INNOVATION & INTELLECTUAL PROPERTY
COLLABORATIVE DYNAMICS IN AFRICA
Editors: Jeremy de Beer, Chris Armstrong, Chidi Oguamanam & Tobias Schonwetter

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Collaborative Dynamics in Africa

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JEREMY DE BEER, CHRIS ARMSTRONG,
CHIDI OGUAMANAM AND TOBIAS SCHONWETTER

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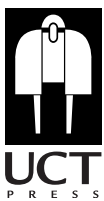

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Preface

This book is among the key outputs of the Open African Innovation Research and Training (Open A.I.R.) Project. Based on case study research in nine African countries, the book examines the recent history and current on-the-ground realities of innovation and intellectual property (IP) in African settings. In doing so, the book reveals complex collaborative dynamics across a range of different countries, sectors and socio-economic contexts, and generates recommendations for how innovation and IP can be married with social and economic development objectives in African settings. This book's sister report, *Knowledge and Innovation in Africa: Scenarios for the Future,* situates the current realities covered in this book within a much longer historical trajectory and multiple potential futures.

Conceived in 2009, established in 2010 and launched in 2011, Open A.I.R. is a pan-African and globally interconnected research and training network, which was established to:

- raise IP awareness in African settings and facilitate critical policy engagement;
- empower a networked, epistemic IP community in Africa;
- identify IP-related innovation bottlenecks and modes of open collaboration; and
- interrogate IP-related innovation metrics, capital and power structures.

Open A.I.R. is financially supported by Canada's International Development Research Centre (IDRC) and Germany's Federal Ministry for Economic Cooperation and Development (BMZ), and collaborates with numerous other organisations and individuals – all of whom are recognised in the Acknowledgements' pages of this book. In addition to the aforementioned case study and foresight research, the Open A.I.R. network engages in a wide range of training, capacity building, outreach and policy engagement activities – both on the African continent and in settings outside the continent where matters of African innovation and IP are engaged. These engagements target external stakeholders capable of changing policies and practices, including:

- innovators, creators and entrepreneurs – individuals and companies;
- business groups such as chambers of commerce and industry associations;
- national, regional and international law-makers and policy-makers;
- issue leaders, such as politicians, judges, professors and practitioners;
- scientific and cultural research and development funding bodies;

- university researchers, administrators and technology transfer officials;
- rights-holders and collective rights management organisations; and
- representatives of indigenous and local communities.

Open A.I.R. is motivated by a vision in which innovation and creativity in Africa are sustainable, properly valued, collaborative, widely accessible and result in benefits that are distributed throughout society. Based on this vision, the network's mission is to better understand how innovation and IP processes work in African settings, how knowledge and technology currently protected by IP can be mobilised, and how IP systems can be harnessed or adapted in a manner that fosters openness-oriented collaborative innovation resulting in just distribution of new knowledge and technology.

This book and the *Scenarios* volume are two parts of a much broader attempt, by Open A.I.R. and other initiatives, to facilitate, in the medium to long term, the emergence of new, pragmatic means of valuing and facilitating innovation and creativity in Africa. Contextually appropriate metrics sensitive to the monitoring of meaningful changes in behaviour around innovation and creativity could be instrumental for promoting African grassroots entrepreneurship, broad-based business development, and a vibrant private sector built on small and medium-sized enterprises (SMEs) with a sustained ability to innovate. And the opportunities for innovation-driven SMEs could also benefit from policy-maker adoption of appropriate metrics when designing the policy and regulatory frameworks necessary to ensure predictable innovation environments for stakeholders.

Open A.I.R.'s core funders, IDRC and BMZ, have provided a framework for Open A.I.R.'s objectives. Open A.I.R. fits within the IDRC's Science and Innovation programme, which supports research and policy engagement in relation to how science, technology and innovation (STI) can be engines of socio-economic development. Within this programme, the Information and Networks (I&N) initiative, which funds the Open A.I.R. Project, aims to better understand the linkages among innovation, creativity, networked collaborations (often enabled via information and communication technologies [ICTs]), and determinants of openness – including IP rights. The IDRC also supported the precursor network to Open A.I.R., the African Copyright and Access to Knowledge (ACA2K) Project, which ran from 2007 to 2011 and generated the nucleus of the expert network now driving Open A.I.R.

BMZ supports Open A.I.R. via Germany's Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), under the GIZ commons@ip – Harnessing the Knowledge Commons for Open Innovation initiative**.** The commons@ip initiative focuses on how IP rights interact with open innovation, the knowledge commons, open licences and collaborative innovation. It is part of the BMZ-

mandated Train for Trade programme, which aims at strengthening the private sector and its constituent bodies in the Southern African Development Community (SADC) region through training and capacity building in export promotion, quality control and promotion of open innovation – as well as through promotion of local and regional economic development and trade.

Open A.I.R.'s training and capacity building components include:

- building the network's capacity – through online platforms, network-wide workshops, research methodology support, scenario-building meetings and thematic seminars;
- awarding Open A.I.R. Fellowships to emerging IP scholars and potential leaders – from Tanzania, Kenya, Uganda, Ethiopia, Cameroon, Nigeria and Egypt;
- exchanging knowledge through Africa-wide and South–South knowledge networking at seminars, workshops and conferences;
- growing awareness among African creators, innovators, entrepreneurs and policy-makers of openness-oriented approaches to innovation and IP matters in Africa; and
- teaching at African tertiary educational institutions, including development of a replicable, open course curriculum on IP law and development.

Because of the immense geographic size of the African continent, and unique logistical challenges of African intra-continental travel, ICTs have been instrumental in empowering the research network's "community of practice". Open A.I.R. has an offline presence in 14 African countries and in multiple countries outside the continent. Online, the network includes hundreds of individuals and institutions throughout Africa and from all corners of the globe, linked via a suite of online networking and social-media tools. The Open A.I.R. community of practice advances a culture of multidirectional exchange among African innovative and creative communities and external actors – with a view to sustainably empowering local communities and SMEs. Network members promote cross-fertilisation of ideas via original thinking and partnerships with national and international institutions, scholars, funding agencies, civil society organisations and other willing partners. Those wishing to join the community can visit http://www.openair.org.za/join.

Acknowledgements

True to its emphasis on "collaborative dynamics", this book is the product of the collective energy of dozens of people and institutions in many countries, all of whom work within the Open African Innovation Research and Training (Open A.I.R.) network. Open A.I.R. currently has core network members and institutions in 14 African countries, spanning North Africa (Egypt, Tunisia), West Africa (Senegal, Ghana, Nigeria, Cameroon), East Africa (Ethiopia, Uganda, Kenya, Tanzania) and southern Africa (Malawi, Mozambique, Botswana and South Africa). Other network members and institutions are in Canada, the United States, the United Kingdom, Germany and France. These members are, in turn, linked – via online and offline interactions – to a broader Open A.I.R. network of hundreds of individuals and institutions, including people and entities in Brazil, India, Malaysia, Australia, Switzerland and the Netherlands. The network receives generous financial support from Canada's International Development Research Centre (IDRC) and Germany's Federal Ministry for Economic Cooperation and Development (BMZ).

Each of the editors and authors of this volume is part of, and collaboratively exchanges knowledge and expertise with, this large network, and we the editors, and each of the contributors, are profiled in "About the Editors" and "About the Contributors" sections of this book and on the Open A.I.R. website's Team page, http://www.openair.org.za/content/open-air-team. On this Team page, one can also find the names and contact details of Open A.I.R. Fellows and other network members and institutions. The network is also accessible via its social media platforms, featured at http://www.openair.org.za/join

Open A.I.R.'s administrative hub is the IP Unit in the University of Cape Town Faculty of Law, where Project Manager Nan Warner and Administrator Phyllis Webb are the key operational drivers. Warner and Webb receive management support from two of the editors of this book (and the co-Principal Investigators of the Open A.I.R. Project), UCT IP Unit Director Tobias Schonwetter and Jeremy de Beer of the University of Ottawa Faculty of Law. Also supporting project management are Julie Nadler-Visser of UCT's Research Contracts and IP Services (RCIPS) unit, members of the UCT Finance Department and Faculty of Law Finance Department, and another editor of this book: Chris Armstrong of the LINK Centre at the University of the Witwatersrand (Wits) in Johannesburg.

Network strategic guidance is provided by a Steering Committee composed of De Beer, Schonwetter, Warner, Chidi Oguamanam (another of this book's

editors) of the University of Ottawa Faculty of Law, Nagla Rizk of The American University in Cairo (AUC), Sisule Musungu of IQsensato in Nairobi, Khaled Fourati of the IDRC office in Cairo, and Balthas Seibold of Germany's Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) in Bonn. Further strategic support from the IDRC is, or has been, provided by Naser Faruqui, Simon Carter, Laurent Elder, Fernando Perini, Matthew Smith, Heloise Emdon and Phet Sayo; Karim Badran and Rose-Marie Ndiaye Pereira on financial matters; and Michelle Hibler and Nola Haddadian on publications. GIZ's involvement is focused on the capacity-building components of the network, which are carried out in collaboration with the GIZ's commons@ip – Harnessing the Knowledge Commons for Open Innovation initiative. At GIZ, in addition to support from the aforementioned Steering Committee member Balthas Seibold, who advises on matters of international knowledge cooperation and networking, support has also come from Petra Hagemann, Christine de Barros Said, Ursula van Look, Marina Neuendorff, Margrit Brockhaus and the Working Group of German Development Organisations on Promoting Innovation Systems. At UCT, as well as those already mentioned, key supporters and collaborators have been the Dean of Law, PJ Schwikkard, Lee-Ann Tong in the Faculty of Law, and, in the IP Unit, the Unit's founder Julian Kinderlerer, its Deputy Director Caroline Ncube and its Senior Research Fellow Bernard Maister. At the University of Ottawa, in addition to those already mentioned, support has been provided by the Dean of the Faculty of Law, Common Law Section, Nathalie Des Rosiers, and Former Dean Bruce Feldthusen.

For this book, key network participants were the team of JD candidates in the University of Ottawa Faculty of Law – Lukas Frey, Will Sapp, Phil Holdsworth, Maya Boorah, Kristen Holman and Saara Punjani – who provided long hours of diligent editorial assistance. In addition, because the research case studies presented in this book all required collection of data from human subjects – via interviews and/or focus group discussions and/or written surveys – this book would not have been possible without the cooperation of dozens of respondents across the countries of study. For reasons of confidentiality, most survey and interview respondents are not named in this book, but we are sincerely grateful for their contributions. Also contributing to the research outlined in this book was Donna Podems of OtherWISE in Cape Town, who advised on research methodologies and supported a methodology workshop for several of the authors featured in this volume, in addition to her support of Open A.I.R.'s monitoring and evaluation (M&E) framework. At this book's publisher, UCT Press, the key drivers have been Publisher Sandy Shepherd and Project Manager Glenda Younge. The cover design for this volume is by Elsabe Gelderblom of Farm Design in Cape Town, who does all of Open A.I.R.'s design work for its website, social media tools, PR materials,

Briefing Notes and the network's other substantial publication output, the Open A.I.R. *Scenarios* compendium – which is available in hard-copy, and on the Open A.I.R. website, as a separate published output and companion to this book.

Network headquarters at the UCT IP Unit serves as Open A.I.R.'s Southern Africa Hub, coordinated by Project Manager Warner. There are also four other Hubs: the North Africa Hub at the Access to Knowledge for Development Center (A2K4D) of the School of Business at The American University in Cairo (AUC), coordinated by Nagham El Houssamy under the direction of Nagla Rizk; the West Africa Hub at the Nigerian Institute of Advanced Legal Studies (NIALS) in Lagos, coordinated by Helen Chuma-Okoro under the direction of Adebambo Adewopo; the East Africa Hub at the Centre for IP and IT Law (CIPIT) of Strathmore University, Nairobi, coordinated by CIPIT Director Isaac Rutenberg; and the Canada Hub at the University of Ottawa Faculty of Law, coordinated by De Beer and Oguamanam. Contact can be made with these Hubs and Hub Coordinators via the aforementioned Open A.I.R. website Team page.

Also integral to the success of the network are its nine Fellows, each of whom has spent time at the UCT IP Unit in Cape Town. The Fellows have contributed to Open A.I.R.'s case study and foresight research, to outreach and training work, and to building the network. The nine Fellows are: Esther Ngom of the Ngo Nyemeck law firm in Yaoundé; Seble Baraki of the Justice and Legal System Research Institute (JLSRI) in Addis Ababa; Moses Mulumba of the Centre for Health, Human Rights and Development (CEHURD) in Kampala; Douglas Gichuki of CIPIT in Nairobi; Milton Lore of Bridgeworks Africa in Nairobi; Eliamani Laltaika of the Tanzania Intellectual Property Rights Network (TIP-Net) in Dar es Salaam; Alexandra Mogyoros, a student in the Faculty of Law at the University of Ottawa; West Africa Hub Coordinator Helen Chuma-Okoro of NIALS in Lagos; and North Africa Hub Coordinator Nagham El Houssamy of A2K4D in Cairo.

Other collaborating institutions are the Program on Information Justice and Intellectual Property (PIJIP) at the Washington College of Law at American University in Washington, DC; the Centre for Technology and Society (CTS) in Brazil; the Centre for Internet and Society (CIS) in India; and the Open Society Foundations, where Open A.I.R.'s key partner is Vera Franz. The Open A.I.R. network has also benefited from interaction with staff at the World Intellectual Property Organisation (WIPO) headquarters in Geneva. In London, Shirin Elahi of Scenarios Architecture is the driver of Open A.I.R. foresight research work, as featured in the aforementioned *Scenarios* compendium that provides an important forward-looking complement to the current picture offered by this volume. Jo Higgs of Go Trolley Films in Cape Town did post-production on the videos available on the Open A.I.R. YouTube channel – videos which show how the network came into being and how the research was conceptualised.

All the people and institutions mentioned here have in one way or another played a role, by collaborating within the Open A.I.R. network, in the conceptualisation, planning, data collection, data analysis, writing, editing, design and production processes that resulted in successful research and the completion of this book. It is hoped that this volume's free availability online, under a Creative Commons (CC) licence, will ensure that the book's collaborative dynamics do not end here at the moment of publication, and continue long into the future in the work of the still-growing Open A.I.R. community.

Jeremy de Beer, Chris Armstrong, Chidi Oguamanam, Tobias Schonwetter
September 2013

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Acronyms and Abbreviations

A2K	access to knowledge
A2K4D	Access to Knowledge for Development Center (The American University in Cairo, Egypt)
AAU	Addis Ababa University
ABS	access and benefit-sharing
ACA2K	African Copyright and Access to Knowledge Project
ACP	African, Caribbean and Pacific Group of States
ACTS	African Centre for Technology Studies (Kenya)
ADPP	Ajuda de Desenvolvimento de Povo para Povo (Mozambique)
AERC	African Economic Research Consortium
AFTE	Association for the Freedom of Thought and Expression (Egypt)
AGOA	African Growth and Opportunity Act
AIM	Agência de Informação de Moçambique
AmCham	American Chamber of Commerce (Egypt)
ARC	Aquaculture Research Centre (Egypt)
ARIPO	African Regional Intellectual Property Organisation
ASSAf	Academy of Sciences of South Africa
ASTII	African Science, Technology and Innovation Indicators
ATO	alternative trading organisation
ATPC	African Trade Policy Centre
ATPS	African Technology Policy Studies Network
AU	African Union
AUC	The American University in Cairo
B-BBEE Act	Broad-Based Black Economic Empowerment Act 53 of 2003 (South Africa)
BCP	bio-cultural community protocol
BIH	Botswana Innovation Hub
BMZ	Federal Ministry for Economic Cooperation and Development (Germany)
BoI	Bank of Industry (Nigeria)
BOTEC	Botswana Technology Centre
BPR	business process re-engineering
CAA	Cocoa Abrabopa Association (Ghana)
CARICOM	Caribbean Community
CBD	Convention on Biological Diversity
CBN	Central Bank of Nigeria

CC	Creative Commons
CCIA	Computer and Communications Industry Association
CEDAT	College of Engineering, Design, Art and Technology (Makerere University, Uganda)
CEHURD	Centre for Health, Human Rights and Development (Uganda)
CEPIL	Centre for Public Interest Law (Ghana)
CIGI	Centre for International Governance Innovation
CIPC	Companies and Intellectual Property Commission (South Africa)
CIPIT	Centre for IP and IT Law (Strathmore University, Kenya)
CIPO	Canadian Intellectual Property Office
CIPR	Commission on Intellectual Property Rights (UK)
CMO	collective management organisation
COCOBOD	Ghana Cocoa Board
CPD	Centre for Policy Dialogue (Nigeria)
CRTT	Centre for Research in Transportation Technologies (Makerere University, Uganda)
CSIR	Council of Scientific and Industrial Research (India)
CTEA	Copyright Term Extension Act (US)
CVCP	Committee of Vice-Chancellors and Principals (UK)
DACST	Department of Arts, Culture, Science and Technology (South Africa)
DEST	Department of Education, Science and Training (Australia)
DFID	Department for International Development (UK)
DHET	Department of Higher Education and Training (South Africa)
DNS	domain name system
DRC	Democratic Republic of Congo
DRM	digital rights management
DRST	Department of Research, Science and Technology (Botswana)
DST	Department of Science and Technology (South Africa)
DTI	Department of Trade and Industry (South Africa)
EAEP	East African Educational Publishers (Kenya)
EC	European Commission
ECBP	Engineering Capacity Building Program (Ethiopia)
ECOWAS	Economic Community of West African States
ECX	Ethiopia Commodity Exchange
EEAA	Egyptian Environmental Affairs Agency
EIPO	Ethiopian Intellectual Property Office
EIPRL	Egyptian Intellectual Property Rights Law
EPA	Environmental Protection Authority (Ethiopia)
EPO	European Patent Office
EST	environmentally sound technology

EU	European Union
EUEI	EU Energy Initiative
Eurostat	Statistical Office of the European Communities
FAO	UN Food and Agriculture Organisation
FCN	Friendship, Commerce and Navigation (Kenya)
FDI	foreign direct investment
FDRE	Federal Democratic Republic of Ethiopia
FDSE	Free Day Secondary Education (Kenya)
FES	Friedrich Ebert Stiftung (Germany)
FLO	Fairtrade Labelling Organisations International
FOSS	free and open source software
FPE	Free Primary Education (Kenya)
FTA	free trade agreement
GDP	gross domestic product
GEM	Global Entrepreneurship Monitor
GERD	gross expenditure on research and development
GI	geographical indication
GIPC	Global Intellectual Property Center
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (Germany)
GM	genetically modified
GOAN	Ghana Organic Agriculture Network
GOK	Government of Kenya
GR	genetic resources
GTZ	German Technical Cooperation
HSRC	Human Sciences Research Council (South Africa)
ICANN	Internet Corporation for Assigned Names and Numbers
ICIDSS	International Creativity and Innovation Development Support Services (Ethiopia)
ICJ	International Commission of Jurists
ICLS	International Conference of Labour Statisticians
ICPSK	Institute of Chartered Public Secretaries of Kenya
ICT	information and communication technology
ICT4D	ICT for development
ICTSD	International Centre for Trade and Sustainable Development
IDC	Industrial Development Corporation (South Africa)
IDLO	International Development Law Organisation
IDRC	International Development Research Centre (Canada)
IDS	Institute of Development Studies (Kenya)
IE	informal economy

IFC	International Finance Corporation
IICA	Inter-American Institute for Cooperation on Agriculture
IIDMM	Institute of Infectious Disease and Molecular Medicine (South Africa)
IIED	International Institute for Environment and Development
IIPA	International Intellectual Property Alliance
IISD	International Institute for Sustainable Development
ILC	indigenous and local community
ILO	International Labour Organisation
INAO	Institut national des appellations d'origine (France)
IP	intellectual property
IPA	Industrial Property Act (Botswana)
IPC	International Patent Classification
IPI	Industrial Property Institute (Mozambique)
IPR-PFRD Act	Intellectual Property Rights from Publicly Financed Research and Development Act (South Africa)
IRB	Institutional Review Board (Botswana)
IRENA	International Renewable Energy Agency
ISAS	integrated seawater agriculture system
ISCTEM	Instituto Superior de Ciências e Tecnologia de Moçambique
ISI	Institute for Scientific Information
ISO	International Organisation for Standardisation
ISP	Information Society Project (Yale University, US)
ITC	International Trade Centre
JBEDC	Japan Bio-Energy Development Corporation
JITAP	Joint Integrated Technical Assistance Programme
JLSRI	Justice and Legal System Research Institute (Ethiopia)
K2C Biosphere	Kruger to Canyons Biosphere (South Africa)
KE	knowledge economy
KECOBO	Kenya Copyright Board
KENFAA	Kenya Nonfiction and Academic Authors' Association
KES	Kenyan Shilling
KHA	Kenya Historical Association
KICD	Kenya Institute of Curriculum Development
KIPI	Kenya Industrial Property Institute
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KNAS	Kenya National Academy of Sciences
KOLA	Kenya Oral Literature Association
KTO	knowledge transfer office
LBC	Licensed Buying Company (Ghana)
LDC	least developed country

LE	Egyptian Pound
LINK Centre	Learning Information Networking Knowledge Centre (Wits University, South Africa)
LSK	Law Society of Kenya
MAN	Manufacturers Association of Nigeria
MANCAP	Mandatory Conformity Assessment Programme (Nigeria)
MCH	Maasai Cultural Heritage Organisation (Kenya)
MCST	Ministry of Communications, Science and Technology (Botswana)
MCT	Ministério da Ciência e Tecnologia (Mozambique)
MDCA	Malindi District Cultural Association (Kenya)
MDG	Millennium Development Goal
MEA	Multilateral Environmental Agreement
MIST	Ministry of Infrastructure, Science and Technology (Botswana)
MIT	Massachusetts Institute of Technology
MOA	Ministry of Agriculture (Ethiopia)
MOE	Ministry of Education (Ethiopia)
MOFA	Ministry of Food and Agriculture (Ghana)
MoFED	Ministry of Finance and Economic Development (Ethiopia)
MOST	Ministry of Science and Technology (Ethiopia)
MoU	memorandum of understanding
MRC	Medical Research Council (South Africa)
Natoil	Natural Oil Company (Egypt)
NACI	National Advisory Council on Innovation (South Africa)
NCC	Nigerian Copyright Commission
NDA	non-disclosure agreement
NEP	National Enquiry Point (Botswana)
NEPAD	New Partnership for Africa's Development
NESC	National Economic and Social Council (Kenya)
NESTI	National Experts on Science and Technology Indicators
NIALS	Nigerian Institute of Advanced Legal Studies
NRF	National Research Foundation (South Africa)
NGO	non-governmental organisation
NIALS	Nigerian Institute of Advanced Legal Studies
NIPMO	National Intellectual Property Management Office (South Africa)
NIS	national innovation system
NMIMS	Narsee Monjee Institute of Management Studies (India)
NPR	National Public Radio (US)
NPSB	National Policy and Strategy on Biofuels (Mozambique)
NRC	National Research Centre (Egypt)

NREA	New and Renewable Energy Authority (Egypt)
NWLR	Nigerian Weekly Law Report
OA	open access
OAPI	Organisation africaine de la propriété intellectuelle
OCEES	Oxford Centre for the Environment, Ethics and Society
OCFCU	Oromia Coffee Farmers Cooperative Union (Ethiopia)
ODEL	open, distance and electronic learning
ODI	Overseas Development Institute (UK)
OECD	Organisation for Economic Co-operation and Development
OER	open educational resource
Open A.I.R.	Open African Innovation Research and Training Project
ORD	Office of Research and Development (Botswana)
PBIP	place-based intellectual property
PCT	Patent Cooperation Treaty
Petromoc	Petróleos de Mozambique
PIIPA	Public Interest Intellectual Property Advisors (US)
PIJIP	Program on Information Justice and Intellectual Property (American University, US)
PPS	probability proportional to size
PRO	public research organisation
ProBEC	Programme for Basic Energy and Conservation in Southern Africa
R&D	research and development
RCIPS	Research Contracts and IP Services unit (UCT, South Africa)
RIPCO (B)	Rural Industrial Promotion Company (Botswana)
RMI	rights management information
SADC	Southern African Development Community
SARUA	Southern African Regional Universities Association
SCE	Society for Critical Exchange (Kenya)
SID	Society for International Development (Kenya)
SINER-GI	Strengthening International Research on Geographical Indications
SME	small and medium enterprise
SMIEIS	Small and Medium Industries Equity Investments Scheme (Nigeria)
SMME	small, micro and medium enterprise
SNA	social network analysis
SON	Standards Organisation of Nigeria
SPS	sanitary and phytosanitary measures
STCI	Science and Technology Capacity Index
STEP	Science Technology and Economic Policy (US)
STI	science, technology and innovation
STS	Society for Technology Studies (Ethiopia)

SVKM	Shri Vile Parle Kalamani Mandal (India)
TBT	technical barriers to trade
TCE	traditional cultural expression
TGE	Transitional Government of Ethiopia
THE	Times Higher Education (UK)
THRIP	Technology and Human Resources Programme (South Africa)
TIA	Technology Innovation Agency (South Africa)
TIP-Net	Tanzania Intellectual Property Rights Network
TISC	Technology and Innovation Support Center
TK	traditional knowledge
TKDL	Traditional Knowledge Digital Library (India)
TPMs	technological protection measures
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
TTO	technology transfer office
TVET	Technical and Vocational Education and Training (Ethiopia)
UB	University of Botswana
UCC	Universal Copyright Convention
UCITA	Uniform Computer Information Transactions Act (US)
UCT	University of Cape Town (South Africa)
UEM	Eduardo Mondlane University (Mozambique)
UGT	Uganda Gatsby Trust
UK	United Kingdom
UM	utility model
UNCST	Uganda National Council for Science and Technology
UNCTAD	UN Commission on Trade and Development
UNDESA	UN Department of Economic and Social Affairs
UNDP	UN Development Programme
UNECA	UN Economic Commission for Africa
UNEP	UN Environment Programme
UNESCAP	UN Economic and Social Commission for Asia and the Pacific
UNESCO	UN Educational, Scientific and Cultural Organisation
UNFCCC	UN Framework Convention on Climate Change
UNICAMP	University of Campinas (Brazil)
UNIDO	UN Industrial Development Organisation
Unilag	University of Lagos
US	United States
USAID	US Agency for International Development
USPTO	US Patent and Trademark Office
WAK	Writers Association of Kenya
WATH	West Africa Trade Hub

WBCSD	World Business Council for Sustainable Development
WCT	WIPO Copyright Treaty
WEF	World Economic Forum
WEP	World Employment Programme
WHO	World Health Organisation
WIPO	World Intellectual Property Organisation
Wits	University of the Witwatersrand (South Africa)
WPIS	WIPO Patent Information Service
WPPT	WIPO Performances and Phonograms Treaty
WTO	World Trade Organisation
ZAR	South African Rand

Chapter 12

Reflections on the Lack of Biofuel Innovation in Egypt

Bassem Awad and Perihan Abou Zeid

Abstract

This chapter outlines findings from research into Egypt's legal environment for biofuel patenting and the present state of biofuel innovation in the country. Based on evidence of only one domestically generated biofuel patent in Egypt at the time of the completion of the research in 2012, the chapter suggests policy and practical mechanisms which could help spark more innovation in this sector. The mechanisms suggested include online clean energy patent databases, a clean energy patent fast-tracking mechanism, and a green "patent commons".

1. Introduction

The energy sector in Egypt faces a number of challenges. The price of liquid petroleum has increased significantly in recent years, putting the country's oil reserves in decline and resulting in deterioration of the financial performance of the country's energy companies. An adequate and reliable supply of energy must thus be secured to support a growing population and to sustain economic growth. At the same time, as part of its commitments under the Kyoto Protocol and the UN Framework Convention on Climate Change (UNFCCC), Egypt must reduce greenhouse gas emissions and incorporate clean energy technology into its development plans.[1]

The government of Egypt has decided to diversify its energy supplies through the development of new and renewable energy sources. The country's national

1 Egypt is also a Member State of the International Renewable Energy Agency (IRENA), which promotes the adoption of clean energy technologies (IRENA, n.d.).

Renewable Energy Strategy was revised in 2007 (and the revisions made official in early 2008) to prioritise the use of natural resources in a more sustainable manner through the production of clean and renewable energy. Biofuels produced from rice straw, sugar cane, jatropha, jojoba or algae have been proposed as alternative fuel sources to solve some of the challenges facing the Egyptian energy sector.

Following the UNFCCC Bali meeting in 2007, the issue of the relationship between intellectual property (IP) mechanisms and clean energy technology innovation was brought to the fore. Laws and regulations governing patents have come to be viewed as possible barriers to the development of clean energy technology and its commercialisation. In 2009, at the UN Climate Change Conference in Copenhagen, countries such as Brazil, China and India proposed to adopt measures on flexibilities and exceptions for IP rights to ensure greater access to clean technology. They argued that new "green" technologies should be subject to an expanded use of existing flexibilities in the implementation of IP rights, including the measure of "compulsory licensing". Such a licensing system has been used in the health area where, for example, a particular lifesaving drug is prohibitively expensive, and the Group of 77 developing nations (G77), led *de facto* by China, has argued for analogous application of this logic to patents for technology related to climate change mitigation and adaptation (Kogan, 2010).

While patents and other forms of orthodox IP are not in themselves accurate indicators for innovation in African countries – for reasons discussed in chapters 1 and 16 of this volume – our research study, as outlined in this chapter, sought to investigate the degree to which Egypt's patent system is conducive to biofuel innovation, and to see whether there are any legal and practical steps needed to enhance the country's innovation potential in this important area. The research consisted of a legal analysis of Egyptian patent law (provided in Section 2 below) and an examination of the current realities of, and stakeholder perceptions of, biofuel patenting (Sections 3 and 4). Section 5 provides our reflections on possible ways forward. (See Chapter 11 of this volume for discussion of innovation and patenting matters in relation to biofuels in Mozambique.)

2. Egypt's patent system

IP protection for innovative research and development in the area of renewable energy can take one of three forms: trade secrets, patents or *sui generis* plant variety protection. Trade secrets have immediate effect, exist for an indefinite period – provided confidentiality is maintained – and have no registration costs. However, it can be risky and expensive to the holder to seek to keep the trade secret information confidential. The Egyptian Intellectual Property Rights Law (EIPRL) 82

of 2002, which consists of four Books, replaced all previous legislation related to IP rights in Egypt in order to ensure the country's compliance with the World Trade Organisation (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). The executive regulation for the EIPRL's Book One (related to patents) and Book Four (related to plant varieties) was issued by Prime Ministerial Decree 1366 of 2003. This Decree addresses procedural issues not specified in the EIPRL itself.

The EIPRL grants patents to all types of inventions in all fields of technology, as long as these inventions meet certain basic criteria. An invention must show some new characteristic not known prior to the application date or priority date (absolute novelty). The invention must also be non-obvious to a person skilled in the particular field of the invention (inventive step). (The EIPRL does not, however, provide a definition for the requirements of an "inventive step".) Finally, an invention must be capable of being applied in industry in its broadest sense (industrial applicability). According to Article 1 of the EIPRL:

> A patent shall be granted, in accordance with the provisions of this Law, to any industrially applicable invention, which is new, involves an inventive step, whether connected with new industrial products, new industrial processes, or a new application of known industrial processes. (Art. 1.1)

At the same time, Article 2 of the EIPRL, modelled on Article 27.2 of TRIPS, excludes the following from patentability:

> 1 – Inventions whose exploitation is likely to be contrary to public order or morality or prejudicial to the environment, human, animal or plant life and health.
>
> 4 – Plants and animals, regardless of their rarity or peculiarity, and essentially biological processes for the production of plants or animals, other than microorganisms, non-biological and microbiological process for the production of plants. (Art. 2)

Egyptian patent law has therefore availed itself of Article 27 of TRIPS, which allows TRIPS Member States to prohibit patentability of inventions in order to protect public order or morality, including avoiding serious prejudice to the environment. We are of the view that the EIPRL made Egyptian IP law "greener" by excluding from patentability inventions that may cause prejudice to the environment as well as providing specific treatment for plant varieties. However, the Law does not provide a clear standard as to how to assess serious prejudice to the environment (Derclaye, 2010).

The EIPRL's Article 2 explicitly excludes plants from patent protection. The Law also establishes a *sui generis* system for plant varieties: Article 189 of the EIPRL states that plant varieties, whether derived inside or outside Egypt, shall

be protected regardless of whether they were developed through biological or non-biological means. This provision is notable, because advanced plant breeding could lead to the development of new plant varieties with improved traits suitable for the production of biofuels, and such new varieties, while not eligible for patent protection, could be protected via *sui generis* methods (Al-Saghir, 2004). According to Article 194 of the EIPRL, any third party wishing to produce, propagate, circulate, sell, market, import or export the propagating material of a new plant variety has to obtain written consent from the breeder.

Article 195 of the EIPRL provides an exemption allowing free access to plant material in order to breed new varieties without having to obtain permission from the first breeder. This kind of "breeder exemption" is one of the cornerstones of plant variety rights systems. The same Article 195 also allows free activities related to experiments and scientific research purposes, as well as selected non-commercial uses and activities related to teaching and training. Article 10 of the EIPRL contains a list of exceptions to exclusive patent rights for the purposes of research or experimental use of an invention. Researchers often build upon existing inventions, and this exception could thus be relevant in the clean energy context where adaptation of technology to local needs and environments is particularly vital.

Formal requirements under Egyptian patent law do not concern the nature of the invention, but rather the manner in which the invention is submitted to the Egyptian Patent Office. According to Article 16 of the EIPRL, the filing of a patent application is followed by the processing of the application through a search of prior art, substantive examination of patentability, and deciding whether a patent is granted or refused. Identifying an invention requires a summary of all the particular features of the invention, such as a description, claim(s), drawing(s) and an abstract. Other formal requirements are evidence of ownership and the payment of fees to the Patent Office. The description filed with the Patent Office must disclose the invention in a clear and complete manner so that the invention could be carried out by a person skilled in the art (EIPRL, Art. 13.1).

Article 13 of the EIPRL includes specific provisions regarding the disclosure of the invention that are potentially relevant to biofuel innovation and other clean energy technology innovations. Article 13 adopts the highest possible level of disclosure, as it requires the patent applicant to disclose in the best possible way how the invention is executable at the time when the patent application is filed (Awad, 2007). Moreover, Article 13 states that, where the invention involves biological, plant or animal matter, traditional medicinal, agricultural, industrial or handicraft knowledge, or cultural or environmental heritage, the applicant should have acquired the source of such product, knowledge or heritage by legitimate means. The patent applicant must, according to Article 3(3) of the Executive Regulation

of the EIPRL, submit to the Patent Office the documents indicating that he/she legally obtained such genetic resources or information according to the provisions of "the applicable legislations in Egypt", which require disclosure of the origin of genetic resources and prior informed consent of the use of traditional knowledge (TK) in patent applications. There are a number of developing countries that have adopted this kind of disclosure requirement as a formal condition for the granting and validation of patent rights. Failure to comply results in a rejection of the patent application (or invalidity of the patent if it was granted prior to the invalidation).[2]

According to the interpretation of Phillips *et al.* (2011), the reference in Article 3(3) of the Executive Regulation of the EIPRL to "the applicable legislations in Egypt" refers not only to national laws but also to the international conventions to which Egypt is a party, including the Convention on Biological Diversity (CBD) (1992). Phillips *et al.* explain that the EIPRL and its Regulation are drafted in light of the CBD, which recognises the sovereign rights of states over their natural resources and that the authority to determine access to genetic resources rests with the national governments (Art.15(1) and 15(4)–(5)). The EIPRL requirement for disclosure of origin aims to improve the transparency of use of genetic resources and TK so as to facilitate access to these resources and sharing of the benefits derived from their commercialisation. Meanwhile, the disclosure of the technical details of inventions aims to expand the public stock of technical knowledge and create competition among innovators and researchers.

3. Biofuels patenting in Egypt

In December 2011 we distributed a formal survey to academics, economists, scientists and technologists in industry to obtain concrete data for mapping the status of biofuels in Egypt. The results of the surveys were analysed to map the current clean energy landscape in the country. This first phase was followed by an examination of the Egyptian Patent Office database to find registered patents of clean energy technology in Egypt.

2 See, for example, Brazil's Provisional Measure No. 2.186-16, of 2001, Article 31; the Member States of the Andean Community (Bolivia, Colombia, Ecuador, Peru and Venezuela), Decision 391 of 1996, Articles 16, 26, 35 and second complementary provision and Decision 486 of 2000, Articles 3 and 75; Costa Rica's Law No. 7.788 of 1998, Article 81; and India's The Patents Act of 1970 (as amended by The Patents [Amendment] Act of 2002, Sect. 10, 25 and 64).

The data and information gathered indicate that research in Egypt includes different types of clean energy, ranging from solar and wind energy to biofuels (obtained from different sources such as jatropha and jojoba plantations, agricultural waste, cooking oil and recently also algae). Notably, solar and wind energy receive substantial government funding for research, specifically from the state's New and Renewable Energy Authority (NREA, 2011).

In general, we found the gathering of data and information on biofuels in Egypt to be a difficult task due to the scarcity of information, the lack of governing rules, the overlap between related public entities and the lack of coordination among different stakeholders. This in itself was a significant finding of this research, as information availability is central to the logic of patent systems as systems which balance the interests of patent-holders with the interests of stakeholders needing access to the patent information for purposes of experimentation and follow-on innovation (see Chapter 10 of this volume, which examines failure, by patent offices in much of Africa, to ensure sufficient public access to patent filings).

Statistics from the Egyptian Patent Office show that the process from the filing date of an application to the approval of a patent takes on average three years and 10 months. Our analysis of the Egyptian Patent Office procedures shows the need to establish an advanced database to make it easier to search for accepted applications and other relevant patent information. Patent information consists of the text of granted patents and published patent applications, including the abstract, specifications, drawings and claims. The information becomes accessible through its publication and the availability of the patent documents at the Patent Office. At the moment, however, it can be very difficult to obtain reliable information about the geographical coverage and status of patents in Egypt. There is also a noted delay in issuing the *Patent Gazette*. The accessibility of information needs to be improved, especially since the Egyptian Patent Office is now, as of 1 April 2013, one of the international searching and preliminary examining authorities under the Patent Cooperation Treaty (PCT) and is currently accepting patent applications from all over the world.

4. Stakeholder activities and perceptions

The final stage in the research consisted of field interviews with stakeholders and policy-makers from three categories: (1) scientists and academics, (2) public sector representatives and (3) private sector project managers. In general, it was found from the interviews that, while most stakeholders acknowledge the importance of biofuels in Egypt, scientific exploration and production remain limited in this area.

Scientists and academics

There is no specific research institute or department within a university faculty in Egypt that specialises in renewable energy or biofuels technology. Biofuel investigations are usually temporary projects. For example, at some engineering faculties and/or departments, such as those at Cairo University and the Arab Academy for Science and Technology and Maritime Transport, there is an interest in the development of biofuel refineries and in undertaking research to evaluate the quantity of energy that can be derived from different types of biofuels. In faculties of agriculture, the departments are mainly focused on studying plants, agricultural waste or algae and biofuel production methods (e.g. the Department of Animal and Fish Production, Faculty of Agriculture, Alexandria University). In environmental institutes, while research is focused on biofuel production in general, there is a focus on the environmental impact of biofuels.

The only important domestically generated biofuels patent we were able to find evidence of was obtained in 2009 by Bahaa Shawky, a professor at the Genetic Engineering and Biotechnology Research Division at the National Research Centre (NRC). The invention involves a pre-treatment method for facilitating the enzyme decomposition of different agricultural waste, e.g. rice straw. Facilitating enzyme decomposition helps generate sugar, which is then fermented to obtain bioethanol.[3] The patent was granted in 2009 but has not yet been commercialised at any level by industry, due in part to lack of government support. According to Shawky, this invention should ideally be considered for adoption as a national project, because it could help reuse, for energy production, the 40 million tonnes of agricultural waste produced annually in Egypt.

At the Faculty of Agriculture of Alexandria University, it was found that some researchers are trying to increase the amount of oil that can be extracted from algae, which can then be converted into biofuels (see Demirbas and Demirbas, 2010). Another important biofuels project was established by the Aquaculture Research Centre (ARC) in the Arab Academy for Science, Technology and Maritime Transport. The ARC managed to create algae powder on a small scale, using dehydration techniques. More importantly, the ARC successfully extracted biofuels from used cooking oil. After applying chemical conversion techniques, the ARC obtained biodiesel from the used cooking oil in a cost-effective manner with minimal environmental impact. For this purpose, the ARC signed agreements with hotels and restaurants to obtain used cooking

3 Patent No. 24507/2009, granted by the Egyptian Patent Office, for "a method and multipurpose apparatus for lignocelluloses materials pre-treatment to enhance subsequent enzymatic hydrolysis for producing fermentable sugars and ethanol".

oil instead of their disposing of it. The ARC team did not pursue the patent route due to the formalities and time required for patent review process at the Egyptian Patent Office.

Public-sector bodies

We were surprised to discover that Egypt's New and Renewable Energy Authority (NREA) does not have any departments that specialise in biofuels, and in fact is not conducting research pertaining to biofuels (NREA, 2012). The Authority's projects and research are mainly concerned with solar and wind energy production, with research on biofuels apparently a lower priority area.

The Egyptian Environmental Affairs Agency (EEAA), meanwhile, is undertaking several projects. One project relates to growing the jatropha plant (a commonly known source of biofuels) using treated waste water. The EEAA planted jatropha, using treated waste water, in the Suez and Luxor regions on land otherwise unsuitable for food agriculture, and the aim is to produce high-energy yields with low inputs of water, fertilisers and pesticides and on the smallest possible land area (Ministry of State for Environmental Affairs, 2012). One of the jatropha plantations was found to be very successful in comparison to its counterparts in other countries (JBEDC, 2008). However, the EEAA officials interviewed stated that Egyptian jatropha is not being used for biofuel production beyond the research setting, due to a lack of funding.

Private sector

Private-sector interviewees were found to be enthusiastic about biofuels, and they acknowledged the importance of biofuels to the country's future. At the same time, they stated that biofuel production has yet to become a commercial reality in Egypt. Energy Allied International, an international development firm, initiated investment in the biofuels sector in Egypt in 2005 and established a subcompany called New Nile Company. New Nile's vision was to adopt an integrated seawater agriculture system (ISAS) which utilises seawater for biofuel and food production (New Nile Company, 2012). New Nile also wanted to do some work in Egypt with a new variety of jatropha that it was developing in conjunction with an Indian company and that was thought to be suitable for the climate, agriculture and irrigation conditions in Egypt. However, after obtaining the necessary approvals, New Nile encountered a number of administrative hurdles which led it to abandon the project.

The private firm Egyptian Natural Oil Co. (Natoil), established in 1996, grows jojoba and sells its seeds and rooted seedlings for further planting (Natoil, 2012).

But while the company acknowledged the importance of jojoba as a source of biofuels, its existing focus is on cosmetic and medical applications, and it has even obtained two patents, from Egypt's Patent Office, the US Patent and Trademark Office (USPTO) and the European Patent Office, for the medicinal applications of jojoba (see El Mogy, 2010).

5. The way forward

Our research found little in the way of biofuels innovation in Egypt. This prompted us to cast our minds towards the future and to try to identify steps that could be taken to potentially boost innovation.

Fast-tracking

We found persuasive the ideas of Derclaye (2010), who has suggested that patent systems as tools for technological development and economic growth can benefit from "green" inventions receiving, among other things, fast-tracked examination, reduced application fees and exemption from deferred examination. Of particular interest is the idea of fast-tracking. The adoption of a fast-track administrative procedure in Egypt could help to encourage innovation in clean energy technology, including biofuels. A faster administrative process would allow clean energy innovations to receive patent protection more quickly and therefore to reach the market earlier. Ideally, faster procedures could encourage Egyptian innovators to invest local resources in developing new technologies and to provide those technologies to the marketplace.

Internationally, several major patent offices have instituted a fast-track mechanism for clean technology innovation. The UK Intellectual Property Office has introduced an initiative to give priority to patent applications directed to technology having environmental benefits. Instead of the typical average of two to three years for an application to get through the UK Intellectual Property Office, a patent application for a clean technology can be granted in just nine months. According to the Office, "[t]here is no specific environmental standard to meet in order to benefit from the Green Channel" (UK Intellectual Property Office, 2009): the applicant simply needs to provide as much justification as is necessary to explain why the invention is environmentally friendly.

The USPTO introduced a system in 2009 to process clean technology patent applications more quickly (USPTO, 2012). The Australian and South Korean patent offices have also launched similar schemes (IP Australia, 2012; Korean

Intellectual Property Office, 2009). South Korea currently provides the fastest examination period in the world for green technology: examinations can be completed in less than one month. In 2011, the Canadian Intellectual Property Office (CIPO) amended its patent rules to expedite the examination of patent applications related to green technologies (CIPO, 2011).

Early evidence suggests that, so far, only a small percentage of eligible patent applicants in the area of green technology make use of the opportunities for accelerated examination under the aforementioned programmes (Dechezleprêtre, 2013). However, in certain circumstances fast-tracking could still help increase the number of green technology patents in Egypt, e.g. if third-party investment is urgently needed, or in order to secure commercial partnerships.

Patent database

Based on the difficulty we faced in accessing reliable patent information for this research, we are of the view that the Egyptian Patent Office should move forward quickly on its plan for an advanced patent database, as a means to ensure wide public dissemination of patent-related information, including clean energy technology information.

Of relevance is the work of the World Intellectual Property Organisation (WIPO) on patent databases. The WIPO Patent Information Service (WPIS) facilitates access to technical information within patent documents (WIPO, 2012), and WIPO has even set up a special patent database related to biofuels, the IPC Green Inventory, which was developed by the International Patent Classification (IPC) committee of experts in order to facilitate searches for patent information relating to environmentally sound technologies (ESTs) as listed by the UNFCCC. The inventory attempts to collect ESTs in one place to facilitate the search for this type of technology innovation (WIPO, 2012), and allows users to search and display all international patent applications available through PATENTSCOPE (a WIPO database that aggregates PCT patent data from developed and developing countries).

A "patent commons"

Another possible approach would be an "open source" approach whereby there is free sharing of knowledge – within a "patent commons" – so as to maximise the collaborative elements of innovation. The Eco-Patent Commons is an interesting initiative of this sort. In January 2008, a number of large multinational companies, including IBM, Nokia, Sony and Pitney Bowes, in cooperation with the World Business Council for Sustainable Development (WBCSD), established

the Eco-Patent Commons initiative to create a collection of patents that concern inventions that directly or indirectly protect the environment (Hall and Helmers, 2011). The patents are pledged by companies and other IP rights-holders and are made available to anyone free of charge. This patent commons is a resource for connecting those who have had success with a particular challenge to those who are facing similar challenges (WBCSD, 2011). Since the launch of the Eco-Patent Commons, 121 eco-friendly patents have been contributed by 13 companies worldwide (WBCSD, 2011). The patent commons model could be deployed in Egypt in order to pool Egyptian clean energy technology contributions and provide an institutional design that allows easy access to patented clean energy technologies.

Accordingly, a biofuels innovation pool that contains different licences from Egyptian patent-holders or breeders of new plant varieties could stimulate use of innovation for equitable reward. Those members of the private sector interested in investing in biofuels innovation could pay a reasonable fee for using these protected technologies. (See Chapters 6 and 7 in this volume for discussion of commons modalities in relation to traditional knowledge [TK].)

Research incentives

One of the main obstacles facing researchers and scientists in Egypt is a lack of funds. And several interviewees criticised the lack of government help in marketing their innovations, making it more difficult to recoup research expenses. Providing incentives in the form of research grants and awards could help promote innovation.

Stakeholder structures

There is neither a policy nor a holistic strategy for the development of biofuels in Egypt. A researcher, scientist or an investor in the field of biofuels does not have access to a governmental body that can provide guidance, funds or approvals in the context of biofuels. Thus Egypt is in need of a workable biofuels strategy and a body that is responsible for governing biofuels research with the objective of developing this important field of technology for national interests. The activities of this body could include:

- setting out a national holistic biofuels strategy that includes, but is not limited to, deciding the optimum level of biofuel generation that Egypt can implement along with providing the necessary infrastructure;
- gathering research data and literature regarding biofuels and compiling a list of research projects undertaken by research institutions in Egypt to facilitate effective research and cooperation among scientists;

- building effective public–private partnerships and collaborative research projects, which could be an effective way for the public sector, generally limited in resources, to achieve public policy objectives through working with the private sector; and
- administering biofuel-related activities and providing the necessary approvals in coordination with different government entities.

In addition, it is important to establish a national platform among researchers and the industry to establish priorities for short- and long-term timeframes for biofuels. Such a platform could act as a lobby to push Parliament towards adopting laws which, among other things, stipulate percentages of biofuels that need to be blended into gasoline, and establish implementation provisions.

Also, during the research interviews with the private sector, we noted that companies are not aware of each other's activities, and interviewees expressed the need for private-sector collaboration (and, in turn, investment) in order to take the biofuels industry forward strongly. The Egyptian government could play a role through creation of new tax and investment incentives for biofuels investors. Accordingly, small and medium-sized entrepreneurs and farmers should consider establishment of a consortium to help secure investments.

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