



INCEPTION PHASE REPORT



Prepared for DFID by the PISCES RPC Consortium
led by the African Centre for Technology Studies

6th December 2007

DRAFT



"...biofuels have great potential for good and, perhaps, also for harm. It is up to national governments to responsibly balance the social costs and benefits."

Ban Ki Moon

Secretary General
United Nations

11th November 2007, Brazil



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1. Background Information

Title of research programme: <i>Policy Innovation Systems for Clean Energy Security (PISCES)</i>
Reference Number: <i>R8536</i>
Period covered by report: <i>1st July to 31st December 2007</i>
Name of lead institution and Director: <i>African Centre for Technology Studies (ACTS), Prof Judi Wakhungu</i>
Key partners: <i>University of Edinburgh, MS Swaminathan Research Foundation (MSSRF), University of Dar es Salaam, Practical Action</i>
Countries to be covered by research: <i>Kenya, Tanzania, India, Sri Lanka</i>

2. Document of Overall Plans

i. Themes

The original idea that drove the establishment of the PISCES Consortium is that security of livelihoods is contingent upon the interdependence of **energy, water and food security** - and that **Bioenergy** is the pivotal issue at the intersection of these three factors. The importance and interdependency of these elements has been reinforced through the six months of the PISCES Inception Phase by an increasingly high profile international debate on bioenergy, which is now at the level of world leaders. This debate has focussed on the promise of **biofuels** as a possible source of low-carbon energy in a world in which people are more and more concerned about Climate Change and the availability of increasingly contested oil resources. However, concerns have been rising at equally high political levels about the potential competition of biofuels production with food production in particular, and about the real carbon reduction contribution of biofuels.

While the debate in the global media has focussed on liquid biofuels for transportation, often in the developed world, an estimated two billion people worldwide (IEA data) still rely on bioenergy in the form of natural wood **bioresources** for basic energy services, often depleting forests, contributing to the deterioration of watersheds, and promoting desertification. At the same time millions of tonnes of **biowaste** residues from forestry, agriculture and industry are burnt, landfilled or simply dumped every day, not always serving any useful purpose to people or land fertility. Taking these facts into consideration, the PISCES consortium remains convinced that, with the focus of the research on improving access to energy and livelihoods for the poor in developing countries, it is even more necessary than ever to take a holistic perspective of the potential and trade-offs of **all forms of bioenergy** to deliver that objective.

A framework for Bioenergy has thus been further developed to provide the foundation of research, policy approaches and decision-making with relation to bioenergy (Fig. 1). This will evolve in discussion with key stakeholders and the networked centre of expertise to be established by the project. The framework illustrates how PISCES conceptualises Bioenergy as deriving from one of three sources: **Bioresources** (natural wood growth), **Biowaste** (by-products from human Agricultural and Industrial Processes) and **Biofuel** (crops purpose grown for energy). In order to turn these resources into the **Energy Services** needed by end users, it is necessary to apply **Production/Extraction Technologies**, **Processing Technologies** and **Appliance Technologies** which are specific to the various types of bioenergy resource and

end-use intended. An overview of these resources, technologies and end use services in the target countries of **Kenya, Tanzania, Sri Lanka and India** can be found in Appendix 1.

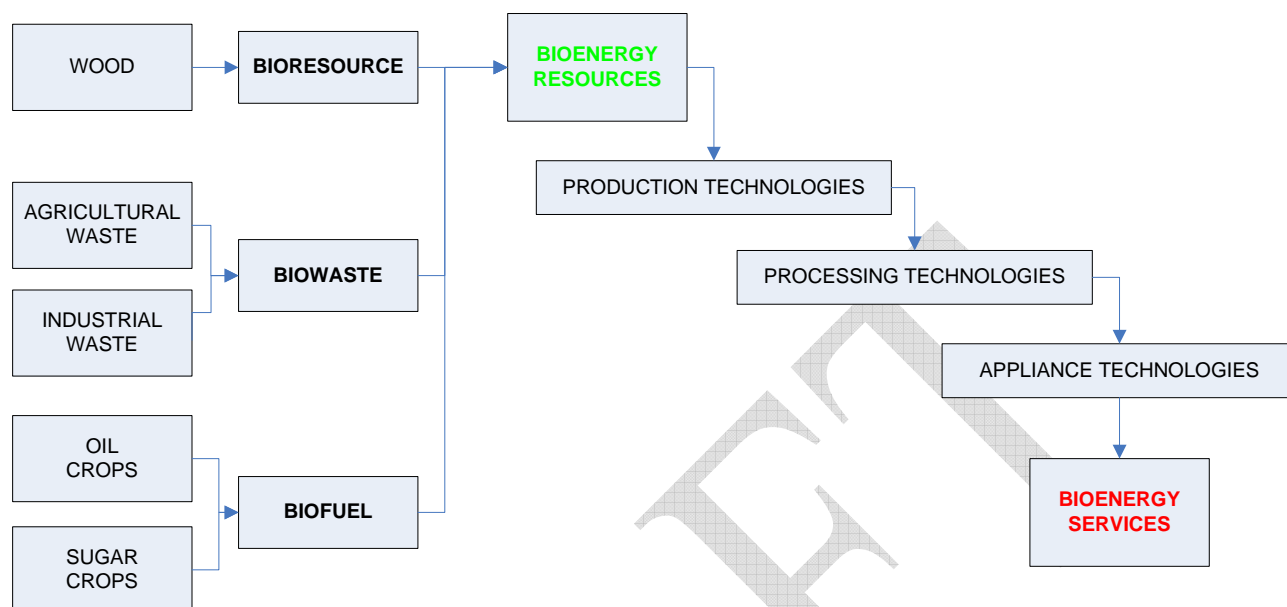


Fig 1 – Bioenergy Framework

Both the various types of resources and the technologies required to transform them into energy services have different characteristics in terms of **Access and Delivery**, whether that is in terms of direct access to the resource, related resources like food, land and water, access to knowledge or skills, or necessary purchasing power. Furthermore, the use of each resource and technology implies a different impact on the **Climate and Environment**. The use of some resources through appropriate technologies can be environmentally benign but over-development of that resource or the use of environmentally harmful technologies can destroy that benefit at local or global level. The number of different pathways for bioenergy development and the range of access outcomes and environmental impacts implied are an ongoing challenge in bioenergy policy development, and one which PISCES remains targeted at unpacking.

Energy can play a central role, directly and indirectly, in achieving the MDGs. Virtually all of the MDGs, halving extreme poverty, gender empowerment and environmental sustainability for example, are wedded in varying degrees to access to and provision of energy. We recognise the complexity of the relationship between energy and development and have organised our research agenda around deepening our understanding of this relationship. Technology is rarely a constraint as of in itself, rather combinations of institutional, social and political contexts shape how energy is produced, how sustainable it is, how much it costs and who has access to it. The herringbone diagram below (Fig 2), illustrates something of the complexity of the gaps in knowledge, or in application of knowledge that ultimately shape energy access and improved livelihoods through the use of bioenergy.

This diagram, which was developed through consultations and experience gained in the Inception Phase, builds on the original conception of the project as a triangle of interconnected Research Themes: **RT1- Technology**, **RT2- Access and Delivery**, and **RT3- Climate and Environment**. It illustrates these instead as areas in which crucial gaps exist, and also brings out the way in which the multi-country strategy provides the opportunity to address the

Applicability and Transferability issues which foil many initiatives, and focuses more on the **Policy** specific gaps. We will expressly *not* look at these themes in isolation, rather we will seek to systemically integrate these themes in order to develop and enhance our collective understanding of the complex linkages between energy provision, access, impacts and influence on development and poverty alleviation. Contributing to this, the Cross-Cutting Themes of **A– Research-into-Use**, **B– South-South-North Exchange**, **C– Capacity Building** and **D– Equity** are retained and form the backbone of the research approach targeted at contributing to Energy Access and Improved Livelihoods through Bioenergy.

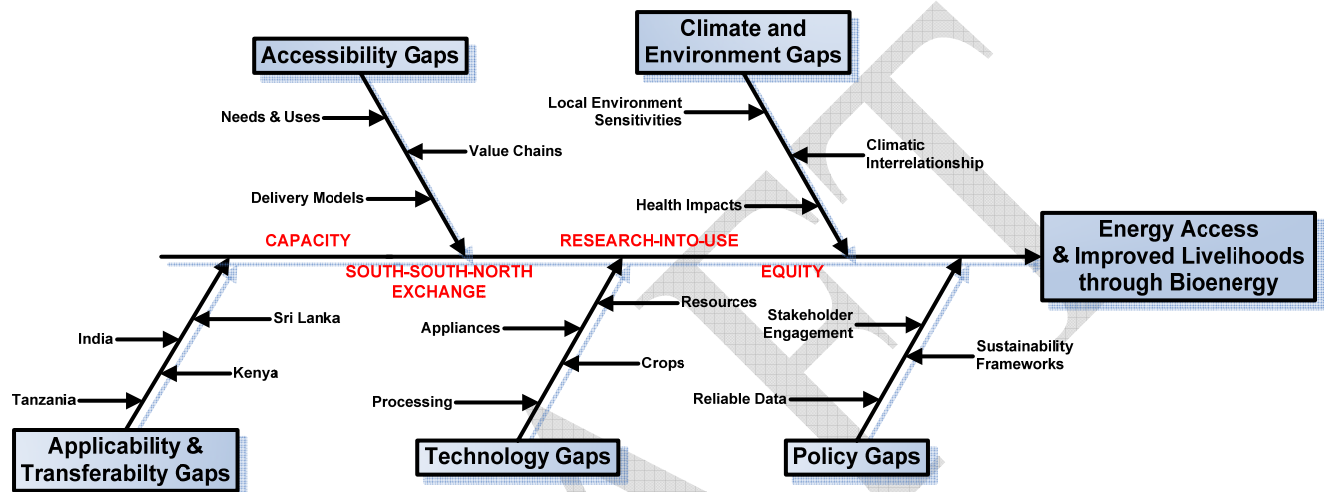


Figure 2 – PISCES Herringbone Thematic Diagram

ii. Planned activities

The research design and activities have been developed in order to balance the following expected outcomes for the project:

- Demonstrable policy change leading to energy access impacts in each country of action
- Contribution to global knowledge regarding bioenergy and development

To meet both these objectives requires an approach which incorporates data, knowledge and policy development mechanisms addressing the gaps specifically relevant in each country, as well as producing a generally coherent body of research which addresses the broader global gaps. The planned activities in each country therefore derive from the initial consultations and research done in those countries during the Inception Phase and are address key challenges and important opportunities within the context of a policy influencing strategy for that country. However these activities have also been mapped against the overall research themes to ensure that the various components contribute to the whole so that broader questions can be addressed, comparisons made and gaps avoided.

Each partner therefore has responsibility for leading a set of activities in their country of most strength, presence and experience, while also having the responsibility of leading one of the Research Theme areas which are international. Thus a programme of work has been developed where each partner leads a Research Theme internationally while also running a programme of work incorporating locally-relevant elements of all the thematic areas in their own country. With the addition of the Cross-Cutting Themes which are implemented internationally

across all activities, this structure is intended to provide for maximum exchange of knowledge and experience and both local and global impacts. The proposed matrix of activities is summarised in Fig.3 below.

Research Theme - Lead	Country Country Lead	KENYA			TANZANIA			INDIA			SRI LANKA			INTER-NATIONAL		
		PA/ACTS			UDSM			MSSRF			PA			UoE/ACTS		
		BIORESOURCE	BIOWASTE	BIOFUELS	BIORESOURCE	BIOWASTE	BIOFUELS	BIORESOURCE	BIOWASTE	BIOFUELS	BIORESOURCE	BIOWASTE	BIOFUELS	BIORESOURCE	BIOWASTE	BIOFUELS
RT1 - UDSM	Resource Mapping															
	Technology R&D															
	Fuelwood (crop)															
	Gasification (co-generation)															
	Conventional Combustion (co-gen)															
	Appliances (for Forest/Agri-waste)															
	Crops (PVO and biodiesel)															
	Crops (Ethanol)															
	Processing (Biodiesel)															
	Appliances (for PVO and biodiesel)															
RT2 - PA	Socio-economic bioenergy needs															
	Delivery Models R&D															
	Fuelwood (product)															
	Charcoal (Stoves)															
	Biogas (Digesters)															
	PVO/Biodiesel															
	Bioethanol															
	Value Chain Analysis and Dev.															
RT3 - MSSRF	Climate & Eco-Impacts Research															
	Deforestation Impacts															
	Indoor Air Pollution															
	Crop Resistance /Climate aspects															
	Life Cycle Emissions Balance															
XCA – ACTS	Policy Development Process															
	Monitoring & Evaluation															
XCB - ACTS	Capitalisation of Int. Experience															
	Communications															
XCC - UOE	Workshops, training given															
	Internal Capacity Building															
XCD - UOE	Equity Mainstreaming															

Figure 3: Proposed Matrix of PISCES Activities by country, research theme and partner

iii. Areas for development during life of the research programme

The following areas have been identified as for further development during the course of the research programme:

- **Trade** - Developing understanding of the impacts of global trade and trade policy on bioenergy value chains is currently the subject of an ongoing research programme under Prof Donald MacKenzie and his colleagues at University of Edinburgh, linked to PISCES.
- **Global Climate Change Policy** – As we approach 2012 new opportunities for energy access may emerge within global climate policy which do not exist at the moment
- **New Financing Mechanisms** – Consideration may also be given to the opportunities of financing mechanisms such as carbon financing as it becomes relevant for energy access

The above will not be addressed immediately within the project as they are considered to be on the second level of importance at this stage - however they will be monitored through the project and ongoing linked research effort opened up on them as possible.

iv. Responses to referees comments on the original research proposal and comments and notes of endorsement from the CAG

The following sections extracts from PISCES replies to “Comments from DFID advisers on the ACTS/Edinburgh Bioenergy RPC proposal”, “Environmental Screening Note” (Anna Balance, 15 May 2007), and to subsequent comments made by Peter Davies and Peter O’Neill at the Inception Workshop (DFID comments in *italics*, PISCES’ responses in regular).

1. The interdependence of food, energy and water seem to be well argued. This work is likely to have a significant impact in helping to eradicate poverty. This is especially so in the short term and where access to energy is limited to biofuels. The research approach is clear and sensible. However, need information on ideas about how scale up could be achieved.

We believe scale-up will depend on *demonstration* (for which we are proposing pilot schemes organised through the offices of PA in Kenya and Sri Lanka, the village Ecotechnology programmes of MSSRF and the outreach programmes of UDSM) and on the promotion of appropriate policy instruments to encourage effective and efficient use of diverse bioenergy sources.

2. How will soya/sugar for diesel/ethanol contribute to increasing energy access for the poor - as these will be sold as transport fuels - most probably on an international market?

We are looking at bioenergy broadly and will consider and analyse both; although in the context of energy access, the use of woodlots, agricultural residues, and dual use (food + fuel) crops appears most promising. But energy access may also be achieved by increasing the livelihood security of the poor through income generating activities such as bioenergy crop nurseries and small scale processing of crops to make fuels. See the ‘Access and Delivery’ research theme.

3. I think the main challenge is to structure the assessments - perhaps using a cost-benefit analysis framework.

CBA is one useful way of structuring the assessments; but issues of accessibility of technologies, appropriate scale for processing, and gender issues in relation to end use, are

also relevant in assessing options.

4. Research Theme 1: What are the trade-offs for using agricultural waste? (what is agricultural waste? - crop residues left on the land fertilise the soil, as does rotting woody vegetation, and stripping these out for fuels could lower the overall productivity of the land.) What are the benefits - e.g. reduced industrial waste to landfill? What are the emissions predictions for using different types of processed or raw wastes? The document poses a question about viability of using agric. wastes - over what scale - spatially and temporally? Where will waste be taken from and where will it be used - i.e. what is the urban/rural link? Also important to consider the efficiency of different types of technology, their energy needs over their lifetime, their wastes and emissions, etc - same for the appliances - how efficient are each of the types - and what are the relative benefits of different fuel types compared to different efficiency rates?

This is a summary of what we intend to research on, particularly the environmental questions which are under Research Theme 3. Trade-offs: The results of the AG assessment will help us here. Our primary focus is on rural use because this is where the sources of the materials are; but we will also examine the impact of market for fuels in the urban areas.

5. Research theme 3: I think this needs broadening out as well, so that it covers not just climate change impacts on bioenergy potential, but to look at how increased production or use of different types of bioenergy combine with climate change to impact the poor

The contribution and impacts of bioenergy production on climate change and vice versa are considered under Climate and Environment Research Theme 3. The combined impacts of bioenergy and related climate change impacts will also be considered - although a full Climate Change impact analysis incorporating all factors is outside the scope of this research.

6. Parts of the agenda are becoming crowded (e.g. biofuels). Is this an opportunity or a threat? How do international markets for bio-energy affect benefits to the poor?

We agree that the biofuels issue, which is of particular interest in the EU, is becoming crowded. We will consider this in the context of bioenergy use, and will assess the impacts, including markets. The trade issue is the subject of an ongoing research programme under Professor Donald MacKenzie and his colleagues at University of Edinburgh.

7. How and at what stage do you propose to engage in capacity building with research users?

We intend to involve users from an early stage, particularly through the local outreach activities of UDSM in Tanzania, of PA in Kenya, Sri Lanka and elsewhere, and of MSSRF through its village technology centres in India.

8. At the moment we just have a long list of tasks and these need to be set within an explicit framework, within which we can justify why we are dealing with some issues and not others. We need a global synthesis of options. Above all we need to ensure that each partner takes cognisance of, and responds to, what the other partners are doing. Everything should feed into a common purpose and goal.

We have attempted to address this in the research design, see particularly the first two sections of this report on Themes and Planned Activities, the Research Matrix in the second of those sections as well as the Appendix 1 Bioenergy Pathways Matrix.

9. The primary focus should be on the development aspects of fuel options (e.g. particulates and human health). What is replicable? We need to identify the added value of our programme, especially for farmers in rural areas, and for the poor.

We have emphasised this focus throughout and set up a sub-theme on Applicability and Transferability. Africa is not a big emitter of GHGs and Climate Change analysis is a proofing



mechanism and not really a driver of our activities. All activities in the programme are aimed at adding value for the poor but the primary mechanism is through the development and promotion of pro-poor bioenergy policies in the target countries.

10. Success creates success. "Shameless" self-publicity needs to be developed as a strategy, to maintain a high profile. Communication strategy should be planned, proactive and continuously driven.

The Communications Strategy in this report has been developed with a view to achieving this high public awareness of the programme.

11. DFID will be looking specifically for targets, motivation, and satisfaction that each piece of work is right and is connected to everything else. "COVER ALL EXITS"

Through the consultation process and use of a research design and matrix fed from a form structure for scoping studies we hope that we have addressed the targets and motivation for each piece of work and set them within a broad framework. Satisfaction will be measured through the M&E Process.

The following are a selection of **comments and notes of endorsement from the CAG** so far:

We are foreseeing fuelwood to be the life blood of a new economy, supplying not only grid connected power plants but the full scope of fuelwood uses - 1.Domestic Cooking Energy 2.Rural Industrial CHP 3.Rural (off-grid) Electrification 4.Industrial Thermal and finally 5.Grid connected biomass power.

We would like the study to analyse the catalysis required to transform the market into a sustainable energy chain. Judging by the progress of the study thus far, I think the direction is quite right and await a positive response on the dendro (biomass) market study matter. We at SEA also can join you with resources if such a study is undertaken.

CAG Member, Harsha Wickramasinghe, CEO, Sustainable Energy Authority, Sri Lanka

I have not yet seen what the programme is doing precisely, but I understand from you that there are some important topics being researched in an effective way that will help policy makers in the public and private sector to understand the implications of liquid and other biofuels for poverty reduction and biodiversity. Authoritative world class research is desperately needed to guide public and private investment in this area. I would be delighted to contribute to this process through my networks, my knowledge of the literature, and experience of energy policy in a number of developing countries and aid agencies including as Moderator of the World Bank's trust-funded energy programmes.

CAG Member, Andrew Barnett, Director, The Policy Practice, UK

We expect more CAG feedback on this draft Inception Phase report and this will be compiled into the final IP Report.

3. Finalised Logframe

Narrative Summary (NS)	Verifiable Indicators (OVI)	Means of Verification (MOV)	Assumptions/Risks
Goal: (DFID) The production and uptake of technologies and policies that will contribute to poverty reduction and the achievement of the MDGS	(No need to complete)	(No need to complete)	(No need to complete)
Purpose: To understand the policy relevant trade-offs between energy, food and water security for access and livelihoods in relation to Bioenergy	Development of policy relevant frameworks on bioenergy supported by comprehensive data, analysis and stakeholder participation. Sustainable pilot projects running action inquiry research and demonstrations operating in three countries.	Track uptake and download of publications and outputs tailored for targeted audience in countries and for each Research Theme (RT). Monitoring and Evaluation reporting of pilot projects including by external observers.	Data or informant availability. Ability to reach consensus on conclusions with stakeholders. Planning permission available and partners able to participate. Budgets will be sufficient for full implementation.
To promote improved policies for sustainable energy access via bioenergy in Kenya, Tanzania, India and Sri Lanka.	Research outcomes are taken up in policy, regulations, standards and practice in each country. Establishment of the PISCES RPC expert working groups and engagement with them by policy makers and practitioners.	Transcripts of ministry/ parliamentary proceedings. Texts of standards, refs in practice docs, stakeholder testimonies. Reporting of number of meetings of PISCES research and policy working groups, number, seniority and range of attendees.	Legislative speed allows for uptake in lifetime of the RPC. Institutions prioritize energy standards and action. Other priorities will not reduce attendance by participants.
Outputs: RT1 - Data, policy frameworks and capacity on bioenergy technology	Improved data and methods available on bioenergy resource maps Improved information available on viability of bioenergy production, processing and appliance technologies.	(Sources of data needed & contents of reports) Industrial and agricultural data from government, Int Orgs, industry bodies, existing reports. Information on crop characteristics and experience from other initiatives. Input from food and water specialists.	(Assumptions for absorption of knowledge & barriers) Presentation of report in both comprehensive forms and more accessible summaries. Framework adapted to each country situation and presented through those channels built into policy preparation.
RT2 - Data, policy frameworks and capacity on how bioenergy can improve energy access and delivery and livelihoods	Improved data on Socio-economic needs, gaps, status and opportunities in relation to bioenergy. Market based rural access & delivery models developed, tested and presented for bioenergy Sustainable value chains balancing food and water production developed & tested for bioenergy.	Representative sample of communities. Data and analysis produced in country reporting. International experience gathered from best practice. Reports on how models were arrived at and results of pilots. Close integration with RT1 pilot technology work. Methods from Market Mapping developed by PA	Report is aware of the reports of other initiatives (e.g. COMPETE, UNDP etc), so as to concentrate interest & lessons. Policymakers are open to new approaches integrating community, private sector and local involvement. Development of market literacy and capacity within consortium and stakeholders.
RT3 - Data, frameworks, capacity and policy recommendations on bioenergy linkages with climate and environment.	Technical data and tools developed on the climate and environment impacts of bioenergy options & vice versa. Lifecycle emissions balance of bioenergy understood.	Data from field studies. Local & regional climate & eco-data and models. Utilisation of LCA and carbon footprint analysis tools.	Availability and accuracy of existing meteorological models in target regions. Some policymakers resist integration of climate change concerns in policy.

XCTs – 4 Crosscutting-Themes are successfully incorporated into the project research.	XCA- Outputs & recommendations from PISCES are successfully taken up by policymakers based on information capture from PISCES.	Information on relevant policy making processes, stakeholders & drivers. Research outputs from RT1-RT3.	Access to policymakers at the key decision making levels is available.
	XCB- Successful transfer of knowledge & expertise is achieved between the four PISCES countries & international experience is capitalised on.	Policy & project data on selected international bioenergy projects. Comprehensive internal & external communications strategy & tools.	It is assumed that all countries can access information and countries are safe to visit.
	XCC- Capacity built within consortium & key stakeholders regarding Bioenergy	A structured internal & external capacity building plan & mechanisms.	Interest exists on the part of external stakeholders to engage with bioenergy issues.
	XCD- Equity mainstreamed in policy recommendations	Equity policy analysis studies & local data on equity balance from RT2 Socio Economic data	Emphasis on equity being compatible with local policies & realities on the ground.
Activities: RT 1 - Technology Bioenergy Resource Mapping	<i>(Inputs)</i> Data from Industrial, agricultural, government, international organisations, industry bodies. Physical mapping and assessment.	<i>(Reports)</i> Bioenergy resource analyses in target countries on selected bioenergy resources	<i>(Assumptions for absorption of knowledge & barriers)</i> Availability of data, safe access to survey sites, no issues of secrecy on part of industries.
Technology R & D	Leadership from USDM staff. Other inputs country dependant, see detailed Work Plan. Inputs from food and water specialists.	Interim report on research and data acquisition. Second interim report on framework.	Availability of data.
RT 2 - Access and Delivery Needs & Uses Socio-economic research	Practical Action leadership and experience. National data. Communities, private sector, farmers, local government (surveys)	Report on the baseline, role and opportunities for bioenergy in meeting energy and livelihoods needs in poor communities.	Access to communities (no civil strife or blockages). Participation of survey targets.
Delivery Models R & D	Practical Action leadership and national/international expert inputs via conferences studies. Participation of pilot communities and partners.	Interim report on models and policies proposed. Interim report 2 on application of models in pilots. Ongoing reports on status and M&E.	Availability and interest of outside participants.
Value Chain Analysis & Development	Practical Action (including Aim 2: Access to Markets input). Market participants and suppliers participation in PVCA processes.	Video training materials on the PVCA method. Policy brief on target bioenergy value chains. Report on modelling and analysis.	Participation of market actors in an innovative process where competitors may have to collaborate.
Activities: Climate and Environment RT 3 Climate and Environment Impacts Research	MSSRF leadership. Crop breeders and other projects. Climate data from modelling experts.	Report on pathways for bioenergy impacts on climate change and vice versa.	Willingness of environmental groups to participate in energy and development and to explore trade offs.
Life Cycle Assessment Balance Research (including emissions)	Stakeholders, policymakers at state level, technocrats, Corporate community.	End of Inception Phase: full scoping of data sources and costing. Interim reporting on progress.	Willingness of national climate monitoring bodies (e.g. meteorological offices, universities) to share data.
Activities: XCA Policy Development & Influencing Process	Development professionals, innovation systems thinkers, in policy working groups on bioenergy access issues, participation and innovation.	Reports submitted to these groups from the RTs. Policy briefs produced under the auspices of the groups. PISCES progress reports.	Availability of necessary external participation. Willingness of key experts to participate.
Monitoring & Evaluation	Good awareness and capacity on M&E in the PISCES team plus robust M&E mechanisms. Community participation in baseline studies.	Progress Reports from PISCES according to DFID schedule.	Repeatable access to baseline constituencies, resources, firms or communities.
Activities: XCB	Data from international initiatives	Compilation of study reports on	Access to relevant personnel and

International Experience Collection	and stakeholders on their experience.	RT aspects of case studies in standard format.	data for case studies.
Communications	Communications Working Group led by ACTS/UOE with representation from all partners reflecting their national needs. CAG members as ambassadors.	Information packaged for various audience, updated information on PISCES web page, media coverage and conference presentations	It is assumed that stakeholders will have access to internet, policy makers will be access information and use it.
Activities: XCC Workshops, training given	USDM (Tz), MSSRF (In) and Practical Action/ACTS (Ke) leading in their country with inputs from other partners according to their RT or cross cutting theme	End of inception plan for capacity building agreed. Updated on an ongoing basis by partners and lead partner. Annual reporting from PISCES project.	Ongoing interest on the part of policymakers in the bioenergy sector. Finding match funding to bring relevant persons from outlying areas.
Internal capacity building	Staff/students at partner and Associate institutions other stakeholders, local energy suppliers, market participants etc, in each of the countries	End of inception plan for capacity building agreed. Updated on an ongoing basis by partners and lead partner. Annual reporting from PISCES project.	Availability of relevant courses from outside institutions in areas in which the consortium needs to build strength.
Activities: XCD Equity Mainstreaming	Participation from ENERGIA and specialist staff within PISCES on equity analysis of policy recommendations and approaches.	Review reports of policy briefs, frameworks and recommendations as produced by the project.	Policymakers openness to adopting pro-poor & gender sensitive policy during the lifetime of the RPC

4. Plans for Capacity Development

Our key capacity development objective is to strengthen the capacity of partners to develop and utilise knowledge. To achieve this we seek to utilise the capacities of partners, Associate Institutions and allied organisations, to develop the skills, insights and operational experience of Consortium members and stakeholders. Capacity building (CB) is as much about developing shared understanding and professionalism as it is about building experience and academic achievement. It should help Consortium members and stakeholders to translate their expertise into policy and practice now and in the future. We will build capacity of stakeholders as a matter of course through our research activities and working relationships, not just in trainings. To these ends, the following three principles have been accepted by all partners:

1. *Utilise all of the resources of the partners*
2. *Don't get on a plane without articulating the CB benefits of your journey*
3. *Always seek dual/multiple benefits from your journeys*

The following workplan shows how we intend to provide the experience, skills and training required for partners and associates to carry out their research, communication and implementation tasks. It is envisaged that all Consortium members will be involved in capacity development to a greater or lesser extent, as providers or recipients (and ideally both). Outside inputs will be sought as necessary. The 'offers and needs' section illustrates the range of expertise available and programmes offered, as well as early identified needs of PISCES staff. Other needs will appear as the programme develops; the Consortium is well-equipped to meet many of these from internal resources and from Associate Institutions. We use a Sharepoint diary to list future requirements, and to provide an open record of completed events/courses.

Capacity Building Workplan (as of 11/07)	Lead	Timing
CB and Training offered by PISCES partners (year 1). UoE: <ul style="list-style-type: none"> - Taught MSc, MSc by Research, PhD, in a range subjects: - visiting scholars programme - practical skills workshops tailored to needs - production and field trialling of questionnaires - Transfer of equity and economic analysis methodologies ACTS: <ul style="list-style-type: none"> - ACTS Institute courses are held on a regular basis, and include the RIU workshop, "Innovations Systems in Energy Policy for African Development", 26-30 Nov 2007. MSSRF: <ul style="list-style-type: none"> - Training related to bioprospecting of bioenergy crops, using propagation techniques such as tissue culture and other biotechnology. - Exposure and training in the use and establishment of Village Resource Centres and Village Knowledge Centres (SSN Travelling Workshops to be undertaken). - Exposure to Biovillage and Ecotechnology based enterprises supported by the Foundation and run by the Women's Self Help Groups. PA: <ul style="list-style-type: none"> - Rural Electrification through micro-hydro: conference held in Sri Lanka August 2007 - Exchanges and field studies in association with PA's Africa and South Asia offices. - Bioenergy Market Mapping training, in Nairobi. - Monitoring & Evaluation training course. - Monitoring & Evaluation Training (in Chennai) - Design, development of bioenergy SE research methodology (in Chennai) - Video show on focus group discussions; share information about bioenergy initiatives in other regions UDSM: <ul style="list-style-type: none"> - Short course on operation and implications of CDM. - Bioenergy value chain results, data and analysis. - Market chain developments and quantitative understanding developed through modelling - Conference panel explaining the methods and models developed - User training on operating a biodiesel plant - Artisan training on making a biodiesel plant - MSc and PhD programmes (sandwich programme Tz-UoE). - Attachments to the Technology Development and Transfer Centre 	<p>CP, JS</p> <p>CP MSc student TM</p> <p>NC, JW JS</p> <p>AN</p> <p>RN</p> <p>TWG, RN, SH project managers;</p> <p>JK Ken&SL policy-makers JK</p> <p>AT JK/CLP AT</p>	<p>(yr/mth/wk/d)</p> <p>Oct 08 & subsequently 12-36m/3-6m for visitors. 1-2w for workshops Dec 07 2008, poss with Makerere Post- 2.1&2.3</p> <p>Throughout</p> <p>Coinciding with partners in Chennai planned for Oct 08</p> <p>Courses of up to 1 wk, on demand Nov 07 Jan 08 (5d) Sep 08 (1d) Sep 08 (1/2 d) On demand (4d)</p> <p>July 09 July 10 in 2011 2008 on t.b.a. On demand On demand Commencing 08</p>
Training requested by partners to enable Research Theme Activities. UoE: <ul style="list-style-type: none"> - RIU, and market mapping - Distance management of projects; Climate change and human rights; Small-scale gasification - Participatory rural appraisal - SPSS, equity and economic analysis - M&E ACTS: <ul style="list-style-type: none"> - Market mapping - SPSS; Equity and economic data collection and analysis training - Refresher course on communications - GIS course MSSRF: <ul style="list-style-type: none"> - Training in modelling and how climatic modelling is conducted - Bioenergy and Environment Modelling - Energy Audit, Life Cycle Analysis and Environmental Impact Assessment PA: <ul style="list-style-type: none"> - Rural Electrification through micro-hydro conference (in SL) 	<p>TM CP CP TM TM</p> <p>SN SK, JK HM SK</p> <p>All staff</p> <p>SP</p> <p>Several staff</p>	<p>Nov 07 (5d) Oct 07 (3d) Dec 07 t.b.a. t.b.a.</p> <p>Nov 07 (1d) t.b.a. t.b.a. Oct 07 (5d)</p> <p>t.b.a.</p> <p>part of PhD programme?</p> <p>July 07 (5d)</p>

<ul style="list-style-type: none"> - Bioenergy Market Mapping training (in Nairobi) - Monitoring & Evaluation training - SPSS data entry and analysis - GIS Mapping training - Systems Dynamics modelling - Bioenergy conferences 	TWG, other PA staff & partners SH	Nov 07 (1d) Jan 08 (5d) Jan 08 (5-10d) tbd tbd
UDSM: <ul style="list-style-type: none"> - research, development and design of appliances and engines - Training in molecular analyses (Protein) - Attendance at conferences/workshops on biofuels Profiting From Jatropa: Expanding its Potential as Sustainable Renewable Energy' (Indonesia) 5th International Biofuels Conference (New Delhi) Bioenergy: Challenges and Opportunities (Portugal) World BioEnergy 2008 (Sweden) Bioenergy Conference and Exhibition (Canada)	UDSM research Moshi Nyomora, Maroko Attendees t.bc.	Ongoing UoE/MSSRF 23-24 Jan 08 7-8 Feb 08 6-9 Apr 08 27-29 May 08 3-5 Jun 08

Capacity development opportunities will be posted on Sharepoint, on the PISCES website and in allied networks such as REEEP, GVEP, HEDON and GBEP. For further details on communication, reference should be made to the Communication Strategy. Outputs include course materials, textbooks, and training packages.

5. The Management structure for the research programme

i. The role of the partners in decision making and management

The Planned Activities and activity matrix in section 2 also illustrates the allocations of responsibility for **Research Themes**, **National Programmes** and **Cross-Cutting Themes**. This decentralised approach means that the most relevant national partner leads activities in their own country, the most thematically experienced leads a Research Theme internationally, and the consortium leaders co-ordinate Cross-Cutting Themes. In this way, all partner organisations have contributed to the scoping studies defining what is included in the project in each country and under each theme. Scoping proposals drawn up by each lead partner have been shared and commented electronically via the project Sharepoint site and discussed via Skype Conference Calls and e-mail before being updated and incorporated into this report.

Although in reviewing processes, all named-researchers are often consulted, the official forum for decision-making, Monitoring and Evaluation, and partner-representation is the Joint Implementation Group (JIG) which is constituted of the consortium partner leaders and their seconds, and meets 3-4 times a year in addition to retaining a separate e-mail group. The JIG also includes the Project Manager Steven Hunt and is headed by the Research Director Judi Wakhungu. The Project Manager is responsible for the day to day running of the project internationally as well as ensuring that the decentralised responsibilities of the partners are co-ordinated towards the overall objectives. The Research Director holds overall responsibility for guiding the programme and final decision on any points of conflict. She is assisted in this responsibility by the Consortium Advisory Group (CAG), which she sits on as Ex-Officio and is described in the next section. This structure is represented in the Organogram below (Fig. 4).

In addition to the formal structure below some additional issue-specific working groups have been set up and will be set up as required during the project. In particular a Communications Working Group (CWG) with a representative from each partner to enable PISCES to develop the most appropriate international communications strategy and country-relevant sub-strategies.

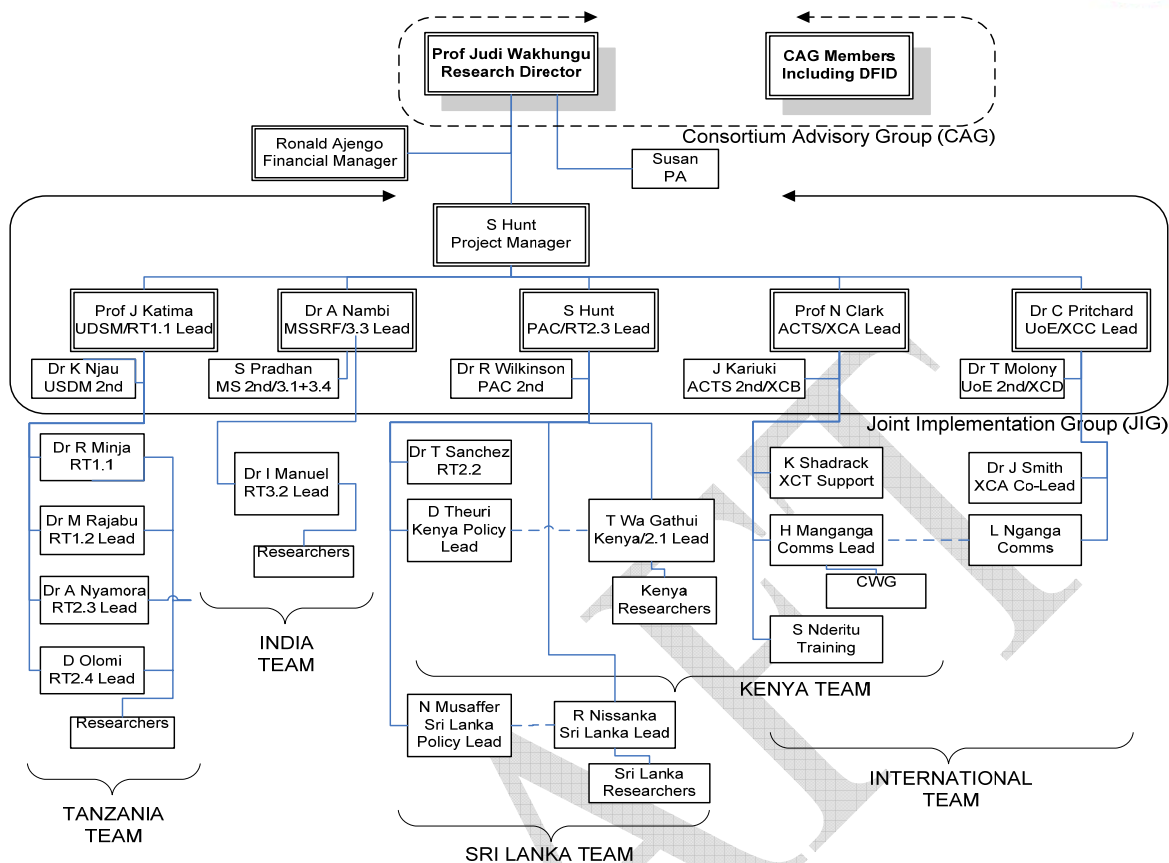


Figure 4 - PISCES Organogram

ii. Composition and any arranged meetings of the CAG/CARG

The members of the CAG, their organisations and designations are as follows:

#	CAG Member	Organisation	Designation
1	Bashir Mrindoko	Ministry of Energy, Tanzania	Commissioner for Energy
2	Harsha Wickramasinghe	Sustainable Energy Authority, Sri Lanka	Deputy Director General
3	Dr Chandrika Nath	POST, UK	Scientific Advisor and broadcaster
4	Prof M. S. Swaminathan	MSS Research Foundation, India	Chair
5	Rainer Janssen	COMPETE, EU Biodiesel policy for SSA	Chair
6	Theophilus Mlaki	Commission for Science & Tech, Tanzania	Director
7	Prof P.K. Aggarawal	Indian Network on Climate Change and Ag.	National Prof. & Network Coordinator
8	Dr H. Wickramatillacke	Ministry of Environment, Sri Lanka	VP, Air Resource Management Centre
9	Dr Njeri Wamukonya (TBC)	Regional Office for Africa, UNEP	Energy Programme Officer
10	Ray Holland	EU Energy Initiative, GTZ, Germany	Partnership Dialogue Facility Manager
11	Andrew Barnett	The Policy Practice, UK	Director, Energy Policy Advisor
12	Sheila Oparaocha	ENERGIA Gender and Energy Network	Co-ordinator
13	Sarah Adams	GVEP International	CEO
14	Dr Marianne Osterkorn (TBC)	REEEP Secretariat	International Director
15	Prof. Sir John Marsh	Ex-head Reading Centre for Ag. Strategy.	Economist and policy commentator
16	Michela Morese	GBEP Secretariat	Knowledge Management Officer
17	Loek Boonekamp	Directorate for Trade and Ag, OECD, Paris	Head, Agri-food, Trade & Markets Div
18	Ralph Simms	IEA, Renewable Energy Division	Senior Analyst (Bioenergy)
19	Peter O'Neill	DFID, UK	DFID Representative
20	Prof Judi Wakhungu (Ex-Officio)	African Centre for Technology Studies	Research Director

Given member schedules, CAG recruitment timescales and ongoing work in the Inception Phase it was not possible to have a full CAG meeting in the Inception Phase although a part-attended review was held at the Inception Workshop in Nairobi in September which provided extremely useful feedback. Additionally CAG members have been sent a copy of the draft Inception Report for their comments. A full CAG meeting is scheduled for **June 2008 in Dar es Salaam, Tanzania** which will coincide with the **quarterly JIG Meeting** and will be annually thereafter for the duration of the PISCES Programme.

iii. Details of dates and venues for research programme meetings

Planned research programme meetings planned at this stage are as follows:

Date	Location	Meeting Title
June 2008	Dar es Salaam, Tanzania	1 st Annual CAG Meeting (and 3 rd JIG Meeting)
Oct 2008	Chennai, India	PISCES 2 nd Annual Meeting and Workshop
Jan 2009	TBD	4 th JIG Meeting
May/June 2009	TBD	5 th JIG Meeting
Sept/Oct 2009	TBD	PISCES 3 rd Annual Meeting and Workshop

6. Ongoing monitoring arrangements for the research programme

i. How will the activities & outputs in the research programme be monitored?

In line with DFID's 'Monitoring & Evaluation: A guide for DFID-contracted research programmes', we have:

- Identified in the logical framework (Section 3) clear purpose and output statements
- Identified clear responsibilities for monitoring (this section and Section 5)
- Protected resources for data collection and monitoring activities
- Established a Research-into-Use component (see Appendix 3, XCT A) that will ensure that maximum benefit and impact is derived from all consortium activities, new knowledge is effectively disseminated and the impacts of these activities are monitored and documented

Each RT and cross-cutting activity (detailed in Appendix 3) includes baselines, outcomes, and impacts which feed into the logframe. The logical framework is central to the approach, providing an objective basis for activity review, monitoring, and evaluation, and (when properly updated during implementation) allows for corrective action to be taken where necessary. It is the task of each partner institution leader to monitor progress of their particular RT and report to the Project Manager and the JIG. It is the responsibility of the Project Manager through the JIG to oversee the monitoring and evaluation of project progress as a whole.

By adopting an innovation systems approach PISCES is continuously working from the perspective of real, identified developmental needs. This involves, in addition to policymaker engagement, a specific focus on robust and responsive M&E systems and effective community and stakeholder engagement in order to ensure we identify and prioritise need for knowledge. As stated in Appendix (XCT A) our approach is fundamentally driven by Research-Into-Use and the first task (Ai.) of the RIU Cross-cutting Theme is an 'M&E and review', to be carried out by ACTS/UoE. This involves ensuring we have systems in place to mainstream M&E through the RIU approach, and will also assess the effectiveness of dissemination pathways, uptake and impact, and will be evolve alongside our research and policy work.

Monitoring and Evaluation tools developed through the GVEP-supported International Working Group on Monitoring and Evaluation of Energy and Development Projects (M&EED) - which Practical Action has been a participant in - will be adapted and developed for use in PISCES assessing impacts on communities, research organisations, private sector, donors and policymakers. Capacity will be built on these tools within the consortium through trainings and workshops in Nairobi and Chennai given by PA M&E specialists, as discussed in Section 4. As indicated in our initial bid document, this will include the monitoring of the beneficial and harmful effects of the RPC's work, along with issues that relate to equity.

ii. What baseline data will be collected and how?

Our Activity Plans also include the collection of baseline data. These are both to inform the development of the technologies, access models and studies, as well as to provide baseline data for M&E systems which will enable use to measure impacts of demonstration projects and policy changes. These baseline data collection plans are outlined specifically under the relevant Activities listed in Appendix 3, and involves the collection of information on existing surveys, publications and the undertaking new baseline surveys if no data are currently available.

Documentation of the baseline conditions will be at the national level mainly based on available literature complemented by with more focussed new baseline creation in locations where detailed studies, interventions or demonstrations will be carried out. In each location identification of direct and indirect (causal-chain) indicators will be recorded to provide a picture of status quo from which to measure progress during the course of the research. Data and information will be collected using workshops, interviews, questionnaires, direct measurements and in Regional/Districts/Village Annual Development Reports that are available in each zone of interest. Data collection procedure and analytic methods for evaluation will be location specific, and will depend on the type of indicator. Table 1 below lists some of the baseline data and indicators that will be recorded for assessing the interventions.

#	Item	Baseline Data and Information to be collected	Observable or measurable Indicators
1	Energy Services	Energy type accessible, applications, appliances, fuels and alternatives, collection labour/times, seasonality, alternatives, energy cost/expenditure, perspectives on bioenergy, etc.	Fuel costs, fuel consumptions, collection labour and times, cooking times, efficiencies, Income generation from energy interventions, etc.
2	Food and other key services	Food sources, linkages between current food and energy, cooking requirements, food prices, education accessibility, healthcare accessibility, transport access etc	Number of food sources, level of imports, % of food requiring cooking, food cost, km to clinic/school, transport options etc.
3	Bioenergy Resources	Types, quantities, seasonality, properties, collection distances, available quantities, alternative uses, disposal methods, ownership, accessibility, etc.	Types, mass/volume, properties, ave distances, available mass, costs, alternative uses etc.
4	Pollution and Environment	Emissions from existing appliances/ processes, Post-harvest clearing methods, indoor pollution and associated diseases, forestation levels etc	CO2 Emissions (T), Other pollutants (T), Indoor pollution (Particulates, CO), Health indicators etc.
5	Farming and Other Economic Activities	Land productivity, farming methods, farm sizes, crop types, irrigation methods, crop processing methods, other energy intensive economic activities, incomes from activities, etc.	Farming methods, average hectares, crop types (% food v non-food), irrigation (L/day), crop processing methods, Incomes from activities
6	Land and water issues	Availability of clean water, distances from clean water sources, irrigated/non-irrigated farms, etc	L/day available, km from H2O, % Irrigated farms etc
7	Social issues including gender	Distances/time by women to collect fuel wood/water, time used by women in farming/business, playtime available for children, time available for leisure, capacities/education etc.	Hrs/day and km to collect fuel wood/water, hrs/week women activities, hrs/day for child's play, time available for leisure etc.
8	Bioenergy Policy	Policies and Regulations in place, responsible authorities at various levels, defacto practices with relation to bioenergy.	Policy Document extracts, Organograms, reports. Etc.

7. Communications Strategy

The Overall objective of the Communication Strategy is to meet PISCES' policy-influencing objectives by effectively communicating and disseminating the project and its research outputs to target audiences in such a way that will lead to the more sustainable use of bioenergy for energy access and livelihoods improvement.

This strategy assesses the Policy, Communication and Research/Innovation environments within PISCES and identifies mechanisms, processes and materials to reach identified target audiences. The strategy will also build the capacity of both partners within the PISCES consortium and also of the target user groups. The strategy includes a monitoring and evaluation process, including annual reviews and checkpoints, and a risk analysis.

Structure

The lead partner of PISCES, ACTS, will be responsible for implementing the Communications and Public Awareness strategy. This will be coordinated by ACTS' Communications and Public Relations Department, with full-time specialist staff committed to the project.

All partners will contribute to the implementation of the strategy, and a Communications Working Group (CWG) has been established to facilitate this. The CWG comprises of partner staff to help adapt the strategy to the particular country contexts and to the research themes:

- Harrison Maganga (ACTS): Kenya Communications Co-ordinator
- Liz Ng'ang'a (UoE): Mass-Media specialist
- Thomas Molony (UoE): Cross-cutting theme inputs
- Shishusri Pradhan (MSSRF): Climate and Environment Theme inputs and India communications
- Rona Wilkinson (PA): Access and Delivery Theme inputs and PA representative
- Rwaichi Minja (UDSM): Technology Theme inputs and Tanzania communications

Internally, the CWG will facilitate and implement the strategy by setting up a dedicated email discussion forum on the PISCES website, regular Skype conference calls and face-to-face meetings at the annual PISCES partner meetings.

Both internally and externally, the CWG is guided by the belief that communication is a two-way process and that communicators need to be aware of, and adaptive to, communication needs as they evolve. Through the CWG, PISCES partners are encouraged to engage with stakeholders and be imaginative and proactive in how they communicate their findings. The CGW regards communication as a continuous exchange of knowledge and opinions that help inform and sustain debate. When conducted effectively, we aim for this exchange to lead to the establishment of trust, legitimacy and consensus-building around the PISCES project and its research outputs.

The strategy identifies:

- Who needs to be targeted and informed of the research
- Communication Objectives for consortium partners and target audiences
- Responsibilities and aims of Communication Strategy team and others
- Effective messages and appropriate communication channels for dissemination
- Timely communication and dissemination
- Monitoring and evaluation processes and activities
- The strategy also has individual communication action plans for each organisation according to themes

Strategy

The strategy will target the following stakeholders with a timely and effective agenda:

Policymakers:

- Working with the consortium members, the CWG will develop a database of key contact people in the various policy-making systems within the regions of operation. This will include political and non-political appointees to ensure a balance between influence and continuity. It will comprise influential advisory bodies such as sub-parliamentary working committees on various sectors of the economy.
- The committee will also compile a list of government policies, development visions and other important documents under construction, influential bills, as well as key public events (for instance, important national days), national budgets, and so on.
- Based on these two tasks, the CWG will identify timely entry points and match make the right messages to the right people, thus circumventing often-complicated government bureaucracy.
- In order to ensure that the policymakers understand and embrace the agenda at hand well and are strong enough to push it through, the communications team will formulate our design messages so that they: are responsive to other challenges; fit within national agendas; and, are alert of, and deliberately sensitive to, the political and social events of the day.
- This information will be evidence-based, yet synthesized and packaged in a way that policymakers can access and utilize easily. The CWG could, for instance, provide tips that members of parliament could turn into parliamentary questions. This information can be presented in quick-to-read hand-outs.
- The CWG will also lobby for the inclusion of the issue of bioenergies in speeches by policymakers and key public information/opinion shapers in important public occasions, such as national days.
- Importantly, the CWG will be open to communicating the challenges faced by the policymakers themselves towards addressing the complexities of the development of



bioenergy, and its efforts and initiatives in improving access to energy by the poor members of the community.

Academia:

- The CWG will work with the consortium to bring the issue of bioenergy centre-stage in academic discourses. The objective is to interest universities in bioenergy as a topic of study, as well as to help project into the public domain pre-existing bioenergy studies being undertaken at universities.
- On a wider scale, the CWG will assist the consortium to develop dialogue and lobby curriculum makers at all levels of learning for inclusion of bioenergy and related complexities.

International and non-governmental organisations:

- Maintain regular contact with relevant networks and organisations and arrange for sharing of information. This will include GVEP, REEEP, and CRD. See the **Initiatives Contact database in Annex 2** for further information on relevant initiatives identified and contacted so far. GVEP International for example have shown particular interest so far in linking PISCES research outputs to their developing knowledge management and dissemination systems. The possibility of joint publications for bioenergy practitioner GVEP partners will also be explored further.

Research institutes:

- Research institutes act as a critical control point for research on bioenergy. Based on on-going research, the CWG will form a partnership with communication officers to strengthen the incumbent role of researchers in making information on bioenergies available.

The media

- The impact of the outputs of PISCES will be greatly increased when reported accurately by the news media. Therefore, the CWG sees as a major priority the strengthening of bioenergy reporting capacity within the mainstream and alternative media, including mainstream, online and community-based media.
- Working with consortium members the CWG will compile a database of contacts for existing media, publications and networks of science and environmental journalists. It will then establish links and relations with them.
- For greater influence of PISCES outputs, the categories of media contacts will be widened beyond this group of journalists to include, for example, opinion editorial writers, independent columnists, cartoonists, and letters to the editor.
- In each region, the CWG will scan and map the media in relation to the target groups; for instance by identifying which newspapers and sections that policymakers are likely to read or which television stations/programmes they listen to. It will also compile a variety of options such as news, science pull-outs, talk-shows, call-in programmes, and so on.

- In all the national regions, the CWG will involve influential media associations and trainers towards demystifying bioenergy, creating interest and training young and upcoming journalists in reporting on it.
- The committee will provide press releases, press conferences, news and human interest feature tips to journalists.
- A team of contact people drawn from within and outside the consortium who can be contacted for comment/opinion/interviews will be made available for the media in the respective regions covered by PISCES.
- In addition, the Committee will seek ways to enhance the communication skills of the above group of people, through training, for instance, on handling the media, fielding press queries, discussing PISCES on television, and so on. It will also assist the consortium members to draft opinion articles etc for publication in the media.
- The CWG will alert the media on its own breaking news, as well as that of other intermediaries, online and international journals and media encompassing scientific, policy, communication, development, environmental issues. This will be executed through an online press centre and/or through the creation of a weekly alert.
- At the same time, especially for the international media, it will be important to sign up with online press services such as Eurekaalert and Alphagalileo.
- The CWG will seek ways of forming a partnership to influence science communication outfits (e.g. scidev.net) for regular coverage on bioenergies, and the creation of a discussion forum for key PISCES events.
- The CWG will consider organising site visits that would give journalists the opportunity to ground-truth findings; these could be the best and the worst examples of bioenergy development.
- Through the various consortium members, the CWG will work out mechanisms of lobbying media owners, senior media managers and editors to make it a policy for their organisations to report on bioenergy.
- In order to motivate journalism coverage, the CWG will consider introducing an award for excellence in reporting on bioenergy. This could be done on a regional basis.

Private and corporate sectors

- The CWG will work with the consortium to communicate the potential of biofuels as an investment opportunity, that can also be linked to corporate social responsibility (CSR). It will also highlight stories of corporate organisations, venture capitalists already involved in bioenergy, and the development of bioenergy in a socio-economically responsible manner.



Community members and organisations

- PISCES considers a top-up communication process vital. The CWG will therefore form a strong partnership with Community-Based Organisations and civil society and religious organisations, to ensure that they have accurate information on bioenergies. For this purpose, the CWG will use those options outlined in the media section.
- Giving ordinary citizens a voice and a place in determining the designing of proper policies for bioenergies will inform an important aspect of the Communication Strategy. The CWG will in particular communicate the potential of bioenergies for critical members of society; women and the youth. To these ends, communication outputs will be created so that their content, language and vocabulary suit their intended audience.
- In addition to providing information, therefore, the CWG will harness the opinion of citizens, and help provide avenues for members of public to articulate their fears, hopes and (mis)understanding relating to bioenergy. This could include televised public forums where policymakers and citizens dialogue on bioenergies. It could also involve the developing of community newsletters distributed through these organisations.

Corporate branding

- The CWG is charged with the responsibility of positioning PISCES as a strong, independent and trusted voice in matters of bioenergy. This will facilitate objective decision-making in the public interest.
- To accomplish this task, the committee will assist PISCES in maintaining a high profile. This has been started with the design of a distinctive logo and creation of an interactive and interlinked website (www.piscès.or.ke) that will be kept up-to-date with all PISCES documents, information, news and events. We expect to grow the facilities of this website with time and in response to stakeholder needs and PISCES specific opportunities such as bioenergy information centre and forums.
- The CWG will also help towards the preparation of printed material such as brochures, posters and banners to be used for our self-promotion.
- It will also identify for the consortium members photo opportunities, to be then be placed in respective media.
- The CWG will help towards the creation of a slogan for PISCES that will be translated into regional languages.
- The committee will also establish ways of monitoring coverage and feedback, so as to assess critically how PISCES and its work is perceived by others, and will identify and act upon areas to be improved on.

Publicity achievements so far

Date	Title	Primary target audience	Forum (Media/event)	Region	Impact /Comments
Sep 2007	Inception Workshop	Ministry officials, other donors, NGOs, academia, bioenergy firms etc	Conference day + Research-into-use training day	East Africa	Very well received, participation from all PISCES target sectors in EA.
Nov 2007	Bioenergy and Climate Change: The Case Study of Policy Innovation Systems for Clean Energy Systems	Polymakers	Global Forum 2007	Global	A key note address delivered by RD to over 100 participants
Nov 2007	PISCES website established at www.pisc.es.or.ke	Mass audience	Website	Global	Established and now must be developed further.
Nov 2007	PISCES brochure	NGOs international organisation	Brochure on PISCES distributed at training in RIU	Kenya (so far) - Tz, In, SL and Int. pending	Has been targeted at Kenya stakeholders. Needs adapted for other audiences.
Nov 2007	"Bio-fuels—A Growing Solution or Decomposing Illusion?"	Seminar at the Dag Hammarskjöld Foundation	Channel 4 TV, Sweden (live), Channel 2 TV, Sweden (live), newspapers in Gothenburg and Uppsala.	Europe	-
Nov 2007	Article "A five-year research project to help deliver sustainable and affordable energy to the poor in Africa and Asia" http://africasciencenews.org/asns/index.php?option=com_content&task=view&id=92&Itemid=2	African science professionals and policymakers	Africa Science News	Africa	-
Nov 2007	Article "Consortium of NGOs, Universities launches program to bring energy, food and water security to the poor in Asia and Africa" http://biopact.com/2007/11/consortium-of-ngos-universities.html	Bioenergy sector professionals	Biopact	Africa, Europe	-
Dec 2007	Article "Bioenergy focus for PISCES Energy Research Programme"	Energy and development professionals	Boiling Point – The Household Energy Journal	Global	Also visible to donors and at grassroots org levels.

The Monitoring and Evaluation process is closely linked to the general PISCES mechanism and will be completed in January.

Action plans for the communication strategy will follow the scoping studies and will be completed in January.

8. Annual activity plan

The full Activity Plans for the PISCES Project can be found in Annex 3. These were produced through an iterative process with each RT lead partner proposing, receiving feedback and inputs, from the JIG and partners, and refining their proposals and interlinkages accordingly. As discussed in section 2.ii, the Research Themes are linked with Country Activities and Cross-cutting themes and the RTs have a focus in the country in which the lead partner for that RT is based however relevant elements of all RTs are present in each country of focus.

The Gantt charts below show the plans and dependencies for each of the Research Themes and Cross-Cutting themes. It is not possible to represent all the linkages between the Activities and RTs clearly in an A4 graphical format - however the interlinkages with other RTs, Cross-cutting Themes and country programmes are clearly highlighted in the detailed plans provided in Annex 3.

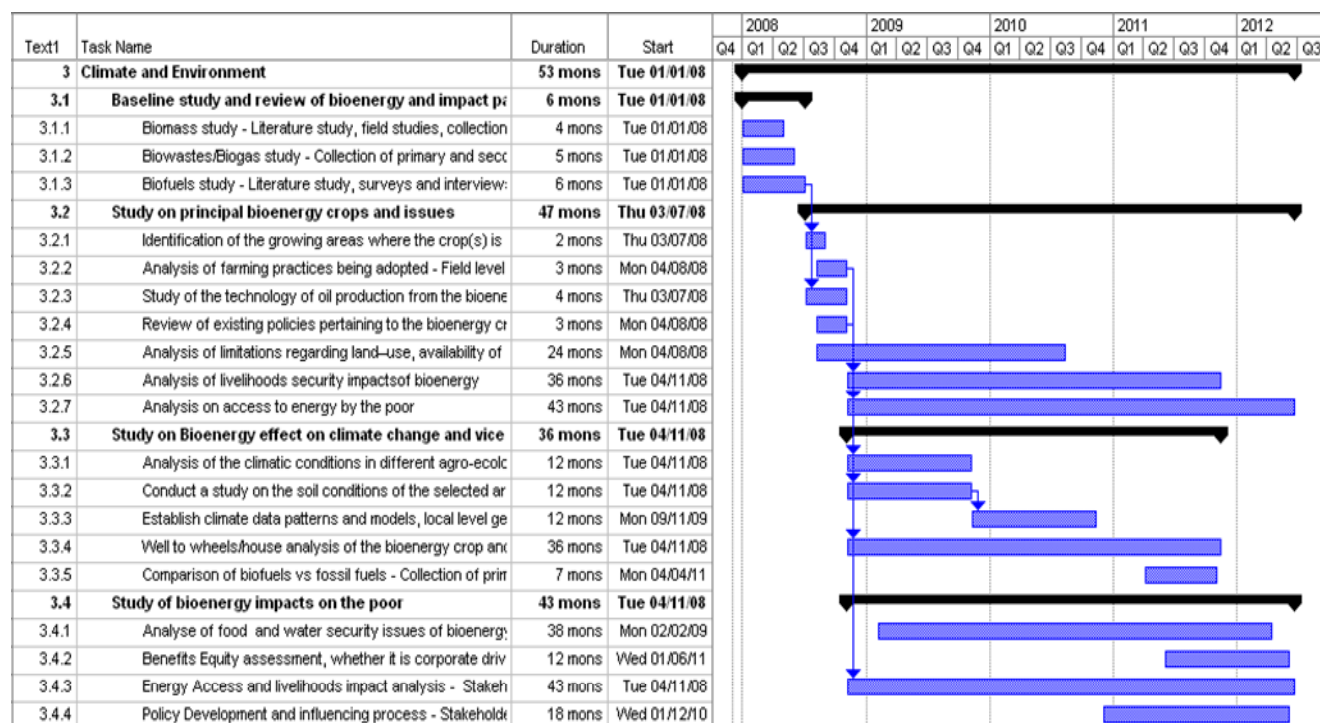
Research Theme 1 - Technology



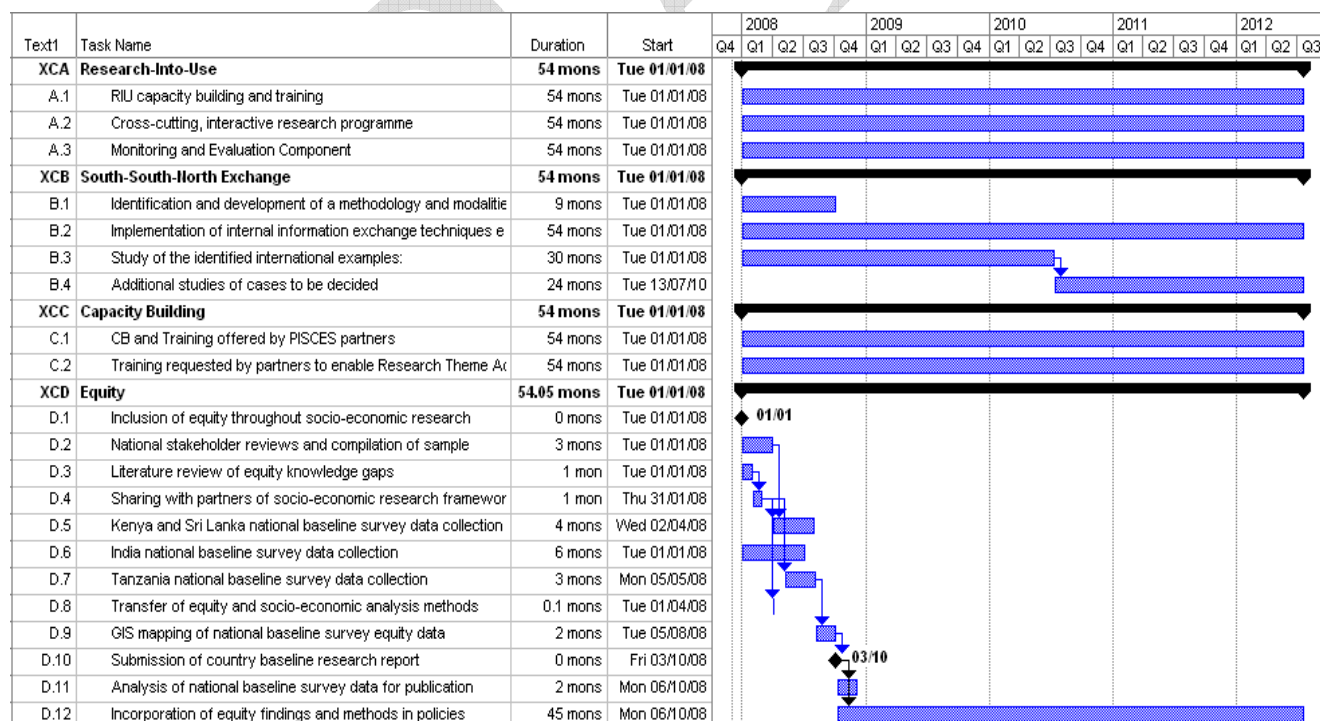
Research Theme 2 – Access and Delivery

Text1	Task Name	Duration	Start	2008				2009				2010				2011				2012			
				Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
2	Access and Delivery	54 mons	Tue 01/01/08																				
2.1	Socio-economic research of bioenergy status	51.41 mons	Tue 01/01/08																				
2.1.1	Desk study and literature review	3 mons	Tue 01/01/08																				
2.1.2	Monitoring & evaluation training, 5 days	0.25 mons	Mon 07/01/08																				
2.1.3	One to one stakeholder meetings	3 mons	Tue 01/01/08																				
2.1.4	Stakeholder analysis/profiling	3 mons	Tue 01/01/08																				
2.1.5	Stakeholder workshop 1 in Nairobi	1 day	Wed 02/04/08																				
2.1.6	Survey design and field questionnaire development	2 mons	Fri 01/02/08																				
2.1.7	Development of an Monitoring and Evaluation Framework	1 mon	Mon 14/01/08																				
2.1.8	Training of field data collection research assistants	0.5 mons	Mon 17/03/08																				
2.1.9	Field surveys and Focussed Group Discussions	2 mons	Thu 03/04/08																				
2.1.10	Mapping of local initiatives using GIS	2 mons	Tue 01/04/08																				
2.1.11	Data entry analysis and survey report writing,	2 mons	Thu 01/05/08																				
2.1.12	Community level workshop 1(out of Nairobi)	1 day	Mon 07/07/08																				
2.1.13	Community level workshop 2 (out of Nairobi)	1 day	Tue 08/07/08																				
2.1.14	Stakeholder workshop 2 in Nairobi	1 day	Wed 09/07/08																				
2.1.15	Identification of gaps (including capacity building) and ne	7 mons	Tue 01/01/08																				
2.1.16	Research Monitoring (for M & E framework)	6 mons	Tue 01/01/08																				
2.1.17	Preliminary Evaluation	1 mon	Thu 03/07/08																				
2.1.18	Communication (including meetings) with RT sub activity	9 mons	Tue 01/01/08																				
2.1.19	Design, production and dissemination of communication ;	2 mons	Tue 01/01/08																				
2.1.20	Research report writing & submission	2 mons	Thu 10/07/08																				
	Annual update of research, baslines and impact	37.59 mons	Mon 02/03/09																				
2.2	Research into Bioenergy Delivery Models.	54 mons	Tue 01/01/08																				
2.2.1	Site visits	6 mons	Tue 01/01/08																				
2.2.2	Case studies	6 mons	Thu 03/07/08																				
2.2.3	Analysis of the gaps	6 mons	Mon 05/01/09																				
2.2.4	Design of appropriate delivery models	6 mons	Mon 05/01/09																				
2.2.5	Piloting	24 mons	Wed 08/07/09																				
2.2.6	Impact studies	6 mons	Mon 18/07/11																				
2.2.7	Monitoring and Evaluation Framework	54 mons	Tue 01/01/08																				
2.3	Mapping Bioenergy Market Chains	54 mons	Tue 01/01/08																				
2.3.1	Capacity Development on Market Mapping	1 day	Tue 01/01/08																				
2.3.2	Development of Market Mapping Tools for bioenergy	7 mons	Tue 01/01/08																				
2.3.3	Case study identification with inputs from Activity 2.1	4 mons	Tue 01/01/08																				
2.3.4	Establishment of Case Studies and baseline creation	3 mons	Fri 02/05/08																				
2.3.5	Participatory Market Mapping Process undertaken	3 mons	Mon 04/08/08																				
2.3.6	Analysis and quantification of Market Maps	1 mon	Tue 04/11/08																				
2.3.7	Iteration of Maps with market stakeholders	2 mons	Thu 04/12/08																				
2.3.8	Workshop on market maps, pub policy briefs	4 mons	Wed 04/02/09																				
2.3.9	Modelling and analysis of maps using systems dynamics	6 mons	Mon 08/06/09																				
2.3.10	Consultations on models with stakeholders via Activity 2	1 mon	Wed 09/12/09																				
2.3.11	Testing of maps through project interventions (linked with	30 mons	Fri 08/01/10																				
2.3.12	Calibrate, improve and update models, draw policy concl	30 mons	Fri 08/01/10																				
2.3.13	Working with PISCES partners in India and Tanzania on E	30 mons	Fri 08/01/10																				
2.3.14	Workshops via 2.4, Policy brief update	1 mon	Thu 01/07/10																				
2.3.15	Cconference and book on market analysis and modelling	12 mons	Fri 01/07/11																				
2.4	Policy Development Process	54 mons	Tue 01/01/08																				
2.4.1	Policy, Regulations and Standards review	54 mons	Tue 01/01/08																				
2.4.2	Analysis and Identification of stakeholders	3 mons	Tue 01/01/08																				
2.4.3	Identification of experts and Establishment of a policy w	3 mons	Wed 02/04/08																				
2.4.4	ID linkages with RIU activities and develop validation mec	3 mons	Wed 02/04/08																				
2.4.5	Development of thematic headings and programme	3 mons	Wed 02/04/08																				
2.4.6	Review of existing policies and gaps analysis	48 mons	Thu 03/07/08																				
2.4.7	Review of regional and international policies	48 mons	Thu 03/07/08																				
2.4.8	Identify specific bioenergy issues and opportunities	48 mons	Thu 03/07/08																				
2.4.9	Evaluate consistency with existing national policies and :	48 mons	Thu 03/07/08																				
2.4.10	Draft the policy briefs	36 mons	Wed 01/07/09																				
2.4.11	Share policy briefs with respective national governments	30 mons	Fri 01/01/10																				

Research Theme 3 – Climate and Environment



Cross-Cutting Themes



9. ANNEXES

i. Bioenergy Pathways and Status in Target Countries

The following is a live draft document and will be updated on sharepoint through consultations with partners and stakeholders.

KEY:

Unknown	Not used/available	Limited use/availability	Widely used/available
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	Biomass	Ke	SL	Tz	In	Biowaste	Ke	SL	Tz	In	Biofuels	Ke	SL	Tz	In
Resources ↓	Wood					Animal Waste					Sugar Cane				
	Grass					Husks/Shells					Jatropha				
						Stalks/Leaves					Gliricidia				
						Human Waste/sewage					Maize				
						Sawdust					Sugar Beet				
						Landfill/MSW					Palm Oil				
											Sunflower				
											Soya Beans				
											Sweet Sorghum				
											Coconut oil				
Production Technologies ↓	Cutting					Biogas Digestion					Cultivation				
	Forestry Management										Seed Selection				
											Harvesting				
											Pest Control				
Processing Technologies ↓	Charcoal Production					Briquetting					Distillation				
	Chipping					Shredding					Transesterification				
	Pelletisation					Drying					Drying				
	Drying					Pelletisation					Blending				
	Material Transport					Biogas Storage					Material Transport				
						Material Transport					Filtration				
Use Technologies ↓	Traditional Stoves					Biogas cooking burners					Engine Modification				
	Improved Stoves					Stoves					Diesel Engines				
	Cookers					Biogas Engines					Petrol Engines				
	Boilers					Cookers					Pumps				
	Gasifier stoves					Gas Lights					Generators				
											Oil Lanterns				
Fuel Forms KEY: Solid Liquid Gas	(generally solid)					(Generally solid or gas)					(Generally solid or liquid)				
	Sticks/logs					Syngas					Biodiesel				
	Charcoal					Briquettes					Bioethanol				
	Briquettes					Pellets					Vegetable Oil				
	Pellets					Chips					Gel Fuel				

ii. Bioenergy Initiatives Database

Initiative	Reference	Status	Notes	Country /Region Focus	PISCES Contact Person	Notes on last contact
Biopact	http://biopact.com/	Voluntary Organisation	Towards a green pact between Africa and Europe	Africa	Harrison	Have published article on PISCES.
AFREPREN	http://www.afrepren.org/		AFREPREN/FWD is a registered Non-Governmental Organization (NGO) based in Nairobi, Kenya, with vast expertise on energy in East and Southern Africa and some experience in West and North Africa.	Africa	TBD	-
COMPETE	http://www.compete-bioafrica.net/links/links.html	Africa	Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems- Africa (COMPETE) is to stimulate bioenergy implementation in arid and semi-arid regions in Africa. COMPETE provides a platform for policy dialogue and capacity building and identify pathways for the sustainable provision of bioenergy.	Africa	Teo Sanchez, Rona Wilkinson	Rainer Janssen COMPETE Chair on CAG.
SNV - Collaborative Forestry Management	http://www.snv.org/bt/forestmanagement.htm http://www.bioenergylists.org/stovesdoc/Nienhuys/Beehive%20Stove.pdf		The SNV CFM programme operates in the Asia region and involves the management of timber, fuel wood, non-timber forest products and even tourism as sites spread across the country an income generating forest activity.	Asia	TBD	-
GVEP	www.gvep.org	Network /NGO	GVEP (Global Village Energy Partnership) was launched at the WSSD in Johannesburg, in August 2002 as a unique Partnership with the aspiration of transforming the manner and effectiveness of the way the development community tackle access to energy and as a vehicle to promote innovative approaches to increasing energy access.	International	Steven	Sarah Adams agreed to be on CAG. Interested in collaborating particularly on knowledge exchange methods.
EUBIA	www.eubia.org	Industry Association	European Biomass Industry Association	EU	TBD	-
CleanAirSIG (Hedon)	http://www.hedon.info/goto.php/CleanAirSIG	Network	Connects people and enables discussions household energy and indoor air. Online conference 16 -27 July 2007 (Practical Action involved)	International	Rona	Have published article in Boiling Point Journal
Oil from a Wasteland - The Jatropa Project in India	http://www.daimlerchrysler.com/dccom/0_0-5-7166-1-446319-1-0-0-446301-0-0-135-7166-0-0-0-0-0-0-00.html	Project	Supported by Daimler Chrysler India. The results of the experiment have been very satisfactory for two reasons. Firstly, it has revealed that jatropa-based biofuel can be used without any problems in modern CDI engines adapted for biodiesel. What's more, this fuel produces only half of the unburned hydrocarbon emissions and one-third of the particulate emissions produced by diesel fuel derived from crude petroleum.	India	TBD	-

TERI	www.teriin.org	NGO	TERI is a leading energy and development player in India and is running a large project on biofuels and Jatropa with BP and GTZ.	India	Steven /Shishu	Prosanto Pal is contact point after GVEP intro. Exchanging information about project pre-meeting.
CII (Confederation of Indian Industry) and Rabobank	http://www.cionline.org/news_new/newsMain04-05-2007_1.asp	Policy development	Public Private Partnership between CII and Dutch bank Rabobank looking at development of the Biofuels Sector / A Comprehensive long term policy on the Anvil; Special Secretary, Ministry of New & Renewable Energy.	India	TBD	-
Ethanol in India	http://press.arrivenet.com/industry/article.php/961906.html	Article /initiative	India launches 5% EBP (Ethanol blended petrol) project	India	TBD	-
Biofuel Watch	http://www.biofuelwatch.org.uk/background4.php	Information Network	Sharing data and information on Biofuel developments	International	TBD	-
D1 Fuel	http://www.d1plc.com/index.php	International Biodiesel Producer	D1 is a UK-based global producer of biodiesel. "We are building a global supply chain and network that is sustainable and delivers value from "earth-to-engine". Their international business is presently focused on four regional markets: India, Southern Africa, South East Asia and Australia and New Zealand.	International	TBD	-
REEEP (hosted in UNIDO)	www.reeep.org	Network	The Renewable Energy and Energy Efficiency Partnership, based in Vienna	International	Steven	Binu Parthan has received a project profile. Marianne Osterkorn invited onto CAG.
Biofpr (Biofuels, Bioproducts & Biorefining)	http://www.biofpr.com/index.html	Information Network	International news items related to Biofuels etc.	International	TBD	-
Btg Biomass Technology Group Ptz Bioenergy Ltda (Brazil)	http://www.btgworld.com/company_prof/ http://www.ptz.com.br/	Company	BTG Biomass Technology Group BV (BTG) is an independent, private firm which for the past 20 years has specialised in the process of conversion of biomass into useful fuels and energy. BTG has as its mission the world-wide development and implementation of economic and environmentally sound bio-energy systems.	International	TBD	-
IEA Bioenergy	http://www.ieabioenergy.com/OurWork.aspx Task 29 http://www.task29.net/index.php?id=3 Task 40 www.bioenergytrade.org	IO	IEA Bioenergy is an organisation set up in 1978 by the International Energy Agency (IEA) with the aim of improving cooperation and information exchange between countries that have national programmes in bioenergy research, development and deployment. International Members including South Africa	International	Melvyn	Ralph Simms is now on CAG.

International Energy Agency (IEA)	http://www.iea.org/Textbase/subje ctqueries/keyres ult.asp?KEYWORD_ID=4116	IO	Energy and Environment Data Reference Bank (EEDRB) http://www.iaea.org/inisnkm/nkm/aws/eedrb/	International	Melvyn	Ralph Simms is now on CAG.
Global Bioenergy Partnership (GBEP) hosted in the FAO	http://www.globalbioenergy.org/about_gbep.html	Registered as a CSD Partnership	GBEP's specific aims include facilitating an international policy dialogue on biofuels, helping to integrate bioenergy into domestic markets by tackling supply chain problems and prompting the exchange of knowledge and skills between member-states through multilateral collaborations. Tanzania first African country to join.	International (Africa)	Melvyn	Michaela Morese is now on CAG.
LAMNET	http://www.eubia.org/325.0.html	Network	The project Latin America Thematic Network on Bioenergy (LAMNET) is funded by the European Commission in the framework of the specific research and technological development programme 'Confirming the International Role of Community Research'.	Latin America	TBD	-
BEASL (Bio Energy Association of Sri Lanka)	http://www.bioenergysrilanka.com/index.php?title=Dendro_2005 http://www.bioenergysrilanka.com/toolbox/index.html	Association	This project will be centred around the staging of an international conference on the subject of the development of dendro-power and the use of agricultural waste for energy production, to be entitled "Issues for the Sustainable Use of Biomass Resources for Energy". PAGE DOESN'T APPEAR TO HAVE BEEN REVIEWED SINCE 06	Sri Lanka	Ramani	-
UNEP - CDM Forestry /Bioenergy Initiative	http://www.uneptie.org/energy/act /fin/docs/FFEM-UNEP%20forestry%20CDM%20project%20brochure%20COP%20(Engl).pdf	UN programme	United Nations Environment Project. Based in Nairobi. Has published recently on biofuels and bioenergy. DFID introduced PISCES to Peerke de Bakker at Inception Workshop.	Sub Saharan Africa	Steven/Daniel	Peerke de Bakker sent project profile and will reply in new year. Njeri Wamukonya invited onto CAG.
EC ManagEnergy	http://www.managenenergy.net/indexes/1100.htm	Information Network	EC Directorate General for Energy & Transport	EU	TBD	-
The International Bioenergy Platform	http://www.fao.org/sd/dim_en2/en2_060501_en.htm		FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS ROME, 2006.	International	TBD	Should be linked with GBEP. More information to be sought.
GNESD	http://gnesd.org/centres.htm	Network	Global Network on Energy for Sustainable Development	International	TBD	-

Linking Trade, Climate Change and Energy	http://www.sarpn.org/documents/d0002330/Trade_climate-change ICTSD Nov2006.pdf	International Centre for Trade and Sustainable Development	PART 3 BIOFUELS: HOPE OR HYPE? -Biofuels, Agriculture, and the Developing World 16 -Biofuels and Trade: Peril and Promise for Policy-makers 17 -Trade and Sustainable Development Implications of the Emerging Biofuels Market 19 -Certification as a Tool for Sustainable Bioenergy 21 -Bio-ethanol from Sugarcane and Sweet Sorghum in Southern Africa: -Agro-Industrial Development, Import Substitution and Export Diversification 23 -Cane Resources Network for Southern Africa -Opportunities for Biofuel in Select Asian Economies: Emerging Policy Challenges 25 -The Brazilian Experience with Sugarcane Ethanol	International	TBD	-
Energy Research Centre, Cape Town	http://www.erc.uct.ac.za/	University	Department specialising in energy in the African context.	S Africa	Tom	-
UNIDO	http://www.unido.org/doc/68431	Conference	Sustainable biofuels development in Africa : Opportunities and Challenges A joint activity of the African Union, the Brazilian government and UNIDO (UN Industrial Development Organization). 30th July -1st August 2007	Africa	Rona	-
African Sustainable Fuel Centre	http://www.asfc.org.za/	Centre	The African Sustainable Fuels Centre (ASFC) aims to catalyse the development of the biofuels industry in the Southern African Development Community (SADC) by providing support for sustainable biofuels initiatives.	Southern Africa	Joan	Contacted by
More to be added to this as a live document on sharepoint						

iii. Detailed Activity Plans

Research Theme: 1 - Technology

Research Activity: 1.1 - Development of Small-Scale Processing Technologies

Lead Partner: University of Dar es Salaam (UDSM)

Objectives

Main objective: to develop cost-effective bio-energy processing technologies for provision of clean energy access to the rural community, create an enabling environment for better social and economic well being of the rural communities.

Specific objectives:

- i. Select one type of bioenergy for further development (selection criteria to be developed)
- ii. To develop a detailed process flow sheet that will lead to the establishment of the selected bioenergy processing technologies
- iii. To design fabricate and install the bioenergy processing plant;
- iv. To commission the bioenergy processing plant;
- v. To optimise the bioenergy process plant;
- vi. Contribute to the development of bioenergy national standards

Research Question(s)

What biofuel type would have a multifunctional application? Can bioenergies be processed at local (village) level? Can it be packed, distributed, accessed and utilized easily for cooking, lighting and running stationary engines? Is the product safe (Health wise, easy to catch fire, etc.)?

Interconnections with other Activities and Research Themes

Linkages with other activities within the Research Theme:

RT1.1 will provide the design, efficiency improvement and small scale demonstration of bioenergy processing plant for providing energy services to the poor.

This means that RT 1.1 will have a *direct/parallel* link with other activities within the Research Theme, such as:

RT1.2 – Bioenergy Appliance (development and analysis)

RT1.3 – Energy Crop and Technology Research,

RT1.4 – Value Chain Analysis

The biofuels produced will be tested by appliances adopted by RT1.2 while the developed/recommended appliances for end users will be dealt within RT1.4.

Linkages with other activities under other Research Themes:

RT1.1 will be closely interlinked with activities under other research themes like:

RT2.1 - Bioenergy Socio-economic survey

RT2.3 - Mapping Bioenergy Market Chains



RT2.5 - Study of International Experience

RT3 - Climate and Environment impact pathways identification, and

RT3.2 - Data Review and integration of Climate Change data

in some of the following specific ways:

RT1.1 will utilize outputs from 2.1 (Socio-economic survey) to identify/define local needs and how to improve the socio-economic development of the rural community; the developed/recommended appliances (RT1.2) for end users will be dealt with in RT2.3;

RT3.1 (Climate and Environment impact pathways identification) outputs will benefit the RT1.3 (Energy Crop and Technology Research) that are under consideration as fuel sources in RT1 hence an influence to RT1.1;

RT3.2 (Data Review and integration of Climate Change data) will be important for bioenergy development in RT1.1.

In addition, the Cross-Cutting themes will be interwoven with this activity, developing mechanisms to take the processing research into use in policy and practice, learning and contributing knowledge via South-South-North exchange, building capacity within the team in processing technologies and mainstreaming equity into the process design.

Introduction

The interest in bioenergy processing and use in Tanzania is increasing. However, the level of exploitation is still low. Most of the initiatives are small scale (Diligent Energy Services, 2006). Also, despite the fact that all these energy initiatives have recognised the link between energy and economic development, most of the initiatives are focussing on urban and well-to-do communities, e.g. production of biodiesel for transport purposes. Very few initiatives, if any, are focussing on empowering the rural poor to access services. The real danger is that the majority of rural poor will continue to be marginalised in their access to energy services (Shuma, 2006).

By definition, a pilot plant is a small processing system which is operated to generate information about the behaviour of the system for use in design of larger facilities. Pilot plants are used to reduce the risk associated with construction of large process plants. They do this in two ways:

- They are substantially less expensive to build than full-scale plants. They do not require large amounts of capital. Further, design changes can be made more cheaply at the pilot scale.
- They provide valuable data for design of the full-scale plant. Scientific data about reactions, material properties, corrosiveness, for instance, may be available, but it is difficult to predict the behaviour of a process of any complexity. Engineering data from other processes may be available, but these data can not always be clearly applied to the process of interest. Designers use data from the pilot plant to refine their design of the production-scale facility.

This Research Theme intends to develop small scale bioenergy processing plant that is cost-effective for the provision of clean energy access to some rural communities that will be selected in Tanzania, to create an enabling environment for the better social and economic well-being of the rural communities.

Methodology and Scope of Work

- i. The study will use 1 PhD, 2 M.Sc. Students (dissertation) and 4 undergraduate students (final year project);
- ii. A detailed literature review will be undertaken to understand the process for production of bioenergy ;
- iii. The process flow sheet will be developed using DesignPro.;
- iv. Manufacturing will be carried out at the workshops of the Chemical and Process Engineering (CPE) Department and Technology Development and Transfer Centre (TDTC);
- v. The designs/drawings will be available to other partners for replication as required;
- vi. Conduct laboratory work to understand the operating conditions of the developed bioenergy processing plant; identify the problems/ limitations; develop solutions to reduce the problems.

Workplan

The following is the estimated time frame:

	Year 1				Year 2				Year 3				Year 4				Y5	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
<i>Literature Review</i>																		
<i>Staff and student exchange</i>																		
Bioenergy processing small-scale plant design																		
Procurement of material, plant components and other supplies																		
Fabrication of processing Plant																		
Commissioning of the processing Plant																		
Trial runs																		
<i>Report dissemination</i>																		

Outputs, Consumers and Communication

Outputs	Target Consumers
Bioenergy small-scale demonstration plant(s)	-Rural community -SMEs and other entrepreneurs -Researchers -Policymakers
Bioenergy product as energy service	-Rural community -SMEs and other entrepreneurs -Researchers
Procedure for designing and developing a small-scale bioenergy processing plant	-Researchers
Written report for dissemination	-Researchers, policymakers

Capacity Building

- 2 M.Sc. Students
- 1 Ph.D. students (Sandwich program-TZ-UK)
- User training on operating a bioenergy processing plant
- Artisan training on making a bioenergy processing plant



- Stakeholder workshops and seminars on bioenergy processing technologies to be held in Dar es Salaam and two other zonal centres to be selected based on needs and demands for bioenergy processing technologies.

Personnel Requirements

Staff Member	Role in the Activity
Jamidu H.Y. Katima	UDSM-RT 1 leader and Unit operations expert, review of stakeholders
Hassan Rajabu	UDSM-Fuel testing and engine expert
Abraham Temu	UDSM-Technology Transfer and heat exchanger design expert
Rwaichi Minja	UDSM- Coordination and Research
Karoli N. Njau	UDSM-Reactor Design expert, Processing technologies selection
Happiness Mlay (PhD candidate)	UDSM-Research assistant- Literature review
M.Sc. Students and final Year Students	UDSM- Assistants in lab works
Donath Olomi (UDSM)	UDSM- Markets specialist, to deal with value chain analysis

Equipment Requirements

- SuperPro Plant design software
- Equipment (model appliances, model engines) and accessories for pilot plant
- 1 Laptop computer for researcher meeting presentation
- 2 Desk top computer for research assistant and M.Sc. students' data entry and analysis

Expected Impacts

Direct impacts

- The economic and social well being of the rural poor will be improved by having more income, less time wastage to collect fuelwood and water.
- Household environment will be improved by utilizing clean fuel and better lighting.
- Access to information through TV, radio and internet cafes resulting from electric power generation in non grid electrified rural communities. And increased ability to charge mobile phones and use them where infrastructure permits.

Indirect Impacts

- Small and medium scale enterprises (SMEs) will take the opportunity to market the developed technologies to other communities
- Policy makers and politicians will be enlightened by the outcome and become advocates of the developed technologies as sustainable energy access to the poor. This will be achieved through dissemination workshops and seminars – linking to the Research-into-Use and Communications Strategies.

Research Theme: 1 - Technology

Research Activity: 1.2 - Bioenergy Appliances

Lead Partner: UDSM

Objectives

The overall objective of the research is to assess and demonstrate clean energy options for energy services from bioenergy for the rural poor, and to provide evidence to policy makers and other stakeholders on the environmental, social and economic benefits of the clean energy options.

The specific objectives are:

- i. To adapt, develop and demonstrate the gasifier-stoves for agro-waste and forest residues.
- ii. To identify and adapt suitable engines to run on Pure Vegetable Oil (PVO) and also with pure biodiesel.
- iii. To conduct laboratory tests (mapping) and field demonstrations of PVO and biodiesel engines.

Research Question(s)

- i. What type of feedstock will suit gasifier-stoves and gasifiers?
- ii. How is the flexibility of the appliances for different feedstock?
- iii. What are the important thermochemical and handling properties of the feedstock and “as-collected” conditions such as purity? (contamination with foreign matters and other agro-processing by-products)
- iv. What is the seasonal availability of the feedstock?
- v. What sizes (power range) of appliances are appropriate for different applications?
- vi. What are the in-house safety issues? (operational stability, external surface temperature, possibility of explosion, CO emissions when leakage happens)
- vii. What are the main benefits (economical, social, environment, gender and health) of the selected appliances to the poor communities?
- viii. What are the levels of air pollution from the combustion processes, and how can they be reduced to decrease associated health impacts?
- ix. What are the other environment impacts? And how can they be avoided or reduced?
- x. How is fire management (increase/decrease power), ease of loading, and starting/response the appliances be made to suit the users?
- xi. How will the fire management suits local cooking habit and customs (especially for staple foods)
- xii. Can the appliances be produced/purchased at an affordable cost?
- xiii. What type of diesel engines (pre-chamber, direct injection) are easy to run on PVO?
- xiv. How easy is to start an engine with PVO?
- xv. How can viscosity of PVO be made to suit fuel intake system of diesel engine designed for fossil diesel?
- xvi. What PVO characteristics have influence on sustainable operation of the diesel engine?
- xvii. How does performance of engine running on PVO compare with fossil diesel?
- xviii. What is the cost benefit at the village level of running a diesel engine with PVO?

Interconnections with other Activities and Research Themes

This activity is closely linked with all other RT1 Technology activities. It is also linked RT2 through looking at availabilities of feedstocks, pricing levels and appliance markets. In looking at local environmental impacts of the appliance technologies both on health (Indoor Air Pollution) and carbon implications this Activity will also link with RT3. As with all activities, the cross-cutting research-into-use principles will be developed for the bioenergy appliance research, knowledge exchanged internationally, capacity built within the consortium and with stakeholders and equity considered throughout.

Introduction

Most crop residues have relatively uniform properties (particle size, moisture and ash contents), and are found in huge quantities, concentrated around the processing facilities within villages. In most cases, the operators of these facilities have to incur extra cost to dispose of them. For economic reasons, crop and wood processing SMEs have disposed of excess residues that have no alternative use. The disposal method commonly used is to dump them nearby and sometimes burn them. This disposal practice creates air, soil and water pollution within the locality, and in downstream rivers and streams.

As fuelwood scarcity increases due to population growth, increasing farmlands, and human settlements, rural villagers are beginning to rely more heavily on agricultural residues for fuel. "Large-particle" crop residues (such as maize cobs and coconut shells) can readily be burned directly in conventional household and institution stoves, and in furnaces and kilns used in small industries and are widely used (though with low thermal efficiency and higher pollution).

"Small-particle" crop residues and sawdust cannot be burned directly in conventional stoves or grate-fired furnaces because the small particles choke the primary air supply, thus extinguishing the fire. For the case where forced primary air supply is employed, the small particles are entrained with the air, causing increase in fly ash and very poor efficiency, since the particles leaves the combustion chamber unburned or partially burned (incomplete combustion).

Gasifier-stoves for rice husk have been introduced successfully in some countries (India, Thailand, Philippines, Peru, China, and Gambia). In Dar es Salaam and other places where sawmills exist, sawdust gasifier-stoves are commonly used by food vendors and restaurants. The sawdust gasifier-stove has not been successful in domestic application. This is mainly because of the fragility of the compacted sawdust in the stove when the stove is moved or shaken slightly (like when cooking *ugali*), the sawdust column crumbles down, blocking the air draft and extinguishing the fire.

In an effort to solve the disposal problem of jatropha seed cakes generated after pressing the oil, *Kampuni ya Kuendeleza Tecknologia* (KAKUTE) of Arusha has developed gasifier-stove to utilize seed cakes. The stove burns with intense heat (due to oil left in the cake), but at a price of Tsh. 35,000/= [2007], the intended users finds the cost of stove too high.

For these reasons, adoption of low-cost gasifier-stoves to suit available feedstock, cooking habits and fire management skills is of great consequence to most areas with crop processing activities.

For the case of biodiesel engines, despite the high interest shown by the government in bioliquid fuels production and use in Tanzania, the level of exploitation is still at an infant stage. Most of the initiatives are small scale, and the large scale activities are aiming at exporting the fuels. However, all these energy initiatives have recognised the link between energy and economic development although most of the initiatives are focussing on urban and well to do communities,

often in the production of biodiesel for transport purposes. Very few initiatives, if any, are focussing on empowering the rural poor to access modern energy services.

There is a therefore a need to increase awareness and to demonstrate how diesel engine powered by the fuel that can processed locally can increase productivity in farming, crop processing and electricity generation at the village level. The idea is to introduce a technology that could be owned and operated by the village or an entrepreneur in the village, using local labour and resources.

Methodology and Scope of Work

- i. The research will use M.Sc. Students (dissertation) and undergraduate students (final year project) to study specific areas/components
- ii. A detailed literature review will be done to understand the current state of technology of cooking, lighting and mechanical power generation, diesel engines operated by PVO and biodiesel.
- iii. Technical development of gasifiers and gasifier stoves.
- iv. Laboratory tests to understand the operating conditions of the identified appliances identify the problems/limitations and develop solution to reduce the problems.
- v. Monitoring operation, problems/acceptance/etc, of appliances in the field.
- vi. Modify the designs where necessary.

Workplan

#	Description	Lead	Timing
i	Literature review	UDSM & UoE	Jan2008-Dec2012
ii	Field survey, baseline data collection, and Identification of potential residues and locations for technology demonstrations	UDSM & UoE	Mar2008-June2008
iii	Surveying and identification of stationary diesel engines for adapting to run on biodiesel	UDSM	Mar2008-Jun2008
iv	Laboratory tests of identified crop residues	UDSM	Jun2008-Dec2008
v	Development of gasifier appliances for selected residues	UDSM, UoE & Makerere	Jun2008-Jun2009
vi	Laboratory tests of gasifier-stoves	UDSM, UoE & Makerere	Jun2008-Jun2009
vii	Testing (mapping) of engines with both diesel and biodiesel	UDSM	Jun2008-Jun2009
viii	Field testing/demonstration of gasifier stoves	UDSM, UoE & Makerere	Jun2009-Jun2011
ix	Field testing/demonstration of biodiesel engine operating on different applications (Alternator, water pump, milling)	UDSM	Jun2009-Jun2011
x	Data analysis and report writing	UDSM, UoE & Makerere	Jun2011-Jun2012

Outputs, Consumers and Communication

Outputs	Target Consumers	Date
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Approach/procedure/methodology for evaluating potential quantities of crop residues generated, their alternative uses, and available quantities for fuel application	Village leaders Researchers	Dec 2008
Procedure for designing and developing gasifier for given physical and thermochemical properties of crop waste	Researchers	May 2010
Economic and technical considerations in sustainable operation of diesel engine running on PVO	Researchers Policy makers	May 2010
Understanding the need for balancing resources (agro waste, land, water, crops) for food, land improvement, and animal feed, and fuel	Village leaders Policy makers	Dec 2011

Capacity Building

Capacity-building activities would *include*:

- i. The production and field trialling of questionnaires eliciting local energy technology needs and priorities. [MSc student project, Edinburgh 2008; possibly also addressed by Makerere].
- ii. Briefings for/with bioenergy implementation schemes in PA (K), PA (SA) and UDSM (TDTC).
- iii. Specific training in research, development and design of appliances and engines, involving:
 - a) 3 M.Sc. students
 - b) 2 Ph.D. students
 - c) Several user of gasifiers
 - d) Several artisans
 - e) Other stakeholders in workshops and seminars

Personnel Requirements

Staff Member	Role in the Activity
Dr. H.M. Rajabu	Leader
Dr. Abraham Temu,	Researcher (Student supervisor, gasification)
Dr. Rwaichi Minja,	Researcher (Student supervisor, biofuels processing)
Dr. K.N. Njau	Researcher (Student supervisor, biofuels processing)
Dr Colin Pritchard, UoE (15%)	Technology Specialist
Dr Ewen Macpherson, UoE	Research student supervisor
Dr I da Silva, Makerere University	Associate (gasification)
Dr May Sengendo, Makerere University	Associate (gender-related issues)

Equipment Requirements

-Carbon monoxide (CO) and hydrogen (H₂) analyser (for producer gas)

Expected Impacts

- i. Establish potential for small-scale gasifiers for local CHP generation
- ii. Reduction in the amounts of fuelwood and charcoal consumed in the localities
- iii. Reduce household expenditure and time burden on cooking energy
- iv. Reduce the fuelwood-collecting burden on women
- v. Reduce household indoor air pollution
- vi. Reduce deforestation rates in the villages
- vii. Reduce residue disposal problem and associated soil, water, or air pollution
- viii. Capacity building in making and operating appliances
- ix. Experts in energy technologies
- x. Increasing links, collaboration and networking with policy makers, experts and other actors in the sector

DRAFT

**Research Theme: 1 - Technology****Research Activity:** 1.3 - Identification and Characterization of Biocrops**Lead Partner:** UDSM**Objectives**

The overall objective of the activity is to assess the suitability of locally available oil crops (non-edible) for PVO and biodiesel production with a focus on Tanzania.

Specific objectives of this particular research activity with reference to the overarching goal of increasing energy access for the poor?

- To conduct detailed studies for selection of most suitable non-edible oil crops in Tanzania.
- To conduct ecophysiological studies aimed at optimizing productivity.
- To establish markers to be used in identification of high yielding provenances and oil quality
- To study the effect of climate on the yield of oil seeds selected
- To establish agronomical conditions needed for the selected oil seeds
- To evaluate vegetative propagation of bioenergy crops and establish protocols for mass production
- To establish an observation/demonstration orchard that will serve a dual purpose as a mother tree orchard, and a research and teaching facility

Research Question(s)

- What crops can be used for biofuel?
- What is known about them? How can they be improved?
- What is their domestication potential/ productivity?
- Any implications for the current farming systems?
- Are there benefits, other than fuel/energy, that the putative fuel crops might have?
- Which characteristics/markers can be used in the field to identify high yielding provenances?
- Which characteristics/markers can be used to identify oil quality in seeds?

Interconnections with other Activities and Research Themes

These research theme outputs will mostly feed into Research activities RT1.1 and RT1.2 by provision of a pool of biofuel crops to choose from by stakeholders (growers and processors and policy makers). We anticipate major collaboration with MSSRF who have substantial experience in crop analysis and development also. A particular area for research collaboration with RT3 will be on the climatic sensitivity of the crops, also taking into account climate change factors. Through our focus on current farming systems this activity will also link to RT2. Cross-cutting themes will link throughout.

Introduction

Tanzania is almost uniquely gifted in the capacity for expansion it has in terms of the land area and resources (water and people) at its disposal for energy and food production. The 55 million ha of land currently unused for agriculture but capable of producing crops represents a

substantial development opportunity for this Least Developed Country but only if sustainability criteria are placed at the heart of its development policy.

Potential biofuel crops

Potential food crops that are currently grown and can produce biofuel in Tanzania include oil palm, sunflower, cashew, coconut, cotton, simsim and groundnut. A common objection to bio energy production from food crops in the Third World is the fear that it could divert agricultural production away from food crops hence provoking mass starvation in poor countries. Coconut contributes 65%, groundnuts (45 to 55 %), cashew nuts (46%), sunflowers (25 to 85 per cent) and palm fruits (43 to 51 per cent) oil. Need to emphasize the non-edible plant sources, either the traditionally oil producing plants or biomass energy plants is eminent.

Already jatropha which is not edible contributes 33 to 60 per cent to biofuels in Tanzania. Other common oil producing inedible plants worth researching on for biofuels in Tanzania includes jojoba (*Simmondsia chinensis*) in high altitude- arid –sandy areas such as Rujewa, or the versatile castor oil (*Ricinus communis*). This study will concentrate on biodiesel crops.

In general, there are different routes to using biomass as an energy source (see Figure 1.3 Theme 1.4). Plant oil can be extracted from oil seed crops and converted to biodiesel in a transesterification process. Alternatively, bioethanol can be produced from sugar and starch crops (and potentially, in the future, from lignocellulosic feedstock) by fermentation and distillation.

Biodiesel refers to a [diesel](#)-equivalent processed fuel derived from biological sources (such as [vegetable oils](#)) which can be used in unmodified [diesel-engine](#) vehicles. It is distinguished from the pure vegetable [oils](#) (PVO) or [waste vegetable oils](#) (WVO) used as fuels in some diesel engines.

Biodiesel feedstock plants utilize [photosynthesis](#) to convert solar energy into chemical energy. The stored chemical energy is released when it is burned; therefore plants can offer a sustainable oil source for PVO and biodiesel production. Most of the carbon dioxide emitted when burning biodiesel is simply recycling that absorbed during plant growth, so the net production of greenhouse gases is small. Feedstock yield efficiency per acre affects the feasibility of ramping up production to the huge industrial levels required to power a significant percentage of vehicles nationally. There are several factors that affect the yield. Furthermore, since different plants produce different amounts of biodiesel, and that different sources have different impacts on food security, there is a need to study biocrops to establish suitable biocrop for the intended use.

Methodology and Scope of Work

- 1.3.1. The study will use 1 Ph.D., 1 M.Sc. Students (dissertation) and 1 undergraduate student (final year project). The PhD candidate will have a major in Botany, The MSc. Candidate will be selected from BSc. Agriculture/Agribusiness applicants while the Special projects will be done by the Faculty of Science finalists. A detailed literature review will be undertaken to understand the characteristics of biocrops and the factors influencing their yield, resilience, etc.
- 1.3.2. Conduct protein and restriction analyses of various oils to identify plants giving good quality oils at high yields
- 1.3.3. Conduct laboratory tests to establish the best propagation methods for the plants, to test their resilience and to identify co-products
- 1.3.4. Study visits to MSSRF (India) for further laboratory work

Workplan

#	Description	Lead	Timing
1.3.1	The study will use 1 PhD, 2 M.Sc. 2Students (dissertation) and undergraduate students (final year projects).	Nyomora	Oct 07-Oct 2010
1.3.2	Detailed literature review to understand the characteristics of biocrops and factors influencing their yield, resilience, etc.	Nyomora	July 2007-June 2012
1.3.3	Conduct protein and restriction analyses to identify plants yielding high and good quality oils	Manoko	March 2009-Aug 2009
1.3.4	Conduct greenhouse trials to test best propagation methods, to test plants resilience and to identify co-products	Nyomora	June 2008-June 2009
1.3.5	Visits to MSSRF (India) for further laboratory work	Moshi	Sept 2009

Outputs, Consumers and Communication

Outputs	Target Consumers	Date
<ul style="list-style-type: none"> Most suitable oil crops/provenance in Tanzania identified 	Growers policymakers development practitioners, donors	2010
<ul style="list-style-type: none"> Effect of climate on the yield of the selected oil seeds understood 	Growers, Agric. Extension staff	2012
<ul style="list-style-type: none"> Required agronomical conditions for optimum yields established 	Growers, Agric. Extension staff, development practitioners	2012
<ul style="list-style-type: none"> Growth and yield characteristics of selected bio crops identified 	Growers, Agric. Extension staff, development practitioners	2012
<ul style="list-style-type: none"> Capacity in Biofuel crops built 	Researchers and trainers	2012
<ul style="list-style-type: none"> Effect of ecophysiological factors affecting oil production known 	Growers, Agric. Extension staff, development practitioners	2010

Communications channels

- PISCES website and others as per the Communications Strategy and RIU plan.

Capacity Building

- Heriel Moshi to Train in molecular analyses (Protein) (UK or MSSRF, India)
- Dr Nyomora and Dr. Manoko and Moshi to attend conferences/Workshops on biofuels
- Offer training in propagating biofuel crops

Personnel Requirements

Staff Member	Role in the Activity
Dr. Agnes Nyomora	Principal investigator, crop scientist
Prof. Jamidu Katima	RT 1 Leader
Dr. Manoko	Botanist, Student supervision
Heriel Moshi	PhD Student



To be selected	MSc student
To be selected	Special project, Undergraduate finalist

Equipment Requirements

1. Ecophysiology (Canopy analyser, Leaf area metre, Gaseous exchange analyser)
2. Equipment required for molecular work (Microplate reader (Yr 2), Spectrophotometer (Yr 3), Bench top amino acid analyser, L-amino acid Quantitation kit (Year 2)
3. Computer for the postgraduate students (Yr 4)

Expected Impacts

1. Rural Poverty reduced. Small holder farmers will be able to grow and sell the crops to users. They will also be able to use the crops for fuel (lighting, cooking) and therefore offset the cost they would have incurred on fossil fuels.
2. Environmentally empowered. By growing their own fuel, Sustainable farms so formed by the end of the study will use less fossil fuel and release less carbon than industrialized farms, while the food they produce doesn't travel as far from farm to table and is much less processed.
3. Access to cheap and safer energy source. Current cost on fuels. Diesel fuel consumption in Tanzania is projected to be about 700 million litres in 2010. At the current price of 1400TSh. this would translate into 9.8 trillion assuming the prices stays the same. For example if all the projected palm oil production in the Kigoma project (8,000ha producing 5000 lt/ha) were to be converted to biodiesel, a 5.7% national blend would be possible (This is would be equivalent to 5.2% on an energy basis).

References

1. DeVilliers, A.B.(2006) An Alternative Fuel? Biofuels 37 (2):8
2. McNeely, J.A.(2006) Green energy or grim reaper?. Biofuels. The green Series of opinion articles on environmental topics running weekly on the BBC News website.
3. GTZ (2005) Liquid Biofuels for Transportation in Tanzania. Potential and Implications for Sustainable Agriculture and Energy in the 21st Century.



Research Theme: 1 - Technology

Research Activity: 1.4 – Technology Value Chain Analysis

Lead Partner: UDSM

Objectives

To carry out a value chain analysis for biogas and ICS technologies, with the intention of enhancing their adoption and use by the poor communities, with a focus on Tanzania.

Specific objectives of RT 1.4 activities:

- i. To Identify all actors, processes and links in the value chains for biogas and ICS technologies
- ii. Examine critical links, and the strengths and weaknesses of these, as a basis for recommending action to improve the value chain for sustainability purposes
- iii. To identify and examine policies regulation environment which may arrest and perhaps partially reverse the development of the value chain for biogas and ICS
- iv. To examine the support environment
- v. To develop a value chain analysis framework for use in other technologies

Research Question(s)

Main research question: What prospects are there to enhance adoption and diffusion of biogas appliances and Improved Charcoal Stove (ICS) appliances, to foster energy access for the poor?"

Specific questions are:

- i. Which gaps, weaknesses, opportunities and threats exists in the whole of the appliances chains?
- ii. How do appliances/technologies production processes take place?
- iii. Who are the producers and where they are located?
- iv. Who are the users, what are the distribution channels and availability of technical assistance?
- v. Who are the different actors in and outside the chain?
- vi. What linkages existing and what are the power relation among actors?

Interconnections with other Activities and Research Themes

This activity will require inputs from RT1.2 in particular as appliances identified in RT 1.2 will be used to carry out value chain analysis and develop a logframe which can be used to assess other products. There will also be close linkages and inter-learning with RT 2.3 on Market Mapping and Participatory Techniques for Value Chain Analysis as well as to value chain analysis activities proposed in India and Sri Lanka. There will also be linkages with RT2.1 on the user needs for bioenergy and the demand side delivery mechanisms which also affect uptake. The cross-cutting themes will ensure that knowledge is exchanged effectively between the international efforts on value chains and into use in policy and practice.

Introduction

Biogas appliances and improved charcoal stoves are widely developed in Tanzania. Despite the significant progress that has been made, diffusion and uptake of these technologies is still

limited. The benefits that can accrue from the adoption of these technologies include: reduction in fuel cost, improved cooking environment, time saving and many others. On the basis of these benefits, one would expect a widespread adoption of these technologies. There have been attempts to understand why the uptake has been low (TaTEDO, 2003)¹ However, the focus has been more on the technology rather than on a holistic assessment of the value chain of the technology development, dissemination and final acceptability. This work package is intending to address the adoption issue holistically.

Methodology and Scope of Work

The research will use the following methodology:

- i. Secondary information gathering;
- ii. Interviews with key informants, observation, questionnaire survey, visiting and working with other research collaborators,
- iii. Different methods will be used to identify and examine actors, processes, linkages and power relations in the value chains.

Workplan

#	Description	Lead	Timing 2008-12
1.4.1	Literature Review and mapping the value chain, identifying different actors and stakeholders, gathering information on policy regulation and support environment	Olomi Namsifu	Jan – June 08
1.4.2	Stakeholder analysis/profiling	Olomi Namsifu	Jan-Mar 08
1.4.3	Stakeholder workshop in Morogoro, Arusha, Dodoma and Tanga	Olomi Namsifu	Mar-Sept 08
1.4.4	Survey design and field questionnaire development	Olomi Namsifu	Mar-May 08
1.4.5	Test and Review of the tools	Olomi Namsifu	May 08
1.4.6	Actual data collection regarding product segmentation, ways producers access final markets, links and gaps along the chain, products' efficiency, governance in the value chain	Olomi Namsifu, 2 other research assistants	June 08- May 09
1.4.7	Data Analysis	Olomi Namsifu	May – June 09
1.4.8	Report writing and developing a framework to be used in designing and disseminating technologies	Olomi Namsifu	July – Sept 09
1.4.9	Report dissemination: conducting workshops at different levels to share information with different actors, other shareholders and policy makers	Olomi Namsifu	Oct –Dec 09
1.4.10	Implementation/adoption of the developed framework to technologies developed in the PISCES project	Olomi Namsifu	Jan '10 – Dec '12

¹ TaTEDO -Tanzania Traditional Energy Development and Environment Organization (2003). A study on factors hindering Wide adoption of Improved Charcoal Stoves. Accessed from

1.4.11	Monitoring and Evaluation (continuous follow up, mid term and end of project evaluation)	Olomi Namsifu	Jan '10 – Dec '12
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Outputs, Consumers and Communication

A tangible output for this research will be a research report that comprises the following:

Outputs	Target Consumers
The value chain map	Policymakers (members of parliament in Morogoro and Tanga, at The Ministry of Energy), Technology developers, development practitioners and donors
List of stakeholders along the value chain and their power relations	Policymakers (Members of Parliament in Morogoro and Tanga, and at The Ministry of Energy); development practitioners and donors
Profile of main weaknesses and gaps in the links	Policymakers (Members of Parliament in Morogoro and Tanga, and at The Ministry of Energy); development practitioners and donors
Implementation design for desirable sustainable technology absorption	Policymakers (Members of Parliament in Morogoro and Tanga, and at The Ministry of Energy); development practitioners; donors; other project (inc PISCES) components

The dissemination process will be carried out through organised workshops at different levels, from village to national.

Capacity Building

- M.Sc. Students
- Training on SPSS
- Workshops and seminars

Personnel Requirements

Staff Member	Role in the Activity
Donath Olomi	UDSM-Principle investigator, markets specialist
Jamidu Katima	UDSM- RT 1 Leader
Hassan Rajabu	UDSM- Biofuel appliances expert
Abraham Temu	UDSM-Technology transfer coordination
Namsifu Nyagaboma	UDSM-Research assistant
2 other	Research assistants

Equipment Requirements

- 1 Laptop computer for field work
- 1 Desk top computer for project data entry and analysis and other project work
- SPSS software
- 1 Digital camera

Expected Impacts

Direct Impacts

- i. Change in behaviour of actors in the value chain to maximise profits that can be harnessed in the chain. This includes making informed decisions as they recognise the consequences of their actions in the chain.
- ii. Knowledge base increased among Tanzanian policymakers on factors affecting wider use of biogas and improved charcoal stoves.
- iii. The framework designed for developing and disseminating technology will be available for use by other project components.

Indirect Impacts

- i. Value chain upgrading and so the benefits of using these technologies are realised
- ii. Policymakers, stakeholders assisting in dissemination of technologies by the action they take in their daily duties.

DRAFT

Research Theme: 2 - Access and Delivery

Research Activity: Activity 2.1 Socio-economic research of bioenergy status, gaps and opportunities at village level including capacity building around bioenergy options

Lead Partner: Practical Action (UK, East Africa and South Asia)

Objectives

Objectives of the RT 2.1 Activity:

- To identify the socio-economic linkages and patterns of bioenergy use, access and delivery for the poor with an initial focus on Kenya and Sri Lanka
- To create a baseline of socio-economic information that will create the baseline of data required by the project, sector actors and by policy makers in order to base decisions relating to bioenergy

Research Question(s)

The overall RT 2 Research questions are:

- What models of financing, incentives and capacity development can create, sustain and scale – up access to bioenergy for poor communities?
- How can sustainable supply and value chains be enabled and regulated for delivery of bioenergy to poor communities while minimising negative impacts on food and water resources
- How can policy and institutional set-ups strike a balance between the need for community participation and innovative leadership in bioenergy service provision development?
- What are the trade offs and impacts between centralised versus decentralised bioenergy service delivery in providing sustainable improved energy access for the poor while maintaining (or increasing) food and water access?

Key research questions for the RT 2.1 Activity are as follows:

1. How do poor people in Kenya and Sri Lanka access and use bioenergy at the village level?
2. Who are the stakeholders involved bioenergy production, supply, and conversion, processing and service provision?
3. What are the types of bioenergy resources currently used by poor people in the two countries?
4. What are the current bioenergy initiatives in Kenya and Sri Lanka?
5. What are the barriers, gaps and opportunities around bioenergy options for the poor in Kenya?

Interconnections with other Activities and Research Themes

Linkages other activities in the Research Theme:

- RT 2.1 will provide the baseline socio-economic information on bioenergy status, access and use in the country, which will be closely interlinked with RT activities 2.2.2.3, 2.4 and 2.5 in some of the following specific ways:

- Identify existing delivery models to support RT 2.2 (Development and testing of models for delivery of bioenergy services) to support the development of new or improved models of bioenergy service delivery.
- It will Identify stakeholders as well as some of the gaps in service provision to support the market mapping process to be carried out by RT Activity 2.3
- Identify the key policy makers who will support XC-A Policy Development Process in the establishment of policy working groups and communicate some of the bioenergy access and delivery issues from the grassroots to the EWG
- Some of these lessons from XC-B SSN Review of global experience will be appropriately packaged and shared with grassroots communities as a means of providing preliminary feedback to the users of bioenergy RT Activity 2.5 to support policy development.

Linkages with other activities in the Research Themes:

- This project involves 4 different countries, 3 research themes each led by a different national partner and 2 cross cutting themes. The socio economic research design and methodology as well as field experiences will be shared with the rest of the partners of the PISCES RPC team for potential replication of similar work in their respective countries after adaptation to local conditions

Introduction

The research involves the collection of data and analysis of bioenergy status, gaps and opportunities at community level, including capacity building around bioenergy options. Bioenergy resource use at both the household and institutional level will be identified with respect to the types of users, the uses, suppliers, costs, the rates of use etc. An analysis of this data will generate baseline information about pro-poor bioenergy access and delivery in the country.

Several background research activities have been carried out during the inception phase, including:

- Meetings with the RPC team centrally to study the scope and depth of the research, to define best ways of working together to produce useful research data that can be used effectively by policy makers with the ultimate aim of creating a tangible impact at the grassroots
- Inter-country visits and discussions e.g. PAC in the UK, East Africa and South Asia, PAC EA and USDM and PAC SA and MSSRF to identify how best the Practical Action experience in working with energy issues in poor communities can be utilised to implement this project
- Within PAC, meetings between the UK, Kenya and Sri Lanka offices to discuss the scope of their research theme activities
- Participation in workshop with stakeholders involved bioenergy service provision to share information about PISCES
- Participation in Research-into-use Training workshops in Kenya
- Meetings with DFID in Kenya to obtain feedback on the inception phase
- Meetings in Kenya with selected stakeholders in Kenya to gather preliminary data on stakeholders, ongoing and planned initiatives, sources of information in the bioenergy sector, types of bioenergy resources in use, emerging issues, etc.

Information gathered from the above has helped better refine the research questions, and identified a clearer methodology and scope of work for the implementation of the research in Kenya. In particular, the following have clearly emerged as key aspects of the research:

- The whole range of bioenergy resources in use will be considered in this research, instead of focussing on a few specific types, in both the countries. In Kenya this will include:
 - Natural vegetation, Biomass: fuel wood (including charcoal from wood) , *Prosopis juliflora* locally known as “mathenge”
 - Agricultural residues, Bio waste: coffee husks, maize cobs and stalks, rice husks, sugar cane stalks and bagasse, sawdust, wheat stalks, coconut shells, cashew nut waste, animal dung, animal fat
 - Purpose grown crops, Biofuels: *Jatropha Curcas*, *Croton megalocarpus*, yellow oleander, sugar beet, euphorbia, etc.
- Existing national and household energy data and findings of past and ongoing surveys and research on bioenergy in Kenya will be used to extract information about household energy resource types, consumption patterns, costs, etc. Information generated on bioenergy access and delivery by the poor will be shared with the stakeholders to obtain their feedback update them during different phases of the research. Annual updates will be carried out in the subsequent years of the research to identify emerging issues and trends
- A stakeholder review and analysis encompassing various sectors including government, non-government, private and community based agencies will be considered during the review will be carried out through literature reviews and meetings.
- Investigations into all local initiatives on bioenergy will need to encompass all levels (i.e., both community level as well as institutional levels). Important Linkages in Kenya that have already been identified include:
 - The National Steering Committee on Biofuels ; the *Jatropha* and Biogas Sub-committees established in the Ministry of Energy
 - The Vanilla *Jatropha* Foundation and the Green Africa Foundation with their community based focus
 - Kenya Sugar Board discussions on Bioethanol production from Bagasse in relation to the sugar industry in Kenya
 - The ongoing GTZ funded biofuels feedstock study as well as their ongoing programmes of work in the area of improved household cookstoves and household/institutional biogas technologies
 - The DGIS supported Biogas Initiative for Africa
 - Ongoing academic research at the higher institutions of learning such as the Jomo Kenyatta University of Agriculture and Technology (JKUAT) and the University of Nairobi

Methodology and Scope of Work

The research will be implemented through desk studies; literature reviews; targeted stakeholders meetings; national and community level stakeholder workshops; site visits; focussed group discussions at community level; monitoring and evaluation; ongoing annual updates of data in areas with ongoing projects.

In Kenya, the research will be carried out in six different regions to represent key agro-ecological zones, and are characterised by high levels of poverty. Initial review of literature and data and location of bioenergy initiatives will further support the identification of specific areas for field data collection. The 2006/7 economic survey and the integrated household budget survey both released in 2007, for example, will be used to stratify the target areas where focussed group discussions and other meetings could be held. The six regions in which the research will be carried out are:

- Mountain region (Mount Kenya area covering Nyeri and Meru areas)
- Western region (the Lake Victoria region and the sugar cane growing area)
- North Rift (Turkana, an ASAL- arid and semi arid lands-area)
- Larger Nairobi area (peri-urban and urban. This region will also include another ASAL area - to the south west of Nairobi which is Magadi Division in Kajiado District)
- Coastal region (looking at specific initiatives in the utilisation of agricultural residues from coconut cashew nut)
- Northern region (Mandera)

With the exception of the coastal region, all the above regions are areas where Practical Action has a long standing presence and strong links with poor communities as well as key stakeholders. The research will build upon these links to identify and mobilise target groups and stakeholders for the research. At least 25 focussed group discussions will be held, with an average of 4 per region. GIS mapping using existing data will be used to map local initiatives in the country. The outputs of this research will be disseminated locally through two national stakeholder workshop and two local level workshops during the first year, as well as with a wider audience through several communication channels described below

The methodology developed for Kenya and implemented in Kenya and Sri Lanka will be shared with the PISCES partners in Tanzania and India to support the creation of similar baseline data.

Work plan

The research in Kenya will be carried out between January and September 2008, for a total of 9 months, and then for one month in every subsequent year of the project

#	Description of Key Activity	Lead person	Timing (2008-12)
2.1.1	Desk study and literature review	Margaret Rukwaro	Jan - Mar 2008
2.1.2	Monitoring & evaluation training, 5 days	Gaudensia Owino	Jan 2008
2.1.3	One to one stakeholder meetings	Tameezan wa Gathui	Jan- Mar 2008,
2.1.4	Stakeholder analysis/profiling	Tameezan wa Gathui	Jan– Mar 2008
2.1.5	Stakeholder workshop 1 in Nairobi	Tameezan wa Gathui	March 2008
2.1.6	Survey design and field questionnaire development	Carolyn Nekessa	Feb- Mar 2008
2.1.7	Development of an Monitoring and Evaluation Framework	Gaudensia Owino	Feb 2008
2.1.8	Training of field data collection research assistants	Carolyn Nekessa	March 2008
2.1.9	Field surveys and Focussed Group	Carolyn Nekessa,	April - May 2008,

	Discussions		intensive; annual updates over 2009-12
2.1.10	Mapping of local initiatives using GIS	GIS expert /Shadrack Kirui	April- May 2008, plus annual updates up to 2012
2.1.11	Data entry analysis and survey report writing,	Carolyn Nekessa	May –Jun 2008
2.1.12	Community level workshop 1(out of Nairobi)	Tameezan wa Gathui	July 2008
2.1.13	Community level workshop 2 (out of Nairobi)	Tameezan wa Gathui	July 2008
2.1.14	Stakeholder workshop 2 in Nairobi	Tameezan wa Gathui	Aug 2008
2.1.15	Identification of gaps (including capacity building) and needs, and development of a training and capacity building plan	Tameezan wa Gathui	Feb -Aug 2008
2.1.16	Research Monitoring (for M & E framework)	Tameezan wa Gathui	Jan - July 2008
2.1.17	Preliminary Evaluation	Gaudensia Owino	Aug 2008
2.1.18	Communication (including meetings) with RT sub activity leaders & with main RT 1 & 3 leaders	Tameezan wa Gathui	Jan- Sept 2008
2.1.19	Design and production and dissemination of communication products	George Maina/ Francis Muchiri	July - Aug 2008
2.1.20	Research report writing & submission	Tameezan wa Gathui	Aug -Sep 2008
2.1.21	Annual updates of the research, including impact monitoring	Tameezan wa Gathui	Mar-Apr 2009 to 2012

Outputs, Consumers and Communication

The products of the research will be as follows:

- Research report on the baseline for bioenergy use by the poor in Kenya
- GIS map of bioenergy initiatives
- Stakeholder workshop reports
- Single page profiles of local initiatives in bioenergy.
- 30 minute combined video on Focus Group Discussions and bioenergy initiatives in all the regions

Communications channels

- Project Sharepoint site
- PISCES website
- PISCES and non-PISCES local, regional and international seminars and workshops
- Partners in Tanzania and Uganda
- Practical Action country offices in South America and Southern Africa

Capacity Building

Capacity Building Requirement A	Researcher	Date/ Duration (2008)
Requirements for capacity building in order to do the research activity		
1. Monitoring & Evaluation training,	Tameezan, Carolyne, 2 research assistants, PISCES project partners	Jan 2008 (5 days)
2. GIS Mapping training	Tameezan, Carolyne	Mar 2008 (10 days)
3. UOE Training course on research-into-use	Tameezan, Margaret, George	Nov 2007(5 days)

Capacity Building Requirement B	Researcher	Date/Duration
Capacity building to be provided by the Research Activity team		
1. Monitoring & Evaluation Training (in Chennai) to share M & E methodology and field experiences from the Kenya research	PISCES project partners, interested project managers from other organisations	Sept 2008, 0.5 day
2. Presentation on the design and implementation of the bioenergy socio economic research methodology	PISCES Project partners, selected stakeholders working in bioenergy	Sept 2008, at the second annual partner meeting in Chennai
3. Video shows for communities to share experiences and provide feedback from the research and information about other bioenergy initiatives in Kenya	Target communities involved in the research.	March 2009, 6 days (during the 2009 annual update)

Personnel Requirements

The following people will be involved over the 5 year period of the research for Kenya. The principal investigator will manage the research over the whole period of time. All the other members, except for the two field research assistants and the GIS expert are full time staff of Practical Action. Shadrack Kirui from ACTS will be drawn in to support the GIS planning and mapping exercise.

Staff Member	Role in the Activity
1. Tameezan wa Gathui, Energy specialist	Principal Investigator
2. Margaret Rukwaro, Librarian	Literature review
3. Carolyne Nekessa, Researcher	Research design and implementation
4. Gaudensia Owino, M & E specialist	Monitoring and Evaluation design, implementation & training
5. George Kamau/ Francis Muchiri Communications/ Graphic design	Communications product design & development
6. Lydia Muchiri, Gender specialist	Gender Expert, field questionnaire development
7. 2 Field Research Assistants	Field data collection
8. External GIS expert / Shadrack Kirui, Surveyor (ACTS)	identification of existing GIS maps, design of a possible GIS mapping strategy to produce map of bioenergy use in Kenya



Equipment Requirements

- 1 Laptop computer for field work
- 1 Desk top computer for project data entry and analysis and other project work.
- 1 GPS hand set for updating GIS data in the field
- 1 Digital camera
- 2 audio recorders and audio cassettes and batteries for recording the focus group discussions

Expected Impacts

- Better data and information on gaps and problems in the bioenergy sector that will stimulate change and provide support for policy measures to be proposed later in the project
- Greater community awareness about other local and international initiatives in bioenergy, leading to informed decision making over the access and use of bioenergy to improve their livelihoods
- Profiles of local and regional initiatives in bioenergy raised nationally, regionally and internationally
- Greater awareness raised about the PISCES project, leading to increased collaboration with stakeholders
- PISCES Partners capacity built on Research-into-use, GIS mapping, Monitoring and Evaluation frameworks, etc.

Research Theme: 2 - Access and Delivery

Research Activity: Activity 2.2 Research into Bioenergy Delivery Models.

Lead Partner: Practical Action (UK, East Africa and South Asia)

1. Introduction

The delivery of energy services to the poor has been extensively discussed during the last decade; several delivery models and approaches have been designed and tested, especially on electricity service delivery models. Better understanding of the delivery models rests on the difficulties that energy promoters, policy makers and suppliers confront to provide sustainable energy services to the poor. There are many examples around the world which show that people accept a service, start using the service, but soon stop using them, either because they perceive that the services do not match with their needs, with their social and cultural requirements or because they cannot cope with payments.

Activity 2.2 in PISCES involves research, design and testing delivery models on bioenergy services to reach people who are presently without access or those with access but who are poorly serviced either in quantity or quality, it includes on bioenergy energy services for cooking as well as for electricity provision. Since the main concern of this project is to look at the bioenergy energy services, the delivery models will include whole production and delivery chain, from farming, cropping, processing biofuels as energy sources to energy generation and energy service delivery.

The activities will cover the following biomass resources

- Solid biomass, including wood, shrubs, charcoal, agricultural residues, etc.
- Gas from biomass, including gas production from biomass, biomass gasification, biogas from fermentation and other sorts of gas production.
- Biofuel crops, including the most popular and promoted biofuels presently, such as jathropha, alcohol from sugar cane, sorghum, etc.

2.0 Research Hypothesis.- The main hypothesis regarding delivery models on energy access for the poor is that “appropriate delivery models are required to stretch the present energy access boundaries within the poor and/or improve the quality and quantity of those who presently have inadequate access to energy; that the effectiveness of the exiting models may be limited due to important gaps in the understanding of the social, cultural, technical and financial conditions of the users and government policies”.

More effective energy delivery models may be possible to obtain from two main sources: (1) the improvement of the existing delivery models, and (2) by designing and implementing new delivery models, or a combination of both. Any of these categories require a great understanding of the delivery gaps mentioned above and then the implementation of a range of measures to fill the gaps; however the implementation of such measures may require local, regional or national policy changes.

This hypothesis also considers that appropriate delivery models may stretch energy access boundaries for the poor by filling the exiting gaps (financial, cultural, social and technical), however such stretching by no means would cover the 100% of the access, because there are other fundamental issues on the filling of the gaps, which could not be possible but only with huge structural changes such as poverty which is directly linked to purchase capacity of the people.

3.0 Methodology

The methodology to be used for this research work is a combination of social and technical research methodologies; these are: analysis of existing literature, case studies, design and field testing of appropriate delivery models, studies of the piloting results. Both desk and field research activities will be required. A team of researchers will be organized and led by Practical Action Consulting.

The research activities will be performed starting from wide issues of energy access on energy services for the poor, review of the existing delivery models, then narrowing to specific models on bioenergy in the target countries (Tanzania, Kenya, India and Sri Lanka). It should be pointed out that important work has been developed during the last decade concerning some gaps, and especially concerning “the financial gap”. Especial attention will be put to review pilot projects of the past decade on energy delivery models using credit schemes; examples like the credit schemes for the delivery of solar PV systems by the Grameen Bank in Bangladesh, the free for service delivery model started in Dominican Republic, loan to retailers, and others, will be thoroughly reviewed.

4.0 Activities

4.1 Analysis of existing information. - A worldwide review of existing information on energy delivery models for the poor will be conducted first; this will help identify the different delivery models, their degree of success or failure and the most important characteristics, and the financial, technical, social and cultural environments of application. This study will be carried out through review of case studies, impact of studies of energy access, meeting and discussions with relevant organizations and networks involved on energy delivery and other sources of information. Specific literature reviews for the target research countries, investigating the different models designed and tested during the last twenty years.

The study on delivery models for the target countries will include a brief review of information about the existing energy delivery models for each country. Specific information will be gathered for each successful model identified, conducted through research on written information, and consultations with organizations involved in the implementation of energy delivery models.

Outputs:

- A paper on the situation of delivery models for bioenergy
- Four reports (1 per focus country about energy delivery models there)
- Sample of projects or programmes to be visited in both the target countries as well as in other countries

4.2 Site visits. - A number of projects on delivery models will be selected for site visits. These projects are expected to be located primarily in the target countries; however a handful of relevant projects from other countries will also be considered for such visits. The purpose of these visits is to gather first hand information about features of the model, implementation conditions, use of energy, and stakeholder perceptions of delivery models. The information of site visits will be gathered through interviews and discussion with project managers of implementing institutions, community leaders and local government leaders; lists of questions will be prepared in advance to the visit. A list of open ended questions will be prepared for the interviewees, while the visitors will write notes and/or tape record the conversation.

Outputs

- Field visits to at least 10 projects in each target country
- reports on the interviews to project managers and stakeholders (one per country)



- at least 4 visits to relevant projects related to delivery models located in different countries than target countries.
- Sample

4.3 Case studies. - Based on the research information gathered and especially on the site visits, a sample of relevant delivery models (either successful or unsuccessful) will be chosen for further detailed field studies. These case studies will preferably be carried out in the target countries (India, Sri Lanka, Kenya, Tanzania), but without ruling out relevant cases from other countries, especially those that the partners consider to be relevant for the purpose of the research.

Each case study will require field data collection from the different stakeholders (but especially the energy users and project implementers). Structured questionnaires will be prepared for this purpose; the questionnaires will have different sections (considering the different issues, social, financial, technical, cultural, etc).

The field data collection will be carried out by Practical Action Consulting project team members, field staff and partners of Practical Action field offices in Kenya, Sri Lanka, Tanzania and India. A group of interviewers will be chosen and trained in each target country to perform the site visits and interviews. Among the most suitable candidates for this activity are university students.

It is expected that the result of the case studies will identify the most important and common social, cultural, financial, technical and policy gaps regarding delivery models. The results will also allow the team to identify the degree of success, with a view to [indicate how this will help].

Outputs:

- four reports (one per target country) on the delivery models and their degree of success or failure, identifying the most important factors of success and the main social technological, cultural, financial gaps.

4.4 Analysis of the gaps.

This activity will allow compiling and analyzing previous information and bringing together a report on the social, cultural, financial and technological gaps, it will also allow identifying the gaps on the delivery models.

Output: Report on the analysis of gaps

4.4 Design of appropriate delivery models - Based on the information and the analysis of the field data collection, new energy access delivery models will be designed. These delivery models will be designed bearing in mind the social cultural, financial and technical gaps and will primarily consider the ways to overcome or fill the gaps. Consultations and workshops with the different stakeholders, and especially with policy makers, will be held in order to make them aware about the different existing gaps and get their inputs on issues of gap filling, and the strategies and policies required for the implementation of new models.

It is expected that at least two delivery models will be designed and recommended to policy makers and stakeholders in each country.

Output: Report containing the new models proposed and description of the new models, the tools needed for their implementation, and the interrelation between stakeholders.

4.5 Piloting. - Pilot activities will be carried out in at least two of the target countries. The pilot projects will be action research activities, which will test the delivery model on the ground. It will provide insights about the processes of implementation, the acceptance or rejection of the model by the people and the reasons for doing that. However the implementation of a delivery model will require choosing a technology or technologies to be delivered, this choice will be made in concordance with the outcomes of the technological research in process as part of this project. The piloting of delivery models will consider as options, (a) the implementation of new projects (from scratch); (2) when convenient, undergoing energy projects or programmes, which agree on the need for the improvement of the delivery model and agree on the designed and proposed delivery model.

Outputs: stakeholder's consultation workshops in the target countries

Proposal about the implementation practicalities (where, project, partners, costs involved, etc)

4.6 Impact studies. – It is expected that some impact studies will be undertaken at the final stage of this project. Such studies will be done as part of the research work and will start at the beginning of the fifth year of implementation of the project. The purpose is to understand the degree of acceptance of the delivery models by the stakeholders and measure their degree of success or failure and the reasons for that. The results will provide indicators of success or failure.

Output: Reports of the results, and the impact on the users.

4.7 Monitoring and Evaluation Framework. - The monitoring of this activity is a responsibility of the team leader of Access to Services Delivery Models. The performance will be measured against the outputs indicated for each activity. Frequent discussions and assessments of the progress will be done as part of the project

5.0 Time Frames

-Worldwide literature review (first 6 months of the project implementation)

-The literature review and country studies will be performed during the second half year of the project.

-The pilot activities on the energy delivery models will last throughout the project development

Sixth months periods										
Activity	1	2	3	4	5	6	7	8	9	10
4.1										
4.2										
4.3										
4.4										
4.5										
4.6										
7.7										

6.0 Personnel requirements

- Teodoro Sanchez (team leader)
- Energy researchers (Kenya, Sri Lanka)
- Consultants for specific activities required along the project development



- Data collectors

7.0 Other requirements

7.1 Equipment

- One Laptop computer
- 1 desk top computer

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Research Theme: 2 - Access and Delivery

Research Activity: 2.3 – Mapping Bioenergy Market Chains

Lead Partner: Practical Action Consulting

Objectives

- Develop an improved understanding of bioenergy value chains and their dynamics, impacts and characteristics in target countries.
- Develop improved tools and policy approaches for sustainable bioenergy market development.
- What is the existing value chain or environmental service delivery networks?

Research Question(s)

Main question (from proposal) - How can sustainable supply and value chains be enabled and regulated for the delivery of bioenergy to poor communities while minimising negative impacts on food and water resources?

Also relevant to question (from proposal) - What are the trade-offs and impacts between centralised versus decentralised bioenergy service delivery in providing increased energy access *and socio-economic development* while maintaining or increasing food and water access? (*italics added since proposal*)

Interconnections with other Activities and Research Themes

Necessary Input Activities – This activity will require inputs from: 2.1 Socio-economic survey to help define local need and focus for case studies; and XCB SSN Study of International Experience to provide relevant best-practice experience from other countries. It will also benefit from inputs from the Bioenergy Resource Survey and 3.1 Study of Bioenergy Climate/Environment Impacts that will also inform case study selections.

Parallel Activities - The activity will be integrated with 2.2 Access Models Development, which focuses on the demand side while this activity focuses on supply. It will also provide information to and receive feedback from XCA RIU Policy Working Groups. It will benefit from collaboration with RT1 Technology activities in analysing technology options and RT3 Climate and Environment in understanding environmental implications of value chains. The activity will have linkages to all cross-cutting themes, with particular linkages to Research Into Use, turning improved understanding of markets into better policies, and Capacity Building, for example, as we build market literacy amongst the teams and stakeholders and combine training activities.

Introduction

Currently bioenergy value chains vary from very established (e.g., charcoal, fuel wood), underdeveloped (e.g., biowaste from industry) to rapidly evolving (e.g., jatropha, sugarcane ethanol, etc). These value chains involve many stakeholders from poor producers to large companies, and from energy sector to agricultural to industrial players. It is well known that the manner of production and supply of bioenergy plays a crucial role in the outcomes of availability, price, environmental impact and socio-economic benefit profile. Furthermore, there is a wide consensus (certainly in the countries covered by the PISCES project) that market-based

approaches are, with the proper regulation and incentive structures in place, the preferable method of encouraging expanded production and availability of energy.

In this context, Activity 2.3 is focused on a better understanding of the market and value chains for bioenergy resources, products and services in the context of poor communities in Eastern Africa and South Asia. This improved understanding will provide information on how policies and project interventions can be more effective in improving the sustainability and accessibility of these market systems, products, services and socio-economic benefits to the poor.

Specifically this Activity seeks to apply to bioenergy value chains the exciting potential of the Participatory Market Mapping process. Although this process has research elements in that one is trying to identify the market layout through a kind of interview/workshop process – it was originally intended, and also functions as, a project intervention in its own right. This is because through the participatory process the various market actors increase their own understanding of the value chain, and possible changes or opportunities within it become possible. This has previously been applied in agricultural market chains but this will be the first time it has been applied in a bioenergy context. It will also be expanded through this research to address Governance issues and policy-responses which are vital to the successful and sustainable evolution of value-chains.

Research so far has focussed on bringing together existing information on market mapping methods, reviewing case studies, building awareness within the consortium and stakeholders of the technique, identifying potential sub-sectors for analysis and building up the resource base for the project through trainings and workshops.

Methodology and Scope of Work

The main methodologies to be employed will be:

- literature review and methodology development
- trainings and workshops to build capacity and awareness
- the participatory market mapping technique itself (both as a piece of research and action inquiry)
- market modelling using systems dynamics tools
- on-the-ground surveys of market changes and tracking of trends
- pilot (policy or other) interventions within existing/emerging markets
- policy development processes and consultations

The scope of the work undertaken will be limited to Kenya and Sri Lanka in the first instance with methodologies, capacity and lessons learned made available to Tanzanian and Indian partners with a view to improving their own work. The method will be developed and applied within the context of each of the identified three bioenergy categories in order to understand the different general properties and dynamics of those types of market:

- (a) Wood Fuel - focus on charcoal in Kenya or biomass (dendro) in Sri Lanka
- (b) Agricultural Residues - focus tbd in Kenya or Sri Lanka
- (c) Biofuels - focus on jatropha versus sugarcane trade-offs in Kenya

Two of these research project items will be undertaken in Kenya, one in Sri Lanka with the split between the three resource types, and the specific examples to be addressed, to be decided at the first annual meeting in Sep 08 after the inputs from Activities 2.1 and 2.5 in particular.

Workplan

#	Description	Lead (see table next page)	Timing
2.3.1	Capacity Development around Market Mapping within PAC team and consortium in general. Market Mapping Training and workshop in Nairobi Nov 07 including video.	AG	Nov 07
2.3.2	Development of Market Mapping Tools for bioenergy specific types of value chain	SH/GB/AG	Jan-Aug 08
2.3.3	Case study identification with inputs from Activity 2.1 consultation, data collection and bioenergy scenario needs assessment process	TWG/RN	Jan-Apr 08
2.3.4	Negotiation and establishment of Case Studies as well as baseline data collection on study value chains.	TWG/RN	May-Aug 08
2.3.5	Participatory Market Mapping Process undertaken with market chain participants in identified regions in Kenya and Sri Lanka.	GB/PT/RN	Oct 08 – Dec 08.
2.3.6	Analysis and quantification of Market Maps produced and issues developing	SH	Jan 09
2.3.7	Iteration of Maps with market stakeholders and further surveys to quantify maps as far as possible	GB/PT/RN	Feb-Mar 09
2.3.8	Running of a workshop on the market maps produced with key stakeholders plus production and publication of a policy brief on market maps and data so far plus a separate practical guide to the methodology.	SH/GB/DT/RN/TWG	Apr-Jul 09
2.3.9	Modelling and analysis of maps using systems dynamics tools to assess impacts of subsidy, regulation, policy etc with respect to possible interventions and policy issues.	SH	Jan - Jul 09
2.3.10	Consultations with policy makers on maps and models in conjunction with Activity 2.4 (possibly during annual meeting 09)	SH/DT/RN	Jul 09
2.3.11	Testing of maps through project interventions (linked with Activity 2.2) or through looking at effects produced by conducting Market Mapping itself (through Activity 2.1 ongoing surveys)	TWG/RN	Jul 09 – Jun 12
2.3.12	Calibrate, improve and update models in response to field data updates building further confidence in data and policy conclusions.	SH	Jul 09 – Jun 12
2.3.13	Working with PISCES partners in India and Tanzania on	SH/GB/	Jul 09 –

	bioenergy value chain development with respect to their research activities	TWG/RN	Jun 12
2.3.14	Hosting of workshops for policy makers on bioenergy value chains and in particular market mapping and modelling results in conjunction with Activity 2.4. Publish update to bioenergy policy briefs and data with added market modelling and data.	SH/DT/RN	Jul 10
2.3.15	Delivery/organisation of a conference panel on participatory value chain analysis and modelling approaches developed for bioenergy and the results of the case studies in Kenya and Sri Lanka. Produce a corresponding book on the subject.	SH/GB/DT/RN/TWG	Jul 11- Jun 12

Outputs, Consumers and Communication

Outputs	Target Consumers	Date
Video training materials on introduction to market mapping	Partners, development practitioners	Nov 09
Policy Brief including data and analysis on existing bioenergy identified value chains in Kenya and Sri Lanka	Kenyan and Sri Lankan policymakers	Jul 09
Practical Guideline on conducting Participatory Market Mapping with case studies on bioenergy chains	Development practitioners internationally, industry players, producers	Jul 09
Policy brief and analysis from market modelling and feedback plus data and market map update	Kenyan and Sri Lankan policymakers	Jul 10
Book on value chain analysis and incorporation of systems dynamics modelling including 3-4 year case studies now available	Development practitioners internationally, academics, economists	Jun 12

In addition to the publications (a combination of policy briefs, guidelines and books), information will be disseminated via websites. There will also be a number of workshops and conference dissemination routes as noted in the workplan both as host of specialised meetings and panel participants in larger international conferences.

Capacity Building

Capacity building activities in the research team planned in order to undertake the work include:

- An internal PAC training to be held on 27th November in Nairobi
- A markets training and workshop in Nairobi on 29th November for the whole consortium
- Market modelling methods and

The team also plans that the following capacity building activities will be given BY the research activity team:

- The markets training and workshop in Nairobi on 29th November will also be open to relevant policymakers and stakeholders in East Africa under the umbrella of the Research-Into-Use cross cutting theme.

- Workshop for policymakers in Kenya and Sri Lanka in Jul 09 on the bioenergy market mapping results, data and analysis.
- Follow-up workshop for policymakers in Kenya and Sri Lanka in Jul 10 updating on market chain developments and quantitative understanding developed through modelling
- Arranging or participating in a conference panel explaining the methods and models developed in 2011.

Personnel Requirements

Staff Member	Role in the Activity
Steven Hunt	RT leader and Systems Dynamics specialist
Greg Beeton	Support on market mapping development).
Alison Griffith	Market Mapping Specialist / Trainer
Purity Thirimu	Participatory Market Mapping Leader in Kenya
Tameezan wa Gathui	Kenya Project Leader and RT2.1 leader
Ramani Nissanka	Sri Lanka Project Leader
Daniel Theuri	Policy aspects in Kenya and RT2.4 leader
Namiz Musaffer	Policy aspects in Sri Lanka
Namisifu Nyagaboma (UDSM)	UDSM Markets specialist and leading Tanzanian market development process

Equipment Requirements

- Systems Dynamics Modelling Software
- Visio flow diagram software

Expected Impacts

Direct Impacts

- Efficiency and sustainability improved within 3 specific bioenergy market chains delivering rural energy services within Kenya and Sri Lanka
- Access and socio-economic benefits improved for people relying on and involved with these 3 energy supply chains
- Understanding among Kenyan, Sri Lankan, Tanzanian and South Indian policymakers of market approaches with respect to bioenergy rural markets and appropriate tools and approaches

Indirect Impacts

- Development practitioners with access to improved market analysis and modelling tools are able to improve value chains and sustainable bioenergy access elsewhere in the world
- Policymakers, donors and IOs worldwide may be influenced by methods, case studies and results to make changes to the way they support bioenergy development and so improve sustainability and access in their contexts.

Research Theme: 2 – Access and Delivery

Research Activity: 2. 4 – Policy Development Process

Lead Partner: Practical Action Consulting

Objectives

The overall objective is to bring together policy makers, stakeholders and experts to develop a combined methodology on participatory policy dialogue and apply the same in developing bioenergy policy with a focus on Kenya and Sri Lanka.

Research Question(s)

Policies and policymaking methodology are respectively the *end* and the *means* by which PISCES will deliver the ultimate goal. The project will establish an expert working group to develop a consultative and participatory policy methodology to discuss the policy issues and guide policy statements on bioenergy.

The key question of ‘how can policy and institutional set-ups strike a balance between the need for community participation and innovative systems in bio energy service provision development?’ can be broken down into three(or more) questions.

- i) What are the policies needed to accelerate and enhance use of bio-energy in the country?
- ii) What are the policy issues and gaps that need to be addressed by countries to enhance uptake of bioenergy?
- iii) What elements of good policymaking processes are needed to promote the participatory process and institutional set-ups necessary for enhancing access to bioenergy services by poor communities?

Interconnections with other Activities and Research Themes

The policy-working group will interlink with all Research Themes, groups and activities. From a thematic point of view, it is important to establish thematic issues being addressed and what are the policy implications; and on the other hand themes will or may require specific policy elements to meet their thematic goal and ultimately access to bioenergy services.

Research Theme 1 on technology has major policy dimensions that need to be taken note of or addressed through policy interventions. Among these are technology and their uses, capacity needs, and national and sub-regional policy issues in technology transfer.

In Research Theme 2, Access and Delivery thematic interrelationships, one notices the need for the policy-working group to maintain a close linkage with all Research themes and specific activities. Research theme 2.1 will provide an insight on very wide-ranging policy implications. These include current use, access, socioeconomic implications and other competing uses (by default or by implication). RT2.2 is an important policy linkage in terms of rural energy delivery models. The success or failure of other energy types and systems will inform the bioenergy policy. It will be important to keep constant track of innovation and other outcomes of the delivery models, and their policy implications and influences. RT2.3 also has important policy dimensions. Among them are the market mechanisms for guaranteed access, equity in production and use and demand-supply balance. The national policy statements are largely a statement of how we shall address the supply-demand balance and the implications of the use of commodity exchange. This task will regularly feed into and receive information from the other RT2 activities.

Research Theme 3 on climate change – the International discussions and emerging knowledge on climate change linkages with bioenergy production systems, and the implications of land and land use changes, will have far-reaching policy implications and need to be understood at the earliest point.

Among the X-cutting issues, this task will be particularly closely linked with XCA on Research-into-Use and will be linked to the policy case studies to be executed under that task. From XCB SSN, international experience will highlight how other countries are succeeding, we can learn policy lessons from a number of countries, especially from their successes and failures.

Introduction

This activity is the main vehicle through which RT2 in particular, but PISCES in general, will engage policymakers directly in the process of consuming, defining and implementing the research outputs of the project. This policy development process, linking to the RT outputs and through the vehicle of the expert-working group, will endeavour to create a formal policy dialogue working group that will be consultative and engage closely with policy makers and end users. The process is expected to be continuous and highly visible, and will develop mechanisms for identifying stakeholders, process and expected outputs and the modalities for defining consensus and best interests at local and national levels. A mechanism for information exchange, and constant development of policy briefs and instruments of further dialogue and feedback, will be initiated. Of importance is the need to disaggregate the target audience, depending on the intended results or policy development issue.

Methodology and Scope of Work

The methodology proposed for this research theme is a consultative and participatory policy dialogue approach with the process lead and moderated by PAC and ACTS. Stakeholder workshops, briefing sessions, consultative forums and commutation products will be used. It is envisaged that a minimum of four stakeholder workshops will be held.

Workplan

#	Description	Lead	Timing
2.4.1	Policy, Regulations and Standards Literature Review	Daniel Theuri and ACTS	On – Going
2.4.2	Analysis and Identification of stakeholders in Kenya and Sri Lanka	Daniel, ACTS and Namiz	Jan-Mar 08
2.4.3	Identification of experts and Establishment of a policy working group in Kenya meeting.	Daniel, ACTS	Apr-Jun 08
2.4.4	Identify linkages with RIU activities and develop validation mechanisms	Daniel , James, Norman	Apr-Jun 08
2.4.5	Development of thematic headings and programme of action to facilitate the process	Daniel,	Concurrent with the identification of the experts
2.4.6	Review of existing policies and undertaking a GAP analysis	Daniel, ACTS and Namiz	Continuous
2.4.7	Review of regional and international policies as well as in Tanzania, Sri Lanka and India and number of selected case studies – South Africa Biofuel Policy and at least one country in Europe or South America	TBD	Jan 08-Sep 09
2.4.8	Identify specific bioenergy issues and opportunities to provide the basis for formulating policy objectives, strategies and standards.	TBD	Continuous
2.4.9.	Evaluate the consistency with existing national policies and standards	TBD	Continuous
2.4.10	Draft the policy briefs in conjunction with annual meetings of the policy working group	Daniel Theuri and ACTS	After every Policy theme in 2.4.5. and 2.4.6 above
2.4.11	Share the policy briefs with respective national governments.	Daniel Theuri and ACTS	Immediately after release

Outputs, Consumers and Communication

Outputs	Target Consumers
Development of Group working protocols and mechanisms, including regulatory and also identify who will be the conveners and general <i>modus operandi</i>	The working group and key project staff
Policy research papers and inter-group discussion papers	Policy working group, Policy makers, stakeholders
Policy briefs	Policy makers and communication outlets
Information bulletins	End users and communication outlets and general public information.

In order to create harmony in the policy making process, it is important to establish a *modus operandi* indicating really the level of classification needed on any item. The group leader or convener will authorise the communication products in conjunction with the project managers.

Capacity Building

- There is need to provide same basic refresher on methodologies and expectations to the working group. This could be a one-off workshop that can serve as inception work shop for the group.

Personnel Requirements

Staff Member	Role in the Activity
Daniel Theuri	Policy dialogue leader and convener
ACTS lead person	Co convener of the policy working group
Practical Action Consultants	Specific missions, refer to the Work Plan
James Smith	RIU Leader
Norman Clark	RIU Leader
Ramani Nissanka	Sri Lanka project leader
Namiz Musaffer	Sri Lanka policy lead

Expected Impacts

Direct impacts will include:

- Development and agreement of improved policies regarding bioenergy use
- Increased shared understanding amongst policymakers of bioenergy issues and trade offs benefiting all players.
- The government will benefit from a hastened process of addressing a major issue in their energy and developmental agenda.

Indirectly impacts will include:

- All partners in this project will learn lessons in policy processes and issues necessary in refining other policies.

- Poor people in the target countries will benefit from more appropriate and responsive policies regarding bioenergy leading to improved energy access and livelihoods.

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Research Theme: 3 – Climate and Environment
Lead Partner: MS Swaminathan Research Foundation

Objectives

The objectives under research theme 3 are:

- 3.1 Conduct a detailed literature review and study of the existing bioenergy scenario, with an emphasis on climate and environment issues in India
- 3.2 Scoping study on the principal bioenergy crops being cultivated and related issues such as land use, socio-economic factors, market chains, policies associated with the promotion of these crops
- 3.3 Bioenergy provisioning and its effect on climate change and vice versa
- 3.4 The implications of bioenergy development for food, water and environmental security - and whether it can improve energy access for the poor

Research Question(s)/Planned Activities

This theme focuses on climate change and environment related issues with relation to bioenergy. It will consider the interrelationships between variations in climatic patterns and how in turn they affect various factors which can have an impact on the output, availability or usage of different bioenergy sources. With respect to bioenergy crops, it will aim at establishing the relationship between seasonal conditions and the effect these have on the bioenergy crop yield and so make recommendations for more climate change resilient crops. It will involve geophysical modelling pertaining to soil fertility data, land-use patterns, irrigation potential and overall climatic linkages, and how these have an impact on the bioenergy crops and vice versa. It will be supplemented by life-cycle analysis from the cultivation of the crop to the production and use of biofuels. These findings will be compared with the effects of fossil fuels, and whether in the long run they can contribute to mitigating climate change. Linkages will be drawn between the various types of bioenergy sources used abundantly by the poor and how vulnerable the availability or usage of these sources is, with respect to changes in global climatic and local environmental patterns.

The following questions will be asked under the numbered RT3 activities, with a focus on India:

3.1. Baseline study and review of existing bioenergy use, impacts and options

- What are the different types of bioenergy sources being used currently, what are their impacts on the environment and what other options exist?

3.1.1 Biomass study

- What percentage of fuelwood is used in rural areas?
- Depending on access to forests and how the usage varies from one location to another?
- To what extent does it lead to deforestation?

- Health effects arising due to the combustion of wood? (This activity was stressed by the CAG members)
- How the burning of fuelwood affects the air quality and leads to climate change?

3.1.2 Bio wastes/Biogas study

- Which substrate is predominantly used?
- Feasibility of using agricultural residues
- The existing policy on biogas and technology being used
- Limitations in usage, cultural sensitivities, lack of awareness
- and follow –up services

3.1.3 Biofuels study

- Study on the various types of bioenergy crops being cultivated
 - Sugarcane
 - Sorghum
 - Pongamia
 - Jatropha
- Review and analyse as to which crop(s) is best suited to meet the bioenergy needs of India. This will involve a status review of each crop.

Based on the outcome of activity 3.1.4 the scoping study of theme 3.2 will be streamlined to the major bioenergy crop(s)

3.2 Study on the principal bioenergy crops being cultivated and related issues like land - use, socio-economic factors, market mapping, and policies associated with the promotion of these crops.

- 3.2.1 In which areas is the crop(s) is being grown extensively?
- 3.2.2 What farming practices are being adopted?
- 3.2.3 What technologies of oil production from the bioenergy crop are being used?
- 3.2.4 What are existing policies pertaining to the bioenergy crop and are they being followed?
- 3.2.5 What limitations regarding land–use, availability of market, socio-economic factors, grants and subsidies from the Government sector exist?
- 3.2.6 How does the cultivation of the particular bioenergy crop affect the livelihood security of the people in that area?
- 3.2.7 What are the direct or indirect impacts on the access to energy by the poor?

3.3 Bioenergy provisioning and its effect on climate change and vice versa

- 3.3.1 What are the existing climatic conditions in different agro-ecological zones where the crop is being cultivated?
- 3.3.2 What are the soil conditions of the selected area, availability of water, seasonal variations and how do they affect the growth of the crop?

3.3.3 What are the climate data patterns and models, local level geophysical data on fertility, land use, water table and how these are affected by the growth of bioenergy crops?

3.3.4 What is the Well to wheels/house Life Cycle Emissions output of the bioenergy crop and what are the overall implications it has in mitigating climate change by reducing emissions?

3.3.5 How do biofuels compare to fossil fuels against the above measures?

3.4 The implications of bioenergy development on food security and whether it can improve the access of energy to the poor

3.4.1 Does the cultivation of bioenergy crops lead to food and water security issues?

3.4.2 Who benefits from bioenergy, whether it is corporate driven and do the poor farmers benefit? How equitable is the distribution of benefits?

3.4.3 How does the promotion of bioenergy crops improve the access of energy to the poor and enhance their livelihoods?

3.4.4 How the outcome of the various activities can play a role in acting as valuable inputs to policy makers?

Interconnections with other Activities and Research Themes

Activity 3.1 involves resource mapping and is linked with the baseline data collection that will be carried out in Kenya, Sri Lanka and Tanzania.

Based on the outcome of activity 3.1, wherein the various bioenergy crops have been analysed, some pointers will be developed in terms of viable crop(s) that are suited to meet the energy demands and further study will be carried out. Information on available technologies for oil production will be exchanged between MSSRF and UDSM. Hands on experience from PAC in market mapping and socio-economic analysis will be utilised. Insights gained from this activity will be interlinked to the RT1 Technology and RT2 Access and Delivery themes.

Activity 3.3 deals with climate change related issues. It will aim at establishing the relationship between the seasonal conditions and the effect it has on the bioenergy crop yield. It is linked to activity 3.1 and 3.2. Training is required on the methodology of LCA and how to carry out climatic modelling.

Activity 3.4 shall deal with the overall issues of bioenergy and how it can adversely affect food and water security and is linked to 3.1, 3.2 and 3.3.

Introduction

India is a large country and is home to people of different cultures and practices and there are huge variations in landscape and climatic patterns. Due to escalating oil prices, insufficient native reserves of coal and oil, socio-economic factors and environmental concern, the government is promoting the use of bioenergy to meet the energy demands of India.

There is a large potential to promote bioenergy and up to today majority of the rural population depends on fuelwood to meet their energy needs. Despite previous efforts by the Government, many of the available options of bioenergy have not been promoted or exploited to their full potential. Based on background research conducted thus far, inputs from the inception meeting and keeping in mind the given mandate, theme 3 involves a detailed study of bioenergy status and available options in India. It will be followed up by a scoping study and field analysis of the appropriate bioenergy crop(s) and other factors such as land-use, technology, socio-economic factors, market mapping and policies.

The major impetus will be on climate change and environment. This will encompass analysing the climatic conditions of selected agro-ecological zones, establishing data patterns relating to soil fertility, availability of water and how it affects the bioenergy crops, and vice versa. It will be complemented with life cycle analysis and modelling, together with a comparative review of biofuels versus fossil fuels.

Holistically, the entire study will aim to establish the relationship between bioenergy and climate change and how in turn it can contribute to improve the livelihood of the poor and can cater to their energy needs.

Methodology and Scope of Work

The planned activities will be implemented through desk studies coupled with field level analysis. It will involve energy auditing along with climatic and geophysical modelling studies. Surveys will be carried out encompassing group and individual interviews. Consultations with different stakeholders, especially with policymakers at state level, technocrats, corporate community, farmers, community organisations and research institutions will be the mainstay of the methodological approach. Quantitative techniques will be employed as required. The focus will be on mapping of market potential, examining socio-economic constraints and scoping of suitable pilot projects.

Workplan

#	Description	Lead	Timing
3.1.1	Biomass study - Literature study, field studies, collection of primary data, surveys, modelling studies	Nambi, Shishusri	Jan 08-May08
3.1.2	Biowastes/Biogas study - Collection of primary and secondary data, review of existing policies, field and plant visits, surveys	Isaac, Shishusri	Jan 08-Jun08
3.1.3	Biofuels study - Literature study, surveys and interviews, field level analysis, workshops	Isaac, Shishusri	Jan 08-Jun08
3.2.1	Identification of the growing areas where the crop(s) is being grown extensively - this activity is dependent on the outcome of activity theme 3.1. Literature study combined with field level assessment	Shishusri, New Researcher	Jul 08-Aug08
3.2.2.	Analysis of farming practices being adopted - Field	Isaac, New	Aug08-

	level studies, workshops	Researcher	Oct08
3.2.3	Study of the technology of oil production from the bioenergy crop - Workshops, literature study, scientific research, pilot project studies	Nambi, Shishusri	Jul 08-Oct08
3.2.4	Review of existing policies pertaining to the bioenergy crop - Literature study, stakeholder consultation	Shishusri	Aug08-Oct08
3.2.5	Analysis of limitations regarding land–use, availability of market, socio-economic factors, grants and subsidies from the Government sector - Literature study, collection of primary data, scientific research, workshops, village knowledge centres	Nambi, Isaac, Shishusri	Aug08-Aug11
3.2.6	Analysis of livelihoods security impacts that the cultivation of the particular bioenergy crop bring to the people in that area - Field studies, ICT, village knowledge centres, surveys	Isaac, Shishusri, New Researcher	Nov08-Aug11
3.2.7	Analysis on access to energy by the poor (directly or indirectly) - Field studies, ICT, village knowledge centres, surveys	Nambi, Shishusri, New researcher	Jan09-May12
3.3.1	Analysis of the climatic conditions in different agro-ecological zones where the crop is being cultivated - Literature study, field level analysis, scientific research	Isaac, New Researcher	Nov 08-Nov 09
3.3.2	Conduct a study on the soil conditions of the selected area, availability of water, seasonal variations and how it affects the growth of the crop. - Geophysical modelling, collection of primary and secondary data, scientific research, field studies	Isaac, New Researcher	Nov08-Nov09
3.3.3	Establish climate data patterns and models , local level geophysical data on fertility, land use, water table and how these are affected by the growth of bioenergy crops - Agro-economic analysis coupled with climatic and geo-physical modelling, this activity is dependent on activity 3.3.2. Scientific research, literature study, collection of primary data	Nambi, Isaac, New Researcher	Nov09-Nov10
3.3.4	Well to wheels/house analysis of the bioenergy crop and see the overall implications it has in mitigating climate change by reducing emissions - Literature study, LCA analysis, modelling, scientific research	Shishusri, New Researcher	Nov08-Nov 11
3.3.5	Comparison of biofuels vs. fossil fuels - Collection of primary and secondary data, field level analysis, surveys.	Isaac, Shishusri	Apr11-Oct 11
3.4.1	Analyse of food and water security issues of bioenergy crops - Literature study, field studies, surveys, collection of primary data, workshops	Nambi, Isaac, New Researcher	Feb09-Apr12
3.4.2	Benefits Equity assessment , whether it is corporate driven and do the poor farmers benefit, men and women - Stakeholder consultations, surveys, research analysis	Nambi, Shishusri, New Researcher	Jun 11-May12
3.4.3	Energy Access and livelihoods impact analysis - Stakeholder consultations, surveys, research analysis	Nambi, Isaac,	Nov08-May12

		Shishusri,	
3.4.4	Policy Development and influencing process - Stakeholder consultations, surveys, research analysis	Nambi, Isaac, Shishusri	Dec10- May12

Outputs, Consumers and Communication

Outputs	Target Consumers	Date
Bioenergy resource map	Development practitioners, Research Institutions, NGOs, Industry players	June 2008
Policy brief and country survey data design pertaining to bioenergy crops	Government officials, NGOs & CBOs,	June 2008
Technology inputs, market potential and socio-economic factors	Development practitioners, Industry players, Research institutes, NGOs & CBOs	Aug 2011
Data pattern and tools with respect to modelling based on Climate and Environment	Government officials especially to the MoEF, Development practitioners, Stakeholders	Nov 2010
Report on the comparative study between biofuels and fossil fuels	Research Institutes, NGOS , Oil companies	Oct 2011
Detailed information about the various shortcoming and issues encountered and tools of analysis	Development practitioners, CBOs, Policy makers	Aug 2011
Pointers, case study results of how bioenergy enhances the access of energy to the poor	Policy makers, Stakeholders	May 2012

There will also be position papers, documented workshops, journal issues, side events at international meetings, reports and inputs to national discussions on relevant topics.

Capacity Building

Activity 3.1 involves conducting a study on the various available options of bioenergy in India. It encompasses various activities and training will be required in energy auditing and understanding the local environmental implications of bioenergy options.

In this activity, modelling study will be done on the appropriate bioenergy crop(s) and will involve various issues like land-use, socio-economic factors, market potential and existing policies. The team in India would like to gain experience about market mapping and socio-economic analysis from PAC.

Activity 3.3 deals with climate change related issues. It will aim at establishing the relationship between the seasonal conditions and the effect it has on the bioenergy crop yield. This activity will involve geophysical modelling pertaining to soil fertility data, land-use patterns, irrigation

potential and overall climatic linkages and how it has an impact on the bioenergy crop and vice versa. It shall further be supplemented by conducting life-cycle analyses from the cultivation of the crop to the production and usage of biofuel. These findings will be compared with the effects of fossil fuels and whether in the long run it can mitigate climate change. This activity is linked with all the other activities since data from the other activities will serve as additional inputs for this activity. Training is required on the methodology of LCA and how to carry out climatic modelling.

MSSRF's experience in the South- South exchange process is wide and focused, leading to a variety of knowledge sharing and partnership building experiences. The South-South exchange process is designed to help bridge the knowledge adaptation gap by leveraging local and global knowledge to bring expertise to help enhance client capacity in the focus area. The proposed South-South-North exchange process under the research consortia will give an insight into the various bioenergy related technologies, experiences, and social/cultural ramifications.

The vision of the Village Knowledge Centres (VKC) is to harness the power of ICT in the knowledge, skill, economic and social empowerment of rural families. MSSRF is one of the pioneering agencies, with more than a decade of rich experience, and has demonstrated success in using ICT for rural development. The knowledge centres envisioned under the research consortia would promote "Energy Literacy" and would help in adding value to the available information in terms of promoting appropriate bio-energy crops and related technologies, access and delivery, socio- economic factors and energy conservation measures.

Personnel Requirement

Staff Member	Role in the Activity
Dr. A.A Nambi	Research theme leader, Social scientist, Climate change specialist, will monitor the overall activities
Dr. Isaac Manuel	Agronomist, involved in agro-ecological zone studies, crop studies, establishing growth pattern linkages
Shishusri Pradhan	Bioenergy mapping, policy innovations, market mapping, LCA analysis, technology studies
Sunder Vadivelu	Office administration
To be recruited	Energy specialist
To be recruited	2 Research assistants

Equipment Requirement

- 3 Laptops for field work, with software to carry out modelling studies and having slopes decision system (a software programme that provides insights on how best to manage a site vulnerable to climate change)
- Digital camera for field work
- 1 GPS hand set

Expected Impacts

Direct Impacts

- Aid decision/policy makers in understanding environment – climate change – bioenergy linkages.
- Provide insights on possible best practices, management options for bioenergy promotion and climate mitigation.
- Aid understanding of the substantial role of bioenergy in the national energy balance.
- Identify pathways for a flexible management framework to address bioenergy implications on agriculture and rural development.
- Case studies on novel biomass and bioenergy systems.

Indirect impacts

- Detailed adaptation choices under bioenergy management regimes across agro-ecological zones.
- Disseminate knowledge on biomass based climate mitigation, and promote 'energy literacy' through information kiosks/Village Knowledge Centres
- Fostering institutional networking, interested collaborations and common views of key bioenergy related technical and methodological issues.



Cross-Cutting Theme: A - Research Into Use

Led by: University of Edinburgh and the African Centre of Technology Studies

Objectives

“To ensure that a research into use perspective is mainstreamed through all activities and improve knowledge regarding bioenergy research and provision and innovation systems approaches”

Research Questions

The main research questions that will guide activities under the ‘research into use’ theme are:

- What role can innovation systems thinking play in aiding the development of better bioenergy policy, access and technological approaches?
- What innovation policies, platforms and structures can be developed to generate innovation pathways with regard to bioenergy in partner countries?
- How can we best analyse consortium and associated activities to document best practices and insights to aid the policy-making process?
- In what ways can thinking regarding innovation systems and research into use improve multidisciplinary and contextualised ways of working within the consortium and the broader bioenergy community?

Interconnections with other Activities and Research Themes

The Research into use theme cuts across all partners and partner activities. As developing more appropriate and stronger bioenergy policy lies at the heart of virtually all RPC activities research into use will play a key role in providing a conceptual platform into the process of developing better policy. In addition the research into use theme will feed into the capacity building theme in order to enable people to make use of research into use and innovation system perspectives in terms of developing their own research and policy activities. The theme will initially be organised around building capacity and knowledge regarding research into use but it is envisaged this will develop into an interactive and iterative research strand of its own as RPC and partner activities develop. This will encourage continuous reflection of the likely and intended impacts of research activities as an element of M&E and to ensure maximum impact of all activities.

Introduction

Research into use and innovation systems perspectives are gaining weight as important tools in developing more appropriate policy, more appropriate technological solutions to development problems, and localised and sustainable dissemination pathways for technologies and solutions to problems. Given the focus on the RPC on technological and knowledge issues, and how to develop policy to best translate these issues into appropriate solutions regarding energy provision, access and use on the one hand, and the expertise of various RPC members to utilise research into use and innovation systems perspectives on the other the RPC is well placed to develop research into use as a core cross-cutting theme within the consortium.

Methodology and Scope of Work

The scope of work for the research into use theme will initially be organised around three sets of activities that we envisage will merge into one integrated set of activities over time:

1. A series of capacity building activities will be developed to build RPC members' awareness and understanding of research into use and innovation systems perspectives and tools
2. An interactive research programme will be developed to document research into use best practice within the RPC and across the bioenergy sector more broadly
3. A series of dissemination activities will be organised around maximising impact from research into use activities.

Capacity building activities will include, but not be limited to, a series of carefully targeted short courses, workshops and executive training programmes for RPC members and members of the broader bioenergy community in each partner country; the development of methodological training courses and workshops; the development of training materials, case studies and literature; individual mentorship, advice and discussion with research into use team members; feedback regarding research into use and innovation systems perspectives on RPC activities.

The interactive research programme will be developed with three goals in mind. Firstly, to inculcate research into use perspectives within partner research activities in order to improve the applicability, insight and impact of RPC work. Secondly, to develop a means of documenting best practice within the bioenergy policymaking sector. Thirdly, to further develop insights into research into use and innovation systems thinking with regard to development policy and bioenergy policy in particular.

Dedicated research into use dissemination activities will be organised around maximising impact from RPC cross-cutting theme activities. We will target a range of stakeholder through appropriate use of meetings, workshops, presentations, and the production of papers, books, policy briefs and other materials. We will build on our existing strong links with the research into use and innovation systems research and policy communities.

Workplan

Description	Lead	Timing
<p>Research into use capacity building and training</p> <ul style="list-style-type: none"> • One day initial workshop • One week 'bioenergy and innovation' workshops (Nairobi initially but then undertaken in partner countries as demand arises) • One day methodological training course on market mapping (others to be developed) • The development of a series of bioenergy case studies to highlight RIU and innovation systems approaches and perspectives • The development of more formal training materials such as pamphlets, documents, manuals or possible also via web delivery (such as webCT) • Workshops and other activities to reflect back on and refine the theme's research activities • Will feed into expert working group activities (research activity 2.4) <p><i>Note much of this work will integrate with the capacity-building cross-cutting theme</i></p>	<p>JS, NC, SN</p>	<p>Oct 2007 Nov 2007 Mar-Apr 2008</p> <p>Then periodically as needs and circumstances dictate</p>

<p>Cross-cutting, interactive research programme <i>Will build on capacity-building and training activities outlined above and develop alongside other research activities</i></p> <ul style="list-style-type: none"> • Document and develop a series of case studies regarding: <ol style="list-style-type: none"> 1) Bioenergy policy development 2) Bioenergy access issues 3) Bioenergy technological development • Mainstream innovation systems thinking into RPC research in partner countries (with respect to activities such as research activity 1.2 (Bioenergy appliances); research activity 2.2 (Research into bioenergy delivery models); and research activity 2.3 (Mapping bioenergy market chains); and develop analyses of these interactions, insights and impacts • Through a synthesising process develop theoretical, practical and policy insights from the above activities as the broad outcomes and outputs for this theme 	<p>JS, NC, SN</p>	<p>Currently developing research programme (to be implemented alongside other RPC research activities)</p> <p>Will begin spring 2008</p>
<p>Monitoring and Evaluation Component</p> <ul style="list-style-type: none"> • Contribution to broader M&E activities in order to ensure as far as possible that RPC research activities have as wide an impact as possible [this work cuts across other activities such as interactive research, M&E activities, communication and dissemination] 	<p>JS, NC</p>	<p>Ongoing during life of RPC</p>

Outputs, Consumers and Communication; and Expected Impacts

Outputs	Target Consumers	Date
Training courses; executive training; methodological training	RPC members; Individuals and institutions dealing with bioenergy	Continuous
Documentation of appropriate case studies	Research institutions; Stakeholders in bioenergy; Policymakers (local and international)	Periodically
Publication of policy briefs, case study insights and other short notes (on the website and in hard copy)	Policymakers, Regulatory Bodies, Government Ministries, Private Sector, Academics, NGOs	2009 onwards
Conference presentations, proceedings, targeted workshops, meetings with policymakers	Academics, Policymakers, Key decision makers with regard bioenergy	2009 onwards
Peer-reviewed journal articles, book chapters, monographs, edited volumes	Academics and policymakers	2009 onwards

Expected Impacts

- PISCES will play a key role in developing knowledge on bioenergy and research into use



- PISCES will develop operational in-house and external capacity to utilise and develop appropriate research into use tools and methodologies
- PISCES will develop a high-quality and targeted series of outputs to disseminate knowledge on research into use
- PISCES will play a role in promoting research into use and innovation systems as tools to develop more appropriate and nuanced bioenergy policy
- Stakeholders and policymaker decision-making is improved based on availability of knowledge and materials developed by this cross-cutting theme

Personnel Requirements

It is envisaged that all Consortium members will be involved in the research into use theme to a greater or lesser extent, as the targets of training and later as interactive researchers (ideally both). The staff list highlights the key individuals involved in organising this cross-cutting theme. Each will apportion a significant part of their PISCES time to the research into use theme.

Staff Member	Role in the Activity
James Smith (UoE)	Theme coordination, capacity-building, research
Norman Clark (ACTS)	Capacity-building, research
Serah Nderitu (ACTS)	Capacity-building and research support



Cross Cutting Theme: B - South–South–North Exchange

Lead Partner: ACTS

Objectives

Ensure maximum South –South –North information exchange and benefit from that exchange within, from and into the PISCES Research.

Research Question(s)

How can PISCES most effectively replicate best practice and share this with as many stakeholders as possible. Example of sub-questions that will guide the consortium include –

- What tools will facilitate information exchange on bioenergy?
- How can we best utilise existing networks, initiatives and institutions dealing with bioenergy for information exchange?
- What information is critical for policy-making and implementation in the field of bioenergy initiatives, and how can this be shared between different regions?
- How can we evaluate the transferability of knowledge or practises between one country/region and another?
- How will the information produced be disseminated?

Interconnections with other Activities and Research Themes

The consortium is made up of S-S-N partners. This learning process cuts across all the thematic areas but is particularly closely linked with the Capacity Building Cross-Cutting Theme C. It will serve as an information tool for policy makers and partners and will have elements in all RT activities. In particular the Capitalisation of International Experience which falls under this task will provide reference case studies to the research themes by touching on all elements of the international cases relevant to the PISCES research.

Introduction

The consortium partners, through both their previous work and their work in the inception phase, have identified gaps in bioenergy knowledge from community to policy making levels, both nationally and internationally. This information has yet to be utilized for the benefit of mutual learning at the international level. This activity will identify and develop effective ways of transferring knowledge and experience between partners and regions.

As a cross-cutting theme, SSN will also keep stakeholders informed, ensuring that lessons learned and knowledge generated is replicated rather than duplicated.

Methodology and Scope of Work

A range of tools will be used and further developed including the following:

- Conferences, use of partners web page to share information
- Partnership with existing bioenergy networks and initiatives that can be used for information exchange
- Word of mouth via appropriate forums through the consortia to various stakeholders

- Literature review of strategies adopted elsewhere
- Identifying networks with similar modes of working and sharing information
- Workshops to share information and experience between southern partners and partners visits to each other country for information exchange
- Collection of international experience through masters projects
- Organizing conference/s in Asia/Africa calling for papers on relevant topics (as a information collecting/reviewing exercise, in addition to general objective of information sharing) with ACTS/UOE moderation
- Detailed case studies of a few selected cases (energy access needs, supply chain, technology options, technology selected, delivery mechanisms, level of benefit (to immediate beneficiaries, to overall energy scenario, national economy/energy security perspective) and other socio-economic implications etc:
 - It is intended that the above list will grow and adapt over the course of the programme as new examples come onto the international radar.

Workplan

#	Description	Lead	Timing
Bi	Identification and development of a methodology and modalities for South-South-North exchange, in consultation with project partners, associated institutions, & other external partners including policymakers.	UOE & ACTS	Jan 08-Sept 08
Bii	Implementation of internal information exchange techniques e.g. project collaborative webspace on Sharepoint; structured Skype conference calling; issue-based working groups etc.	UOE& ACTS	Jan 08-Jun 012
Biii	<p>Study of the identified international examples:</p> <p>Case studies proposed under SSN <u>within</u> the study area</p> <ul style="list-style-type: none"> • Successful adoption of improved fuelwood stoves – Sri Lanka • Usage of improved stoves in Kenya (if the supply chain of the charcoal to be studied, this will supplement to that activity as well, identifying the whole issue, further comparative study could be done with the Sri Lankan case) • Use of bioresources for power in village electrification / small scale industries in India. <p>Case studies proposed under SSN <u>outside</u> the study Area</p> <ul style="list-style-type: none"> • Brazil – Bioethanol (energy access, livelihoods and biodiversity impacts of bioenergy production) • Malaysia/Indonesia – Bio diesel (environmental and climate change impacts of palm oil production) • Mexico – Corn and Bioethanol (Impacts of biofuel production on food prices and trade aspects) • Mali and Malawi – Jatropha (advanced stage in Jatropha production for rural energy access) • China – biogas (widespread uptake of biogas digesters) 	UOE & ACTS	Jan 08-Sept 10
Biv	Conducting of additional international experience studies on topics as they develop	UOE/AC TS	Sep 10-Jun12

Outputs, Consumers and Communication

Outputs	Target Consumers	Date
Case Studies and policy briefs on Bio energy status based country case studies	Institutions dealing with bioenergy, Government Ministries, Parliamentarians, Private sector, Consumers (farmers), CBOs	Continuous
Web site information	Research institutions and stakeholders in bioenergy	Continuous
Edited volume of international experience based on studies, conferences etc	Institutions of Higher Learning Regulatory Bodies, Government Ministries, Private Sector	2010
Conference proceedings, literature reviewed and masters project	Partners and stakeholders in bioenergy	2011
Sharepoint information	Consortium partners	Continuous
Thesis and other publications	Universities and stakeholders in energy sector in Asia, E Africa	Annually

Capacity Building

The Capacity Building programme described in (XC C) will be the main vehicle for exchange off SSN information, knowledge and experience within the Consortium, and between partners and other stakeholders at both local and international levels.

A proportion of each partner's travel budget has been "ring-fenced" to ensure that exchanges are made between regions on a regular basis; and SSN will be a "permanent agenda item" of such exchanges.

Personnel Requirements

Staff Member	Role in the Activity
Joseph Nyangon	Web update and Management
Joan, Judi, Norman, Harrison, Mary	Workshops for information dissemination
Communications Working Group	Ensure SSN learning is communicated outside the consortium effectively.
Colin Pritchard	Supervise masters students
Steven Hunt/Practical Action IT Unit	Administer & provide the Sharepoint web teamspace

SSN is an integral part of each partner's activity, including (but not restricted to) their capacity-building and communication programmes. As such it does not have a separate budget line however it is a responsibility shared by all partners and researchers. A proportion of the time allocation to the personnel named above will however be devoted specifically to SSN development.

Expected Impacts

- PISCES research work is as high quality and well-informed as possible



- Research knowledge generated within the consortium is effectively shared and built on
- Stakeholders and policymaker decision-making is improved based on availability of most relevant and best practice information.

DRAFT

Cross-cutting Theme: C - Capacity Building

Led by: University of Edinburgh

Objectives

“To strengthen the capacity of partners and stakeholders to develop and utilise knowledge”.

Supplementary objective: Utilising the capacities of partners, associate institutions and allied organisations, to develop the skills, insights and operational experience of Consortium members and stakeholders.

Research Question

The CB programme will in particular address “gaps” in knowledge (summarised in the “Knowledge gaps” section) and meet capacity needs identified by PISCES staff and for the wider stakeholder community as targeted by the Research Themes and Country Programmes.

Interconnections with other Activities and Research Themes

The capacity to research and to produce improved policy is a key pillar for the achievement of PISCES objectives as laid out in the Logframe. This includes the experience, skills and training required for partners and associates to carry out the research, communication and implementation tasks across all activities. The workplan below illustrates the range of expertise available and offered, as well as early identified needs of PISCES staff. Other needs will appear as the programme develops. The Consortium is well-equipped to meet many of these from internal resources (capacity building between partners) and from Associate Institutions.

Introduction

Capacity building (CB) is as much about developing shared understanding and professionalism as it is about building experience and academic achievement. It should help Consortium members and stakeholders to translate their expertise into policy and practice now and in the future. We will build capacity of stakeholders as a matter of course through our research activities and working relationships, not just in trainings.

Methodology and Scope of Work

The principles of Capacity Building accepted by all partners are:

1. Utilise all of the resources of the partners
2. Don't get on a plane without *articulating* the CB benefits of your journey
3. Always seek dual/multiple CB benefits from your journeys

Specific Capacity Building tools include: Seminars, conferences, specific training opportunities, technical and site visits, visiting scholar, MSc and PhD programmes and research exchanges. Participants include staff/students at partner and Associate Institutions, and other stakeholders such as local energy suppliers, market participants, etc., in countries where PISCES operates. Providers include: staff at Consortium, partner and Associate Institutions; consultants providing specific CB activities.

We have a Sharepoint diary listing future requirements and offers, and an open record of completed events/courses.

Workplan

Description	Lead	Timing
CB and Training offered by PISCES partners: (referring principally at this point to year 1).		(yr/mth/wk/d)
UoE: <ul style="list-style-type: none"> - Taught MSc, MSc by Research, PhD, in a wide range of subjects: including specific training and possibly followed by working experience under the Scottish Government's Fresh Talent Initiative: see Edinburgh's capacity-building leaflet appended. - visiting scholars programme - practical skills workshops tailored to needs - production and field trialling of questionnaires eliciting local energy technology needs and priorities - Transfer of equity and economic analysis methodologies 	CP, JS CP MSc student TM	Oct 08 & subsequently 12-36m/3-6m for visitors. 1-2w for workshops Dec 07 2008, poss with Makerere Post- 2.1&2.3
ACTS: <ul style="list-style-type: none"> - ACTS Institute courses are held on a regular basis, and include the RIU workshop, "Innovations Systems in Energy Policy for African Development", 26-30 November 2007. 	NC, JW JS	Throughout
MSSRF: <ul style="list-style-type: none"> - Training related to bioprospecting of bioenergy crops, using propagation techniques such as tissue culture and other biotechnology. - Exposure and training in the use and establishment of Village Resource Centres and Village Knowledge Centres (South-South Exchange Travelling Workshops could be undertaken). - Exposure to Biovillage and Ecotechnology based enterprises supported by the Foundation and run by the Women's Self Help Groups. 	AN	Possibly in association with the meeting of partners in Chennai planned for Oct 08
PA: <ul style="list-style-type: none"> - Rural Electrification through micro-hydro: conference held in Sri Lanka August 2007 - Exchanges and field studies in association with PA's Africa and South Asia offices. - Bioenergy Market Mapping training, in Nairobi. - Monitoring & Evaluation training course. - Monitoring & Evaluation Training (in Chennai) - Design, development of bioenergy SE research methodology (in Chennai) - Video show on focus group discussions; share information about bioenergy initiatives in other regions 	RN TWG, RN, SH project managers; research target groups	Courses of up to 1 wk, on demand Nov 07 Jan 08 (5d) Sep 08 (1d) Sep 08 (1/2 d) On demand (4d)
UDSM: <ul style="list-style-type: none"> - Short course on operation and implications of CDM. - Bioenergy value chain results, data and analysis. - Market chain developments and quantitative understanding 	JK Ken&SL policy- makers	July 09 July 10 in 2011

<p>developed through modelling</p> <ul style="list-style-type: none"> - Conference panel explaining the methods and models developed - Briefings for/with bioenergy implementation schemes in PA(K), <p>UDSM (TDTC).</p> <ul style="list-style-type: none"> - User training on operating a biodiesel plant - Artisan training on making a biodiesel plant - MSc and PhD programmes (sandwich programme Tz-UoE). - Attachments to the Technology Development and Transfer Centre 	<p>Ditto</p> <p>UDSM</p> <p>JK</p> <p>AT</p> <p>AT</p> <p>JK/CLP</p> <p>AT</p>	<p>2008 on</p> <p>t.b.a.</p> <p>On demand</p> <p>On demand</p> <p>Commencing</p> <p>08</p>
<p>Training requested by partners to enable Research Theme Activities.</p> <p>UoE:</p> <ul style="list-style-type: none"> - RIU, and market mapping - Distance management of projects; Climate change and human rights; Small-scale gasification - Participatory rural appraisal - SPSS, equity and economic analysis - M&E <p>ACTS:</p> <ul style="list-style-type: none"> - Market mapping - SPSS; Equity and economic data collection and analysis training - Refresher course on communications - GIS course <p>MSSRF:</p> <ul style="list-style-type: none"> - Training in modelling and how climatic modelling is conducted - Bioenergy and Environment Modelling - Energy Audit, Life Cycle Analysis and Environmental Impact Assessment <p>PA:</p> <ul style="list-style-type: none"> - Rural Electrification through micro-hydro conference (in SL) - Bioenergy Market Mapping training (in Nairobi) - Monitoring & Evaluation training - SPSS data entry and analysis - GIS Mapping training - Systems Dynamics modelling - Bioenergy conferences <p>UDSM:</p> <ul style="list-style-type: none"> - research, development and design of appliances and engines - Training in molecular analyses (Protein) - Attendance at conferences/workshops on biofuels <ul style="list-style-type: none"> Profiting From Jatropha: Expanding its Potential as Sustainable Renewable Energy' (Indonesia) 5th International Biofuels Conference (New Delhi) Bioenergy: Challenges and Opportunities (Portugal) 	<p>For</p> <p>TM</p> <p>CP</p> <p>CP</p> <p>TM</p> <p>TM</p> <p>SN</p> <p>SK, JK</p> <p>HM</p> <p>SK</p> <p>All staff</p> <p>SP</p> <p>Several staff</p> <p>TWG, other PA staff & partners</p> <p>UDSM research</p> <p>Moshi</p> <p>Nyomora, Maroko</p> <p>Attendees</p> <p>t.b.c.</p>	<p>Date</p> <p>Nov 07 (5d)</p> <p>Oct 07 (3d)</p> <p>Dec 07</p> <p>t.b.a.</p> <p>t.b.a.</p> <p>Nov 07 (1d)</p> <p>t.b.a.</p> <p>t.b.a.</p> <p>Oct 07 (5d)</p> <p>t.b.a.</p> <p>part of PhD programme?</p> <p>July 07 (5d)</p> <p>Nov 07 (1d)</p> <p>Jan 08 (5d)</p> <p>Jan 08 (5-10d)</p> <p>Mar 08 (5d)</p> <p>Ongoing</p> <p>UoE/MSSRF</p> <p>23-24 Jan 08</p> <p>7-8 Feb 08</p> <p>6-9 Apr 08</p> <p>27-29 May 08</p> <p>3-5 Jun 08</p>

World BioEnergy 2008 (Sweden) Bioenergy Conference and Exhibition (Canada)		
<i>* Note that these are immediate identified needs. Other needs will appear as the programme develops. The Consortium is well-equipped to meet many of these from internal resources.</i>		

Outputs, Consumers and Communication; and Expected Impacts

See “Objectives” and “Indicators” above. Refer also to Communication Strategy. Opportunities will be posted on Sharepoint, on the PISCES website and in allied networks such as HEDON, REEEP, GBEP. Outputs include course materials, textbooks, training packages.

Personnel Requirements

It is envisaged that all Consortium members will be involved in CB to a greater or lesser extent, as providers or recipients (and ideally both). Outside inputs will be sought as necessary. The staff list below is that for the lead institution in this activity.

Staff Member	Role in the Activity
Colin Pritchard, Senior Research Fellow	Course coordination. Placements in Science and Engineering; co-funding applications
James Smith, Senior Lecturer	Placements in Humanities and Social Science; visiting fellowships
Tom Molony, Research Fellow	Register of training needs, opportunities and courses offered.



Cross Cutting Theme: D – Equity

Lead Partner: UOE/ACTS

Objective

“Ensuring that equity is promoted in policy recommendations.”

To achieve this objective, equity sensitivity is to be taken into account throughout the activities of the RPC research themes. Gender equity is a key objective in this respect, but the RPC recognises that equity also encompasses other factors that can lead to people being marginalised, such as age, ethnicity and—crucial to PISCES—poverty.

The aim of PISCES is therefore inextricably bound to the objective of this key cross-cutting tie: to influence policy so that the poor have better and more equitable access to energy.

Research Question(s)

Equity has been mainstreamed in the research process to help identify how different members can be better represented in, and engage more effectively with, the decision making process—with the ultimate aim of ensuring that the most marginalised are represented in our policy recommendations.

The research questions are covered during the collection of information on existing surveys, publications and baseline surveys (below) in Kenya, Tanzania, India and Sri Lanka.

Interconnections with other Activities and Research Themes

Given the centrality in PISCES of equitable energy access for the poor, it is clear that equity cannot be regarded as a discrete entity within the programme. In order to inform our policy recommendations, this document outlines how we will address questions that relate to equity throughout the research process and activities.

Introduction

DFID states in its (2002) ‘Energy for the Poor’ document that, “Equity of access to basic energy services for cooking, space heating and lighting, like access to water, could be considered a human right. The rights-based agenda highlights inclusion of poor people, their participation in decision-making about their development, and the responsibility of government, as well as the poor, to fulfil obligations.”

The RPC recognises that the provision, access and delivery of energy services and the effect they have on livelihoods are different for men and women, and for the poor. This is well known at a very general level. What is less well known is how this applies to the specifics of the different geographical and thematic contexts. To these ends, the methodology for each RT will address a gender sensitive and pro-poor approach in every location where research takes place.

Methodology and Scope of Work

A stakeholder review is intended to cover all communities covered by PISCES and identify and consult marginalised groups—especially the poor—and adopt a gender-sensitive mindset when interacting with them. Wa Gathui and her colleagues at Practical Action have initial mapping of

stakeholders for Kenya, and they are in contact with Energy for Sustainable Development Africa (ESDA), who are conducting an economic and market analysis for GTZ's Kenya National Biofuels Study. UDSM are to compile a stakeholder analysis for Tanzania with support from Molony, while Nissanka is to compile for Sri Lanka and MSSRF will conduct this under their Activity 3.1.

Methods of data collection for the national baseline surveys will primarily take the form of questionnaires, semi-structured interviews and focus groups. To assist this, wa Gathui has created a socio-economic design framework that will initially be carried out in Kenya and Sri Lanka during RT2. It will also feature during the baseline surveys conducted during RTs 1.4.1 & 1.4.6, and 3.1 & 3.2 (Value chain mapping, and Bioresource mapping, respectively).

Molony will work with wa Gathui to build in an equity dimension throughout the framework, and will then consult with RT partners to draft questions that relate to equity under each item listed in the baseline table under 6.ii (i.e. *in addition* to Item 7 on 'Social issues, including gender').

To take Item 1 ('Energy Services') of the baseline table as an example, national baseline surveys will seek to consult individuals and groups from marginalised communities on: accessible energy types, applications, appliances, main fuels and alternatives, fuel collection (labour/times), energy costs, and so on. This approach of mainstreaming equity into each item of the national baseline surveys is designed to better ensure that perspectives are gathered from the mouths of those marginalised people whose daily lives can be affected by the difficulties of the energy services they depend on. It also helps to ensure that national baseline surveys are not unduly influenced by those more powerful informants who can claim to be able to speak for others but who may not be in the best position to understand the situation of the marginalised (and who may have their own local agendas that seek to serve their self-interests).

Molony will be involved in data collection in all countries to ensure that there is continuity in the approach to Equity in data collection across the partner countries. He will closely follow the progress of the initial research in Kenya and Sri Lanka and will help UDSM to apply the lessons learnt to the Tanzania baseline survey. He will also assist with transferring the methodologies to India for their baseline surveys. The advice of RT leaders and their local partners will be sought to ensure that the methodologies take due consideration of local contexts.

No limitations to the research in terms of place and subject are envisaged at this stage. There is a possibility that in some locations cultural norms make it difficult for women to be interviewed. Local researchers will be sensitised to this prior to data collection and, where required, asked to facilitate access to marginalised groups. In general surveys will be targeted in the areas in which interventions or more detailed research under the Research Themes will be undertaken.

Workplan

#	Description	Lead	Timing
D.1	Inclusion of equity throughout socio-economic design framework (created by wa Gathui for Kenya and Sri Lanka)	Molony, wa Gathui	Present-14/12/07
D.2	National stakeholder reviews and compilation of initial sample to be covered in national baseline surveys (desk study for Molony and Kariuki)	Country partners, Molony, Kariuki (with Sengendo)	Present-31/03/08
D.3	Literature review of equity knowledge gaps, focussing on	Molony, Kariuki,	07/01/08-

	local-level particulars; inclusion of gaps into socio-economic design framework questions	in consultation with country partners	31/01/08
D.4	Sharing with partners, and finalisation, of socio-economic design framework (including initial sample and suggested equity research questions) for comment on suitability to local contexts	Molony, Kariuki, country partners	01/02/08-29/02/08
D.5	Kenya and Sri Lanka national baseline survey data collection, including data collection pilots and training of local researcher assistants	PA (with local partners), Molony, Kariuki	01/04/08-31/07/07
D.6	India national baseline survey data collection, including data collection pilots and training of local research assistants	MSSRF (with local partners), Molony	05/01/08-30/06/08
D.7	Tanzania national baseline survey data collection, including data collection pilots and training of local research assistants	UDSM (with local partners), Molony	[t.b.d. with UDSM. Ideally from 05/08]
D.8	Transfer of equity and socio-economic analysis methodologies	Molony, Kariuki, Kirui	Course date t.b.d.
D.9	GIS mapping of national baseline survey equity data	Kirui	Post receipt of raw data
D.10	Submission of country baseline research report with section addressing discussion of equity and economic analysis, recommendations, and appendix of raw data	Country partners, Molony	End Sep 08
D.11	Analysis of national baseline survey data for brief report and academic paper on equity issues	Molony	Post receipt of raw data
D.12	Incorporation of national baseline survey findings, including equity findings, into RPC policy recommendations.	Molony, Smith, country partners	Ongoing post Oct 2008

Outputs, Consumers and Communication

We aim for the adoption of the research outputs to show how best to mitigate adverse effects for all sections of society. More specifically, we seek to provide ways of incorporating a pro-poor and gender sensitive approach into energy and development policies, and how to include better representation of these large and important groups in decision-making processes. This will be expressed in country-level and RPC-wide policy recommendations given in the PISCES publications (as indicated in the Communication Strategy). The baseline research report and all other reports produced by the project that cover socio-economic data will therefore be required to have a section on equity in their findings and recommendations.

Verifiable indicator (OVI):

Policies adopted or influenced by research outcomes clearly display gender and pro-poor components.

Means of Verification (MOV):

Key phrases relating to gender and an emphasis on the poor in analysis of transcripts of statements, policies and standards.

Outputs	Target Consumers	Date
List of in-country stakeholder contacts	Internal PISCES, external as required (and to be made available on website where permission granted from individual stakeholders)	31/03/08, updated as grows
Country baseline research reports with section addressing equity issues and recommendations	Internal PISCES, NGOs and other interested stakeholders as required	Ongoing 2008-2012
GIS map of national baseline survey equity data	Internal PISCES, NGOs and other interested stakeholders as required	-
Report and academic paper on equity issues	Academics, practitioners, policymakers	Ongoing 2009-2012
Policy briefs	Policymakers (in-country local and national, regional, international, DFID)	Ongoing 2009-2012

Capacity Building

Requirements for Capacity Building in the PISCES team in order to do the research activity:

- Socio-economic (especially equity) data collection and analysis training (Kariuki, Kirui, Molony, others as required)
- Monitoring and Evaluation training (Kariuki, Kirui, Molony, others as required: 5 days, 01/08)
- National level Innovation Systems analysis course (Kariuki, Kirui, Molony, others as required: date t.b.c. by JS)
- GIS training (Kirui: 07-11/10/07)

The capacity building activities planned to be given by the research activity team to stakeholders and partners:

- Transfer of equity and economic analysis methodologies (Kariuki, Kirui, Molony)

Personnel Requirements

The RPC will be sensitive to cultural norms when conducting research with women in societies where they are often marginalised, and recognises the importance of having a gender balanced research team. When possible, women will undertake the equity analysis where it involves interaction with women stakeholders. Advice on gender issues will be sought from the Executive Director, Professor Wakhungu, who has served as Director in the Women in the Sciences and Engineering (WISE) Institute at Penn State University and was “designated energy expert” for the United Nations Commission of Science and Technology for Development (Gender Working Group).

Staff Member	Role in the Activity
Tom Molony, Research Fellow, UoE	Equity lead, Socio-economic research
Joan Kariuki, Research Fellow, ACTS	Socio-economic research
RT partner country baseline researchers	Socio-economic research

Shadrack Kirui, Intern, ACTS	GIS component of equity and economic analysis
May Sengendo, ENERGIA	Compilation of Uganda stakeholder contacts; Gender policy recommendations
Lydia Muchiri, PA Kenya	Gender specialist

Equipment Requirements

Data analysis software (e.g., SSPS/Nvivo) x2

Expected Impacts

Direct impacts

The most direct impact of a focus on equity will come about through reaching our objective of ensuring that equity is promoted in policy recommendations.

This is potentially limited, of course, by the degree to which policymakers are open to adopting pro-poor and gender sensitive policy during the lifetime of the RPC. PISCES have a comparative advantage here. ACTS is closely linked to civil society organisations and government ministries in a number of African countries. Other partners have valuable tools and experience on how to engage policy makers and influence decisions in Africa, India and Sri Lanka. For example, PA, who have a track record in participatory research and in socio-economic analysis, are working with the University of Makerere in an EU project looking at how to mainstream gender into energy policy in 12 African countries.

To take gender equality and women's empowerment (MDG 3) as an example, the widespread adoption of the RPC's outputs has a potential to offer a direct contribution to change by:

- freeing women's time from survival activities such as gathering firewood and other domestic labour, allowing opportunities for income generation;
- giving women the opportunity to gain control of new technologies within the household, reducing exposure to indoor air pollution and improving health;
- lighting streets to improve women's safety; and
- providing lighting for home studying and the possibility of holding evening classes.

Indirect impacts

The widespread adoption of our outputs could also provide opportunities for poorer social groups more generally, where small increases in energy consumption are often associated with dramatic improvements in quality of life. At the local level, modern energy services help to improve health and education, and provide the energy required for creating businesses and jobs, turning locally available resources into productive economic assets. At the national level, energy services facilitate economic development by underpinning industrial growth and providing access to global markets and trade.

Because the environmental and social benefits and costs of bioenergy are not priced in the market, leaving bioenergy development entirely to the private sector and the market will lead to levels and types of bioenergy production that fail to achieve the best environmental and social outcomes. To ensure better outcomes, the public sector has important roles to play.