Bottom-up, bottom-line : development-relevant enterprises in East Africa and their significance for agricultural innovation

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Andy Hall, Norman Clark and Andy Frost

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United Nations University – Maastricht Economic and social Research and training centre on Innovation and Technology
Keizer Karelplein 19, 6211 TC Maastricht, The Netherlands
Tel: (31) (43) 388 4400, Fax: (31) (43) 388 4499, email: info@merit.unu.edu, URL: http://www.merit.unu.edu

BOTTOM-UP, BOTTOM-LINE: DEVELOPMENT-RELEVANT ENTERPRISES IN EAST AFRICA AND THEIR SIGNIFICANCE FOR AGRICULTURAL INNOVATION

Andy Hall[1], Norman Clark[2] and Andy Frost[3]

Abstract

Over the last 10 years much has been written about the role of the private sector as part of a more widely-conceived notion of agricultural sector capacity for innovation and development. This paper discusses the emergence of a new class of private enterprise in East Africa that would seem to have an important role in efforts to tackle poverty reduction and food security. These organisations appear to occupy a niche that sits between mainstream for-profit enterprises and the developmental activities of government programmes, NGOs and development projects. This type of enterprise activity is not corporate social responsibility, but an altogether new type of business model that is blending entrepreneurial skills and perspectives with mission statements that seek to both serve the needs of poor customers and address their welfare. The ethos is both "bottom-up" and "bottom-line". This paper classifies these organisations as *Development-Relevant Enterprises* (DevREs).The experience of the Research into Use (RIU) programme discussed in this paper suggests that supporting these types of entrepreneurial activity may form the basis of a new mode of development assistance aimed at using innovation for both social and economic purposes.

Key words: Development-Relevant Enterprises, Agricultural Research, Agricultural Innovation, East Africa

JEL Codes: N5, N57, O13, O19, O31, Q13, Q16

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[1] Head of the Research Into Use (RIU) Central Research Team (CRT)
[2] Senior Adviser, RIU
[3] Deputy Director, RIU

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LIST OF ACRONYMS

AECF	-	African Enterprise Challenge Fund
AGRA	-	Alliance for a Green Revolution in Africa
COLEACP	-	Europe-Africa-Caribbean-Pacific Liaison Committee
CRT	-	Central Research Team
CSR	-	Corporate Social Responsibility
DevRe	-	Development-Relevant Enterprise
DFID	-	Department for International Development
EU	-	European Union
FIPS-Africa	-	Farm Input Promotions Africa
FVM	-	Faculty of Veterinary Medicine
IDE	-	International Development Enterprises
IPM	-	Integrated Pest Management
NAADS	-	National Agricultural Advisory and Development Service
NARC	-	National Agricultural Research Council
NGO	-	Non-Governmental Organisation
ODA	-	Overseas Development Assistance
PIP	-	Pesticide Initiative Programme
R&D	-	Research and Development
RIU	-	Research Into Use
RNRRS	-	Renewable Natural Resources Research Strategy
SCODP	-	Sustainable Community Orientated Development programme
SIDA	-	Swedish International Development Agency
SOS	-	Stamp Out Sleeping Sickness
UNDP	-	United Nations Development Program

USAID - United States Agency for International Development

USDA - United States Department of Agriculture

1. INTRODUCTION

Over the last 10 years much has been written about the role of the private sector as part of a more widely-conceived notion of agricultural sector capacity for innovation and development[4]. These debates have proposed the private sector as a source of R&D expertise; as a client-responsive mechanism for distributing products embodying the results of scientific research; as conduits to high-value markets as well as a source of information about the nature of demand and regulation in these markets; as a source of new business models that can efficiently service the needs of large markets of poor people; as a mechanism for the delivery of services and products that sit at the interface of public responsibility and private interest (such as agricultural extension and responses to livestock disease and pest outbreaks); and as a broker or intermediary agent, making links, negotiating partnerships and policy changes and communicating information, aspirations and agendas. Partnership between the private sector and public agencies and other development actors has been at the heart of these debates. The notion of inclusive business has been held up as a new vision of private sector-centric development efforts. In reality, however, the participation of the private sector in such roles has been less than anticipated. This still leaves open a question over whether the mainstream private sector can really become a genuine development partner and what are the alternatives?

This paper discusses the emergence of a new class of private enterprise in East Africa that would seem to have an important role in nascent agricultural innovation systems orientated towards tackling development goals of poverty reduction and food security. These organisations appear to occupy a niche that sits between mainstream for-profit enterprises and the developmental activities of government programmes, NGOs and development projects. This type of enterprise activity is not corporate social responsibility, but an altogether new type of business model that is blending entrepreneurial skills and perspectives with mission statements that seek to both serve the needs of poor customers and address their welfare. The ethos is both "bottom-up" and "bottom-line". This paper classifies these organisations as *Development-Relevant Enterprises* (DevREs).

[4] See for example: Hall (2006), Hall et al (2002), Byerlee and Echeverría (2002)

The paper outlines five such cases. The first is a company that initially emerged in Kenya to service the large-scale horticultural sector's need for bio-control pest management approaches that conform to European market regulation. The company is now targeting smallscale farmers' need for bio-control agents to combat *Striga* (a parasitic weed of the food staple crop maize). The second initiative aims to do a similar thing with the migratory pest *army worm*. A third organisation is acting as a broker negotiating access to new crop varieties developed by national agricultural research organisations and working with input supply companies, by persuading them to produce micro-seed and fertiliser packs that small farmers can afford. A fourth is a company that has established a multimedia platform (print, internet and radio) to communicate with Kenyan youth and is using this to sell advertising for soft drinks and mobile phone companies while also raising revenue from development agencies for communicating agricultural development messages. The fifth is an initiative established as a spin-off from a university that is establishing a network of veterinary services aimed at creating self-employment for recent graduates and diploma holders and, in the process, propagating a novel approach to eliminating sleeping sickness by eradicating the parasite in the livestock reservoir.

Each of these organisations has been set up or is staffed by individuals who have both business and developmental skills as well as the specific technical expertise often acquired from research for development careers. Hence their professional networks are wide and diverse, spanning the development community, the private sector, and research and tertiary education. These initiatives are notable for three characteristics. The *first* is the provision of services and supply of inputs using market-based principles that rely on revenue from either the poor themselves or government and development assistance or usually a combination of the two. The *second* characteristic is that services provided are often of an intermediary nature, helping bridge gaps among other players in the innovation system. Alternatively the enterprises are operating as part of a wider coalition of private sector and development partners, where champion organisations have stepped forward to facilitate the connections needed to mobilise expertise and resources to tackle complex societal issues at the interface of public and private responsibility and interests (army worm control being a case in point. *Thirdly*, they often involve establishing rural networks of advisers/experts/para-workers with an explicit agenda of employment generation for rural youth as well as degree and certificate holders.

The organisations and initiatives discussed in this paper are all partners in the *Research into Use (RIU)* programme of the Department for International Development (DFID), established to experiment with and identify opportunities to bridge the gap between research and innovation. This represents a new type of donor-funded programme that spans both research and developmental objectives, with an explicit objective of understanding how to add value to existing research knowledge and, where needed, how to strengthen emerging innovation arrangements that have significant developmental potential. The initiatives were selected competitively and judged in terms of how additional capital investments in novel business models could mobilise research-derived and other knowledge for innovation[5]. The important caveat was that these business models should also explicitly service the needs of poor people.

The purpose of the paper is not to suggest that this new type of organisation, or *DevRE,* and the business models that they represent are a new development blueprint that can be widely replicated. Rather, the purpose is to draw attention to the fact that within the vast diversity of private sector activity in East Africa a range of new business models and organisational formats are emerging which, if properly understood and appropriately nurtured, could make an important contribution to innovation-driven sector development and associated welfare gains. None of them is itself a blueprint for change. Rather, they each represent a combination of illustrative approaches on how organisations can participate in an inclusive, business-for-development agenda.

We begin with a brief introduction to contemporary debates about agricultural innovation, development and the private sector. The idea of an inclusive business approach is discussed in this context. Section 3 provides some background on the RIU programme as a way of explaining the way the organisations and initiatives discussed in the case studies were identified and supported. This leads into the case studies themselves in Section 4. Section 5 draws out the key generic features of the organisations observed and the roles that they are playing in nascent agricultural innovation systems. The following section (6) reviews the extent to which the cited *DevREs* are assuming these roles. The final section (7) discusses the policy significance of the emergence of these new types of organisation and is aimed at decisionmakers in national and international arenas responsible for investments in agricultural research and innovation.

[5] RIU supports a sixth project in East Africa under the African Best Bets initiative that deals with the promotion of NERICA rice and which is not covered in this paper due to space constraints. See www.researchintouse.org

2. AGRICULTURAL INNOVATION, DEVELOPMENT AND THE PRIVATE SECTOR

A key feature of the debate about the nature of agricultural innovation in developing countries has been the understanding that that it is a process embedded in a much wider set of relationships than those implied by research-extension-farmer linkages. Biggs and Clay (1981) and Biggs (1990) talked of different and multiple sources of innovation. Röling (1992) introduced the idea of agricultural knowledge systems and the Wageningen School of Innovation Studies used such ideas to explore multi-actor rural innovation landscapes (see Engel, 1997; Leeuwis and Pyburn, 2002). At the same time two interlinked debates were also going on. First, starting in the 1980s was the global trend to revisit the role of the state in national economies. This rolled out from Europe and North America to emerging economies of South Asia and Africa as an accompaniment to development assistance and development bank investment conditionality — so-called structural adjustment. The second was the reappraisal of the role of private sector activity in innovation in the most successful economies and the realisation that innovation was not solely associated with public R&D (or even R&D, more generally) but was an activity distributed through the whole of the economy. The most successful countries were found to be those where dense networks of interaction underpinned a national system of innovation (Freeman, 1987).

This idea of a national system of innovation was later adapted to explore the innovation process in agricultural development (Hall et al, 1998; 2002; Hall, 2007). This built on the work of Biggs, Röling and others, but was much more explicit about the importance of private sector actors in the agricultural innovation process and flagged the fact that the macro enabling environment for innovation was as important as the micro-innovation activities of farmers in the rural space (World Bank, 2006). Early work rather prematurely predicted that such private sector-dependent models of innovation had potential for development goals such as poverty reduction (Hall et al, 2002). More recent writing on agricultural innovation systems has embraced a greater diversity of innovation arrangements — some more participatory, some more research–driven (Hall, 2009). This line of thinking nevertheless flags the importance of the private sector for different types of innovation activity and at different points in the innovation trajectory (Hall, 2005; 2009).

Within this broad conceptualisation the private sector has been perceived as fulfilling the following roles:

i. As a source of R&D activity and expertise (Echeverría, 1998)
ii. As a client-responsive mechanism for distributing products embodying the results of scientific research (Morris, 2000)
iii. As conduits to high-value markets and as a source of information about the nature of demand and regulation in these markets (World Bank, 2006; Kaplinsky and Morris, 2001)
iv. As a source of new business models and innovation processes that can efficiently service the needs of large markets of poor people (Prahalad, 2004; Kaplinsky et al, 2010)
v. As a mechanism for delivery services and products that sit at the interface of public responsibility and private interest, such as agricultural extension (Sulaiman, 2000) and responses to livestock disease (Dijkman, 2009) and crop pest outbreaks
vi. As a broker of intermediary agents, making links, negotiating partnerships and policies and communicating information, aspirations and agendas (Klerkx et al, 2009)

In the case of the emerging economies of Africa, much was expected of the private sector, given widespread public sector failure. Structural adjustment programmes spelt an end for important parastatal bodies such as marketing boards, which while imperfect, did often play an invaluable intermediary role in markets for key agricultural commodities. Quite often the private sector simply failed to emerge as a viable alternative to the ineffective state mechanisms. This was particularly so in marginal areas where the rural poor lived (Stringfellow, 1995).

Of course in a sense the private sector always was an important player. It has been prominent in input supply (seeds, tools, machinery, agro-chemicals) and commodity trading (including value chain supply for high-income African urban markets as well as those in Europe and North America). The real problem, however, was that such mechanisms failed to service the needs of the poorest rural households. The private sector has tended to operate in those segments of the market where it can make a profit most easily — large-scale, well-organised agricultural producers in accessible areas (for example, see the discussion of horticulture sector development in Kenya in Steglich et al, 2009). This has not necessarily mapped onto the needs and location of poor people, particularly the rural poor.

More generally there is a now a decade of well-documented difficulties in engaging the private sector as a development partner. Tensions between the public and private sectors have hampered partnership formation (Hall et al, 2002; Spielman et al, 2009). Intermediary organisations capable of brokering new partnerships with the private sector have often been absent (World Bank, 2006). Examples of successful public-private sector partnerships in the agricultural sector do exist (Byerlee and Echeverría, 2002). However, a small number of high-profile examples involving multinational corporations have been widely-publicised and these types of mechanisms have tended to dominate the debate (Hall, 2005). This has eclipsed the policy importance of strengthening the role of local private sector organisations, with a resulting neglect of the role of strengthening relationships between local private sector firms and other players within the innovation landscape (ibid).

The private sector's role in agricultural extension, intermediation and innovation brokering has also been widely discussed (Sulaiman, 2000; Sulaiman and Hall, 2004; Klerkx et al, 2009). However, experiences such as that of the National Agricultural Advisory and Development Service (NAADS) in Uganda, which relied on local private service providers, suggest that it was first necessary to create local private capacity (Kidd, 2002; Hall and Yoganand, 2004). Klerkx et al (2009) explain that such innovation brokers often find it hard to persuade both farmer clients and governments to pay for an intermediation service that is useful, but at the same time intangible.

More recently there has been discussion of the possible emergence of new business models that rely on innovation processes that respond to the existence of large markets of poor people. Prahalad (2004) referred to this as "innovation at the bottom of the pyramid" and predicted that the locus of corporate sector innovation in a globalised knowledge economy would shift from Europe and North America, so that it was contextualised within product-user environments. Kaplinsky et al (2010) refer to this as "below the radar" innovation, and argue that its location has not only shifted to emerging economic systems of China and Asia, but is often taking place outside the organisational and professional vision of the corporate sector and organised science — hence its invisibility. Kaplinsky et al suggest that these new and as yet invisible modes of innovation may have development significance for other emerging economies, particularly those in Africa.

A related concept that is currently receiving considerable donor attention is that of inclusive business models — business models that include the poor as clients and customers on the demand side or as employees, producers and business owners on the supply side. According to those promoting such approaches, inclusive business models are designed to deliver benefits for business and for low-income communities — generating profits while at the same time creating jobs, expanding access to critical products and services, and increasing incomes. For companies, these models are opportunities to pursue growth and competitiveness while leveraging core assets and activities for development impact. For development organisations, inclusive business models promise to empower the poor as economic agents and drive development in ways that are financially self-sustaining, with the potential to scale up and out (UNDP, 2008). While conceptually elegant, the practicalities of this approach have yet to take operational form.

More worrying, still, a recent review by Arora and Romijn (2009) cautions that there is very little empirical evidence that "bottom of the pyramid"-type approaches are spreading and that some of the assumptions of this type of business model are naive and unlikely to attract widespread private sector participation.

So despite well-founded arguments of the importance of private sector organisations in a variety of roles related to agricultural innovation and development what, in fact, is the reality? Can the private sector really play a role that truly has developmental significance as part of its own business model? Or does its role extend no further than corporate social responsibility and all the limitations that accompany that idea? Does a private sector that can play this role even exist? Or will the needs of agriculture-dependent poor people need to be met by public agencies and public money for the foreseeable future? Can the dream of collaboration for innovation, profit and development become a reality?

3. THE RESEARCH INTO USE (RIU) PROGRAMME

The *DevREs* discussed in this paper have come to attention as an identifiable class of organisation as a result of the DFID-sponsored Research into Use Programme (RIU). The RIU programme began in July 2006 as a follow-up to DFID's £220m investment in the Renewable Natural Resources Research Strategy (RNRRS), its flagship agricultural research funding mechanism between 1995 and 2006. The final evaluation of RNRRS (Spencer et al, 2005) suggested that while it had generated good scientific research, its development impact had been modest. Hence RIU was conceived as an activity that would link together the many agents involved in innovation — policymakers, researchers, suppliers and end users — and enable a system that uses research to benefit the poor. One component of this programme is that of "Best Bets". These were originally conceived as technologies that show promise for simply being rolled out by the private sector. However, it subsequently evolved into a series of exploratory projects with a range of activities with large entrepreneurial content. These are being supported as a way of facilitating technology diffusion as well as helping nurture the kinds of linkages needed to underpin a sustained capacity for innovation. RIU is using these as applied policy experiments to learn how to link research and innovation.

This represents a new type of donor-funded programme that spans both research and developmental objectives. It has an explicit objective of understanding how to add value to existing research knowledge and, where needed, how to strengthen emerging innovation arrangements that have the potential to be of developmental significance. The selection of these partners mimicked a venture capital investment selection process. They were, thus, judged in terms of how additional capital investments in novel business models could mobilise research-derived and other knowledge for innovation. The important caveat was that these business models should also service the needs of poor people. This often involved developing markets among the poor for new technologies and expert services so that once developed the private sector could supply these in a sustainable way. As would be expected an open call for proposals that would fulfil these criteria elicited applications from organisations and clusters of organisations that are operating at the interface of enterprise activity and developmental concerns. The 5 short case studies that follow were organisations and projects selected by RIU.

4. CASE STUDIES OF *DEVRES* AND ASSOCIATED INITIATIVES

(i) Case Study 1: Real IPM Company

This case examines the way The Real IPM Company developed as a response to an emerging market for bio-control systems in the horticulture and flower export sector. The company has developed a business model that blends conventional revenues for its expert services and bio-control products with development assistance money, often through challenge funds, in order to develop products and services that can be sold to small-scale producers. Such initiatives usually involve complex partnership agreements. RIU's support to Real IPM is an example of market development funding to create a sustainable revenue stream from supplying products and advice to poor people.

Origins

The Real IPM Company is a Kenya-based company established in 2004 to commercialise biological control pest agents for the horticultural industry. Its origins can be traced back to 2000, when Kenya's largest horticultural and floriculture exporter, the Flamingo Holdings Group (better known as Homegrown Company), established Dudutech as a subsidiary to develop biological controls systems to reduce pesticide use in the horticulture/ floricultural sector. Dudutech was established as a response to regulatory issues in its major market of Europe; there was a both a need to reduce pesticide residues, but also human rights issues associated with exposing workers to these during application. The company's first major success was the development of a control agent spider mite in roses with the use of Phytoseiulus persimilis (a predatory mite of red spider mite). Bio-control systems for this and other pests are now widely used in the industry.

Two of the key personnel brought into Dudutech to develop mass-rearing capabilities and integrated pest management (IPM) protocols were an independent IPM consultant from the UK and a former Professor of Horticulture who had worked in agricultural research at the Natural Resources Institute under the UK's Overseas Development Assistance (ODA) programme (Labuschagne, 2004). These two experts established Real IPM in 2004 with a vision of practical, sustainable and affordable reductions in pesticide use for both large-scale commercial growers and small-scale subsistence farmers throughout Africa and elsewhere.

Mission

The company's mission statement explains that it brings "innovation, experience and above all a passion for empowering growers to self-reliance in low-pesticide regimes, in plantation crops, cereals, fruit, vegetable and flower crops" (http://www.realipm.com/aboutus.asp.) Real IPM staff has worked in Kenya, Tanzania, Ethiopia, Uganda, Rwanda, Zambia, Mozambique, Madagascar, Zimbabwe, South Africa and Ghana.

Real IPM's website explain its niche as one of providing a comprehensive suite of training and consultancy packages aimed at bringing clients up to speed on all aspects of best practice in sustainable pest and disease management programmes, with particular focus on compliance with the regulatory regimes governing imports of fresh produce into the EU (food safety, pesticide residues etc). The company also produces and sells seven biological control agents to deal with a range of crop pests.

The company currently employs 80 staff, including nine graduates, and has an annual turnover of £600,000. The company has a number of revenue sources. It sells its services and products to the horticultural industry and elsewhere in a conventional way. It also sells its services and products to both the industry and to small-scale producers via project funding. For example, it implemented a project under the Pesticide Initiative Programme (PIP), an EU-funded project managed by COLEACP (Europe-Africa-Caribbean-Pacific Liaison Committee). Development projects include projects from DFID's Business Services Management Development Programme; USAID's Kenya Horticultural Development Programme; USAID's Ethiopian Agribusiness and Trade Expansion Programme; USAID's Honduras Rural Economic Diversification programme; USDA's Ethiopian Technical Cooperation Extension programme; the Dutch Ministry of Economic Affairs' Agency for International Business Cooperation (EVD); SIDA's Bio Earn Innovation Programme; and World Wildlife Fund and The Obsolete Pesticides Stockpile Programme.

Another source of revenue has been through various businesses for development challenge fund-type arrangements. For example, Real IMP applied to the Business in Development network for support to develop a partnership with the Kenyan Agricultural Research Institute for the purpose of commercial mass production of nematodes for bio-control of thrips — a major pest in subsistence and export crops. Similarly Real IPM was awarded a matching

funded contract to commercialise Fusarium oxysporum f sp Isolate Foxy 2 as a mycoherbicide for Striga (a parasitic weed of maize) by the African Enterprise Challenge Fund (AECF).

Real IPM does not view its commercial focus on the small-hold sector as corporate social responsibility and has set up a not-for-profit wing call Real Impact for CSR purposes.

The focus of its activities under RIU is the promotion of an already-developed bio-herbicide to control the parasitic weed Striga, and the use of seed priming. As mentioned above, a project focused on the registration and production of the bio-herbicide had been supported with a matching grant from the African Challenge Fund. The RIU project is entirely focused on promoting the micro-herbicide seed treatment technology along with good agricultural practices to subsistence maize farmers. The initiative is promoting small seed treatment packs for farmer-saved seed. Popularisation of the approach will improve subsistence maize production and, at the same time, create a market for Real IPM's biological control agent fusium sp.

RIU support is being used for:

- The establishment and training of a support network of 100 field workers of national programmes, NGOs, etc.
- Promoting the technology through radio programmes and advertising, and communication via a text messaging service
- Support for farmers in three successive waves of plantings in Nyanza province by distribution of small-scale technology packs to 48,000 farmer households

The implementation of the project involves a number of partnerships with European universities that are responsible for developing the Striga bio-herbicide seed treatment and improved agronomic practices for maize production. Other partners include the Kenyan Agricultural Research Institute, which has an extensive collection of beneficial micro-organisms with potential for bio-control applications.

The financial benefits of the RIU project to small-scale farmers are estimated at 1,800 Ksh per hectare, or 250 kgs/ha of increased maize yield per crop, more in heavily Striga-infested

fields. The estimated value to the rural economy of the target area (Nyanza district) will be 25.9 million Ksh (around $300,000) in one planting season, assuming an uptake of 10% of the households. Expected returns to Real IPM have not been disclosed, but with a target of 48,000 farmers in the first two years long-term revenues could be substantial.

(ii) Case Study 2: Farm Input Promotions – Africa (FIPS-Africa)

FIPS is a Kenyan not-for-profit company established in 2003. Its unique feature is the mass promotion of improved technology through small, affordable packs of seeds and fertilisers. Its operations in some of the poorest areas of Kenya has shown that farmers who are encouraged to try out new technology using small affordable packages return to their local stockists to purchase ever-larger quantities of inputs, thus improving food security independently without the need for credit or handouts. This strategy has reduced four main constraints to fertiliser usage: (a) availability of appropriate fertilisers, (b) unit cost of standard bags of fertilisers; (c) inefficient fertiliser use, and (d) private sector unwillingness to invest in development of markets for small-scale farmers. (http://www.worldbank.org/afr/fertilizer_tk/documentspdf/FIPS_SmallPacks_Demos.pdf)

FIPS has also had a good track record of providing farmers with access to new varieties from national research organisations. Activities under the RIU project — which involves a wide coalition of public and private actors — focus on strengthening local advisory agents to help popularise the small seed and fertiliser packs. RIU support is also helping strengthen the market orientation of FIPS.

Origins

The origins of FIPS Africa can be traced back to 1990 with the establishment of a Kenyan NGO called Sustainable Community Orientated Development programme (SCODP), which aimed to make fertiliser available in small packages to farmers who were previously unable to use it due to high costs. SCODP set up a network of shops and within five years each was selling 10 tonnes of 1-2 kg packs of fertilisers (rather than the 50 kg pack sold by most agricultural dealers).

By 2003 SCOPD realised it needed to broaden its scope beyond fertilisers into seeds and that this would need a different organisational structure that not only had a broader reach and stronger links with research organisations but also a stronger negotiation role to help make

appropriate inputs available through existing retail channels. FIPS was set up as a commercial entity (rather than as an NGO) specifically so that it could deal more effectively with input suppliers. FIPS employs small teams of promoters who work on market days to encourage farmers to take mini-packs of seeds along with other purchases. Notable successes include the widespread promotion of streak-resistant maize varieties. The company has developed relationships with a large number of leading private sector, input-supply companies, and scientists at NARCs and is now seeking to partner with a novel youth communications initiative to popularise its extension messages to a much larger audience (more on this in the next case study)

Mission and Niche

FIPS thus built on the work of SCOPD. It developed an approach that explicitly identified the farmer as its partner. It works with any source of information in an area (from NGOs, private companies and researchers) to identify major constraints. Farmers, using mini-kits and simple experimental protocols, are encouraged to test for themselves the most promising options (Blackie and Albright, 2005). FIPS places great emphasis on this process of "empowering farmers to use new technologies".

FIPS describes itself as an honest broker. Its initial source of funding came through project grants from the Rockefeller Foundation and DFID's Crop Protection Programme. Later on USAID and AGRA (Alliance for a Green Revolution in Africa) provided support.

FIPS' proposal to RIU was to engage the youth as agricultural advisors and scale up this activity to reach many more farmers in target regions.

RIU Support is being used for:

- *Input Supply*: A continuation of the small seed and fertiliser packs, but with an expanded range of products.
- *Technical Advice*: Expansion of FIPS-Africa's networks of village-based agricultural advisers in target districts. These advisors are mainly unemployed youth who, with limited employment opportunities available in rural areas, would otherwise migrate to Nairobi.

- *Business Development:* Providing incentives for its advisers to generate income from selling fertilisers and seeds directly to farmers. Advisers also generate income from vaccinating local poultry against Newcastle disease. The rationale is that this motivates staff to reach more farmers, and provides an exit strategy for staff after cessation of donor funding. In addition FIPS-Africa works closely with two firms in the private mining sector to supply small affordable packs of fertiliser input, thus creating jobs in the formal sector. The intention is to formalise this relationship and enable FIPS-Africa to benefit financially.

FIPS estimates that there are approximately 12 million small-holder farmer families in the region to which this range of products/technologies could be offered. It predicts that funding under RIU will enable the initiative to reach approximately 10% of these farmers

(iii) Case Study 3: Well Told Story Ltd. — Shujaaz FM Radio and Comic Strip

This case discusses a relatively new company called Well Told Story Ltd. It was established by a commercial media professional to exploit what he perceived to be a niche in the market that sits between development communication and commercial advertising. The company has targeted teenagers and young adults. Kenya, like many emerging economies, has a large young population. Farming holds few attractions for them, but in rural areas there is little else in terms of employment opportunities. Well Told Story Ltd recognised the need to give teenagers and young adults important life messages, but recognised the challenge of doing so without being patronising. The company also recognised that this large population was also the same market segment that soft drinks and mobile phone companies want to target their products to.

Origins

As a vehicle for its business model Well Told Story Ltd. has developed an FM radio segment and comic strip called *Shujaaz* — Swahili slang for ‘heroes’. These describe a world that is recognisably Kenyan and populated by characters such as Boyie — roughly translated as geezer — a geeky-cool school-leaver with a shock of dreadlocks, glasses and a pirate radio station in a shed. Then there is Maria Kim, the foxy teenager who plays mum to her little brother in a slum shack and has to avoid predatory men on her way to school, and Charlie Pele, the football-mad 14-year-old living with his father in a camp for people displaced by the violence that tore through Kenya after the 2007 elections. The speech bubbles are in “*sheng*”,

a blending of English and Swahili slang that has become the language of Kenya's youth — adults don't get it, which is just the point. *Shujaaz* is distributed once a month across Kenya inside the *Daily Nation* newspaper. (More details can be seen at http://www.timesonline.co.uk/tol/news/world/africa/article6966930.ece)

A website (http://www.shujaaz.fm/) and a daily radio show simulating Boyie's pirate station have also been launched. When Boyie asks his comic strip audience to text him the real audience will be able to join in, blurring the lines between fiction and reality as the comic book characters take on real lives. This, therefore, creates an interactive mechanism for communicating with a key target group for development efforts as well as a key market for phones and drinks and other companies.

Initial support for Well Told Story came from the British High Commission in Nairobi. RIU support was initially to be used to link Well Told Story with the FIPS initiative mentioned above, but it has been supported separately to allow it to pursue a wider agenda.

The first comic book was distributed through the *Saturday Nation* in February 2010 (200,000 copies). Around 300,000 copies of the first edition were distributed in March (staggered over two weeks) through 9,000 Safaricom Mpesa (mobile phone-based money transfer services) kiosks. An example of a story funded by RIU is that of dyeing chickens pink (which protects poultry from aerial predators). While a fun story, poultry could still be easily sold and so the story provided ideas that readers could then use and generate cash. Examples of the messages transmitted can be seen in Table 1.

Table 1. Extension Messages

Edition	Date	Story supported by RIU funding
1	February 27, 2010	Pink chickens – protected against birds of prey
2	March 27, 2010	Breeding Termites as chicken feed
3	April 24, 2010	Manual box baling of maize stover
4	May 22, 2010	Solar Drying technologies for Fruit Improved Sweet Potato vines
5	June 26, 2010	Chicken Vaccines
6	July 24, 2010	New Maize Varieties & Seed Priming

Well Told Story Ltd. estimates that through its radio, website and comic strip it will reach more than 6 million youths each month.

(iv) Case Study 4: CABI and EcoAgriConsult Initiative on Community-Based Control of Army Worm

This case discusses a consortium of researchers, NGOs and government ministries that have joined forces to tackle a migratory pest, the African Army Worm (*Spodoptera exempta*). What is notable here is the way CABI has been able to broker this consortium and the way it has been able to persuade government ministries in both Kenya and Tanzania to address the public good issues of migratory pest control in a novel way. The novelty of the approach is that it (a) firstly, combines pest prediction with pest control (b) secondly, uses it to involve communities in these activities and (c) thirdly, mobilises the private sector to provide pheromone traps for forecasting and bio-control agents. RIU is supporting market development through training and social marketing.

Origins

African army worm is a moth that produces caterpillars in such high densities that they appear to march across the landscape. The caterpillars feed on all types of grasses and have become a major problem for food production in many parts of East Africa. Moreover it is a problem that conventional extension services have a hard time dealing with, since by the time the outbreak has been recognised countervailing measures are relatively ineffective.

The consortium working on these initiatives actually started life as two separate consortia, one dealing with prediction and one dealing with control. Both consortia had long-established partnerships built around a series of research projects developing the prediction and control approaches. These consortia have been expanded (and now merged) to involve both government agencies responsible for migratory pest control and the private sector as a source of diagnostic materials and control measures.

The initiative supported by RIU involves 2 elements:

i. *Forecasting traps:* These use pheromones to attract female moths and are placed in villages to indicate when an outbreak is due

ii. *A Biopesticide, SpexNPV,* produced by a private firm EcoAgriConsult, which is then sold to the villages where the outbreak is forecast

The main focus of RIU involves training and popularisation at the community level and hence market development for a system that relies on the private companies to supply traps (for predictive purposes) and bio-control agents

The initiative's key characteristic is the creation of networked capacity for innovation among all relevant stakeholder groupings. The project is led by CABI Africa (an international research-based NGO) and closely assisted by a Tanzanian consulting firm (EcoAgriConsult) and other technical groups. The team is working with suppliers to ensure that the forecasting pack (pheromone and trap) is made available to communities so that they can forecast invasions. One of the companies involved will also establish a facility for making the biopesticide SpexNPV. It is likely that the forecasting packs will be available before SpexNPV has been given usage permission by the regulatory authority, but in the short-term synthetic pesticides will be used in conjunction with the forecasting. Both products will need to be sold widely to be financially viable. The success of this initiative may therefore be dependent on expansion throughout East Africa.

(v) Case Study 5: Stamp out sleeping sickness

This case discusses the way a consortium based around the Faculty of Veterinary Medicine (FVM) at Makerere University, Uganda has developed and supported a model of livestock disease control based around establishing micro-enterprises in rural areas to provide livestock health services. The initiative emerges out of many years of research on the target disease and has been made possible by policy changes within Uganda that have made an alternative approach to disease control possible. These policy changes have also been supportive of the enterprise and employment creation emphasis in the initiative and this has aided its expansion. An organisational innovation within the university involved — the newly-created *Institute for Strategic Animal Resource Services* — and a partnership between this and a private company is a notable feature of the case. RIU is supporting the expansion of the enterprise-based rural health services.

Origins

Livestock is critical to the livelihoods of poor people in many parts of rural Africa. Unfortunately livestock is also susceptible to a range of diseases (mainly vector-borne in the

tropics), affecting growth and health. Trypanosomiasis (commonly known as sleeping sickness) is one such disease. It is caused by unicellular protozoan parasites, termed trypanosomes, which are carried by the tsetse fly in Africa and propagate in the blood and tissue fluids of their hosts. The disease is also always fatal to humans if left untreated and is hard to diagnose.

RIU is providing support to build on an initiative known as The Stamp Out Sleeping Sickness (SOS) project. At the time of writing this has now been operational for 3 years. It is currently being run through a loose consortium based at the Faculty of Veterinary Medicine (FVM) at Makerere University, Uganda. Partners and interested parties include cattle owners, district veterinary officers, universities (mainly Edinburgh and Makerere), the corporate sector, donors, and national regulatory authorities. The component being funded by RIU is supporting a public-private partnership designed to create small veterinary businesses. The rationale behind this is that unless steps are taken in this direction veterinary care will continue to remain within the province of charities and NGOs and the "corporate social responsibility (CSR)" activities of international private companies. As such it will remain a "dependent" activity, reliant on outside inputs and in this sense not integrated into national capacity building.

FVM is doing this by creating a new *Institute for Strategic Animal Resource Services (AFRISA)* linked to (but financially independent of) the University of Makerere. Part of this new institute is a body designed for in-training community service delivery. The University sees this as a generic mechanism for equipping graduates for a labour market that is no longer satisfied by the supply of traditional university degree-holders. Instead, the demand is for graduates who not only possess saleable business skills, but are also capable of actually generating their own jobs virtually from scratch. Under this programme (which is still at a formative stage) veterinary students spend the final year of an undergraduate degree entirely in a commercial activity and producing at the end a project report that is assessed as a key component of the final degree. In the SOS case, and in co-operation with a private veterinary health products company, final year undergraduates participate in block treatment of cattle and ancillary spraying activities. A small number of these undergraduates have been invited to set up small businesses under the supervision of the private veterinary company.

5. CONTOURS OF THE BOTTOM-UP BOTTOM-LINE BUSINESS MODEL AND *DEVRES*

The organisations and initiatives discussed above, while all being quite different in their approaches, have certain common features. These features, which relate to their origins, staffing and ethos of the organisations, separate them from mainstream private sector activity. This is important because these are not CSR wings of enterprises driven by conventional motivations and market forces. Instead development-relevant activities are an integrated component of their business model and strategies. This not only makes them viable, but also a reliable development partner as developmental activities are integral to their own sustainability. These features include:

(i) Origins that blend research, enterprise and development expertise

The organisations are all spin-offs from research-based and developmental research-type activities. Their selection by an aid programme somewhat skews the prevalence of this characteristic, but it is nonetheless important. Two of the organisations — Real IPM Company and EcoAgriConsult — have origins in science-based conventional private sector organisations selling expert service and products for bio-control, which have now shifted or expanded their attention to make these services and products available to the subsistence farming sector. Others have emerged out of donor-funded development research projects that have helped lay a foundation for the establishment of independent companies — for example, FIPS. In other cases organisations have been drawn into bigger initiatives that are the continuation of earlier developmental research — for example, the army worm and sleeping sickness cases. The result is that these organisations and initiatives are led and/or staffed by individuals with backgrounds that combine enterprise, research and developmental skills and perspectives. The result is organisations with mission statements that blend these perspectives with an emphasis given to delivery (of services and products), innovation (applying and sharing knowledge from research and elsewhere) and welfare (of poor people). These characteristics are very similar to those of social entrepreneurs, but seem to be explicitly positioning them in the space between market-based and social entrepreneurship (see Hall 2010)

(ii) Blended bottom-up/bottom-line business models

The next feature is a reflection of these mission statements and is manifested by their business models, which blend revenues from sale of products and services and revenue via development assistance projects. Some of the organisations have an explicit agenda of selling services directly to clients (for example, Real IPM Company), but nevertheless also rely on project-type funding. The poor are explicitly viewed as a market. Others, such as FIPs-Africa, classify themselves as not-for profit companies that rely exclusively on project funding, while still retaining many private enterprise features (RIU is supporting a shift to a more commercial/ cost recovery-based approach). Others again, such as Well Told Story Ltd., are quite explicit in a desire to rely on both commercial (advertising from soft drinks and mobile phone companies) and development revenues. What becomes apparent from these cases is that there is currently sufficient development assistance funding available to allow such blended business models to work. In other words development assistance funding is creating a market for the services and products of these *DevREs*. Innovations in business-friendly development funding have also probably (and unintentionally) contributed to the creation of this market and the emergence of *DevREs* as a new class of private enterprise. Such funding innovations include the RIU Programme; the Business in Development network; the Africa Enterprise Challenge Fund; and the DFID-supported Research into Business fund.

(iii) Investment in developing markets of poor people

Most of the organisations and initiatives discussed explicitly recognise that the market of poor consumers is underdeveloped. The poor as a market are unorganised and this prevents the articulation of demand for products and services. This means that opportunities for business are hard to spot and risky. Often the poor simple don't have information about products and services and the value of these, and therefore don't demand them. Investment in creating this market through promotional activities is too high and risky for most early stage and small (and even large) businesses. A common feature of the *DevREs* is that they use development assistance support to develop this market made up of poor people. In part this means acting as an intermediary to link poor clients up to existing information as, for example, FIPS-Africa's link to research institutes. But more often it also involves promoting technologies and ideas to the poor so that once exposed to these ideas they then become a market for these products and services — for example, the Striga control products sold by Real IPM. Sleeping sickness control works in a similar way as it is demonstrated as part of a bundle of livestock health remedies that poor livestock keepers are willing to pay local self-

employed veterinary graduates to administer[6]. The use of public funds to develop these markets fills a gap in conventional marketing systems that is preventing the conventional private sector providing products and services to the poor. It is notable that achieving this has required an interconnected set of institutional and organisational innovations on the part of donors, private organisations and, in the case of sleeping sickness control, universities also. (For a comparison see the marketing systems development approach of IDE; Clark et al, 2003; Hall et al, 2007).

(iv) An explicit self-employment agenda

A number of the initiatives discussed have an explicit employment generation agenda. This takes the form of enabling local people to set up businesses as field agents to promote new approaches that the *DevREs* or its partners can then sell. Alternatively it involves blending of technology promotion and employment generation, such as in the sleeping sickness case. What is also important to note is that while this greatly decentralises expertise, often to the village level, the *DevREs* themselves often act as a support structure for this capacity, linking it to a continuous stream of new ideas and products and complementary inputs, such as credit. The Well Told Story Ltd. example continues a similar theme, but in a slightly different way. It recognises that in a predominantly young population exposure to ideas for self-employment might be the only viable option. For demographic reasons one would expect this focus on self-employment generation to emerge as much more significant in the future.

(v) The centrality of partnerships

Partnerships are now so widely-discussed that it is easy to overlook the significance of such a mechanism. Partnership, however, seems to be a crucial element of the bottom-up/bottom-line business model. Partially this reflects the fact that some of the initiatives that the *DevRes* are working in are at the interface of public responsibilities and private interest — for example, the private sector supply of pheromones for control of the migratory pest army worm, or the use of self-employed vets for sleeping sickness control. Other cases illustrate the way partnerships are used to bring together different ideas and expertise — for example, the way the Real IPM Company example has brought in scientific partners who have expertise and informal proprietary rights to technologies. This has then been blended with the

[6] Morton argues that there may be years when poor livestock keepers will simply be unable to pay for health services and that this challenges the sustainability of a purely market-supported mechanism. Rather than this being a flaw in the approach, it points to the need for support from the public purse in difficult times. This, in turn, points to a development model that blends market-sourced and public sourced revenues. (Morton, 2009)

marketing (and technical expertise) of the Real IPM Company. A related aspect of this is the way the staff of the *DevREs*, with their blended backgrounds of enterprise, research and development, have wide professional networks and feel quite comfortable in all three domains. This appears to reduce barriers to partnership and allows them to take advantage of such collective approaches.

(vi) Delivery of impact at scale

While no systematic evaluation has been undertaken of the impact of the *DevREs* discussed, for the activities under the RIU programme impact projections have been made (see Table 2). Even if these are relatively optimistic, once combined with the wider set of activities that *DevREs* are involved in it suggests that this class of organisation is already making a major contribution to development goals.

Table 2. RIU Projections of Impacts from its Best Bet Projects

RIU programme/project	**Scale and type of impact on small-scale farmers**	**Projected total number people to be impacted**[7]
Best Bet FIPS-Africa	1.5 million farming families in East Africa benefit from increased food security through improved access to improved crop varieties and farming practices	7,500,000
Best Bet Well Told Story	8 million young Kenyans reached exposed to improved agricultural practices and ideas for incoming generating activities through multi-media communication initiative	8,000,000
Best Bet Real IPM	48,000 farming households; 240,000 people have first-hand experience of *Stopstriga* on their own plots 4,900,000 people exposed to radio messages about *Stopstriga*	240,000 4,900,000
Best Bet CABI -	120 villages covered by improved armyworm forecasting and response systems; equivalent to	60,000

[7] One farming household is assumed to consist of 5 people

EcoAgriConsult Armyworm control	12,000 farming households	
Best Bet exemplar Stamp Out Sleeping Sickness	10,000,000 Ugandans protected from risk of sleeping sickness	10,000,000

Source: RIU 2010

6. ROLE OF *DEVRES* IN AGRICULTURAL INNOVATION

The discussion in Section 5 identified 6 potential roles for the private sector in agricultural innovation systems. To what extent are the cited *DevREs* assuming these roles?

(i) *As a source of R&D expertise*: A number of these organisations have considerable in-house R&D expertise. Real IPM Company and EcoAgriConsult are obvious examples with their bio-control research application expertise. In general the cases observed, because of a common history in emerging in association with development research, all have staff with research and technical expertise. Even if they are no longer actively engaged in research they can identify research problems accurately and draw on their professional networks to access R&D expertise and services to address these.

(ii) *As a client-responsive mechanism for distributing products and services, embodying the results of scientific research and other types of information*: This was probably the most common role observed with an element of this in all the *DevREs* and associated initiatives observed.

(iii) *As conduits to high-value markets and as a source of information about the nature of demand and regulation in these markets*: It would be expected that an organisation playing such a role would be part of a value chain connected to distant markets. There is no such organisation in these examples, although it doesn't discount the possibility for this to occur (Fairtrade companies like *Tropical Whole Food* would be an example (Hall 1995). A related role is that played by Real IPM Company and EcoAgriConsult in their wider set of activities (enabling pesticide reduction in horticultural production), which have been a response to regulatory environments, particularly those in Europe.

(iv) *As a source of new business models that can efficiently service the needs of large markets of poor people*: The selection of these *DevREs* was partially on the basis of them having a business model that served the poor, so it is not surprising that the *DevREs* and associated initiatives observed here are playing this role. Perhaps it is more useful to note how such business models had been developed. FIPS-Africa, for example, came out of piloting in-development

research projects. Real IPM Company was a commercial model applied to developmental objectives. Well Told Story was a genuine hybrid from its inception. What is notable is that the central entrepreneurial figure has made a personal commitment to service the needs of the poor and this ethos is inseparable from their business models.

(v) *As a mechanism for the delivery of services and products that sit at the interface of public responsibility and private interest, such as agricultural extension and responses to livestock disease and pest outbreaks*: Again, all of the *DevREs* have elements that involve an agricultural extension-like role (traditionally the preserve of the public sector). FIPS-Africa places great emphasis on empowering local field staff to deliver information to farmers, although (as discussed below) this is a much more contemporary and expanded interpretation of the role of extension. In other cases, such as Real IPM Company, extension-like promotion of new technologies and agronomic practices is part of the bigger agenda of developing new markets for Striga control seed treatments. The example of EcoAgriConsult and sleeping sickness both demonstrate the way human health and migratory pest outbreaks (a traditional preserve of the public sector) are being dealt with through consortia that include *DevREs*.

(vi) *As a broker or intermediary agent, making links, negotiating partnerships and communicating information aspirations and agendas:* The cases illustrate a number of different aspects of this critical role in connecting up innovation systems. FIPS-Africa plays exactly the role that Klerkx et al (2009) discuss in terms of innovation brokering. FIPS links farmers to research organisations and to the private sector. It negotiates release of varieties suitable for the subsistence sector. And it persuades input supply companies to produce seed and fertiliser packs at a scale suitable for this sector. It also engages in policy debates on behalf of farmers to address innovation framework conditions. However, it also suffers from the revenue problems that Klerkx et al explain relate to the provision of an important yet intangible service. As a result FIPS has the business model that, of all those discussed here, is most dependent on development project funding. In other cases the *DevREs* or their associated initiatives are acting as a framework that links field agents and *expert* services providers with central sources of expertise and new ideas. Finally, Well Told

Story Ltd. plays an almost classic information dissemination role that, while no longer seen as the main task in the contemporary vision of agricultural extension, is nevertheless a critical one.

7. CONCLUDING POINTS

What, then, is the significance of *DevREs* for research and innovation investments? A caveat to the following comments is that this is obviously quite a small sample of organisations and the activities associated with RIU at a formative stage. Nevertheless, the portfolios of various challenge programmes in operation mentioned earlier in this paper suggest that there are many examples of this type of organisation and that therefore it is of sufficient importance to warrant policy attention by development planners — particularly those interested in mobilising research and innovation for development purposes.

At a very simplistic level it can be seen that the bottom-up/bottom-line business model embodied in *DevREs* can be used to help transfer research-derived ideas and products to poor farmers and consumers. This simplistic interpretation undervalues such initiatives and could misinform relevant areas of policy. The much more important role of *DevREs* agents involves strengthening the capacity in an innovation system sense. That is to say that they have a critical intermediation role, creating links between different elements of the innovation system and allowing it to transmit ideas and respond to opportunities and challenges with new ideas and solutions. The cases here also demonstrate an intermediation role in policy arenas — see, for example, the negotiation of pesticide regulatory regimes or the policy changes associated with graduate employment in Uganda.

This is not to diminish their role as sources of R&D, as suppliers of products and services, etc., as outlined above. Rather, it is to emphasise the importance of a brokerage role that is currently not played by any other actor within the African agricultural innovation architecture. It could be argued that public agricultural extension has had a mandate of intermediation, linking up farmers and researchers. Unfortunately not only has extension largely struggled in this respect, but worse still its mandate and role has not been expanded to encompass the wider set of “linking” and intermediation roles that are required in contemporary African agriculture. This involves linking to markets and market demands, to private sector players in the value chain, to policy actors and much more. Even if there was policy agreement on assigning such an expanded role to public extension it is highly unlikely that its structures and institutions could achieve the radical transformation required (Rivera and Sulaiman, 2009). NGOs sometimes substitute for extension, but often they lack technical

expertise and networks and have ideological encumbrances (for example, Scoones and Thompson, 2009).

But the message here is not about the role of the private sector as a substitute for the public sector in a role of connecting up different actors. Instead it needs to be seen as an entrepreneurial strategy central to the business model — the initiatives all rely on the *DevRes* being embedded in a network and the *DevRes* often need to knit together these consortia to make their business models work. For example, Real IPM has developed strong links with both international and local research organisations. The EcoAgriConsult army worm case involves a complex consortium of public and private actors. Not only do these networks create capacity to address the immediate challenges and opportunities at which they are addressed, but more importantly they build up experience and a tradition of public, private and development actors working in partnerships to achieve both developmental as well as profit objectives.

This sort of institutional change — i.e., partnering as a routine way of working — is currently the "rate limiting step" in the operationalisation of ideas such as inclusive business approaches and a raft of other public-private sector-based innovation models. The value of RIU's approach is that it not only helps promote developmentally-relevant business models, but, in addition, because of its focus on this new type of private enterprise that is partnership-dependent, it widens opportunities for different public, private and development actors to gain experience of working in mixed consortia at the intersect of profit and public good. RIU-type interventions will, therefore, make their most important long-term contribution in terms of stimulating the types of institutional change needed to strengthen the capacity of African agricultural innovation systems.

How does this translate into wider policy messages? The major message is not that the private sector in the form of *DevREs* can substitute for the old technology transfer role of public extension — although this is only one of the things that they can do. However, it does seem to suggest that *DevREs* — in their diversity of forms and roles within wider initiatives — can act as an important vehicle in strengthening overall innovation capacity. This is strengthening capacity in terms of an explicit intermediation or brokering role, linking others together. It is also strengthening capacity by using those intermediation and brokers' skills as part of a partnership-dependent business model that has the wider effect of broadening

experiences of working in new ways throughout the sector. Together this suggests that public investors interested in promoting research and innovation for development could achieve many of their goals by providing support to *DevREs* and the bottom-up/bottom-line business models that these embody. Not all countries are likely to have the necessary diversity of *DevREs* needed to cover all public sector responsibilities in promoting research and innovation. The cases in this paper, however, suggest that providing challenge fund financing for private participation in development agendas seems to have a catalytic effect in stimulating the emergence of a diversity of these types of organisations.

The RIU experience also has some more specific lessons. Programmes of this sort need to make special efforts to identify opportunities associated with *DevREs* and emerging business models. This might involve scouting for opportunities as well as novel selection procedures that mimic venture capital investment decision-making, and that integrate developmental objectives. *Into use* programmes should not be based on the assumption that research has been completed and that technological opportunities await commercialisation. The RIU experience suggests that the real task is to identify business models that are successful in using ideas and which integrate research expertise to allow a continuous process of innovation. Sometimes this will involve companies based around a specific technological theme, such as the Real IPM, and other times it will be more generic, such as FIPS. Both, however, have strong links into research. In other words unlike research and extension the "into use" activities are not a messenger to transmit research results, but actually a new way of integrating research into the innovation process. Anything that RIU can learn on how to do this better will be extremely valuable as it could lay the foundation for a new enterprise-led approach to innovation for development.

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