross-scale linkage of drivers of land use change and their impacts on natural, human, social, physical and financial capitals during tree cover transitions.
2. Synthesis on the way (and conditions under which) market opportunities and intensification options can speed up or slow down tree cover transitions in tropical landscapes.
3. Comparison of different modeling approaches for analysis of the driving forces for land use change in the (sub)-humid tropics and their consequences for livelihoods and environmental services.
4. Policy strategies for nesting of subnational changes in forest cover linked to C footprint studies, biofuel/bioenergy production and planning of clean development.
5. Pan-tropical spatial characterization of agroforestry and its dependence on environmental, socio-economic and policy conditions

The World Agroforestry Centre is becoming a recognized global leader in applied and strategic mechanisms providing rewards for ecosystem services. The World Agroforestry Centre's approach stresses action research in contrasting sites, the possibility of a range of payment types, development of parsimonious assessment tools to clarify the real links between land use and ecosystem services, the importance of the negotiation process itself, cross-site learning and synthesis, and engagement with policy makers and the private sector. From 2003-5, this work focused on Asia and Latin America.

In Asia, our work has been organized around the RUPES project (Rewarding the Poor for Environmental Services) and in Latin America around the ProAmbiente programme in the Amazon basin. The period 2006-7 was a time for generating major syntheses and presenting the work in international fora. It was during this period that the World Agroforestry Centre led a pan-tropical assessment with collaborators from around the world.

From 2008-2010 this research was deepened in Asia and the Brazilian Amazon, and extended to Africa and other parts of the Amazon basin. The operational project in Africa is entitled PRESA — Pro-poor Rewards for Environmental Services in Africa and will be fully operational in the 2010-2012 period. These projects are designed to be engaged with reward mechanisms in action research sites as well as in local and national policy dialogue processes. They are also linked to global expertise and debates and aim at producing international public goods in the fore defined methods, tested hypotheses and policy-relevant syntheses.

Specific IPGs targeted for the 2010-2012 time period are the maturation of a setoff rapid assessment tools for environmental services in landscapes with trees and generic models that can be used in this context. The PRESA and RUPES action research site networks in Africa and Asia will continue to offer opportunities for learning for site-based and international (academic) stakeholders.

### **Elaboration of Partners Roles**

The World Agroforestry Centre advances GRP6 through specific research partnerships as well as consortia of organizations engaged in policy experiments in different ways and at different

scales. Among others, we have research partnerships with CIFOR through the joint CIFOR-World Agroforestry Centre biodiversity platform, Conservation International through the Hotspot Alliance, the Sustainability Science Group at the Kennedy School of Environment at Harvard University, and Hohenheim University.

The RUPES project involves a range of international organizations, national policy groups, national and local research and development organizations working across Asia, including Indonesia, the Philippines, China, Vietnam, India, Nepal, and Thailand. A similar network is being established in Africa in collaboration with Care International, the Katoomba Group for East and Southern Africa, the African Highlands Initiative, national government organizations, local NGOs, and private sector collaborators. In the Amazon Basin, the World Agroforestry Centre conducts similar research on rewards for ecosystem services through the Amazon Initiative Consortium and a number of Brazilian institutions, including the ProAmbiente Programme. At the international scale, we collaborate in the production of international publications with Forest Trends, Rights in Resources Initiative, IUCN, UNEP, IDRC, ACTS (Kenya), CGRR (Ecuador), and ISEC (India).

<b>Group</b>	<b>Name of Partner</b>	<b>Strategic Role/Complementary Advantage</b>	<b>Output</b>	<b>Geographical scope</b>
CGIAR and NARS	IITA, CIAT, IFPRI, ASB-Indonesia, ASB-Cameroon, ASB-Peru, ASB-Philippines, ASB-Brazil	ASB Partnership for tropical forest margins	GRP6.1, GRP6.2, GRP6.3	Indonesia, East, Southern and West Africa
International Universities	Universities of Amsterdam (VU), Louvain-la-neuve, Gottingen, Macaulay Land Use Institute	Various work packages in the REDD-ALERT project	GRP6.2, GRP 6.3 and GRP 5.2	Indonesia, Vietnam, Cameroon, Peru
CGIAR	CIFOR	Partner in CIFOR-World Agroforestry biodiversity platform and Landscape Mosaics project	GRP6.1	Asia, Africa
International NGO	Conservation International	Partner in Hotspot Alliance	GRP6.1	Asia, Africa
International University	Sustainability Science Group at the Kennedy School of Environment at Harvard University	Analysis of and synthesis on boundary organizations in NRM negotiations and payments for ES	GRP6.2	Asia, Africa
International University	University of Hohenheim	TUL-SEA project on tools for trees in multifunctional landscapes	GRP6.1	Asia
NARS and NGO's	National RUPES committees in Indonesia, Philippines, Vietnam and Nepal; ICIMOD	RUPES-II: local action research and national scale learning on policy reform	GRP6.1, GRP6.2	Asia and Africa
NGO	WARSI	Landscape Mosaics and RUPES activities in Jambi	GRP6.1, GRP6.2	Indonesia
International	IUCN, Care	PRESA: local action	GRP6.1,	Kenya,

Group	Name of Partner	Strategic Role/Complementary Advantage	Output	Geographical scope
NGO's	International, the Katoomba Group for East and Southern Africa	research and national scale learning on policy reform	GRP6.2	Uganda, Tanzania, Guinea
ACTS (Kenya)	KARI, KEPHIS, GTZ, KEFRI, KIRDI, JKUAT	PRESA: synthesis of best practices for biofuel	GRP6.2	Kenya, Tanzania, Uganda and India
UNEP	Ministry of Agriculture (Kenya), Maseno University, Lake Victoria Basin Commission, NEMA	PRESA: Tradeoff analysis among ecosystem services including drivers of land use change	GRP6.2, GRP6.3	Kenya
Forest Trends,	USAID, Katoomba Group East and Southern Africa Network	PRESA: Capacity building, local action research and community of practice activities.	GRP6.2	Kenya, Uganda, Tanzania, Guinea
Rights in Resources Initiative,	IUCN, CIFOR, SAHEL ECO, and GTZ-Pact	PRESA: sustainability appraisal of forestry codes to promote agroforestry and associate ecosystem services	GRP6.2	Mali, Niger, Senegal, Burkina Faso
International University	Harvard, Michigan state, Pretoria University of Gottingen, Asian Institute of Technology	PRESA: Design of prototype mechanisms  Making Mekong Connected	GRP6.2  GRP6.1, GRP6.3	Kenya, Tanzania, Uganda Asia

## **ASB Partnership for the Tropical Forest Margins**

### **Project Overview and Rationale**

#### *Project Goal*

Raise productivity and income of rural households living in the tropical forest margins without increasing deforestation or undermining essential environmental services.

#### *Project Objective*

The objective of ASB is to evaluate options for addressing climate change in agriculture – forest landscapes in the humid tropics for improving incomes of rural households, strengthening community engagement and maintaining essential environmental services and proactively provide information on those options to influence relevant policy and programme design processes, particularly national and international policies on AFOLU and REDD.

The main policy focus for ASB, at least through the end of 2011, is Reduced Emissions and enhancement of carbon sequestration in Agriculture, Forestry and Other Land Uses (AFOLU) in the landscape including Reduced Emissions from Deforestation and forest Degradation in Developing countries (REDD). In the long term, the project would seek to promote high carbon stocks rural development by strengthening the incentives for land users in the tropical forest margins to maintain trees and forests for their standing carbon value.

ASB – the partnership, the integration of disciplines and perspective, the methods, the databases, the approach, the brand – is uniquely positioned to bring science-based evidence into the fresh new debates on AFOLU and REDD. This realization brought into new focus, energy and commitment to the work of ASB partnership in 2007.

#### *Rationale*

The last 2 years has seen a remarkable resurgence in global concern about the role of tropical deforestation and land use land use change and forestry emissions in climate change. Besides contributing to the loss of biodiversity and other environmental services, it is becoming increasingly apparent that tropical deforestation is a major source of the greenhouse gas (GHG) emissions responsible for climate change. There is a new surge of interest across the globe regarding the possibilities of mitigating GHG emissions through avoided deforestation. The United Nations Framework Convention on Climate Change (UNFCCC) is the main focal point for global-level discussion. At the 13<sup>th</sup> meeting of the Conference of Parties to the UNFCCC in Dec 2007, nearly every head of state and high profile speaker spoke of the need to explicitly address Reduced Emissions from Deforestation and forest Degradation in Developing countries (REDD) within the convention. The COP passed a resolution that “Encourages all parties, in a position to do so, to support capacity-building, provide technical assistance, facilitate transfer of technology to improve, inter alia, data collection, estimation of emissions from deforestation and forest degradation, monitoring and addressing the institutional needs of developing countries for estimating emissions from deforestation and degradation ...” (Paragraph 2 of Decision -/CMP.3).

In the last year, the discussions within the UNFCCC has moved beyond REDD to include other relevant emissions reduction and carbon sequestration potential in broader Agriculture, Forestry and Other land uses (AFOLU) in the landscape. This landscape approach has been backed by a number of submissions to the UNFCCC SBSTA from the FAO, the United States, India and other countries.

This global-level initiative is being mirrored by national-level initiatives in both developed countries and developing countries. The Government of Norway is investing hundreds of millions of dollars in forest carbon management, while both the United States and Europe are considering the potential for allowing forest carbon credits to be traded in cap-and-trade emission management schemes. There is also strong interest in developing countries. For example as of May 2009, 37 countries from Asia, Latin and Central America, and Africa have been selected into the Readiness Mechanism of the World Bank Forest Carbon Partnership Facility and UN REDD Programme. The selected countries become REDD Country Participants and receive grant support to develop a Readiness Plan, which contains a detailed assessment of the drivers of deforestation and degradation, terms of reference for defining their emissions reference level based on past emission rates and future emissions estimates, establishing a monitoring, reporting and verification system for REDD, and adopting or complementing their national REDD strategy. An array of foundations, and international conservation organizations have expressed support for REDD and AFOLU initiatives.

The ASB Partnership for the Tropical Forest Margins is uniquely well placed to bridge the 'top-down' perspective of global GHG mitigation with a "bottom-up" perspective of the causes and consequences of land use change at the tropical forest margins. Building upon the previous decade of ASB research, ASB partners across the tropics have initiated a major study of the dynamics of land use, carbon gain and loss, and returns to land in ASB benchmark sites across the tropical forest margins. The interim results, released at COP13 in Bali, provide new insight into the role of economics as a driver of land use change and the relatively low returns per unit of carbon loss that are generated by carbon-emitting land use changes. In 2007, ASB partners in Indonesia became heavily involved in national-level discussions about deforestation and the best way for the country to reduce emissions from deforestation and forest degradation. ASB research and insights garnered considerable attention from the international media and research communities.

In December 2007, the Global Steering Group (GSG) that governs ASB reconsidered the relevance of its goal and objective statements in light of the attention being given to the carbon storage value of tropical forests. The GSG noted the distinct comparative advantage of the ASB partnership in working on land use, livelihoods and environmental services at the tropical forest margins. The GSG decided that the goal is still very relevant and should not be changed. The GSG adopted a more tightly-defined medium-term objective that recognizes the importance of the climate change policy context and the need for both high-quality research and effective communication of research results.

For 2010-2012, ASB will have two major outputs which stem from this medium-term objective:

*ASB1: Options for addressing climate change in agriculture – forest landscapes in the humid tropics for improving incomes of rural households, strengthening community engagement and maintaining essential environmental services evaluated.*

- Opportunity cost analyses
- Estimates of the greenhouse gas emissions (CO<sub>2</sub> and non-CO<sub>2</sub>) associated with alternative land uses and land use change
- Methods for measurement of the carbon stocks and fluxes associated with a wide range of forestry, Agroforestry and crop agriculture systems
- Assessment of technical, policy and reward mechanisms for reducing incentives for land users to deforest and increasing incentives for land users to invest in forest

*ASB2. Information on those options to influence relevant policy and programme design processes, particularly national and international policies on REDD and AFOLU proactively provided.*

- Tested guidelines for REDD and AFOLU demonstration projects and landscape level published
- Policy-relevant information targeted to key decision makers at the national, regional and national levels
- Information on the possibilities for avoided deforestation with sustainable benefits disseminated to the global public

## **Outputs Description**

### ***Changes from previous MTP***

No substantive changes were made to the outputs. The Global Steering Group of ASB revisited these outputs in December 2008 and found them still very relevant given the global interest in ASB work.

### ***Description (output level)***

*ASB1. Options for addressing climate change in agriculture – forest landscapes in the humid tropics for improving incomes of rural households, strengthening community engagement and maintaining essential environmental services evaluated.*

ASB research examines policies and programmes for avoided deforestation, REDD and AFOLU through the perspective of sustainable rural development in the tropical forest margins.

Current discussions of REDD and AFOLU at the international policy level are focusing on the potential for different types of financial transfers from industrialized countries to developing countries that maintain and restore forest and tree cover. Research by ASB partners does support the proposition that avoided deforestation and reducing emission reductions in agriculture, forestry and other land uses will require real changes in the financial rewards provided to those who make land use decisions in the tropical forest margins and agricultural landscapes. ASB also supports the proposition that a comprehensive land based accounting of GHG including all land management practices at landscape or national level is needed to enable real emission reductions. Hence REDD alone as currently proposed is unlikely to be successful. International transfers may contribute to those changes in incentives but will not be sufficient without accompanying changes in policies and development strategies. The ASB research agenda focuses on livelihoods, land use, landscape management and environmental services in the multiple-use landscapes found at the tropical forest margins. Issues of particular interest to the ASB partnership include the carbon implications of different agricultural development pathways, the effects of high-carbon land uses on other environmental services, multi-stakeholder approaches to management for multi-use landscapes, reduction in disincentives for on-farm tree management, and the potential for enhancing security of property rights to land, trees and carbon .

*ASB2. Information on options for addressing climate change in agriculture – forest landscapes in the humid tropics is synthesized and proactively disseminated to influence relevant policy and programme design processes, particularly national and international policies on avoided deforestation with sustainable benefits.*

Compared to other sectors and issues, policies relevant to climate change are evolving quite rapidly. International climate negotiations and national policy formulation processes create time-bound windows of opportunity for researchers to enhance the base of evidence on which policies are founded. The 2010 to 2012 period is an important window of opportunity in the UNFCCC process for harnessing the GHG mitigation potential of Reduced Emissions from REDD and AFOLU. Broad agreements on principles of REDD are likely to be decided in December 2009, ushering in negotiations on the details (modalities and procedures) of post 2012 mechanisms on the same in 2010 – 2011. Discussions on AFOLU are likely to increase in the same period. There now appears to be a similar window of opportunity to influence the shape of new climate legislation in the United States. New windows of opportunity are likely to open over the next months, in both developing and developed countries. The ASB partnership has developed an important corpus of research results over the last 10 years and will be generating results through the current portfolio of very relevant research projects. These research results need to be refined, synthesized and effectively communicated before they can really become part of the evidence base for policy formulation. ASB experience in 2007 and 2008 indicates that this requires a combination of excellent science and a strategic approach to communication. ASB will also develop feedback loops from communications to research. That is, research priorities in this fast moving area need to take account of likely future windows for policy influence.

### ***Alignment with CGIAR priorities (output level)***

ASB1 aligns with CGIAR System Priorities:

3D: Sustainable income generation from forests and trees

4A: Integrated land, water and forest management at landscape level

5B: Making international and domestic markets work for the poor

ASB2 aligns with CGIAR System Priorities:

3D: Sustainable income generation from forests and trees

4A: Integrated land, water and forest management at landscape level

5B: Making international and domestic markets work for the poor

### ***Countries of planned research***

ASB1: The ASB partnership is based on intensive engagement in a small number of core countries namely Brazil, Peru, Cameroon, Indonesia, Philippines and Thailand. Thailand is on hold as activities have been low in the country. Some additional activities are carried out in Vietnam on the REDD\_ALERT project.

ASB2: The above mentioned countries provide a platform for broader policy engagement across countries in humid and sub-humid Africa (COMESA & COMIFAC), the Amazon basin and South East Asia

### **Impact Pathways by Output**

*ASB1: Options for addressing climate change in agriculture – forest landscapes in the humid tropics for improving incomes of rural households, strengthening community engagement and maintaining essential environmental services evaluated.*

ASB seeks to contribute to an institutional and knowledge infrastructure for climate change mitigation in avoided deforestation and forest degradation, agriculture, forestry and other land uses at the international and national levels that is effective in reducing net CO<sub>2</sub> emissions from tropical forest landscapes, fair to the people dependent on those landscapes for their livelihoods, and sustainable in the terms of livelihood benefits, ecological outcomes and financial inflows.

ASB will achieve this goal through pan-tropical research that establishes the potential cost-effectiveness of REDD; research on the tradeoffs between carbon storage, biodiversity and hydrologic services; development and testing of appropriate tools for baseline assessment and monitoring of REDD and AFOLU programmes; and engagement in REDD, AFOLU and Bio-Carbon demonstration activities.

Our current portfolio of projects include a long term project on Reducing Emissions for Deforestation and Forest Degradation from Alternative Land in the Tropics (REDD-ALERT) project that seeks to develop knowledge on drivers of deforestation, carbon baseline and monitoring and GHG accounting methodology issues, policy and institutional issues and develops tools and models for REDD negotiation processes in five tropical forest countries. Two short term projects with the Commons Market for Eastern and Southern Africa and the Department for Environment Food and Rural Affairs – DEFRA in the UK are focused on reviews and analysis of AFOLU and REDD issues in order to help the respective partner countries set priorities in the current negotiations and national strategy development.

All of our projects build on previous ASB data and results from recent bottom-up studies on opportunity costs for avoided deforestation with sustainable benefits published in 2007 and 2008. It is thanks to the past work that various partners are requesting for support. A new capacity building project is under discussion with the World Bank Forest Carbon Partnership Facility REDD Readiness program to enable 37 participant countries acquire the knowledge and skills and in order to apply ASB opportunity cost and trade-off analysis methodologies in their respective countries. The project would develop training materials, train and provide implementation support to technical staff and policy makers in these countries as necessary. These types of projects exemplify the intended impact pathways that ASB will pursue between 2010 and 2012 for this output. More generally, output ASB2 provides the means to generate outcomes and impacts from the research outputs of ASB1.

*ASB2: Information on options for addressing climate change in agriculture – forest landscapes in the humid tropics is synthesized and proactively disseminated to influence relevant policy and programme design processes, particularly national and international policies on avoided deforestation with sustainable benefits.*

Intended users include the growing research, development and policy communities who are concerned with rural development, deforestation and environmental services in the tropical forest margins. Most importantly, results from that research will be made disseminated to three audiences: climate change negotiators and their forestry advisors in both developed and developing countries; government and non-government organizations involved in the design of REDD demonstration activities; and the global general public who need to be aware of the importance of deforestation as a source of GHGs, and the need for appropriate incentives and benefit sharing to make avoided deforestation a reality.

In 2007 and 2008, ASB has been able to contribute to shaping the post 2012 climate change discussions by bringing its research results to various international fora (about 15 events in all); these include side-events during UNFCCC meetings and presentations at regional meetings in Africa especially in the COMIFAC and COMESA. Research results have also been brought to the policy domain through the ASB newsletter, list serve and website. Since ASB's presentation during the UNFCCC COP 13 in Bali, the findings of the ASB study have attracted a good deal of attention from key players in the global debate on REDD and AFOLU. A summary of the media attention is presented on at <http://www.asb.cgiar.org/>

In a current project with COMESA, ASB and WorldAgroforestry is providing scientific backstopping to COMESA on the Africa Bio-Carbon Initiative. This consists of reviewing, synthesizing and packaging relevant information in a way that can be useful for climate change



negotiators from its 19 countries. For example, in the run-up to the African Ministerial Conference on the Environment (AMCEN) in May 2009 aimed at preparing Africa for the climate change talks in Bonn. ASB is working with COMESA on producing two relevant policy briefs and presentations at different fora of experts, civil society, negotiators and ministerial level officials on key issues for Africa in the negotiations. These exemplify the kind of impact pathways that ASB would pursue in output 2.

In addition, ASB maintains a number of mechanisms to track the uptake of its research results, primarily through use of its publication and downloads from the internet. We have outlined two small projects for more concentrated work, including an ex post analysis of the previous use of ASB results and an ex ante analysis of key targets (clients, processes) for ASB results.

### **International Public Goods**

The ASB Systemwide Programme has been designed to produce international public goods. The Global Steering Group has identified issues and policy problems related to Reduced Emissions from Deforestation and Degradation (REDD) and Agriculture Forestry and Other Land Use (AFOLU) within the UNFCCC climate change mitigation discussions as the main focus for international public goods production in the ASB partnership. Scientists then develop and agree upon the methods to be applied and syntheses to be generated. Site-specific work, using common protocols, is done through teams of national and international scientists. Synthesis teams draw together results by site, theme and across sites and themes. Engagement with international policy processes clarifies the potential for linking site-specific research to global issues.

Examples of International public good to be produced will include;

1. Synthesis papers that draw out the implications of ASB research for avoided deforestation with sustainable benefits are published in high profile journals and summarized into targeted outputs for selected policy processes, particularly the UNFCCC COP in Copenhagen.
2. Analytical papers and policy briefs that consider the implications of 2009 climate agreements and legislation on plans and policies for sustainable development in the tropical forest margins.
3. Synthesis papers and policy briefs summarizing experience with avoided deforestation and REDD and AFOLU pilot studies for key *policy processes*.
4. New methods for baseline assessment and monitoring of landscape-level carbon stock tested in ASB sites.
5. A new spatial analysis of the carbon, livelihood and environmental service tradeoffs associated with alternative development pathways in multiple ASB sites.
6. Dynamic tradeoff studies published for an expanded set of sites in the tropical forest margins, including avoided deforestation and REDD pilot studies.

### **Elaboration of Partner's Roles**

ASB is a multi-level, global consortium of more than 90 institutions governed by a Global Steering Group and coordinated by a Global Coordination Office. The Global Steering Group made up of 11 representative organizations – including 5 IARCs (CIAT, CIFOR, World Agroforestry, IITA and IFPRI) and 6 national research systems (Brazil, Peru, Cameroon, Thailand, Indonesia, and the Philippines). The first advanced research institute (The Macaulay Institute for Land Use Research-MLURI) was invited to join the Global Steering Group in 2008. The Global Steering Group determines priorities and approves annual work programmes, budgets and the allocation of funding. An ad hoc advisory group provides advice to the GSG. The programme is hosted by World Agroforestry Centre, which provides a variety of institutional support, including financial controls.

The 11 Global Steering Group members constitute the core members of ASB. Other institutions include local and national NGOs, national agencies and universities in developing countries,

advanced research institutions in developed countries and international organizations. About 1200 people from this global network receive regular updates through the ASB list serve.

A partnership review conducted in 2008 found that only about 27 of the 90 organizations are currently fully involved in ASB research and outreach activities, including several new European research organizations.

In 2010 -2012 ASB plans to develop a framework for assessing partner involvement with a view to focus on a small but efficient network of partners in the long term. It is hoped that this would help improve delivery and participation. The list provided below focuses on members that are currently involved in research and policy work within ASB- hence indicative of the most active members.

Group	Name of Partner	Strategic Role/Complimentary Advance	Output	Geographical scope
IARC	IITA, IFPRI, CIAT, TSBF, ICRAF, CIFOR,	Collaborate in research on the tradeoffs between carbon storage, biodiversity and hydrologic services; development and testing of appropriate tools for baseline assessment and monitoring of REDD and AFOLU programmes; and engagement in REDD Plus demonstration activities in ASB sites in Latin America, Asia and Africa.	ASB1 ASB2	<b>Global</b> - Humid tropics of Africa, Asia, and Latin America
NARI	Indonesia Soil Research Institute, Embrapa, IRAD, INIA, PCARRD, Amazon Initiative  These NARS organizations are based in Indonesia, Brazil Thailand, Philippines, , Cameroon, and Peru	Collaborate in research on the tradeoffs between carbon storage, biodiversity and hydrologic services; development and testing of appropriate tools for baseline assessment and monitoring of REDD and AFOLU programmes; and engagement in REDD Plus demonstration activities in Latin America, Asia and Africa. Indonesia organizations will co-lead events on REDD Plus.	ASB1 ASB2	<b>Global</b> - Humid tropics of Africa, Asia, and Latin America
ARI	The Macaulay Institute for Land Use Research, MLURI based in	Partners with ASB on the <b>Reducing Emissions from Deforestation and Degradation</b> through <b>Alternative Landuses</b> in	ASB1 ASB2	Humid tropics of Africa, Asia, and Latin America

Group	Name of Partner	Strategic Role/Complimentary Advance	Output	Geographical scope
	UK, University of Gottingen-Germany; Free University of Amsterdam and University of Louvain in Belgium.	Rainforests of the Tropics (REDD-ALERT) project. The project focuses on a number of key areas including drivers of deforestation (socio-economic etc), measurement of carbon and GHG, policy research, land use change modeling and negotiations. The partner's role is to contribute advanced research methods and skills.		
Inter-Governmental	Common Market for Southern and Eastern Africa (COMESA); and World Bank Forest Carbon Partnership Facility- FCPF	Associated partners on policy research work on REDD Plus and AFOLU. The work includes a variety of policy support actions such as scientific support, knowledge provision to client countries and training.	ASB 2	Eastern and Southern African Countries; and Humid tropics of Africa, Asia, and Latin America

## Annex 2 - Financial Tables

Table 1: Overall summary of the proposed budgeted income and expenditure for 2010

	Indicative Budget 2009	Indicative Budget 2010
	US\$	US\$
<b>Income</b>		
Unrestricted grant income	9,822,313	10,640,096
Restricted grant income	19,256,766	19,009,105
Overhead recovery on restricted grant income	1,581,601	1,700,001
Other income	1,250,000	1,100,000
<i>Total Income</i>	<b>31,910,680</b>	<b>32,449,203</b>
<b>Expenditures</b>		
Regions	15,179,018	15,100,021
Global Research Priorities	3,368,785	3,430,533
Systemwide and Ecoregional Programmes	5,599,104	6,069,241
Global Support Units	1,565,420	1,468,517
Management and Essential Services	5,353,203	5,513,873
<i>Sub-total Expenditure</i>	31,065,530	31,582,186
Others	1,795,000	1,517,016
Total expenditure	<b>32,860,530</b>	<b>33,099,202</b>
<i>Estimated transfer to/(from) the operating fund</i>	<b>(949,850)</b>	<b>(650,000)</b>

**Table 2: Unrestricted core grants estimates summary 2010**

DONOR	Estimated income 2009 as at November 2008			Estimated income 2010 as at August 31st 2009			Increase (Decrease)
	Donor Currency	Exchange rate	US \$	Donor Currency	Exchange rate	US \$	
							US\$
Australia	250,000	1.0292	242,900	250,000	1.0292	242,900	-
Belgium	160000	0.84	190476.1905	465,000	0.7400	628,378	437,902
Canada	818,000	1.1000	743,636	818,000	1.1000	743,636	-
China	20,000	1.0000	20,000	20,000	1.0000	20,000	-
Denmark	5,300,000	5.0000	1,060,000	5,300,000	5.5000	963,636	(96,364)
United Kingdom	630,000	0.6500	969,231	661,500	0.6200	1,066,935	97,705
Finland	336,376	0.8400	400,447	650,000	0.7400	878,378	477,931
Germany	317,000	0.8400	377,381	380,000	0.7400	513,514	136,133
Ireland	800,000	0.8400	952,381	750,000	0.7400	1,013,514	61,133
Japan	0	-	-	0	-	-	-
Netherlands	500,000	0.8400	595,238	500,000	0.7400	675,676	80,438
Norway	5,500,000	5.6000	982,143	6,000,000	6.3000	952,381	(29,762)
Philippines	6,000	1.0000	4,646	6,000	1.0000	6,000	1,354
South Africa	20,000	1.0000	20,000	20,000	1.0000	20,000	-
Sweden	3,400,000	7.5000	453,333	2,720,000	7.3000	372,603	(80,731)
Switzerland	500,000	1.1111	450,000	500,000	1.1000	454,545	4,545
Thailand	10,000	1.0000	10,000	-	1.0000	-	(10,000)
USAID	802,000	1.0000	802,000	756,000	1.0000	756,000	(46,000)
World Bank	1,548,500	1.0000	1,548,500	1,332,000	1.0000	1,332,000	(216,500)
			9,822,313			10,640,096	817,783

**Table 3: Summary of restricted grants proposed budget 2010**

Donor/ Grant Number	Grant Description	Start Date	End Date	Proposed budget 2010		
				Funds for Operating Expenses	Overhead Income Earned	Total Grant Amount
Confirmed						
Australian Aid						
AUSD-842	LandCare approach to Foster Collective Action and Learning for Wide Scale Impact of Sustainable Land Management in Eastern Africa	15-Jun-09	30-Jun-10	191,382	19,138	210,520
Australian Centre for International Agricultural Research						
ACAR-712	LWR/2004/078 Evaluation and Adoption of Improved Farming Practices on Soil and Water Resources, Bohol Island The Philippines	01-Jan-07	31-Dec-10	10,159	508	10,667
ACAR-725	Enhancing Tree Seedlings supply via Economic and Policy Changes in the Philippines Nursery Sector Project	01-Jan-07	31-Dec-10	14,462	723	15,185
Bill and Melinda Gates Foundation						
BMGF-745	AWARD Fellowship program to fix the Leakey Pipeline of African Women Agricultural Scientists	01-Nov-07	31-Oct-11	3,400,000	238,000	3,638,000
Brazil						
BRZL-490	Specialized consultancy services and training technicians from the Brazilian agricultural research system	01-Jul-05	30-Jun-10	56,038	5,604	61,642
Centre for Development Research						
ZEFZ-797	Overcoming Barriers to Smallholder Carbon Forestry in the Philippines	01-Oct-08	30-Sep-10	14,484	-	14,484
Centre for Mountain Ecosystem Studies						
CMES-776	Rural Energy Production from Bioenergy	01-May-07	30-Apr-10	33,780	-	33,780
Centro Internacional de Agricultura Tropical, Colombia						
CIAT-822	Amazon Initiative Ecoregional Program (AI-EP)	01-Jan-09	31-Dec-10	20,050	4,411	24,461
CIAT-816	Globally Integrated Africa Soil Information Service (AFSIS)	01-Nov-08	31-Oct-12	405,987	60,898	466,885
Consortium for Study and Development of Participation						
KONZ-853	Expand Community Base Natural Resources Management and Environmental Service Management Linkages with Reduction Poverty, Markets, Gender Mainstreaming and Ecosystem Integrity in Lombok Island.	01-Sep-09	30-Aug-10	23,288	2,911	26,199
Cooperation of Common Fund for Commodities						
CFCZ-846	Promoting Development of Economically Viable Rubber Smallholdings in West Africa	15-Jan-09	30-Dec-10	945,176	-	945,176
Danish Centre for Forest, Landscape and Planning						
FLDZ-785	Vegetation and Climate change in Eastern Africa	01-Apr-08	31-Jul-10	59,121	-	59,121
Department for International Development						
DFID-778	Protracted Relief Programme Phase 2 (PRP 2)	01-Jul-08	30-Nov-10	153,801	9,228	163,029
Deutsche Gesellschaft für Technische Zusammenarbeit - GTZ						
GTZG-804	GIS Spatial Analysis :- Suitability Maps for Biofuel Feedstock for Ethiopia, Uganda, Tanzania	07-Nov-08	27-Dec-10	6,068	425	6,493
GTZG-719	Trees in Multi-Use Landscapes in Southeast Asia(TUL-SEA)	01-May-07	30-Apr-10	234,208	39,019	273,227
GTZG-817	Making the Mekong Connected (MMC): Development of carbon market and conservation financing mechanisms for multifunctional landscape bio-corridors in the Upper Mekong	01-Mar-09	28-Feb-12	120,938	21,769	142,707
Earth Institute - Columbia University						
EICU-648	Monitoring and Impact assessment in the Millennium Villages	01-Jan-06	31-Dec-10	58,410	7,593	66,003
Ebony Enterprises Ltd						
EELZ-821	Rwanda Master Plan For Irrigation	01-Mar-09	30-Sep-10	284,350	62,557	346,907
European Union						
EURU-755	EC/IFAD CGIAR PROGRAMME -Policy Options and Incentives Mechanism for Strengthening Agroforestry	01-Jan-08	31-Dec-10	1,078,801	237,336	1,316,137
EURU-852	BENWOOD - Coordination Actions in Support of Sustainable and Eco-Efficient Short Rotation Forestry in CDM Countries	01-May-09	30-Apr-11	50,552	11,121	61,673
EURU-810	ALL-REDDI SEA	01-Jan-09	31-Dec-11	392,059	27,444	419,503
EURU-NEW1	GRP6	01-Jan-09	31-Dec-09	87,606	-	87,606
EURU-NEW2	REDD-ALERT SEA	01-Jan-10	31-Dec-10	186,167	-	186,167
Finland						
FIND-762	Finnish Associate Expert - Miika	04-Jan-08	31-Mar-10	30,648	6,742	37,390

Donor/ Grant Number	Grant Description	Start Date	End Date	Proposed budget 2010		
				Funds for Operating Expenses	Overhead Income Earned	Total Grant Amount
FIND-840	Associate Expert in Landscape Management for Conservation and Development - JPO	01-Aug-09	30-Jul-11	103,540	22,779	126,319
<b>Flemish Office for Development Cooperation and Technical Assistance</b>						
BELG-847	Community Agroforestry Tree Seed Banks (CATS Banks): Building Agroforestry Scaling up Platform for Diversifying Livelihoods Opportunities in Malawi and Mozambique	15-Dec-08	15-Nov-10	168,988	21,968	190,956
BELG-850	AGROFOR- Improving access to and availability of quality agroforestry learning resources	01-Jul-09	30-Jun-10	131,400	14,454	145,854
BELG-796	Increasing small-scale farmer benefits from agroforestry tree products in West and Central Africa- AFTP4A	01-Oct-08	30-Sep-11	1,126,190	146,405	1,272,595
<b>Food and Agriculture Organization of the United Nations</b>						
FAOZ-845	Tradeoff between Profitability and Environmental Effects at plot and Landscape Scale during Intensification of Rubber Agroforestry in Indonesia	01-Jun-09	30-Nov-10	20,571	-	20,571
<b>Ford Foundation</b>						
FORD-767	Develop efficient and fair mechanisms for reducing carbon emission from deforestation and resource degradation in Indonesia.	01-Apr-08	31-Aug-10	29,420	4,413	33,833
<b>Forum for Agricultural Research in Africa</b>						
FARA-798	Cross-Site Research Support in Data Management to the Sub-Saharan Africa Challenge Programme (SAA-CP)	01-Jan-08	30-Dec-10	15,014	-	15,014
<b>Georg-August-Universität Göttingen</b>						
GAUG-824	Adaptation of Landuse to Climate Change in Sub-Saharan Africa (ALUCCSA)	01-Dec-08	31-May-11	108,387	12,042	120,428
<b>Heifer International</b>						
HFER-749	East Africa Dairy Development (EADD)	15-Dec-07	31-Dec-11	517,723	74,815	592,539
<b>HK Logistics LTD. Global Solutions</b>						
HKLZ-820	Sustainable Livelihood Options and Carbon Rights as a basis for efficient and fair emission reduction in the central Kalimantan Ex-Mega Rice Project	09-Mar-09	30-Jun-10	95,332	11,440	106,772
<b>India Council for Agricultural Research</b>						
ICAR-851	Enabling Small Holders to Improve their Livelihoods and Benefit from Carbon Finance under the National Agricultural Innovation Project (NAIP)	01-Jun-09	30-Apr-12	434,888	13,047	447,935
<b>Indonesian Palm Oil Commission</b>						
IPOC-841	Research on the Study Accounting for Greenhouse gas Emissions	01-May-09	30-Apr-11	174,174	38,318	212,493
<b>International Development Research Centre</b>						
IDRC-819	Going to Scale: Enhancing the Adaptive Management Capacities for Sustainable Land Management in the Highlands of Eastern Africa	16-Mar-09	15-Mar-13	50,688	6,589	57,277
<b>International Fund for Agricultural Development</b>						
IFAD-737	Programme for Pro-poor Rewards for Environmental Services in Africa	18-Apr-07	17-Apr-11	241,655	28,471	270,126
IFAD-781	Programme to Support Smallholder Conservation Agriculture Promotion in Western and Central Africa	01-Jul-08	30-Jun-11	31,329	2,506	33,836
IFAD-808	Promoting Rural Innovations through Participatory Tree Domestication in West and Central Africa	27-Nov-08	26-Nov-11	384,251	49,953	434,204
IFAD-788	Rewards for, Use of and Shared Investment in Pro-poor Environmental Services Phase II(RUPES-II)	30-Sep-08	29-Sep-12	605,631	72,676	678,307
<b>Internationale en Recherche Agronomique pour le Développement (CIRAD)</b>						
CRAD-696	CAFNET: Connecting, enhancing and sustaining environmental services and market values of coffee agroforestry in Central America, East Africa and India	01-Feb-07	31-Jan-11	122,520	7,812	130,332
<b>Ireland</b>						
IRLD-720	Malawi Agroforestry food Security Programme	01-Jan-07	31-Dec-10	966,943	156,083	1,123,026
<b>Italy</b>						
ITLY-714	AHI AGILE 2007	01-Jan-07	31-Dec-10	247,549	54,461	302,010
<b>Japan</b>						
JPAN-753	Bioenergy Provision within Agroforestry Systems in East Africa	01-Apr-07	31-Mar-10	76,098	16,741	92,839
<b>Katholic University</b>						
KZEZ-685	Facilitating Community-Driven Sustainable Development in The Uplands of Southwest China- Phase II	01-Jan-05	28-Feb-10	19,486	1,364	20,850
<b>Kenya Agricultural Research Institute</b>						
KARI-839	Backstopping of WKIEMP by ICRAF - PHASE III - (GEF)	01-Jul-09	30-Jun-11	338,200	-	338,200
<b>Leibniz Centre for Agricultural Landscape Research e.V.</b>						

Donor/ Grant Number	Grant Description	Start Date	End Date	Proposed budget 2010		
				Funds for Operating Expenses	Overhead Income Earned	Total Grant Amount
ZALF-783	Climate Change Impact Assessment and Adaption Options in Vulnerable Agro-landscapes in East Africa	01-May-08	30-Apr-11	194,361	38,590	232,951
ZALF-NEW1	Southern Africa grant	01-Jan-10	30-Dec-10	56,985	-	56,985
<b>Macaulay Land Use Research Institute</b>						
MLRI-826	Development and Application of Methodologies For Reduced Emissions From Deforestation and Forest Degradation (DEFRA REDD)	29-Oct-08	30-May-10	48,427	11,865	60,292
<b>McKnight Foundation</b>						
MCNT-736	Climbing Beans Project	01-Jul-07	30-Jun-10	13,959	1,396	15,354
<b>Multidonor</b>						
MULT-899	SEA Regional Office Operations	01-Dec-06	30-Nov-10	28,383	-	28,383
MULT-994	Gender and Diversity	01-Dec-07	31-Dec-10	420,000	-	420,000
MULT-748	GIS Multi-donor Funds	01-Dec-07	31-Dec-10	18,468	4,063	22,531
<b>Natural Resources Institute</b>						
NRIZ-730	SAPP Project - Caesalpinoid Woodlands of Southern Africa: Optimising the Use of Pesticidal Plants	01-Jan-07	31-Dec-10	23,176	5,330	28,506
<b>Netherlands</b>						
NETH-792	Improved Capacity in Rainwater Management for Sustainable Development	01-Jul-08	01-Jul-10	193,120	19,312	212,431
<b>Norwegian Agency for Development Cooperation</b>						
NORD-838	REALU Architecture: Reducing Emissions from all Land Uses	01-Jan-09	31-Dec-10	376,787	37,679	414,466
<b>Packard Foundation</b>						
DLPF-806	Fair, Efficient and Sustainable Emission Reduction from Land Use in Indonesia (FESERLUI):	01-Jan-09	31-Dec-10	54,655	6,903	61,558
<b>Peru</b>						
PERU-323	Estudio Integral de los factores claves para el desarrollo de la Agroforesteria en Ucayali	01-Jan-02	31-Dec-10	40,000	-	40,000
<b>The Centre for International Forestry research CIFOR</b>						
CFOR-734	CIFOR-ICRAF Biodiversity Platform "Research on Biodiversity Conservation on a Landscape Level"	01-Jun-07	31-May-10	46,188	-	46,188
CFOR-716	Improving Economic Outcomes for Smallholder Growing Tea In Indonesia	01-Jan-07	31-Dec-10	64,151	3,208	67,359
CFOR-784	ICRAF/CIFOR Activities and Projects in Vietnam	01-Jan-09	31-Dec-11	27,575	-	27,575
<b>Unilever</b>						
UNLV-616	To advance domestication of Allanblackia spp. In selected countries in Africa III	01-Dec-05	31-Dec-10	21,013	2,101	23,115
<b>United Nations Development Programme</b>						
UNDP-683	Expansion of the Knowledge Base on Poverty-Environment Linkages through Conducting 10 Cases Studies, Reviews of National Programmes and the Development of Policy Investment Models	11-Dec-06	23-Oct-10	40,848	-	40,848
<b>United States Agency for International Development</b>						
USAD-828	Food Security and Crisis Mitigation (Women in Science - G&D) - Phase II			750,000	112,500	862,500
<b>World Bank</b>						
IBRD-750	IDF Grant for Strengthening the Amazon Initiative Consortium to Address the Need for Sustainable Use Systems in the Amazon	01-Jan-08	31-Dec-10	126,931	6,347	133,278
IBRD-782	FONTAGRO-CGIAR framework project - Improving Competitiveness of Amazon Fruit Species	01-Jan-08	31-Dec-10	128,374	16,384	144,758
<b>World Wildlife Fund</b>						
WWFZ-777	ICRAF/WWF/CARE Climate Change Project	01-Jul-07	30-Jun-10	42,139	9,271	51,409
WWFZ-836	Carbon Benefits Project: Modeling, Measurement and Monitoring	01-Apr-09	31-Dec-10	632,914	57,570	690,484
<b>Total Confirmed</b>				<b>17,215,966</b>	<b>1,844,283</b>	<b>19,060,249</b>
<b>Not Confirmed</b>						
<b>Africa Wildlife Foundation</b>						
AWFZ-NEW1	WCA programme	01-Jan-10	31-Dec-10	123,388	-	123,388
<b>CATIE</b>						
CATE-NEW1	Prediccion y Evaluacion del Impacto del Cambio Climatico sobre los Sistemas Agroforestales	01-Jan-10	31-Dec-10	28,360	-	28,360
<b>Concern Worldwide</b>						
COWZ-NEW1	Eastern Africa Programme	01-Jan-10	31-Dec-10	154,691	-	154,691
<b>Conservation Agriculture with Trees</b>						



Donor/ Grant Number	Grant Description	Start Date	End Date	Proposed budget 2010		
				Funds for Operating Expenses	Overhead Income Earned	Total Grant Amount
CAWT- NEW1	Eastern Africa Programme	01-Jan-10	31-Dec-10	235,518	-	235,518
<b>Danish International Development Agency</b>						
DAND- NEW1	JATROPHA: Domestication of Jatropha curcas for oil production on smallholder farms in the Sudano-Sahelian region with focus on Mali(2009-2013)	01-Jan-10	31-Dec-13	50,002	-	50,002
<b>Food and Agriculture Organization of the United Nations</b>						
FAOZ- NEW1	WCA - Programme	01-Jan-10	31-Dec-10	150,696	-	150,696
<b>Forum for Agricultural Research in Africa</b>						
FARA-NEW	Sustainable intensification of Crop-Livestock System and Markets Access promotion for smallholder farmers in LKPLS	01-Jan-10	31-Dec-10	26,500	-	26,500
<b>Global Environment Facility</b>						
GEFZ- NEW1	Lake Tanganyika programme - GRP4	01-Jan-10	31-Dec-10	90,742	-	90,742
<b>Government of Rwanda</b>						
RWND- NEW1	Technical and socio-economic studies on selected pilots in Rwanda	01-Jan-09	31-Dec-10	85,000	-	85,000
<b>INIA-Spain</b>						
INIA-NEW1	Amazon Region NEW GRANT	01-Jan-10	31-Dec-10	52,501	-	52,501
<b>International Livestock Research Institute</b>						
ILRI-NEW1	Impact Assessment -DDG6	01-Jan-10	31-Dec-10	9,952	-	9,952
ILRI-NEW2	South East Asia Programme - Vietnam	01-Jan-10	31-Dec-10	18,766	-	18,766
<b>Katholic University</b>						
KZEZ- NEW1	South East Asia Programme	01-Jan-10	31-Dec-10	25,814	-	25,814
<b>Kyoto University</b>						
KYUN- NEW1	Rehabilitation of Degraded Tropical Forestry Ecosystems with local communities within the forest	01-Jan-10	30-Mar-11	40,000	-	40,000
<b>LEUSER NOEL</b>						
LIFZ-NEW1	LEUSER NOEL	01-Jan-10	31-Dec-10	165,765	-	165,765
<b>Millennium Challenge Account</b>						
MCAZ- NEW1	Adaptation trials for fast growing forest and fruit trees in Kouroumary (Alatona) zone, Mali)	01-Jan-10	30-Jun-10	105,621	-	105,621
<b>Netherlands</b>						
NETH- NEW1	WOTRO - Scaling-up sustainable land management in the highlands of Kenya and Tanzania	01-Jan-10	31-Dec-10	94,942	-	94,942
<b>Packard Foundation</b>						
DLPF-NEW1	South East Asia Programme	01-Jan-10	31-Dec-10	249,184	-	249,184
<b>RRI</b>						
RRIZ-NEW1	SouthEast Asia Programme	01-Jan-10	31-Dec-10	50,955	-	50,955
<b>Swiss Development Corporation</b>						
SDCZ- NEW1	South East Asia Programme	01-Jan-10	31-Dec-10	24,948	-	24,948
<b>United Nations Development Programme</b>						
UNDP- NEW1	UNDP Tanzania Programme	01-Jan-10	30-Dec-10	20,085	-	20,085
<b>Waseda Environment Research Institute</b>						
WERI- NEW1	South East Asia Programme	01-Jan-10	31-Dec-10	40,000	-	40,000
				<b>1,843,430</b>	No overheads taken into budget for unconfirmed grants	<b>1,843,430</b>
				<b>19,059,397</b>	<b>1,844,283</b>	<b>20,903,680</b>

**Table 4: Total expenses 2009 indicative budgets and the proposed indicative budget for 2010**  
**Split between staff costs and operating costs**

	Indicative budget 2009			Indicative budget 2010		
	Staff costs US\$	Operating cost US\$	Total US\$	Staff costs US\$	Operating cost US\$	Total US\$
<b>Regions</b>						
Eastern Africa	1,895,724	1,765,073	3,660,797	1,988,788	2,049,018	4,037,806
South Asia	277,822	167,083	444,905	266,431	797,145	1,063,576
Southeast Asia	1,689,630	1,883,881	3,573,511	1,959,413	1,897,273	3,856,686
Southern Africa	955,857	1,136,085	2,091,942	1,013,636	1,158,409	2,172,045
West and Central Africa	1,654,323	3,753,540	5,407,863	1,460,963	2,508,944	3,969,907
<b>Sub-total</b>	<b>6,473,356</b>	<b>8,705,662</b>	<b>15,179,018</b>	<b>6,689,232</b>	<b>8,410,789</b>	<b>15,100,021</b>
<b>Themes and Global Projects</b>						
Global Research Project 3	246,217	90,152	336,369	209,069	216,404	425,473
Global Research Project 1	307,369	665,997	973,366	196,028	537,529	733,557
Global Research Project 2	197,616	123,593	321,209	93,859	190,143	284,002
Global Research Project 4	214,101	55,899	270,000	207,007	133,509	340,516
Global Research Project 5	379,424	65,746	445,170	283,584	556,123	839,707
Global Research Project 6	472,496	550,175	1,022,671	397,475	409,803	807,278
<b>Sub-total</b>	<b>1,817,223</b>	<b>1,551,562</b>	<b>3,368,785</b>	<b>1,387,022</b>	<b>2,043,511</b>	<b>3,430,533</b>
<b>Systemwide and Ecoregional Programmes</b>						
Alternatives to slash-and-burn	164,608	46,000	210,608	222,891	370,134	593,025
Amazon Initiative	337,952	581,239	919,191	339,453	566,764	906,217
Gender and Diversity	974,178	3,495,126	4,469,304	908,271	3,661,729	4,570,000
<b>Sub-total</b>	<b>1,476,739</b>	<b>4,122,365</b>	<b>5,599,104</b>	<b>1,470,614</b>	<b>4,598,627</b>	<b>6,069,241</b>
<b>Global Support Units</b>						
Communications Unit	405,995	369,005	775,000	455,611	353,875	809,486
Research Methods Group	298,794	96,230	395,024	308,384	54,247	362,631
Training Unit	278,396	117,000	395,396	187,086	109,314	296,400
<b>Sub-total</b>	<b>983,185</b>	<b>582,235</b>	<b>1,565,420</b>	<b>951,081</b>	<b>517,436</b>	<b>1,468,517</b>
<b>Management and Essential Services</b>						
Board of trustees	37,977	282,023	320,000	60,753	279,247	340,000
Office of the Director General	845,600	255,401	1,101,001	820,914	308,320	1,129,234
Deputy Director General	610,343	433,174	1,043,517	1,022,140	389,182	1,411,322
Director of Communications	163,563	76,460	240,023	185,236	180,567	365,803
Director of Finance	213,749	57,250	270,999	248,848	61,000	309,848
Human Resources unit	259,361	123,100	382,461	392,731	80,904	473,635
Financial Services Unit	536,976	133,156	670,132	576,894	185,306	762,200
Information Technology Unit	-	340,000	340,000	6,820	373,180	380,000
Operations Unit	479,279	175,793	655,072	549,719	(207,889)	341,830
<b>Sub-total</b>	<b>3,146,846</b>	<b>1,876,357</b>	<b>5,023,203</b>	<b>3,864,056</b>	<b>1,649,817</b>	<b>5,513,873</b>
<b>Others</b>						
Depreciation	-	750,000	750,000	-	119,286	119,286
Female Post-doc Programme	-	300,000	300,000	-	134,120	134,120
Science Council	-	330,000	330,000	-	-	-
EPMR	-	-	-	-	150,000	150,000
Contribution to Consortium	-	-	-	-	250,000	250,000
Staff Job Market Alignment	145,000	-	145,000	-	250,000	250,000
World Congress for Agroforestry II	-	100,000	100,000	-	-	-
New strategic positions	250,000	-	250,000	-	443,610	443,610
Buffer fund	-	250,000	250,000	-	170,000	170,000
<b>Sub-total</b>	<b>395,000</b>	<b>1,730,000</b>	<b>2,125,000</b>	<b>-</b>	<b>1,517,016</b>	<b>1,517,016</b>
<b>Total expenditure</b>	<b>14,292,349</b>	<b>18,568,181</b>	<b>32,860,530</b>	<b>14,362,006</b>	<b>18,737,196</b>	<b>33,099,202</b>

**Table 4A: Staff to Operating cost ratio**  
**Indicative 2009 and the Indicative budget for 2010**

	Indicative budget 2009			Indicative budget 2010		
	Staff costs %	Operating cost %	Total %	Staff costs %	Operating cost %	Total %
<b>Grouping by Cluster</b>						
<b>Regions</b>						
Eastern Africa	52	48	100	49	51	100
South Asia	62	38	100	25	75	100
Southeast Asia	47	53	100	51	49	100
Southern Africa	46	54	100	47	53	100
West and Central Africa	31	69	100	37	63	100
<b>Sub-total</b>	<b>43</b>	<b>57</b>		<b>44</b>	<b>56</b>	<b>100</b>
<b>Themes and Global Projects</b>						
Global Research Project 3	73	27	100	49	51	100
Global Research Project 1	32	68		27	73	100
Global Research Project 2	62	38	100	33	67	100
Global Research Project 4	79	21	100	61	39	100
Global Research Project 5	85	15	100	34	66	100
Global Research Project 6	46	54		49	51	100
<b>Sub-total</b>	<b>54</b>	<b>46</b>	<b>100</b>	<b>40</b>	<b>60</b>	<b>100</b>
<b>Systemwide and Ecoregional Programmes</b>						
Alternatives to slash-and-burn	78	22	100	38	62	100
Amazon Initiative	37	63		37	63	100
Gender and Diversity	22	78	100	20	80	100
<b>Sub-total</b>	<b>26</b>	<b>74</b>	<b>100</b>	<b>24</b>	<b>76</b>	<b>100</b>
<b>Global Support Units</b>						
Communications Unit	52	48	100	56	44	100
Research Methods Group	76	24	100	85	15	100
Training Unit	70	30	100	63	37	100
<b>Sub-total</b>	<b>63</b>	<b>37</b>	<b>100</b>	<b>65</b>	<b>35</b>	<b>100</b>
<b>Management and Essential Services</b>						
Board of trustees	12	88	100	18	82	100
Office of the Director General	77	23	100	73	27	100
Deputy Director General	58	42	100	72	28	100
Director of Communications	-	-	-	-	-	-
Director of Finance	79	21	100	80	20	100
Human Resources unit	68	32	100	83	17	100
Financial Services Unit	80	20	100	76	24	100
Information Technology Unit	-	100	100	2	98	100
Operations Unit	73	27	100	161	(61)	100
<b>Sub-total</b>	<b>63</b>	<b>37</b>	<b>100</b>	<b>70</b>	<b>30</b>	<b>100</b>
<b>Others</b>						
Depreciation	-	100	100	-	100	100
Female Post-doc Programme	-	100	100	-	100	100
Science Council	-	100	100	-	-	-
EPMR	-	-	-	-	100	100
Contribution to Consortium	-	-	-	-	100	100
Staff Job Market Alignment	-	-	-	-	100	100
World Congress for Agroforestry II	-	-	-	-	-	-
New strategic positions	-	-	-	-	100	100
Buffer fund	-	100	100	-	100	100
<b>Sub-total</b>	<b>19</b>	<b>81</b>	<b>100</b>	<b>-</b>	<b>100</b>	<b>100</b>
<b>Total expenditure</b>	<b>43</b>	<b>57</b>	<b>100</b>	<b>43</b>	<b>57</b>	<b>100</b>

**Table 5: Total expenses 2009 indicative budget and the proposed indicative budget for 2010**  
**Split between staff restricted and unrestricted core**

		Indicative budget 2009			Indicative budget 2010		
		Restricted US\$	Unrestricted US\$	Total US\$	Restricted US\$	Unrestricted US\$	Total US\$
<b>Grouping by Cluster</b>							
<b>Regions</b>							
	Eastern Africa	3,154,148	506,649	3,660,797	3,385,762	652,044	4,037,806
	South Asia	61,000	383,906	444,905	545,440	518,136	1,063,576
	Southeast Asia	2,626,056	947,455	3,573,511	2,985,002	871,684	3,856,686
	Southern Africa	1,721,837	370,105	2,091,942	1,661,871	510,174	2,172,045
	West and Central Africa	4,738,468	669,395	5,407,863	3,190,427	779,481	3,969,907
	<b>Sub-total</b>	<b>12,301,509</b>	<b>2,877,509</b>	<b>15,179,018</b>	<b>11,768,502</b>	<b>3,331,519</b>	<b>15,100,021</b>
<b>Themes and Global Projects</b>							
	Global Research Project 3	10,266	326,103	336,369	123,739	301,734	425,473
	Global Research Project 1	462,657	510,709	973,366	89,674	643,883	733,557
	Global Research Project 2	-	321,209	321,209	-	284,002	284,002
	Global Research Project 4	-	270,000	270,000	-	340,516	340,516
	Global Research Project 5	62,070	383,100	445,170	587,605	252,101	839,707
	Global Research Project 6	847,581	175,091	1,022,671	598,918	208,360	807,278
##	<b>Sub-total</b>	<b>1,382,573</b>	<b>1,986,212</b>	<b>3,368,785</b>	<b>1,399,936</b>	<b>2,030,597</b>	<b>3,430,533</b>
<b>Systemwide and Ecoregional Programmes</b>							
	Alternatives to slash-and-burn	60,487	150,121	210,608	428,016	165,008	593,025
	Amazon Initiative	651,323	267,869	919,191	578,754	327,463	906,217
	Gender and Diversity	4,469,304	-	4,469,304	4,570,000	-	4,570,000
	<b>Sub-total</b>	<b>5,181,114</b>	<b>417,990</b>	<b>5,599,104</b>	<b>5,576,770</b>	<b>492,471</b>	<b>6,069,241</b>
<b>Global Support Units</b>							
	Communications Unit	-	775,000	775,000	-	809,486	809,486
	Research Methods Group	45,021	350,002	395,024	39,550	323,081	362,631
	Training Unit	245,391	150,004	395,396	131,400	165,000	296,400
	<b>Sub-total</b>	<b>290,413</b>	<b>1,275,007</b>	<b>1,565,420</b>	<b>170,950</b>	<b>1,297,567</b>	<b>1,468,517</b>
<b>Management and Essential Services</b>							
	Board of trustees	-	320,000	320,000	-	340,000	340,000
	Office of the Director General	48,000	1,053,001	1,101,001	-	1,129,234	1,129,234
	Deputy Director General	53,158	990,358	1,043,517	85,067	1,326,255	1,411,322
	Director of Communications	-	240,023	240,023	-	365,803	365,803
	Director of Finance	-	270,999	270,999	-	309,848	309,848
	Human Resources unit	-	382,461	382,461	-	473,635	473,635
	Financial Services Unit	-	670,132	670,132	7,877	754,323	762,200
	Information Technology Unit	-	340,000	340,000	-	380,000	380,000
	Operations Unit	-	655,072	655,072	-	341,830	341,830
	<b>Sub-total</b>	<b>101,158</b>	<b>4,922,045</b>	<b>5,023,203</b>	<b>92,944</b>	<b>5,420,929</b>	<b>5,513,873</b>
<b>Others</b>							
	Depreciation	-	750,000	750,000	-	119,286	119,286
	Female Post-doc Programme	-	300,000	300,000	-	134,120	134,120
	Science Council	-	330,000	330,000	-	-	-
	EPMR	-	-	-	-	150,000	150,000
	Contribution to Consortium	-	-	-	-	250,000	250,000
	Staff Job Market Alignment	-	145,000	145,000	-	250,000	250,000
	World Congress for Agroforestry II	-	100,000	100,000	-	-	-
	New strategic positions	-	250,000	250,000	-	443,610	443,610
	Buffer fund	-	250,000	250,000	-	170,000	170,000
	<b>Sub-total</b>	<b>-</b>	<b>2,125,000</b>	<b>2,125,000</b>	<b>-</b>	<b>1,517,016</b>	<b>1,517,016</b>
<b>Total expenditure</b>		<b>19,256,767</b>	<b>13,603,762</b>	<b>32,860,530</b>	<b>19,009,102</b>	<b>14,090,100</b>	<b>33,099,202</b>

**Table 5A: Restricted to unrestricted core ratio**  
**Indicative 2009 and the Indicative budget for 2010**

		Indicative budget 2009			Indicative budget 2010		
		Restricted %	Core %	Total %	Restricted %	Core %	Total %
<b>Grouping by Cluster</b>							
<b>Regions</b>							
	Eastern Africa	86	14	100	84	16	100
	South Asia	14	86	100	51	49	100
	Southeast Asia	73	27	100	77	23	100
	Southern Africa	82	18	100	77	23	100
	West and Central Africa	88	12	100	80	20	100
	<b>Sub-total</b>	<b>81</b>	<b>19</b>	<b>100</b>	<b>78</b>	<b>22</b>	<b>100</b>
<b>Themes and Global Projects</b>							
	Global Research Project 3	3	97	100	29	71	100
	Global Research Project 1	48	52	100	12	88	100
	Global Research Project 2	-	100	100	-	100	100
	Global Research Project 4	-	100	100	-	100	100
	Global Research Project 5	14	86	100	70	30	100
	Global Research Project 6	83	17	100	74	26	100
	<b>Sub-total</b>	<b>41</b>	<b>59</b>	<b>100</b>	<b>41</b>	<b>59</b>	<b>100</b>
<b>Systemwide and Ecoregional Programmes</b>							
	Alternatives to slash-and-burn	29	71	100	72	28	100
	Amazon Initiative	71	29	100	64	36	100
	Gender and Diversity	-	-	-	100	-	100
	<b>Sub-total</b>	<b>93</b>	<b>7</b>	<b>100</b>	<b>92</b>	<b>8</b>	<b>100</b>
<b>Global Support Units</b>							
	Communications Unit	-	100	100	-	100	100
	Research Methods Group	11	89	100	11	89	100
	Training Unit	62	38	100	44	56	100
	<b>Sub-total</b>	<b>19</b>	<b>81</b>	<b>100</b>	<b>12</b>	<b>88</b>	<b>100</b>
<b>Management and Essential Services</b>							
	Board of trustees	-	100	100	-	100	100
	Office of the Director General	4	96	100	-	100	100
	Deputy Director General	5	95	100	6	94	100
	Director of Communications	-	-	-	-	-	-
	Director of Finance	-	100	100	-	100	100
	Human Resources unit	-	100	100	-	100	100
	Financial Services Unit	-	100	100	1	99	100
	Information Technology Unit	-	100	100	-	100	100
	Operations Unit	-	100	100	-	100	100
	<b>Sub-total</b>	<b>2</b>	<b>98</b>	<b>100</b>	<b>2</b>	<b>98</b>	<b>100</b>
<b>Others</b>							
	Depreciation	-	100	100	-	100	100
	Female Post-doc Programme	-	100	100	-	100	100
	Science Council	-	100	100	-	-	-
	EPMR	-	-	-	-	100	100
	Contribution to Consortium	-	-	-	-	100	100
	Staff Job Market Alignment	-	-	-	-	100	100
	World Congress for Agroforestry II	-	-	-	-	-	-
	New strategic positions	-	-	-	-	100	100
	Buffer fund	-	100	100	-	100	100
	<b>Sub-total</b>	<b>-</b>	<b>100</b>	<b>100</b>	<b>-</b>	<b>100</b>	<b>100</b>
<b>Total expenditure</b>		<b>59</b>	<b>41</b>	<b>100</b>	<b>57</b>	<b>43</b>	<b>100</b>

**Table 6: Total unrestricted core expenses indicative budget 2009 and the proposed indicative budget for 2010**

**Split between staff costs and operating costs**

	Indicative budget 2009			Indicative budget 2010		
	Unrestricted		Total	Unrestricted		Total
	Staff costs	Operating cost		Staff costs	Operating cost	
	US\$	US\$	US\$	US\$	US\$	US\$
<b>Regions</b>						
Eastern Africa	258,892	247,757	506,649	320,468	331,576	652,044
South Asia	271,305	112,601	383,906	250,290	267,846	518,136
Southeast Asia	680,571	266,884	947,455	602,516	269,168	871,684
Southern Africa	298,905	71,200	370,105	373,660	136,514	510,174
West and Central Africa	399,504	269,891	669,395	424,759	354,722	779,481
<b>Sub-total</b>	<b>1,909,176</b>	<b>968,333</b>	<b>2,877,509</b>	<b>1,971,693</b>	<b>1,359,826</b>	<b>3,331,519</b>
<b>Themes and Global Projects</b>						
Global Research Project 3	235,951	90,152	326,103	94,450	207,284	301,734
Global Research Project 1	172,176	338,533	510,709	127,627	516,256	643,883
Global Research Project 2	197,616	123,593	321,209	93,859	190,143	284,002
Global Research Project 4	214,101	55,899	270,000	207,007	133,509	340,516
Global Research Project 5	317,354	65,746	383,100	103,931	148,170	252,101
Global Research Project 6	145,891	29,200	175,091	117,047	91,313	208,360
<b>Sub-total</b>	<b>1,283,089</b>	<b>703,123</b>	<b>1,986,212</b>	<b>743,922</b>	<b>1,286,675</b>	<b>2,030,597</b>
<b>Systemwide and Ecoregional Programmes</b>						
Alternatives to slash-and-burn	104,121	46,000	150,121	102,768	62,240	165,008
Amazon Initiative	191,293	76,576	267,869	167,969	159,494	327,463
Gender and Diversity	-	-	-	-	-	-
<b>Sub-total</b>	<b>295,414</b>	<b>122,576</b>	<b>417,990</b>	<b>270,737</b>	<b>221,734</b>	<b>492,471</b>
<b>Global Support Units</b>						
Communications Unit	405,995	369,005	775,000	455,611	353,875	809,486
Research Methods Group	260,772	89,230	350,002	260,834	62,247	323,081
Training Unit	137,004	13,000	150,004	146,920	18,080	165,000
<b>Sub-total</b>	<b>803,772</b>	<b>471,235</b>	<b>1,275,007</b>	<b>863,365</b>	<b>434,202</b>	<b>1,297,567</b>
<b>Management and Essential Services</b>						
Board of trustees	37,977	282,023	320,000	60,753	279,247	340,000
Office of the Director General	515,600	537,401	1,053,001	820,914	308,320	1,129,234
Deputy Director General	579,204	411,154	990,358	963,673	362,582	1,326,255
Director of Communications	163,563	76,460	240,023	185,236	180,567	365,803
Director of Finance	213,749	57,250	270,999	248,848	61,000	309,848
Human Resources unit	259,361	123,100	382,461	392,731	80,904	473,635
Financial Services Unit	536,976	133,156	670,132	569,017	185,306	754,323
Information Technology Unit	-	340,000	340,000	6,820	373,180	380,000
Operations Unit	479,279	175,793	655,072	549,719	(207,889)	341,830
<b>Sub-total</b>	<b>2,785,708</b>	<b>2,136,337</b>	<b>4,922,045</b>	<b>3,797,712</b>	<b>1,623,217</b>	<b>5,420,929</b>
<b>Others</b>						
Depreciation	-	750,000	750,000	-	119,286	119,286
Female Post-doc Programme	-	300,000	300,000	-	134,120	134,120
Science Council	-	330,000	330,000	-	-	-
EPMR	-	-	-	-	150,000	150,000
Contribution to Consortium	-	-	-	-	250,000	250,000
Staff Job Market Alignment	145,000	-	145,000	-	250,000	250,000
World Congress for Agroforestry II	-	100,000	100,000	-	-	-
New strategic positions	250,000	-	250,000	-	443,610	443,610
Buffer fund	-	250,000	250,000	-	170,000	170,000
<b>Sub-total</b>	<b>395,000</b>	<b>1,730,000</b>	<b>2,125,000</b>	<b>-</b>	<b>1,517,016</b>	<b>1,517,016</b>
<b>Total expenditure</b>	<b>7,472,158</b>	<b>6,131,604</b>	<b>13,603,762</b>	<b>7,647,430</b>	<b>6,442,670</b>	<b>14,090,100</b>

**Table 7: Total restricted expenses indicative budget 2009 and the proposed indicative budget for 2010**

**Split between staff costs and operating costs**

	Indicative budget 2009			Indicative budget 2010		
	Staff costs	Restricted Operating cost	Total	Staff costs	Restricted Operating cost	Total
	US\$	US\$	US\$	US\$	US\$	US\$
<b>Regions</b>						
Eastern Africa	1,636,832	1,517,316	3,154,148	1,668,320	1,717,442	3,385,762
South Asia	6,518	54,482	61,000	16,141	529,299	545,440
Southeast Asia	1,009,059	1,616,997	2,626,056	1,356,897	1,628,105	2,985,002
Southern Africa	656,952	1,064,885	1,721,837	639,976	1,021,895	1,661,871
West and Central Africa	1,254,819	3,483,649	4,738,468	1,036,205	2,154,222	3,190,427
<b>Sub-total</b>	<b>4,564,180</b>	<b>7,737,329</b>	<b>12,301,509</b>	<b>4,717,539</b>	<b>7,050,963</b>	<b>11,768,502</b>
<b>Themes and Global Projects</b>						
Global Research Project 3	10,266	-	10,266	114,619	9,120.0	123,739
Global Research Project 1	135,193	327,464	462,657	68,401	21,273.0	89,674
Global Research Project 2	-	-	-	-	-	-
Global Research Project 4	-	-	-	-	-	-
Global Research Project 5	62,070	-	62,070	179,652	407,953.0	587,605
Global Research Project 6	326,606	520,975	847,581	280,428	318,490.0	598,918
<b>Sub-total</b>	<b>534,134</b>	<b>848,439</b>	<b>1,382,573</b>	<b>643,100</b>	<b>756,836</b>	<b>1,399,936</b>
<b>Systemwide and Ecoregional Programmes</b>						
Alternatives to slash-and-burn	60,487	-	60,487	120,122	307,894	428,016
Amazon Initiative	146,660	504,663	651,323	171,484	407,270	578,754
Gender and Diversity	974,178	3,495,126	4,469,304	908,271	3,661,729	4,570,000
<b>Sub-total</b>	<b>1,181,325</b>	<b>3,999,789</b>	<b>5,181,114</b>	<b>1,199,877</b>	<b>4,376,893</b>	<b>5,576,770</b>
<b>Global Support Units</b>						
Communications Unit	-	-	-	-	-	-
Research Methods Group	38,021.5	7,000.0	45,021	47,550	(8,000)	39,550
Training Unit	141,391.4	104,000.0	245,391	40,166	91,234	131,400
<b>Sub-total</b>	<b>179,413</b>	<b>111,000</b>	<b>290,413</b>	<b>87,716</b>	<b>83,234</b>	<b>170,950</b>
<b>Management and Essential Services</b>						
Board of trustees	-	-	-	-	-	-
Office of the Director General	-	48,000	48,000	-	-	-
Deputy Director General	31,138	22,020	53,158	58,467	26,600	85,067
Director of Communications	-	-	-	-	-	-
Director of Finance	-	-	-	-	-	-
Human Resources unit	-	-	-	-	-	-
Financial Services Unit	-	-	-	7,877	-	7,877
Information Technology Unit	-	-	-	-	-	-
Operations Unit	-	-	-	-	-	-
<b>Sub-total</b>	<b>31,138</b>	<b>70,020</b>	<b>101,158</b>	<b>66,344</b>	<b>26,600</b>	<b>92,944</b>
<b>Others</b>						
Depreciation			-			-
Female Post-doc Programme			-			-
Science Council			-			-
EPMR			-			-
Contribution to Consortium			-			-
Staff Job Market Alignment			-			-
World Congress for Agroforestry II			-			-
New strategic positions			-			-
Buffer fund			-			-
<b>Sub-total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total expenditure</b>	<b>6,490,191</b>	<b>12,766,577</b>	<b>19,256,767</b>	<b>6,714,576</b>	<b>12,294,526</b>	<b>19,009,102</b>