

SIXTH FRAMEWORK PROGRAMME
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PRIORITY A.2.3.: Managing Arid and Semi-arid Ecosystems



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**ANNEX 2-1: Proceedings of COMPETE Roundtables in Ouagadougou,
Burkina Faso, on 27-29 November 2007**

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COMPETE

**Competence Platform on Energy Crop and Agroforestry
Systems for Arid and Semi-arid Ecosystems - Africa**

Responsible Partner:

Utrecht University, Dept. Science, Technology and Society, Copernicus Institute,
Heidelberglaan 2, 3584 CS Utrecht, The Netherlands

Project Co-ordinator:

WIP, Sylvesterstrasse 2, 81369 Munich, Germany

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Specific Measures in Support of International Cooperation (INCO-CT-2006-032448).



COMPETE contributions to the International Conference

'Stakes and Perspectives for Biofuels in Africa'

27- 29 November 2007, Ouagadougou, Burkina Faso

organised by 2iE, CIRAD

Summary of COMPETE Round Table Discussions



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CONTENT

- 1. Background**
- 2. Organisation of Round Table 1
'Biofuels for transport versus electricity production'**
- 3. Organisation of Round Table 4
'Competition between non-food and food uses: stakes and risks'**
- 4. Other contributions of COMPETE members to the conference**
- 5. The COMPETE project**

Introduction

The COMPETE project organised two Round Tables in the framework of the International Conference: 'Stakes and Perspectives of Biofuels for Africa' (27-29 November 2007). This conference on the utilization of biofuels in Africa was organised by 2iE (Institute for Water and Environmental Engineering of the African Institute of Sciences and Technology) and CIRAD (French Agricultural Research Centre for International Development).

In this document the outcomes of the two Round Tables on 'Biofuels for transport versus electricity production' and 'Competition between non-food and food uses: stakes and risks' are briefly presented, and conclusions and recommendations on the issues discussed are summarised.

This document was prepared in the framework of the project COMPETE (Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems - Africa), co-funded by the European Commission in the 6th Framework Programme – Specific Measures in Support of International Cooperation (Contract No. INCO-CT-2006-032448).

Editing and Reporting:

Dr. Veronika Dornburg
Utrecht University, Dept. Science, Technology and Society, The Netherlands
Tel.: +31 30 253 7640
E-mail: V.Dornburg@uu.nl

Dr. Rainer Janssen
WIP – Renewable Energies, Germany
Tel.: +49 89 72012743
E-mail: rainer.janssen@wip-munich.de

1. Background

At the beginning of the 21st Century, Africa contains some of the poorest and most technologically backward regions in the world, with civil conflicts, diseases and droughts further exacerbating the lives of the poor. Over the previous decades their quality of life has continued declining, and currently about 52% of the sub-Saharan Africans live on less than US\$ 1 per day and about 43% of the urban residents have incomes below US\$ 47 per month. The poor economic performance and the shortage of work does not allow for a level of income that is sufficient for obtaining modern, clean energy supplies. Hence, about 80% of the African population is still dependent on charcoal and firewood to fulfil their energy needs.

At the same time, as global fossil energy resources become constrained and prices of fossil energy increase, modern bioenergy is emerging as a major potential resource to supply the energy services currently provided by these fossil fuels. The arid and semi-arid regions of Africa have, in theory, very large areas of land (and associated water and human resources) 'available' for bioenergy production. However, the production of biomass for energy on the scales necessary to supply significant shares of national and global energy provision, will result in very substantial impacts (positive and negative) on the ecosystems and socio-economic circumstances in these target regions. The protection of biodiversity, rural livelihoods, food security and energy security are critical considerations in any analysis of the potential for sustainable bioenergy provision in arid and semi-arid regions of Africa.

The objective of the 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 establishes a platform for discussion, knowledge exchange, policy and methodology development on the provision of modern bioenergy for the sustainable and optimal usage of these special ecosystems.

In the framework of the International Conference 'Stakes and Perspectives of Biofuels for Africa', the COMPETE network organised two round tables that deal with the question on how to use bioenergy in Africa in a sustainable way in order to provide rural development and energy security at the same time benefiting local ecosystems and food security. Round Table 1 discusses whether the provision of electricity and/or transportation fuel is best suited to these objectives, while Round Table 4 investigates the implications of bioenergy production and use on food security.

Round Table 1: Biofuels for transport versus electricity production

Chair: Senator Christian DEMUYNCK,
Senator of Seine-Saint-Denis, France

Co-Chair : Patrice TRANCHANT,
Director of 'Agence de l'AFD', Ouagadougou

Secretary : Rainer JANSSEN,
coordinator of COMPETE, WIP, Germany



Speakers:

- *Benefits of electrification in rural Africa*
Ibrahim TOGOLA, Mali-Folkecenter, Mali
- *Electrification experiences from Guinea Bissau*
Mamadou DIANKA, PRBE, Burkina Faso
- *Sustainability of using biomass for transportation*
Jeremy WOODS, Imperial College London, UK

Participants:

- Touria Dafrallah, ENDA-TM, Senegal
- Fiona ZUZARTE, SEI, Sweden
- Hamimu HONGO, FELISA Co Ltd, Tanzania

Organisation:

Veronika Dornburg, Utrecht University, The Netherlands

Rainer Janssen, WIP, Germany

Introduction

Transportation fuels are a main target of biofuel use in Europe and a main cause of growing oil consumption in Africa. Using biofuels for local transportation needs might contribute to independence from global crude oil markets. At the same time, it remains that most rural areas are not electrified in Africa. Biofuels might help rural electrification and contribute to electricity supplies in urban areas.

The best strategy for using biomass, however, depends on local conditions as well as main objectives of biomass use. Important questions in this context are:

- What are the advantages and disadvantages of using biomass for transportation fuels, electricity production or other uses?
- Can biomass add to improving the living conditions of the rural population and to the sustainable economic development of the whole country and what are the trade-offs between the different uses?

Summary of presentations

The benefits of local small to medium scale biofuel production for rural electrification were highlighted by the COMPETE partner **Dr. Ibrahim Togola**, Mali Folkecenter (MFC). In Mali, as in other oil importing countries of sub-Saharan Africa, the high and increasing oil prices are putting a heavy burden on the country's economy with especially negative consequences for the development of rural areas.

Since 1999, the rural village of Garalo had requested the support of MFC to realise electrification of the community. Based on its experience in establishing rural energy service centres (7 kW generators running on *Jatropha* oil) and in the conversion of cars to operate on *Jatropha* oil, MFC Nyetaa set-up a Public Private Partnership (PPP) involving the following main stakeholders:

- Municipality of Garalo
- MFC Nyetaa, coordinator of the project in Mali
- ACCESS SARL, an innovative Malian energy service company responsible for electricity sales
- FACT Foundation, an international group of biofuel specialists based in Netherlands providing technical support
- SHGW Foundation, based in Netherlands providing financial support for *Jatropha* plantations
- AMADER, Malian Agency for Rural Electrification & Domestic Energy, providing WB/GoM/GEF subsidies to finance electricity generation equipment

The electrification project for the Garalo area (Garalo Bagani Yelen project) is developed in close cooperation with the local communities, and it is based on the cultivation of 1000 ha of *Jatropha* by farmers of the region (up to date 550 ha of *Jatropha* plantations have already been established). 3 generators with a capacity of 100 kW each run on the locally produced *Jatropha* oil, and a newly established mini-grid supplies electricity to the end users.



Community meeting in Garalo village

Since diesel is replaced by *Jatropha*, the considerable money to pay for fuel goes to local people for collecting seed instead of paying for fossil fuel imports. Thereby, value is added at village level, and the local economy is stimulated. Furthermore, it is expected that access to electricity will act as a catalyst for local SME creation and thus contribute to sustainable and environmentally friendly development in this rural region of Mali.

Mr. Mamadou Dianka, COMPETE Partner and coordinator of the UEMOA Biomass Energy Regional Programme, presented a rural electrification programme in the West African country of Guinea Bissau. Based on cashew nuts as raw material, the main agricultural commodity in the country involving about 60% of the population, an integrated programme for industrial development and the production of electricity is implemented with financial support from the World Bank.



Cashew plantation in Guinea Bissau

The programme is fully in line with the objectives for National Biomass Plans of the UEMOA Commission, namely poverty reduction, energy access, rural development and a sustainable environment.

A cornerstone of the programme is the use of residues from the cashew nut production in a boiler to create an annual electricity production of 80 million kWh. The produced electricity will be provided to rural households as well as used together with generated high-pressure steam to up-grade cashew nuts to products such as cakes and beverage, thereby increasing the value added in the country.

It is expected that the programme will provide employment to 15000 people (of which 3000 work in the electricity sector), thereby significantly contributing to sustainable development based on local resources in Guinea Bissau.

In order to address the important topic of potential conflict between biofuel production for electricity or transport fuels, **Dr. Jeremy Woods**, COMPETE coordination partner from Imperial College London, highlighted the following basic questions:

- Is Africa fundamentally constrained in its ability to increase biomass production for food, fuel, fibre, environmental services, etc?
- Can we use existing flows of biomass more efficiently?
- What are the likely social, economic and environmental impacts of increase biomass production for energy?
- What are the consequences of increased local supplies of modern energy services?

Today, it is an obvious reality that a major driver for biofuel production is the high oil price causing countries like Tanzania and Senegal to spend about 40% of foreign exchange earnings for the import of oil products. For the transport sector, biofuels constitute the 'next-cheapest' option compared to the cheap oil products of the past. Thus, African countries have to seriously investigate these alternative fuels to supply their transport fuel needs from local resources. Preliminary studies show that an economically viable production of biofuels (bioethanol, biodiesel) is possible in several African countries.

With respect to land availability and potential competition between food and fuel production, Dr. Woods stressed that integration and efficiency gains of agriculture systems (e.g. efficient use of resources through poly-generation) are urgently required to avoid serious future conflicts for resources. However, systems based on good agricultural management practices, including appropriate investment levels, can lead to a significant increase in both fuel and food production in Africa.

Finally, Dr. Woods emphasised the importance of ensuring a truly sustainable production of biofuels based on credible sustainability schemes. Thereby, it is necessary to take a balanced view on 'sustainability' integrating economic, social and environmental aspects. This specifically includes the crucial topic of how it can be ensured that an equitable share of the value created is retained locally and how biofuels can best lead to sustainable economic development in African countries.

In this context the COMPETE project is currently undertaking an initiative to promote an African perspective on economic, social and environmental sustainability, and to provide a voice to African stakeholders within the on-going development of European and global sustainability schemes.

Public discussion

In the public discussion on above keynote presentation the following main issues were raised for consideration:

- Within the transport sector of African countries an integrated approach for improvement is needed, an approach not solely focussing of biofuels as alternative for fossil fuels.
- Priority should be given to satisfy local needs over export. This includes energy provision for the household sector, a sector which is often overlooked.
- Production of food and energy will provide incentives for African farmers to increase their production.
- Small-scale systems are better suited for rural electricity production whereas large-scale projects may focus on the production of transport fuels (both for national and for export markets).
- As rural electricity production based on locally available raw materials (such as the initiative in Mali presented by Dr. Togola) is currently more expensive than diesel-based systems, there is a need for supportive government policies. These policies should be motivated by a strengthening of the local economy and a contribution to rural development and poverty alleviation.

Conclusions

The following conclusions and recommendations from Round Table 1 on 'Biofuels for transport versus electricity production' were presented to the plenum of the International Conference: 'Stakes and Perspectives of Biofuels for Africa':

- The production of transport biofuels has the potential to reduce the burden of high and increasing oil prices in several African countries. Priority should be given to meeting local demand over export.
- Additionally, biofuels can be used as efficient source of household energy, reducing the negative impact of Indoor Air Pollution and the stress on diminishing wood fuel resources.
- Advantages of biofuel use for small scale rural electrification projects are the comparatively low level of investment and the integration of biofuel production in existing agricultural structures.

- Biofuel based rural electrification projects can be the best practical and cost effective approach to provide access to electricity in remote regions in community driven initiatives.
- Additionally, biofuels can serve as cost competitive transport fuels for the agricultural sector in rural areas.
- Large scale initiatives for the production of biofuels for transport need to carefully take into account the issues of land tenure, food versus fuel competition and sufficient local revenue generation.
- Biofuels can lead to the mobilisation of investment in the agricultural sector of African countries, thereby improving the production of both food and fuel through integration and efficiency gains.
- Domestic use of transport biofuels requires the development of suitable legislation and regulations (e.g. quality standards, blending requirements).
- Export from African countries should focus on processed biofuels rather than the raw material (feedstock) for national revenue generation.
- The appropriate use of biofuels is influenced by a large variety of factors such as land availability and quality, land tenure, climatic conditions, available infrastructure, logistics as well as the development of local, regional, national and international markets.
- African countries need to elaborate national and sub-regional biomass development plans in order to identify the best possible use of biomass/biofuels.

Finally, the following short, medium, and long term solutions were recommended by Round Table 1 to the plenum of the International Conference: ‘Stakes and Perspectives of Biofuels for Africa’.

Short term Solutions

- Blending of ethanol with gasoline at low blends (5 to 10%); no adaptations of engines and infrastructure required.
- Use of vegetable oil for rural electrification (40% cost reduction with respect to conventional fossil solutions).

Medium term Solutions

- African countries have to develop biofuel legislation and regulations in relation to international politics and standards.
- Development of improved technologies adapted to different feedstock and applications.

Long term Solutions

- Innovative technologies linking the electricity and transport sector and maximizing the efficiency of biomass utilization.

3. Round Table 4: Competition between non-food and food uses: stakes and risks

Chair: Florent D THIES, Director GTZ Ouagadougou

Co-Chair : Jacqueline LORELLE, Conseiller de coopération et d'action culturelle
French Embassy Ouagadougou

Secretary : Veronika Dornburg, Utrecht University, The Netherlands

Speakers:

- *Will the growing demand for biofuels lead to food crisis?*
Charles JUMBE, FANRPAN, Malawi
- *Global land use changes - use of agricultural and other land for biofuel production*
Abigail FALLOT, CIRAD, France
- *Are bioenergy crops different from other cash crops?*
Rainer KRELL, FAO, Italy

Participants:

- Sudipto CHATTERJEE, Winrock, India

Organisation:

Veronika Dornburg, Utrecht University, The Netherlands

Rainer Janssen, WIP, Germany

Introduction

Biofuels are criticized for increasing food prices and leading to food insecurity of the poor. Linkages between biofuels and food, however, are complex. On the one hand, bioenergy crops compete with food crops for land and food production in the South might decline for fuel crops that are used globally. On the other hand, bioenergy crop production might contribute to economic development and rural income. Improved bioenergy production systems might have synergies with food production e.g. by using degraded land or intercropping. However, the following questions remain:

- What are the influences of biofuel developments on global and local food markets?
- Which opportunities exist for improved biomass systems?
- Does the combination of biofuels and food production lead to synergies or competition?

Summary of presentations

1. **Charles Jumbe** from COMPETE partner FANRPAN discussed in his presentation whether biofuels will have a negative impact on food security. First, he highlighted the current discussion in the media that gives the impression of biofuels competing strongly for food resources leading to food insecurity of the poor. The current observed increases in food prices would, therefore, be a consequence of the growing biofuels demand. In contrary, it is also assumed that growing food demands can lead to an increase in agricultural productivity and contribute to poverty alleviation. The observed increase in food prices is partly due to other factors.

Following, he focused the debate on two main issues: the timeframe of developments and the question of possibly lost opportunities for Africa. First, rapid and ambitious introduction schemes of biofuels can be observed in the global context (e.g. Brazil, EU, USA). Africa might be the target area for fast implementation of these schemes and while the consequences of biofuels on food supply remain uncertain, they should not be ignored.

Second, biofuel production can if produced sustainable be an opportunity for Africa in terms of Contract-farming opportunities, small-scale refineries and the reduction of expensive crude oil imports. Not taking part in the development of biofuel production at all, therefore, will lead to Africa missing out on the potential benefits that biofuels can offer.

In conclusion, there is a need for country-specific research and the development of appropriate policies to regulate the growing industry. Especially, the protection of rural dwellers from losing land and the equitable distribution of profits between rural communities & investors deserve attention.

2. **Abigail Fallot** from CIRAD presented an overview of land use and its relation to biofuels and food security. While the introduction of biofuel production could have potential negative impacts on food security and environmental protection, it also presents opportunities for Africa in terms of rural energy supply and increases in agricultural productivity. Land availability for biofuel production depends on land use dynamics and the opportunity costs. Prices, including prices for food crops, cash crops and taxes and subsidies, are main drivers of land use and as such a strictly preferential allocation of land to food production can not be expected.

In terms of using land for energy production and ensuring food security several options at different scales are possible. These include:

- At a small-scale, local production and use of energy crops using marginal land and robust technologies.
- At a medium scale, combination of food crop and diversified cash crop production by the farmer.
- At a large-scale, agro-industrial co-production of food and energy adjusted to commodity prices (sugar and oil e.g.) by an outside investor.

At the medium and large scale lessons from cash crop production in global agricultural commodity markets and from the exploitation of other natural resources (oil, gold...) need to be learned.

3. **Rainer Krell** of the UN Food and Agriculture Organization's (FAO) gave an overview of potential competition and synergies between food and biofuel production. Bioenergy crops can be seen as another cash crop, but the current rapid developments are asking for more in-depth analysis of the risks and benefits of certain biofuel types and crops at different scales and for different beneficiary groups. A main concern of the FAO is how the interest of the poor and food insecure can be duly taken into consideration?

Since bioenergy production is a farming practice, all those efforts of the past that identified certain best practices and farming systems that can serve for reducing poverty still hold true. However, the number of people living in poverty and chronically hungry keeps increasing even without the pressure added from bioenergy. Rainer Krell explains that at the core of the food security versus bioenergy argument is not the competition or choice between one crop (food) and another crop (bioenergy) though either may have preferred environmental or socio-economic impact, but the competition between the interests of the various stakeholders involved in the product chains.

Therefore, technological improvements alone cannot solve the potential threat of bioenergy development for food security. In order to obtain benefits also for the weakest parts of society, social elements have to be brought in that require the opposite of competition, i.e. collaboration. In order to turn excluding competition into beneficial collaborative processes that fairly distribute benefits also to the poor and food insecure, participatory processes need to be added to the normal decision making tools, knowledge and implementation. Moreover, in case of external influences like national or global market prices, different filters need to be created through government support or through the promotion of different food and fuel crop alternatives.

Public discussion

The discussion focused on the issues of competition between food and bioenergy production, the former experiences in Africa with cash crops, the potential impacts of bioenergy production and desirable policies.

It was mentioned that the current debate seems too much focused on competition between food and energy production. The potential for bioenergy production in Africa without endangering food security could be very large and should not be neglected. However, to realize this potential it is necessary to use (potentially large) areas of currently not utilized land and/or to increase agricultural productivity which is still very low in many parts of Africa. Moreover, it should be noticed from examples in other parts of the world (India, Brazil) that the production and use of bioenergy might as well lead to increased food production.

The experiences with cash crop production are important in the African countries. These experiences have been both negative and positive. Negative impacts are the economic dependency on global commodity prices and exchange rates. For example, the decrease of cotton prices in recent years, has led to major problems in many parts of West Africa where cotton has been planted as dominant cash crops. Positive impacts have been the increase in agricultural productivity through the knowledge and structure build up in the cash crop sector. This has led to increases also in the productivity of food production.

The lessons learnt from the production of cash crops should be applied to the implementation of bioenergy production. On the one hand, the production of energy crops could have positive effects on food production, but in order to achieve these positive effects it is needed to ensure that the production of food crops is stimulated by the production of energy crops. On the other hand, flexibility of producing multiple crops that could also be used locally should be stimulated in order to minimize the risk of decreasing energy crop prices on global commodity markets.

It became clear in the discussion that risks of food insecurity as well as the potential for increasing agricultural productivity and food security are both inherent to the development of the bioenergy sector in Africa. The panel and the participants recognized that the relation between bioenergy and food security is a complex issue that depends on many factors such as the rate of changes, the type of feedstocks, the biophysical, and economic conditions in a country and the global market development of fossil fuel, food and commodity prices. Therefore, the net impacts of bioenergy production on energy security on food security will strongly depend on the specific situation in the countries (e.g. cash crop producer, net energy importer, biophysical conditions, etc.).

Currently, objectives of bioenergy development are often not explicit, while clear objectives would clarify the relation to food security and could help to develop adequate bioenergy strategies. Potential objectives are climate change, reduction of fossil fuel imports, rural development, etc. For example, with rising oil prices energy security has become an important issues in many African countries and the production of bioenergy can add to local energy supplies.

Conclusions

The current developments in the bioenergy field in Africa are fast, driven among others by developments in industrialized countries. Risks of food insecurity as well as the potential for increasing agricultural productivity and food security are both inherent to the development of the bioenergy sector in Africa. Therefore, addressing the relation between food security and bioenergy is urgent and should be started immediately.

Policies and regulations to ensure food security while developing bioenergy are needed. These regulations should comprise among others: agriculture, energy security, working conditions, economic development and environmental impacts.

Research on the specific situation in a country or region for specific biomass supply chains is needed before implementing bioenergy programmes. This should include a detailed analysis on the local level (e.g. land use, suitability of soils, social conditions etc.). The positive and negative experiences in the production of cash crops in Africa should be taken into account while developing sustainable biomass production schemes.

4. Other contributions of COMPETE members to the conference

The COMPETE consortium comprises a broad range of partners that contributed to various sessions of the International Conference: 'Stakes and Perspectives of Biofuels for Africa' apart from the Round Tables 1 and 4:

- Raffaella BELLANCA, Eco Ltd., UK
Invited Participant to Round Table 6: Biofuels and Energy equity.
- Rocio DIAZ-CHAVEZ, Imperial College, UK
Invited Participant to Round Table 8: How to ensure the sustainability of biofuels.
- Michael MADJERA, EKD, Germany
The necessity of supportive Frameworks for the Production of Energy Crops in Africa.
Presentation to Round Table 5: Biofuels, energy, policy and legislation
- Veronika Dornburg, Utrecht University, The Netherlands
Biofuels: for what market? Local or international?., Second Plenary Session
- Greg AUSTIN, AGAMA, South Africa
Biofuels/bioenergy and creation of Employment opportunities, Second Plenary Session
- Manadou DIANKA, UEMOA, Burkina Faso
WAEMU policy in the field of biofuels: Achievements and Prospects of PRBE,
Third Plenary Session



COMPETE Participants at the International Conference: 'Stakes and Perspectives of Biofuels for Africa' in Ouagadougou, Burkina Faso

The COMPETE Project



COMPETE Objectives

The Competence Platform on Energy Crop and Agroforestry Systems for Arid and Semi-arid Ecosystems – Africa (COMPETE) will establish a **platform for policy dialogue and capacity building** and identify **pathways for the sustainable provision of bioenergy**

- to improve the quality of life and create alternative means of income for the rural population in Africa
- to aid the preservation of intact ecosystems in arid and semi-arid regions in Africa
- to enhance the equitable exchange of knowledge between EU and developing countries

COMPETE Activities

COMPETE will deliver a matrix of multi-disciplinary and cross-sectoral work-packages

- to evaluate current and future potential for the **sustainable provision of bioenergy** in Africa in comparison to existing land use patterns and technologies
- to facilitate **South-South technology and information exchange** capitalising the world-leading RD&D in bioenergy in the key countries Brazil, Mexico, India, China and Thailand
- to develop **innovative tools for the provision of financing** for national bioenergy programmes and local bioenergy projects, including: carbon credits, bilateral and multi-lateral funding instruments, and the role of international trade
- to develop **practical, targeted and efficient policy mechanisms** for the development of bioenergy systems that enhance local value-added, assist local communities and address gender inequalities
- to establish the **Competence Platform** to ensure effective dissemination and knowledge exchange inside and outside the network

COMPETE Partnership

The COMPETE partnership comprises 20 European and 23 non-European partners - 11 partners from 7 African countries, 3 regional African policy and financing bodies (African Development Bank; Food, Agriculture and Natural Resources Policy Analysis Network of Southern Africa; UEMOA - Biomass Energy Regional Program), 9 partners from Latin America and Asia - and the Food and Agriculture Organisation of the United Nations (FAO).

COMPETE Website: www.compete-bioafrica.net

COMPETE Project Coordination WP7 Coordination - Dissemination

WIP Renewable Energies
Sylvensteinstr. 2
81369 Munich
Germany

Contact: **Dr. Rainer Janssen**
Dominik Rutz

Phone: +49 89 720 12743

Fax: +49 89 720 12791

E-mail: rainer.janssen@wip-munich.de
dominik.rutz@wip-munich.de

Web: www.wip-munich.de

WP1 Coordination – Current Land Use

University of KwaZulu-Natal
School of Environmental Sciences
South Africa

Contact: **Dr. Helen Watson**

E-mail: watsonh@ukzn.ac.za

Web: www.ukzn.ac.za

WP2 Coordination – Improved Land Use

Utrecht University
Dept. Science, Technology and Society
The Netherlands

Contact: **Dr. Andre Faaij**
Dr. Veronika Dornburg

E-mail: A.P.C.Faaij@uu.nl
V.Dornburg@uu.nl

Web: www.chem.uu.nl/nws

WP5 Coordination – Financing

Energy for Sustainable Development
United Kingdom

Contact: **Jessica Abbott**
Stephen Mutimba

E-mail: jessica.abbott@esd.co.uk
smutimba@esda.co.ke

Web: www.esd.co.uk

COMPETE Project Coordination WP3 Coordination - Sustainability

Imperial College London
Centre for Energy Policy and Technology
South Kensington Campus, London, SW7 2AZ
United Kingdom

Contact: **Dr. Jeremy Woods**
Dr. Rocio Diaz-Chavez

Phone: +44 20 7594 7315

Fax: +44 20 7594 9334

E-mail: jeremy.woods@imperial.ac.uk
r.diaz-chavez@imperial.ac.uk

Web: www.imperial.ac.uk

WP4 Coordination – International Cooperation

Winrock International India

Contact: **Sobhanbabu Patragadda**

E-mail: sobhan@winrockindia.org

Web: www.winrockindia.org

Stockholm Environment Institute

Contact: **Francis Johnson**

E-mail: francis.johnson@sei.se

Web: www.sei.se

European Biomass Industry Association

Contact: **Stephane Senechal**

E-mail: eubia@eubia.org

Web: www.eubia.org

WP6 Coordination – Policies

Food, Agriculture and Natural Resources Policy
Analysis Network of Southern Africa
South Africa

Contact: **Douglas Merrey**
Dr. Charles Jumbe

E-mail: d.merrey@cgiar.org
charlesjumbe@bunda.unima.mw

Web: www.fanrpan.org



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