Project Title: Experimenting with the design of policies on sustainable resource management.

A Proposal for CIRAD's involvement in a transversal socio-economics component of DMP in West Africa.

Apr 15, 2004

Summary

In our proposal, public policy is approached as a social mediation process, where actors and sectors confront their representations, objectives, and constraints. We offer to set-up and test a platform for demonstration and capacity building with policy makers and representatives of local organizations, to help endogenize resource quality and availability in development policy design. The project contributes to build multi-institutional capacity for policy design related to Natural Resources Management (NRM). It integrates lessons learnt from local experiences, modeling and upscaling. It envisions a 5 years horizon but the strategy and work plan will be reevaluated after 2 years. In this proposal, we focus on the first 3 years.

With groups of scientists and policy makers we will test the process of policy design and negotiation, and the relevance of prevailing economic and ecologic approaches to resource diversity, quality and management. This is done by capitalizing and formalizing local experiences in NRM (e.g. DMP guidelines, appropriate technology, sustainable livelihoods) and translate in a policy making context of national and sub-regional scope. The experimental platform will support the co-construction of an approach that is both culturally relevant and scientifically sound. It is meant to be institutionally independent and neutral to allow the freedom of exploring of policy options and avoid the trap of politics. In that sense, it is a learning tool and not a problem-solving one.

The project focuses on the the arid and semi arid agroecological zones of the DMP West Africa subregion (Senegal, Mali, Burkina Faso and Niger). We will go with national DMP research and extract policy recommendations that will feed in the platform. We will examine the way these countries implement the Convention for Biological Diversity and the Convention to Combat Desertification, particularly with respect to their relevance to climate change and the cross-cutting issue of land degradation. We will also realize transversal research on natural resources diversity, quality and management in a sub-regional/national policy context.
The project will be done in close collaboration with the national DMP coordinations of the sub-region, and with the Pôle Pastoral Zones Sêches (PPZS), Agrhymet, IIED, IER (Mali), with ISRA, ENEA and UCAD (Senegal), as well as with the IARCs and ARIs involved in the project, and CORAF.

Justification.

In its most basic definition, a public policy is a governmental action program in a given sector of society or a given geographical space. A policy can therefore be sectorial (e.g. agricultural policy) or territorial (e.g. regional development).

Nevertheless a public policy is also a social mediation process, as the object of each policy is to take care of imbalances or inconsistencies between a sector and other sectors, or between a sector and society. In this case we would say that the object of a public policy is the management of global/sectorial linkages. This definition is only one dimension of the mediation process that we want to emphasize in our project. The analysis of public policy as mediation or bargaining process is more in the domain of existing relationships between collective action from civil society social groups and the state.

Public policy do not appear to result from decisions elaborated rationally in ministerial bodies, i.e. based on objectives that are both clear and well hierarchized. Instead, the construction and implementation of public policies result more from vigourous wrestling exercises between different ideologies (i.e. vision of the world) or objectives (i.e. vision of the future) given a series of constraints (real, or stated). In addition policies are neither cast in stone as players that were ineffective in having their voice heard during the design phase will elaborate strategies to bypass or undermine them, therefore reducing their effectiveness. This approach to public policy remains incomplete if it doesn't takes into account the increased external constraints and opportunities brought by the Convention on Biological Diversity (CBB), the Convention to Combat Desertification (CCD) and the United Framework Convention for Climate Change.

It is not clear either how natural resources management, in particular natural resources quality, availability, and diversity, is taken into account in the design of development policies in West Africa. In the majority of cases this dimension is uncared for and could lead to the collapse of agroecosystems and irreversible environmental damage. In other cases there is a national strategy on CBB and CCD which is elaborated by environment experts and which legal and economic instruments may clash, at national and local levels, with decentralization measures and with other international constraints such as the trades rules and structural adjustment.

Traditionally natural scientists have either ignored policies (possibly because of the connection with politics) or have adhered to a rational/positivist paradigm where policies are perceived as well instrumentalized, i.e. designed for clear purposes and buiding on data, models, and expert knowledge. Similarly, economists play a key role in policy design yet the way natural sciences is accounted for in economic theory 1) may not pass any test against hard data, and 2) is highly questionable in the context of West Africa's society which has deep cultural and traditional roots and social-environmental linkages.

Moreover, lessons learnt from local experiences with NRM (hence tainted with some cultural attributes) are hardly ever integrated in development policies. This could possibly result from the disconnected nature of disciplinary interventions and the lack of a common language.

To remedy to these shortfalls we propose to set-up an experimental platform as a test bench for the policy design process, in order to confront stakeholders' perceptions and theories in an institutional environment that is closer to reality yet more "controlled" than in the real world. We complement traditional research and networking with a "soft" version of experimental economics; one that is more adapted to the context of Less Developed Countries (LDC) and that embeds the natural sciences. Vernon Smith (2002 Nobel prize in economics) states: « *experimental economics applies laboratory methods of inquiry to the study of motivated human interactive decision behavior in social contexts governed by explicit or implicit rules. The explicit rules may be defined by experimenter-controlled move sequences and information events in extensive form n (>1)-person games with specified payoff outcomes. Or the rules may be those at an auction or other market institution in which motivated people buy or sell abstract rights (to consume or produce) information and services (e.g. transportation) within some particular technological context. Implicit rules are the norms, traditions and habits that people bring to the laboratory as part of their cultural and biological evolutionary heritage; they are not normally controlled by the experimenter* ». The platform can also be seen as the upscaled form of the *companion modeling* approach developed by CIRAD to the context of multi-institutional policy design. It can include multi-stakeholders experiments at DMP experimental sites.

The proposed Experimental Development Economics (EDE) platform is intended as a way to scale-up local experiences using a discussion, negotiation and modeling framework, and endogenize them into a scientific and policy-aware mind shift of all participants for increased governance.

Goal

The project aims at stopping land degradation in arid and semi arid West-African agro-pastoral areas by helping two desirable situations to occur:

- People living in agro-pastoral areas are motivated by a sound policy context to use and maintain high quality natural resources pools, because their voice and their experience is being heard by policy makers;
- Policies are designed in a participatory way and take into account land degradation and resource diversity and quality in accordance to local reality and sound science.

Objective

The project will build a platform that brings together policy makers, representatives of local organizations and in-country scientists and stimulates a constructive and structured dialogue around local experiences on NRM, with an emphasis on biodiversity. This is expected to have a significant influence on their adaptive capacity and the way they conduct their day-to-day activities:

- Policy makers and representatives of local organizations consider natural resources diversity, quality and availability as endogenous to sustainable development and adequately include this dimension in their priorities and systems.
- Scientists fully recognize the policy and development context of natural resources diversity, quality and management, conduct relevant research, and provide adequate and timely understanding and recommendations.

Congruency with DMP objectives.

Table 1 explains briefly how the proposed EDE project contributes to the attainment of DMP objectives.

Table 1. Contribution of EDE project to DMP objectives (darker means greater relevance).

DMP Objective	Contribution of EDE project
Collect and assess current dryland management practices, including traditional smallholder knowledge	*By documenting management best practices (including policies) in terms of underlying conceptual model and systems.*
Understand the causes, extent, severity, and physical processes of soil and ecosystem degradation	*By providing a systemic view of agro-ecosystem dynamics and management best practices.*
Develop improved soil, water, and biodiversity management strategies that are ecologically sound, economically viable, and acceptable to the people of the desert margins	*By involving decision makers we contribute to the political viability of options.*
Design policies, programs, and institutional options that would serve as incentives to people living in the desert margins to adopt these improved practices	*By providing a learning platform on NRM (research and policies), we contribute to secure a dialogue that will ensure the design of more appropriate policies.*
Enhance the institutional capacities of Program member countries to conduct research on sustaining the desert margins	*By linking policy makers, local representatives, and researchers, we contribute to research that has more impact outside the research community and to policy recommendations and action plans based on sound science.*
Spread the word: disseminate the knowledge gained to farmers, policy-makers, and other stakeholders, and catalyze action plans based on it	*By setting-up and facilitating the EDE platform, and provide learning material and experiences on-line, and involving university professors and students, we extend the reach of the project.*

Expected outputs.

We do not aim to actively work on the design of specific policies: we help create an environment to enable the emergence of co-constructed policies. Therefore project outputs include transversal studies that partly build on local DMP experiences, and a platform to translate scientific findings into a learning process between policy analysts, scientists, and national representatives of local organizations.

Specifically 4 outputs are expected from the project:

1) **An assessment of the current policy framework and its instrumentation, and on the current implementation of environmental measures.** We will address the national strategies for implementing biodiversity preservation goals, with an emphasis on the ones that are lead by the state and involving local communities. We will study the coherence of approaches in the sub-region and how DMP projects fit with existing national plans.
2) **An assessment of resilience of rural sub-Saharan agro-ecosystems, with an emphasis on pastoralism and mobility and on the role of biodiversity and land degradation.** We will realize transversal studies to enable upscaling of local experiences in a policy context.
3) **A series of well-documented case studies** that provide
    1. Co-generated biodiversity, land and water use rules to help policy design.
    2. Resource use models (land degradation, resource quality, biodiversity) organized in a generic framework. This will be done in close collaboration with IRD and CEH.
    3. Policy recommendations (goals, instruments, and implementation). 1.
4) **A platform for information exchange, negotiation, and experimental economics**
    1. EDE package, including documents, data, and models
    2. EDE network, workshops and action-research

ARIs have a specific role within the DMP, and are expected to develop outputs and activities as follows:

Table 2. Summary of ARIs role by ARI outputs and activities

ARI OUTPUTS
O1.Improved understanding of ecosystem status and dynamics with regards to the loss of biodiversity
O2. Participatory natural resource management methods that include strategies for conservation, restoration and sustainable use of degraded ecosystems developed and implemented
O3. Capacity of stakeholders and target population enhanced through involvement/participation at all stages of the project cycle
O4. Alternative livelihood systems tested and promoted
O5. Appropriate policy guidelines and interventions for sustainable resource use formulated, promoted and adopted.
ARI ACTIVITIES
A1. Development of common framework for site stratification and characterization of specific bench marks
A2. Provide support to NARS for the development of standardized data collection methodologies, storage and management systems for an understanding of ecosystem status and dynamics with regards to the loss of biodiversity
A3. Participate in the implementation of benchmark site characterizations and an overall synthesis
A4. Generation and production of information dissemination packages for all levels of stakeholders across sub-regions and countries (cross referenced to activities in national log frames)
A5. Provide support to NARS for the development of natural resource management methods and technologies that include strategies for implementing and promoting conservation, restoration and sustainable use of degraded ecosystems (cross referenced to activities in national log frames)
A6. With assistance of all participating researchers assess the scientific, technical and social skills required to implement and fulfill all outputs capacity.
A7. Develop packages that meet requirements identified in A6.
A8. Scientific team exchange visits and information sharing between sub-regions and countries to facilitate technology transfer
A9. Develop an upscaling methodology to infer south-south trends at a regional level through the use of system modeling, remote sensing and GIS tools for extrapolation strategies
A10. Integrate biophysical and socioeconomic approaches to modeling that allow the screening of scenarios that will lead to best bet management practices and policies
A11. With assistance of all participating researchers assess the training needs all stakeholders and target populations implementation
A12. Develop training packages and appropriate policy guidelines that meet requirements identified in A11.

Table 3. EDE project Logframe and contribution to DMP project (most relevant DMP outputs and indicators in bold, ARI outputs and activities in parenthesis)

EDE Output	EDE Indicator	Means of verification	Related DMP output	Related DMP Activity/ Indicators
1) An assessment of the current policy framework and its instrumentation, and on the current implementation of environmental measures.	-Policy practices reviewed and documented -Appropriate target audience and learning approach identified.	-Report -Publication -Contacts database	2, 3, **5 (O5)**	2.1**,** 3.1, **5.1 (A12)**
2) An assessment of resilience of rural sub-Saharan agro-ecosystems. with an emphasis on pastoralism and mobility and on the role of biodiversity and land degradation	- Mechanisms, processes, and functions of agro-ecosystem quantified and documented – to be used for upscaling and modeling to be done in phase 3)	-Report -Publication -Database	**1**, 2 **(O1)**	**1.2,** 1.3, **1.5**, 1.10, 1.12, 1.13, **2.1,** 2.5 **(A1, A2, A9, A10)**
3) A series of well-documented case studies that provide a) Co-generated biodiversity, land and water use rules to help policy design; b) Resource use models (land degradation, resource quality, biodiversity) organized in a generic framework; c) recommendations (goals, instruments, and implementation).	-Information packages on selected ecological and NRM processes (local knowledge, functions, recommendations) produced for EDE and upscaling.	-Printed and web-based summary sheets -Computer models	**1**, **2**, 3 **(O2)**	1.2, 1.3, 1.5, 1.7, 1.9,1.13 2.1, 2.3, 2.5, 2.6, 3.4, 3.5, 3.6 **(A2, A3, A4, A5, A6, A7, A8, A10, A11)**
4) A platform for information exchange, negotiation, and experimental economics: a) EDE packages, including documents, data, and models; b) EDE network, workshops and action-research.	-NRM economic models tested -Dynamic information flow through networking (internet, seminars) -Enhanced capacity of stakeholders to endogenise resource quality into policies, and policies into research	-EDE packages -Workshop synthesis and analysis of experimental data -Evaluation of stakeholder's perceptions -Analysis of Internet traffic; polls	2, **3**, 4, 5, **6, 7 (O3, O4, O5)**	2.5, 2.6,3.1, **3.2**, **3.3, 3.4, 3.5, 3.6**, **3.7**, 4.1, 5.1, 6.1**, 6.2,** 6.3**,** 6.4, **6.5, 7.2, 7.3 (A8, A11, A12)**

Congruence with DMP outputs.

In phase 1 and 2 (2004-2006) the project will contribute to strategic DMP outputs highlighted in Table 4. The table presents the DMP outputs as stated in the DMP project proposal including the 6 months extension of DMP phase 1. Cells are shaded according to the degree of congruence between projects (darker means greater contribution). During Phase 3 the outputs addressed in Phase 1 and 2 will be reinforced (mostly the ones spanning 2005-2006) but the project will address more specifically DMP activities of 2007-2008 (italics).

Table 4. Degree of congruence with DMP activities (darker means greater contribution in years 2-4; outputs in italics will be addressed more during phase 3).

	DMP Phase 1					DMP Phase 2				DMP phase 3			
				CIRAD phase 1		CIRAD phase 2				CIRAD phase 2			
	2002	2003		2004		2005		2006		2007		2008	
DMP Output	Jun	Jan	Jun	Jan	Jun	Jan	Jun	Jan	Jun	Jan	Jun	Jan	Jun
7-Participation	Build capacity of stakeholders to participate fully												
6-Upscaling	Develop strategies for replication					Institutional capacity building of government institutions and farmers in upscaling				*Wilder testing at project site*			
5-Policy guidelines and legislation	Review and draft new guidelines					Test new guidelines/policies				*Adopt nationwide guidelines/policies*			
4-Sustainable alternative livelihoods	Inventory			Tested/adapted/adopted				*Adaptation and pilot testing in selected villages*					
3-Capacity building	In participatory approaches to land and biodiversity management					*In upscaling*							
2-Rehabilitation of land use						Testing implementation schemes				*Adoption and pilot testing in selected villages*			
1-Monitoring and evaluation	Data gathering												

Participating institutions

Principal Investigators.

Three senior PIs from CIRAD are involved in managing the project. Other senior researchers from CIRAD contribute to its execution.

Table 5. Profile of Participating CIRAD researchers.

Type of involvment	Name	Organisation	Expertise/interest	base	%time
PI	Grégoire Leclerc	CIRAD-TERA	Land management, modeling, econometrics, GIS.	Senegal	50%
PI	Marcel Djama.	CIRAD-TERA	Anthropology, policies, decentralization and globalization.	Senegal	25%
PI	Martine Antona.	CIRAD-TERA	Environmental Economics, modeling, collective action.	France (Niger)	25%
Expertise	Laurence Boutinot	CIRAD-FORET	Socio-economics, decentralization and participation	Senegal	15%
Expertise	Patrick D'Aquino	CIRAD-TERA	Gouvernance and territories, companion modeling.	New-Caledonia (Senegal)	15%
Expertise	Veronique Ancey	CIRAD-EMVT	Socioeconomics, pastoralism.	Senegal	15%
Expertise	Denis Gautier	CIRAD-FORET	Land multi-use, dynamics of territories and resources.	Mali	25%
Expertise	Bruno Barbier	CIRAD-ECOPOL	Bioeconomic models and quantitative development policy analysis.	France (Burkina Faso)	15%
Expertise	Guillaume Duteurtre	CIRAD/MAE	Institutional analysis, agricultural policies.	Senegal	15%
Expertise	Alexandre Ickowicz	CIRAD-EMVT	Pastoralism, observatories, society-environment interactions.	Senegal	15%
Expertise	Geert VanVliet	CIRAD-TERA	Governance and public policies, project evaluation.	France	5%
Expertise	Ibra Toure	CIRAD-EMVT	Pastoralism, GIS	Senegal	15%
Coordination	Patrick Bisson	CIRAD/MAE	Coopération technique	Niger	5%
Expertise	Philippe Birnbaum	CIRAD	Agronomie, gestion de l'environnement et des ressources naturelles,fonctionnement des couverts végétaux	Mali	25%

Partner institutions

The project will be carried on in close collaboration with the National/sub-regional DMP coordination and DMP partners of the West-Africa sub-region, particularly with participating ARIs (IRD and CEH) and IARCs, as well as CORAF. It will also involve scientists from Agrhymet, ISRA and ENEA (Senegal), IIED, IER (Mali), and PPZS (Senegal). University professors and NARS scientists will play a key role in the development of the platform and in establishing the conditions for its durability.

Activities.

The main activity lines of our proposal are given below. Specific activities and exact timeframe are specified in yearly work plans.

1) Set-up a network for stimulating dialogue and information exchange.

With the national DMP coordination we will examine whether an existing network is suitable for animation, information exchange, discussions (e.g. SISERA, LEAD, GRN-SP, Girardel, CILLS, OSS, ROSELT, EIS-AFRICA, etc..). If it does we will join and actively participate in the animation. If not we will set-up a community of practice open to anyone interested in NRM and development experimental socio-economics. CIRAD scientists will integrate the Scientific and Technical Advisory Team (STAT) and actively contribute to its dynamics.

2) Understand the genesis of national NRM policies.

This component addresses the sociological-anthropological study of the genesis and implementation of NRM-related public policies (in particular the Convention for Biological Diversity) in Senegal, Mali, Burkina Faso, and Niger. More specifically we will realize case studies on:

- The processes of enforcement of state-owned conceptual frameworks (dominant paradigms, elitism, perception of issues, role of mediators and national and international expertise)
- The role of professional groups (e.g. farmers organisations) and NGOs.
- The role of rural players affected by the implementation of public policy.
- The institutional innovations.

Coherency of approaches will be assessed for the sub-region, in the context of NEPAD. This understanding of the context of policy generation is fundamental to shape the EDE platform. In effect, we do not want to simply (and wrongly) replicate what exist in industrialized countries.

3) Select / Realize studies (data and models) to feed network with ground-truth.

We will select relevant exercises from the experimental economics literature and will assemble information, data, and models related to a series of case studies from our partners (including DMP partners and other ARIs). It will provide material for feeding the network and EDE platform.

In addition a series of transversal studies which have an important scaling-up and modeling component will be conducted. We will address environment-

society interactions at the agricultural frontier in the context of decentralisation. This includes the adaptive capacity of pastoralists for mitigating the effects of drought and of market fluctuations, as well as improving information flow (prices, biodiversity, land and water dynamics, resource management). We will also assess the role of vegetal species on the function of agroeco ecosystems, in a territorial development context. We will build local, national and regional scale agent-based and bioeconomic models linking productivity to natural resources (soil, water, and vegetation). Scaling-up will be done during phase 2 in collaboration with IRD, CEH, and IARCs. The methodology will be devised during the first STAT workshop.

4) ***Preparation of Experimental Development Economics (EDE) material.***

The case studies material gathered in step 3 has to be adapted to the requirements of the experimenting platform. We have to make clear that the exercises have to be designed to induce a mind shift in the participants perception of resource quality, in the context of policy design. The more difficult task is to extract from the case studies the underlying conceptual models that will be tested. The next step is to prepare exercises as a designed experiment, that are digestible to participants and enable generalization and scaling-up. We expect to see the emergence of more valid paradigms as players experiment and grasp the strengths and weaknesses of their current perceptions and approaches.

5) ***EDE animation***

EDE workshops will be carried-on on a quarterly basis during the second year. Each workshop is tested first with a small group of partners, professors, and students. The form of the animation will be defined after we understand better the current framework for policy design, but it will certainly involve role-play, real-time modeling, and bargaining games.

6) ***Synthesis and follow-up, enabling sustainability of EDE platform and network***

These activities aim at feeding-back lessons learnt and securing, within a University framework, sustainability of the network and the platform. University professors will be involved from the beginning, as we expect them to take the lead of Phase 3 of this project, to be submitted 6 months before the end of Phase 2.

Phase 3 of the project will focus on testing and implementing policy proposals with all stakeholders. This includes sustainable livelihoods scenarios, action plans, and regional extrapolation, i.e. unfolding activities that relate to DMP activities 1.11, 1.12, 1.13, 2.4, 2.5, 2.6, 3.6, 3.7, 4.2, 4.3, 5.2, 5.3, 6.2, 6.3, 6.4,

6.5, 7.1, 7.2, and 7.3 (ARI outputs O4 and O5, ARI activities A6, A7, A8, A10, A11, A12).

7) Project management and reporting

The project will be managed by a steering committee composed by the Principal Investigators Grégoire Leclerc (focal point), Martine Antona, and Marcel Djama. Six-month technical and administrative reports built around the DMP logframe will be produced, as well yearly reports and end-of-project report.

Table 6. Timeframe for phase 1 and 2 and congruency with DMP activities (ARI activities in parenthesis).

Activity	PI responsible	Related DMP activity	Phase 1		Phase 2			
			2004		2005		2006	
1) Set-up a network for stimulating dialogue and information exchange.	GL/MA/MD	3.1, 3.2, 3.4, 3.5, 7.2, 7.3 (A6, A8)	▬	▬				
2) Understand the genesis of national NRM policies	MD/GL	2.1, 3.1, 5.1 (A10, A11, A12)	▬	▬	▬	▬		
3) Select / Realize studies (and models) to feed network with ground-truth information	GL/MD	1.2, 1.3, 1.5, 1.12, 1.13, 2.1, 2.5 (A1, A2, A3, A9, A10)	▬	▬	▬	▬	▬	
4) Preparation of experimental development economics material.	GL/MA	1.2, 1.3, 1.5, 1.10, 1.13, 2.1, 2.5, 2.6, 3.2 (A4, A5, A6, A7, A10, A11, A12)	▬	▬	▬	▬	▬	
5) EDE animation	GL	3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.1, 5.1, 6.1, 6.2, 6.3, 6.4, 6.5, 7.2, 7.3 (A2, A6, A10, A12)		▬	▬	▬	▬	▬
6) Synthesis and follow-up, enabling sustainability of EDE platform and network	GL/MD/MA	2.6, 3.7, 4.1, 7.2, 7.3 (A8)					▬	▬
7) Project management and reporting	GL	NA	▬	▬	▬	▬	▬	▬

Budget.

The budget aims to approximately 450,000$ (300,000$ from the DMP) for phases 1 and 2 and will be agreed on with IRD, CEH, and ICRISAT for each phase. For each phase a specific budget will be presented together with yearly workplans. CIRAD will provide as matching funds (in-kind) a minimum of 1.5 times the amount received from the DMP for CIRAD activities.

Annex 1. Jan-Jun 04 workplan and budget.

In this annex we focus on the first 6 months of CIRAD contribution to DMP Phase I. Each output will be summarized in a report for phase I external review (May 2004), but full completion date remains June 30, 2004. The total budget is $154,091 to which the DMP contributes $61,500 and CIRAD $92,591. We mobilize the expertise of several CIRAD scientists, in particular: Bruno Barbier (France, Burkina Faso), Geert Van Vliet (France); Denis Gautier and Philippe Birnbaum (Mali); Grégoire Leclerc, Marcel Djama, and Ibra Toure (Senegal). Some products that will be delivered are already in an advanced stage of completion and are be adapted or modified to DMP objectives.

Outputs/activities.

In phase 1 CIRAD is working on 4 fronts and will produce completed outputs by the end of June 2004.

1) Network communication and learning. We will set-up the *communication and experimentation platform* needed for a multi-stakeholders learning dialogue, in coherence with existing networks. It will include an internet portal where editors can post information and readers exchange and comment, as well as a diffusion list. Activity on the network will be monitored and reported. We will organize a focus group on data collection and analysis with Malian partners and NGOs of the gao-Tombouctou sub-region, which will include a hands-on training session in statistics.

2) Policy analysis. We will summarize the *environmental policy framework of NEPAD*, and complete a pre-assessment of *the implementation of the Convention for Biological Diversity (CBD) in Senegal*. We will organize a small workshop for assessing training needs in environmental policy formulation: we will identify the partners, content, structure and approach for a training workshop to take place later in 2004 or during phase 2.

3) Modelling and scaling up. We will *assist DMP partners to improve the experimental design* of biodiversity conservation and restoration in Bamba (Northern Mali) and *define locally-relevant indicators of human pressure* on environmental quality and biodiversity at territorial scale, to be linked, in phase II, with land use models at sub-regional scale. In Mali we will initiate a study on the role of vegetal species on the function of agro-ecosystems. We will complete an *interactive tool for Food Security analysis* that takes into account land degradation and run scenarios for Burkina Faso with representatives of the Ministry of agriculture. We will compute the Green House Gas abatement cost for Burkina Faso and run a *land-use model to evaluate the impact of various agricultural and environmental policies regarding Green House Gas sequestration or emission*, to be linked with results from CEH and IRD. We will also assess *local adaptation strategies on biodiversity and climate change* and

implement local and expert knowledge *in an agent-based model for common pool resources management* around a drilling site.

4) Project management and reporting. We will set-up an internet-based reporting system for CIRAD scientists. We will produce *reports in both French and English*: one for April 2004 and one for June 2004. *Key technical documents* produced will be edited, translated in English, and made available in pdf on-line. A workplan and budget for activities spanning the remaining of phase 1 will be prepared. We will maintain a fruitful dialogue with other experts of the Scientific and Technical Advisory Team (STAT), and set-up the kick off STAT workshop.

CIRAD scientific activities are summarized by output for January to June 2004 in DMP reporting format (see table next page).

Partners

Our activities will be unfolded in partnership specific to each country of intervention:

- **Senegal**: Institut Sénégalais de Recherches Agricoles (ISRA), Univerity Cheikh Anta Diop (UCAD), Pôle Pastoral Zones Sêches (PPZS), Centre for Ecology and Hydrology (CEH), ICRAF;
- **Mali**: Institut d'Economie Rurale (IER), CEH, ICRAF, ICRISAT;
- **Burkina Faso** : Institut de l'Environnement et de Recherches Agricoles (INERA), Ministry of Agriculture (Secrétariat Permanent de Coordination des Politiques du Secteur Agricole), University of Ouagadougou.

Output	*DMP Activity (ARI Output/ activity)*	Result/Activity	Milestone	Activities performed	Impact/Justification	Possible follow-up
Output 1		**Assessment of the current policy framework and its instrumentation, and on the current implementation of environmental measures**				
1.1	*5.1 (O5/A12)*	Assessment of NRM policies in NEPAD	-Report	-literature review -analysis of NEPAD NRM policies -select 1 student for policy analysis -edit and translate report -purchase low-cost computer	NEPAD is the vision for economic integration of Africa for 2025 and will shape development in the region; the way environment is taken into account by the economy is critical.	Possibility to influence NEPAD environmental agenda. Essential input to STAT workshop of phase II.
1.2	*5.1 (O5/A12)*	Pre-assessment of CDB jural and institutional framework in Senegal	-Report	-analysis of Senegal CDB situation -edit and translate report	Most national environmental policies originate on global environmental conventions. CDB has shapes biodiversity policies in Senegal.	Full assessment of CDB and CCD for DMP countries. Essential input to STAT workshop of phase II.
Output 2		**An assessment of resilience of rural sub-Saharan agro-ecosystems. with an emphasis on pastoralism and mobility and on the role of biodiversity and land degradation**				
2.1	*1.5,1.13 (O1/A3, A9)*	Indicators of human pressure on the Bamba environment, in a territorial context. (Mali)	-Report -Database	-field work (surveys, mapping, data collection) -edit and translate report	By identifying indicators of human pressure on natural resources allows to pinpoint important drivers of change and provide a way for monitoring and evaluation of resource quality.	Introduction of human pressure indicators into at territorial scale land use models during phase II. Replication of the study to other DMP sites. Essential input to STAT workshop of phase II.
2.2	*1.8,1.9,2.6 (O1, A2)*	Experimental design for Bamba site (Mali)	-Report -Database	-review experimental design Bamba site -purchase barbwire -edit and translate report	This is crucial to ensure that results from field experiments can be extrapolated.	Replication of design in all the DMP sites to allow regional extrapolation. Essential input to STAT workshop of phase II.
2.3	*1.8, 1.9, 2.6 (O1, A2, A3)*	Assessment of DMP biodiversity inventories in Bamba (Mali)	-Report -Database	-initiate study on the role of vegetal species on the function of	The role of specific species is particularly important in dry areas,	A common framework for inventories and analysis which

				agro-ecosystems. -review inventories -field work (surveys, data collection) -edit and translate report	yet this role is not well understood. This will also be important for monitoring and evaluation, and quantifying human pressure indicators.	takes into account the specific role of species in native agro-ecosystems. Replication to other DMP sites. Essential input to STAT workshop of phase II.
Output 3		**A series of well-documented case studies that provide co-generated biodiversity, land and water use rules, resource use models, policy recommendations.**				
3.1	*1.2, 1.5, 1.7 (O2, A2, A5)*	Elicit local knowledge on NRM, biodiversity and climate change adaptation for MAS model (Sénégal).	-Report	-exchange about MAS model with communities. -focus group on adaptation issues (NRM, biodiversity, climate change) -edit and translate report	The feedback of local communities on an MAS for their region is crucial to integrate modelling into local decision making. Conversely local knowledge is to be taken into account in policy design.	Exploring policy scenarios with local players.
3.2	*1.2, 1.5, 1.7, 1.13 (O2, A2, A5, A10)*	MAS for common pool resources management, adapted for biodiversity and climate change. (Sénégal)	-Report -Operational CORMAS model	-complete biodiversity and climate change MAS model. -edit and translate report	The way biodiversity is perceived and taken into account by local populations is not well understood; an Agent based model allows to explore the impact of decision rules on biodiversity, according to various scenarios.	A companion modelling approach to policy design, to involve local players and local knowledge. Will be presented during the STAT workshop of phase II.
Output 4		**A platform for information exchange, negotiation, and experimental economics, including EDE package, network, workshops, and action research.**				
4.1	*7.2, 7.3 (O3, A6)*	Synthesis of Sahelian NRM networks.	-Report	-assess existing networks -edit and translate report	Many networks already exist for sub-Saharan Africa, which are often under-utilised. We want to complement existing networks instead of duplicating one of them.	Ensure the DMP is present active in other networks.
4.2	*2.5, 3.2, 3.3, 3.6, 7.2, 7.3 (O3, A6, A8)*	Internet portal and mailing list of network members	-Report -Internet portal	-identify Senegal university professor to be involved -set-up internet portal -set-up mailing lists -select 1 assistant to help with programming -edit and translate report	Ensure an easy, democratic and lively sharing of information and knowledge .	More participation of civil society not directly linked to the project in the process of policy design.

				-purchase low-cost computer		
4.3	*7.3 (O3, A8)*	Integration of French ARIs to the network	- Participation of ARIs in network animation	-email and meetings	There is a growing number of French economists exploring experimental and behavioural economics, which can help us design rigorous methodologies.	We expect increased participation of French economists in our network, particularly for phase II and III.
4.4	*1.13, 3.7 (O5, A5, A10, A11)*	An Interactive tool for national Food security assessment (West-Africa scope; case study in Burkina)	-Report -Web-based tool -Database	- Data collection in Burkina of Food demand and supply - Hire programmer - Java programming of the interface - Scenario runs with stakeholders - Restitution to Ministry of Agriculture in Ouagadougou -assess training needs -edit and translate report	Mathematical models that integrate economic and biophysical factors allows to quickly explore the range of outcomes of policy scenarios.	Models will be updated with most recent data for the DMP countries; a regional sub-model will be added. Key input to STAT workshop of phase II, will help to grasp the importance of parameters.
4.5	*1.13, 3.7 (O5, A5, A10, A11)*	Land use models at different scales (village, region, country for Burkina Faso) that take into account carbon abatement costs.	-Report -Operational model -Database	- Review on land degradation in West Africa -contract arrangement with student - Scenario runs with stakeholders - Restitution to Ministry of Agriculture in Ouagadougou - assess training needs - edit and translate report	Bioeconomic models implement linear programming to solve complex problems involving rational agents and constraints on the environment (as well as opportunities such as carbon incentives). They help provide good arguments to convince sectoral policy makers about the need for resource management to support a healthy economy	Models will be completed with most recent data from the DMP, including biodiversity. Essential input to STAT workshop of phase II, to ensure proper economic data is taken into account.
4.6	*3.1, 3.5, 3.7 (O5, A11, A12)*	Training needs assessment and planning workshop on environmental policy formulation	-Workshop evaluation -Report	-Identification of site, participants, prepare content, approach, strategy; invite participants from WA. - edit and translate report	Policy design is a negotiation process backed by technical arguments. This workshop reviews with partners the way public policy is being shaped in West Africa. It will help all players understand their role and where they can make a difference.	Replication of the workshop to other regions and production of methodology guides. Essential input to STAT workshop of phase II, as well as for guiding socio-economic modelling for phases II and III
4.7	*3.1, 3.5 (O5, A11)*	Focus group on data collection with Malian partners and NGOs of the Gao-Tombouctou sub-region, which will include a hands-on training session in statistics.	-Report -Training material	-prepare material -edit and translate report and training material	The focus group will allow identifying training needs on data collection and analysis methodologies.	Replication to other regions, and production of training material.

Budget

	DMP	CIRAD	TOTAL
1100 Project personnel		$85 191	$85 191
1200 Consultants	$8 500		$8 500
1300 Administrative support	$9 250	$7 400	$16 650
1600 Travel	$10 000		$10 000
2000 Subcontracts	$2 000		$2 000
3100 Fellowships	$3 500		$3 500
3200 Group training	$3 500		$3 500
3300 Meetings, conferences	$5 000		$5 000
4100 Expendable equipment	$4 500		$4 500
4200 Non expendable equipment	$6 000		$6 000
4300 Premises	$1 000		$1 000
5100 Operation and maintenance of equipment	$500		$500
5200 Reporting costs	$4 250		$4 250
5300 Sundry (internet, postage..)	$1 250		$1 250
5400 Hospitality	$2 250		$2 250
TOTAL	**$61 500**	**$92 591**	**$154 091**

*costs engaged in period Jan-Jun 2004 only.