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| Institution: The University of Edinburgh |
| Unit of Assessment: 23 Sociology |
| 2: Improving Bioenergy Use and Policy in East Africa |
| <p>1. Summary of the impact</p> <p>PISCES (Policy Innovation Systems for Clean Energy Security) is a research consortium that is concerned with sustainable bioenergy in developing countries. PISCES has improved clean energy access and livelihoods via bioenergy for approximately 250,000 people in Kenya, India, Sri Lanka and Tanzania. The University of Edinburgh contribution reported here is that of Molony, whose research has provided evidence for the creation of improved national policy for energy and development in East Africa, for example enhancing local understandings of charcoal regulation in Kenya, contributing towards the development and uptake of renewable energy cookstoves in Tanzania, and helping establish national bioenergy working groups in both Kenya and Tanzania.</p> |
| <p>2. Underpinning research</p> <p>For poor people worldwide, bioenergy (energy from biological sources) is central to both energy access and livelihoods. On current trends, 3 billion people will by 2030 still cook using traditional fuels (such as firewood) and appliances. Without improved appliances or fuel, over 30 million people will have died due to smoke-related diseases as a result. PISCES is a consortium linking Edinburgh University to partners (listed in section 3) in Kenya, India, Sri Lanka and Tanzania. The consortium is working to provide policymakers in those countries with new information and approaches to unlock the potential of bioenergy to improve energy access and livelihoods in poor communities. PISCES is multidisciplinary and includes other researchers at the University of Edinburgh, eg Smith's and Pradhan's (UoA 24) work on South Africa and India respectively.</p> <p>The research of Molony (Research Fellow then Lecturer at the University of Edinburgh since 2005) has concentrated on baseline socio-economic issues, and principally the use of bioenergy resources and technologies in East Africa. He draws on his accumulated knowledge of and expertise about East African societies gained through extensive ethnographic research in the region. His work on mobile phones in Africa (cited multiple times, for example, in UNCTAD's <i>Information Economy Report 2010</i>) has strongly influenced his approach to data collection concerning the use of technologies in East Africa. It has also informed his understanding of the complexities of policymaking at the interface of technology and society and thus fed into his work on bioenergy. Since 2007, Molony's work has focussed on two streams:</p> <ol style="list-style-type: none"> 1. Gathering of baseline data on bioenergy in East Africa 2. Influencing national bioenergy policy in Kenya and Tanzania. <p>Molony's field research has shown both how various bioenergy technologies are used and how existing policy processes influence those who use them. As a member of a consortium working with policymakers, Molony has at times made the strategic decision not to wait for his research to be published but instead to put his energies – informed by research findings – into influencing practice more directly (see Section 4).</p> <p>Baseline field research</p> <p>As part of an FAO (Food and Agriculture Organization of the United Nations) and PISCES study on small-scale bioenergy initiatives in developing countries, Molony (2009) conducted research in Tanzania on FELISA Ltd, a company that produces crude palm oil and biodiesel in Kigoma. This involved the production of a 'market map' (an assessment of the balance of rights, responsibilities and revenue between market actors) and an evaluation of the company's impact on livelihood assets. Also in Tanzania, Molony collected baseline information on appliances and biocrops in Morogoro, Iringa and Mbeya regions, and took part in field research on the 'value chain' connecting biogas producers and consumers in Arusha and Kilimanjaro regions. That field research revealed that wider uptake of biogas is hampered by weaknesses in the processes and linkages among the actors. The biogas market has been distorted by interventions from public institutions and donor projects whose beneficiaries, accustomed to their free support, are reluctant to pay for after-sale services. Many potential users are not aware of the technology and a large section of the market remains unexploited. All these, along with an inadequate policy environment, lack of stakeholder development, missing linkages to finance, and few technicians, render the market unattractive to entrepreneurs who would otherwise have invested in the dissemination of the technology.</p> |

Gender and bioenergy policy

Molony has undertaken fieldwork in Kisumu, Kenya as part of a baseline study on gender issues in the bioenergy arena. Building on his systematic review of research by others, the first-hand research acted as a foundation in his (2011) case for mainstreaming gender into African countries' bioenergy policies. This comes at a time when many developing countries are updating their existing energy strategies and formulating their bioenergy policies to accommodate rises in domestic and external supply and demand for biofuels. He suggests that in the integrated global context of biofuels, the conditions that generate inequality between rich and poor remain unchanged, and he highlights national bioenergy Policy Working Groups (PWGs) as having an important role to play in helping ensure that gender issues are mainstreamed into bioenergy policy within the context of the increasing focus on biofuels.

3. References to the research

Molony, T (2011), Bioenergy Policies in Africa: Mainstreaming Gender amid an Increasing Focus on Biofuels. *Biofuels, Bioproducts and Biorefining*, 5 (3). 330-41, DOI: [10.1002/bbb.293](https://doi.org/10.1002/bbb.293). In REF2.

Molony, T, Smith, J. (2010a), Biofuels, Food Security and Africa. *African Affairs*, 109 (436) 489-98, DOI: [10.1093/afraf/adq019](https://doi.org/10.1093/afraf/adq019).

Molony, T, Smith, J. (2010b), African Biofuels. *BioFuels Journal*, Third quarter. 64, <http://www.bluetoad.com/publication/?i=46400>.

Molony, T, and Smith, J. (2010c), 'Biofuels in Africa: Growing Complexities'. In *Africa Energy Yearbook 2010*. London: EnergyNet. 61-64, available from HEI.

Molony, T, and Smith, J. (2009), 'Sustainable Biofuels Crops and Access in Developing Countries'. PISCES Working Brief no.2. Nairobi: PISCES, http://www.acts.or.ke/dmdocuments/POLICY_BRIEFS/PISCES%20WORKING%20BRIEF1.pdf.

Molony, T (2009), 'Tanzania Palm Oil' in Practical Action Consulting, ed. *Small-Scale Bioenergy Initiatives*, 76-80. Rome: FAO, <http://www.fao.org/docrep/011/aj991e/aj991e00.HTM>.

PISCES consortium partners are the African Centre for Technology Studies (ACTS, Kenya), MS Swaminathan Research Foundation (MSSRF, India), Practical Action Consulting (PAC, Kenya and Sri Lanka), University of Dar es Salaam (UDSM, Tanzania), and University of Edinburgh. PISCES is funded with £4.61m from the UK's Department for International Development (DFID). Funding was initially awarded for five years, beginning in June 2007 until June 2012. In 2011 DFID awarded an extension to the funding for an additional 18 months (from July 2012 until December 2013).

4. Details of the impact

If the global community is to meet the UN Secretary General's goal of providing 'Sustainable Energy for All by 2030', then bioenergy – whether from natural biomass, bioresidues or purpose-grown biofuels – will need to be part of the solution. PISCES has contributed to that solution; Molony's research on energy markets in East Africa has helped inform the improvement of energy delivery and policy in the region.

Collective impact of PISCES (corroboration sources: section 5.1)

Although precise measurement in Global South conditions is very difficult, PISCES estimates that it has improved clean energy access and livelihoods via bioenergy for approximately 250,000 people in Kenya, India, Sri Lanka and Tanzania. It has improved energy access for ~220,000 people, many of whom were previously reliant on energy-inefficient three-stone cooking stoves that burn firewood. The majority of the beneficiaries are in Tanzania, where UDSM subcontracted the production of gasifier stoves to Kiwia & Laustsen Company Ltd., which distributed stoves to 30,000 households in the Arusha region and central regions of Tanzania. Assuming an average household size of six members in Tanzania, the total beneficiaries for this activity are 180,000 individuals. To this figure we add 600 people who were involved in the production and distribution of the gasifier stoves. Smaller interventions also took place with 'Uhai' and 'TERI' stoves in Kenya, and with wood gasifier and ethanol cook stoves in Sri Lanka, bringing the total number of people with improved energy access to ~220,000 people. PISCES has contributed collectively to: ~30,000 people with reduced smoke-related health problems; improved and more equitable livelihoods via bioenergy for 350,000 people (benefitting from additional initiatives that build on the ~220,000 figure); and enhanced adaptive capacity of ~10,000 households in vulnerable communities. This final figure refers to the Community-based Adaptation Programme implemented in Kisumu, Kenya by ACTS, involving the establishment of woodlots and the piloting of energy-saving stoves.

Molony's research has contributed to these collective outcomes via three routes: *The Kenya Charcoal Policy Handbook*; the uptake of bioresidue gasifier stoves in Tanzania; and the bioenergy Policy Working Groups in Kenya and Tanzania.

The Kenya Charcoal Policy Handbook (corroboration sources: section 5.2)

The findings of Molony's baseline socio-economic survey were applied to the production of this Handbook, which the author (wa Gathui) asked Molony to edit. Charcoal regulation is an opaque process in Kenya, and the imposition of illegal taxes is widespread throughout the charcoal market chain, which supplies charcoal to 82% of the urban population and the 34% of rural households. The Handbook uses simple language to sensitise farmers, producers, transporters, vendors and buyers on charcoal regulations. It has been received well by local stakeholders (farmers, vendors) and national stakeholders (Ministry of Energy, Ministry of Forestry and Wildlife) and is being used by local officials (especially in the Kenya Forest Service) to guide their work. A simpler Swahili version was produced and is being disseminated to relevant stakeholders including farmers, vendors, police officers. An abridged pocketbook has also been produced. Together they have contributed towards the empowerment of communities relying on charcoal for their livelihoods, and some members are now able to stand firm against the payment of illegal taxes. As [text removed] of the Kenya Forestry Research Institute puts it, 'vulnerable charcoal traders at the mercy of ignorant or unscrupulous officials can now demonstrate to officials their rights to operate freely in the charcoal business.... while [with the introduction of the handbook some] officials now know what the law says, and they are better placed to operate within the law.' (email, 13 May 2013)

The uptake of bioresidue gasifier stoves (corroboration sources: section 5.3)

In Tanzania, Molony's research on the biogas value chain informed an assessment and economic analysis of the bioresidue gasifier market that contributed to the uptake of bioresidue gasifier stoves in institutions (such as fish markets) and households. As the gasifier project leader, [text removed], puts it: "Molony's research highlighted some of the less celebrated examples of biogas use in Tanzania ... helping me to understand how these users overcome some of the problems they encountered. This was important in allowing me to suggest to the Government how the bioresidue gasifier value chain could be made more efficient – something that is crucial to supporting the sector at the national level. The market is now growing, thereby contributing to reduced fuelwood consumption and smoke-related health problems." (email, 14 February 2013)

Molony's contribution to the baseline information on appliances, feedstock and biocrops was used in the testing of modifiers that informed the development of delivery models – and later a market – for modified plant oils to operate rural stationary engines. From the R&D work of UDSM and Kiwia & Laustsen Co., the gasifier stoves have now entered the market and have received a grant for production of 30,000 units under the trade name of '*Jiko Bomba*'. *Jiko Bomba* uses pellets made of rice husks and jatropha cake, which were identified in Molony's baseline research with [text removed] at the Department of Mechanical and Mining Engineering, UDSM. As [text removed] puts it, "Molony's initial research contributions on bioenergy feedstocks and appliances in various regions in Tanzania was crucial in helping the research team to locate various materials for testing. Without this research we would not have been able to identify locally-available materials, narrow down on the rice husks and jatropha cake, and make the appropriate design modifications to the *Jiko Bomba* stove." (letter, 5 February 2013) The World Bank has now funded collaboration between ACTS and UDSM to promote the market development of the stove.

Bioenergy Policy Working Groups in Kenya and Tanzania (corroboration sources: section 5.4)

Molony worked with Muok (ACTS and PISCES manager) in creating a bioenergy Policy Working Group (PWG) in Kenya (chaired by the Permanent Secretary at Kenya's Ministry of Energy, with membership from government, NGOs, bilateral donors, and business) and a bioenergy PWG in Tanzania (with membership from the Ministry of Energy and Minerals, NGOs and farmers' associations) with Minja and Mwakaje (UDSM). PWGs seek to develop a consultative and participatory policy methodology to discuss policy issues and guide bioenergy policy statements. In the most advanced case, members of the Kenya Policy Working Group were instrumental in the writing of the country's National Biofuel Policy, approved by the Ministry of Energy. Muok was tasked with coordinating the draft policy, and asked Molony to act as reviewer. Under the new Kenya constitution promulgated in 2011, the draft Kenya National Biofuel Policy was integrated into

Impact case study (REF3b)

the draft Kenya Energy Policy 2013, to go for approval by the new Parliament when it reconvenes. Molony chaired the second (March 2010) Tanzania national Bioenergy PWG, comprising government policymakers, academics, the private sector, and NGOs. Based on Molony's argument that PWGs could have an important role in helping ensure that gender issues are mainstreamed into bioenergy policy, representatives with a gender perspective were appointed to the group. To date, gender mainstreaming in bioenergy policy has had limited success in Tanzania – owing, in part, to constraints that Molony (2011) discusses. A significant positive step, however, is the establishment of a dedicated Gender Working Group (GWG).

Contributions to critical public debate about biofuels (corroboration sources: section 5.5)

The wider impact of Molony's work on critical public debate is evidenced by a succession of invitations to him. For example:

- following publications with Smith (2009, 2010a, 2010b and 2010c), Molony and he were invited to provide input to the Nuffield Council for Bioethics report 'New Approaches to Biofuels: Ethical Issues'. Molony, Smith and PISCES are all cited in the report.
- following the April 2011 publication of the Nuffield Report, Molony was invited to present at a seminar convened by Practical Action Consulting UK (13 June 2011). The seminar was attended by bioenergy policymakers including DFID, members of the Consortium Advisory Group, and Eco Ltd/HEDON Household Energy Network.
- Molony was invited to discuss issues in (2010a) in a radio interview for 'The Naked Scientists' entitled 'Balancing Biofuels in African Agriculture' (2 July 2010). The programme reaches up to 6 million listeners across the east of England, and has an international following on the web. The interview was selected for re-broadcast on the South African Broadcasting Corp's 'Channel Africa'.

Note re testimony: [text removed].

5. Sources to corroborate the impact

In case of broken links, PDFs of all weblinks are archived at:

www.wiki.ed.ac.uk/display/REF2014REF3B/UoA+23

5.1 Collective impact: Nov 2012 calculations and spreadsheet based on PISCES in-country partners' on-the-ground estimates of quantitative impacts; letter from [text removed], Univ. of Dar es Salaam, 5 Feb 2013, confirming distribution of 30,000 gasifier stoves by Kiwia & Laustsen Ltd.

Individuals who could be approached for further information on PISCES and its impact:

Officer assigned to PISCES, DFID, London; Cabinet Secretary for Environment, Water and Natural Resources, Government of Kenya (former PISCES Director).

5.2 Kenya charcoal policy: a) Practical Action Consulting East Africa. 2011. *The Kenya Charcoal Policy Handbook*, <http://r4d.dfid.gov.uk/Output/189258/Default.aspx>; and b) *Kijitabu cha Kanuni za Makaa Nchini Kenya*, <http://r4d.dfid.gov.uk/PDF/Outputs/PISCES/Charcoal-pocketbook-swahili.pdf>; c) Practical Action Consulting East Africa. 2010. 'Bioenergy and Poverty in Kenya: Attitudes, Actors and Activities': <http://r4d.dfid.gov.uk/Output/183294/Default.aspx>.

5.3 Bioresidue gasifiers: Letter from Senior Lecturer, Department of Mechanical and Mining Engineering, Univ. of Dar es Salaam, 5 Feb 2013, confirming role of Molony's research.

5.4 Bioenergy PWGs, individuals who could be approached to corroborate: Chair, National PWG Kenya; Chair National PWG, Tanzania.

5.5 Public debate on biofuels: a) Nuffield Council for Bioethics report 'New Approaches to Biofuels: Ethical Issues': <http://www.nuffieldbioethics.org/biofuels-0>; b) 'Balancing Biofuels in African Agriculture' radio interview and podcast: <http://www.thenakedscientists.com/HTML/podcasts/archive/africa/show/2010.07.02/>.

Copies of the following PISCES publications that Molony has contributed to are available at <http://www.dfid.gov.uk/r4d/Project/60510/Default.aspx>: contributor of Tanzania section in Canney Davison, S., 2011, c) 'Liquid Biofuels Strategies and Policies in Selected African Countries', Nairobi: PISCES; reviewer of Clements, R., 2008, 'Scoping Study into the Impacts of Bioenergy Development on Food Security', PISCES Working Brief, Nairobi: PISCES.

In addition to the four listed in sections 5.1 and 5.3, a **further individual** who could corroborate Molony's role in the listed Practical Action outputs is: Energy Consultant, Practical Action Consulting.