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ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT WORKING PAPER

ENVIRONMENT CLIMATE CHANGE [BIOENERGY] MONITORING AND ASSESSMENT

Small Scale Bioenergy Initiatives

Brief description and preliminary lessons on livelihood impacts from case studies in Asia, Latin America and Africa

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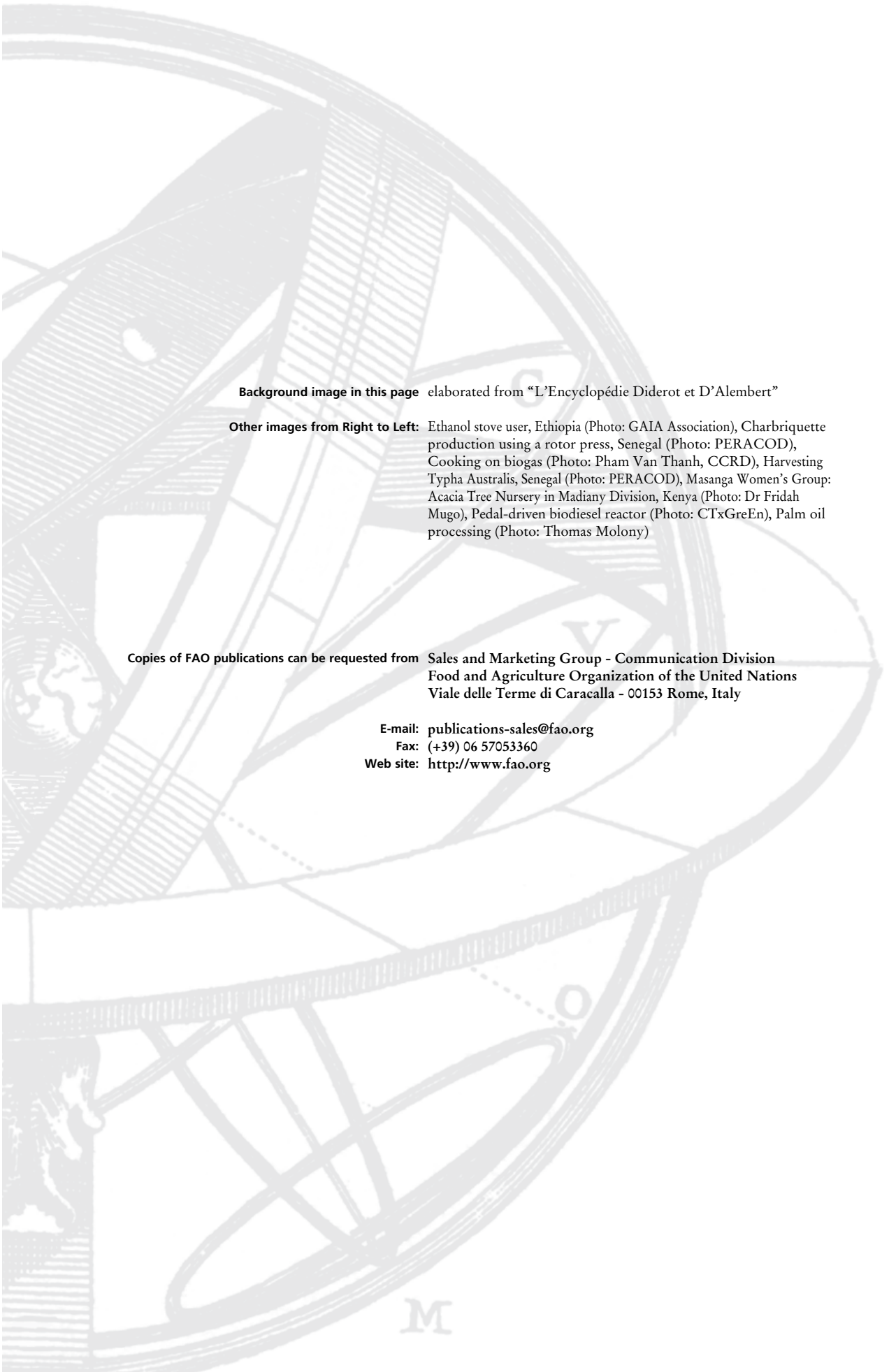

Background image in this page elaborated from "L'Encyclopédie Diderot et D'Alembert"

Other images from Right to Left: Ethanol stove user, Ethiopia (Photo: GAIA Association), Charbriquette production using a rotor press, Senegal (Photo: PERACOD), Cooking on biogas (Photo: Pham Van Thanh, CCRD), Harvesting Typha Australis, Senegal (Photo: PERACOD), Masanga Women's Group: Acacia Tree Nursery in Madiany Division, Kenya (Photo: Dr Fridah Mugo), Pedal-driven biodiesel reactor (Photo: CTxGreEn), Palm oil processing (Photo: Thomas Molony)

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EXECUTIVE SUMMARY

This report is based on a series of 15 international case studies conducted between September and November 2008 under a joint initiative of FAO and the PISCES Energy Research Programme Consortium funded by DFID. The case studies focussed on developing an improved understanding of the linkages between Livelihoods and Small-Scale Bioenergy Initiatives. The study was developed in consultation with the PISCES Consortium Advisory Group (CAG). This is made up of leading international participants in the field of energy and development, including members from the IEA, UNEP, ENERGIA, DFID and FAO, as well as policymakers and research organisations in the PISCES target countries of India, Kenya, Sri Lanka and Tanzania.

The focus of the study was on the impacts that different types of local level Bioenergy initiatives can have on Rural Livelihoods in different contexts in the developing world. Livelihoods are understood as the enhancement of the full range of natural, financial, human, social and physical capitals on a sustainable ongoing basis.

The cases were selected from 12 countries in six regions of Latin America, Africa and Asia, and brief overviews of each case are provided in Chapter 3. They were selected to highlight the use of a range of Bioenergy resources, including natural Bioresources; Bioresidues from existing agricultural, forestry or industrial activities; and purpose grown energy crops, both liquid and solid, commonly known as Biofuels. The initiatives match these resources to a range of energy needs including cooking, mobility, productive uses and electricity for lighting and communication - thereby highlighting the scope of Bioenergy applications. The approach taken also considers the non-energy by-products of production processes where these form, or could form, a significant added benefit in terms of livelihoods, revenues and efficiency.

The case study approach has at its heart a Market Systems perspective, and in particular the use of Market Mapping. This approach enables the identification and illustration of the main Market Actors as well as the crucial Supporting Services and Enabling Environment which contribute to the success or failure of initiatives.

Taking the market map for each initiative as the basis, the project then applied the "4Rs" Framework of Relationships, Rights, Responsibilities and Revenues to the actors in the system. This approach aims to better understand the power dynamics of each case in terms of key issues such as risk, vulnerability, governance and equity.

Following this analysis, the impacts of each initiative on the Livelihoods Assets of the actors in the chain, and the sustainability of these impacts, were assessed and preliminary conclusions drawn.

Tools used in the research included field visits, surveys, existing literature, interviews and workshops, as well as the previous experience of researchers and contributors. In addition

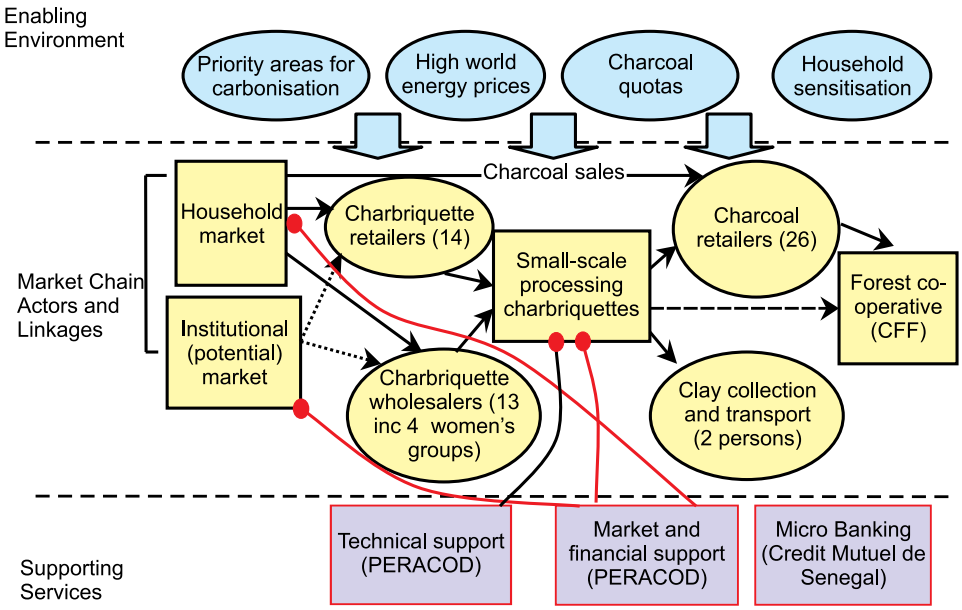

***Figure**: Typical Market Map (from the Senegal Chardust Briquettes' case study showing the three key components in the market model: the key **market chain, actors and linkages** (central band, yellow), the **enabling environment** (top band, blue), and the **supporting services** (bottom band, purple)*

to the initiative leaders, consultees typically included participants, actors and beneficiaries. Details of the methodologies and tools used are provided in Chapter 2.

Chapter 4 of this report provides a comparison and analysis of the cases, drawing out some of their main characteristics and livelihoods impacts, including the following:

- Market Systems – Initiation methods, development strategies, wider linkages, enabling and support requirements.
- Power Dynamics – Leadership, participation, levels of formality, risk distribution, business models, institutional models, land and resource rights, intellectual property.
- Human Capital impacts - Capacity building in agricultural production and processing, entrepreneurship, producer/co-op/community organisation, improved health, reduced indoor air pollution, time saving, skills development and retention.
- Social Capital Impacts - Development of cooperatives, outgrower schemes, producer and consumer groups, collective initiatives for joint action and negotiation.
- Physical Capital Impacts – Production, processing and appliances, equipment, biomass capital.
- Financial Capital Impacts – New income generating activities from underused bioresources, increased revenues from processing of bioresidues, additional agricultural production income in biofuels initiatives.

- Natural Capital Impacts – realisation of bioresidue waste value, management of natural bioresources sustainably (within regrowth capacity), low impact agriculture utilising organic and natural cycles.

A summary is provided in Chapter 5 of preliminary lessons and conclusions which may be drawn from the case studies. It is hoped that these will inform and stimulate debate about the role of small-scale bioenergy projects in contributing to rural livelihoods. The preliminary lessons are summarised as follows:

- Natural resource efficiency is possible in Small-Scale Bioenergy initiatives
- Local and productive energy end-uses develop virtuous circles
- Where fossil energy prices dominate, partial insulation is an option
- Longer term planning and regulation has a crucial role if Small-Scale Bioenergy projects are to succeed
- Flexibility and diversity can also reduce producer risk
- Collaboration in the market chain is key at start up
- Long local market chains spread out the benefits
- Moving Bioenergy resources up the energy ladder adds value
- Any new activity raising demand will raise prices, even those for wastes
- Cases do not appear to show local staple food security to be affected
- Small-Scale Bioenergy initiatives can offer new choices in rural communities

The final section of the main report outlines recommendations for further work, building on the case outlines and preliminary conclusions to elaborate the challenges and opportunities of Small Scale Bioenergy initiatives at the local level more fully. These are:

- Develop sustainability criteria for Small-Scale Bioenergy Initiatives
- Develop more detailed economic analysis for a selection of the cases
- Develop natural resource efficiency and energy balance assessments for a selection of cases
- Work on the incentives and constraints faced by farmers/rural people to adopting improved Bioenergy technologies and practices
- Develop understanding of the cases further from an equity and gender perspective
- Replicate and test the approaches taken in the case studies in other applicable contexts

In addition to the full text of cases provided in Annex 1, a list of authors, contributors and editors is provided in Annex 2, while the full Terms of Reference for the study and the case study template are provided in Annexes 3 and 4.