

Promoting innovation for inclusive rural transformation in South Africa

Executive summary

How can science, technology and innovation (STI) be harnessed for inclusive rural development in South Africa? Given the increasing amount of attention, resources and planning being devoted to rural development in South Africa, but with seemingly little desired impact, this question is vital. The innovation policy framework pays scant attention to rural innovation systems, which tend to be heavily localised and informal and are increasingly extending beyond the agricultural subsector (Hart et al. 2012). Innovations in other social and economic sectors to uplift vulnerable communities in rural areas are gaining momentum and deserve close attention in research and policy.

Evidence from the Rural Innovation Assessment Toolbox (RIAT) pilot study throws light on the dominant characteristics and mechanics of rural innovation in four of South Africa's Rural District Municipalities (RDMs). Networks of rural actors operating in

marginalised and remote localities are in the forefront of diffusing, adapting and adopting innovations. Current rural innovation systems include innovation activities across the primary, secondary and tertiary economic sectors. The community services sector is significant, as are public and non-profit enterprises in their roles of adopters and diffusers of innovation. Private enterprises are important with regard to adoption and adaptation. Despite the apparent local nature of rural innovation systems, they require strong links to areas outside the rural municipalities in order to obtain information relevant for innovation adoption, diffusion and adaptation. The resilience of these complex rural innovation systems can be bolstered with measurement tools to systematically map them and inform appropriate support.

This policy brief recommends three immediate policy actions to better understand the dynamics of rural innovation and how effective public support can strengthen innovative learning and capability development:

- Invest in rural innovations with large and lasting developmental spinoffs for rural communities.
- Facilitate the construction of resilient and inclusive actor networks to drive catalytic rural innovations.
- Develop appropriate measurement tools to monitor, assess and enhance the performance of rural innovation systems to assist policy-makers, government departments involved in rural development and innovation, the broad spectrum of rural innovators and the innovation research community, to utilise and support these pathways and value chains.

Introduction

The 1996 White Paper on Science and Technology remains a cornerstone of South Africa's STI policy and of the National System of Innovation (NSI). Reference to poor and marginalised households in this policy framework makes the White Paper a critical institutional lever for inclusive

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development. This is pertinent to rural areas¹, in which a disproportionate number of destitute and vulnerable communities live and work, particularly in the former homeland regions, which historically suffered from a lack of investment and development.

If innovation² is to be harnessed effectively for equitable rural social change, several conditions must be met. These include: results-driven implementation of programmes, efficient institutional coordination and sound evidence of policy learning, and enhanced innovation capabilities. To this end, this policy brief reflects on evidence from a new pilot study to enable a better understanding of the nature and workings of rural innovation systems and the critical roles of rural actor networks in these contexts. It also recommends actions for efficacious policy support for rural innovation.

Innovation for smallholder farmers

Traditionally, rural innovation has been strongly linked to the introduction of new livestock and crop technologies,

- 1 Unlike localities classified as urban, the typical rural area is defined in terms of relatively low population density, concentration on natural resource economic activities, poor infrastructure and remoteness. In addition to these objective criteria, political decisions, history, customs and cultural traditions also determine whether a territory is rural or not, although these factors are difficult to pin down (See Hart et al. 2012). The 24 RDMs broadly fit these criteria, which are, interactively, the principal drivers behind their underdevelopment, marginalisation and low living standards.
- 2 Contemporary understanding of innovation is that it involves the four activities of invention, adoption, adaptation and diffusion (although not necessarily all of these activities or in this order) and that these activities result in improved products (goods and services), processes, social arrangements and marketing strategies – the outputs of innovation.

marketing and organisational arrangements into the smallholder agricultural sector (Mugwagwa et al. 2010; Spielman et al. 2009; Sumberg, 2005). Many examples from this farming sector relate to the informal and often parallel activities of innovators in poor communities.³ Studies highlight cases of individual experimentation and peer-to-peer networking. These are often separate from the mainstream or national system of innovation, and look beyond the innovation of technical artefacts to include social relationships and different actors (Gupta 2012; Sanginga et al. 2009).

Innovation in other sectors is often related to agriculture and has two primary areas of engagement and outcomes. The first is to improve on-farm production and post-farmgate storage and sales of produce by means of introducing or adapting information and communication technologies (ICT), transport, institutional development, agricultural water and energy supply, and storage technologies (Sanginga et al. 2009). The second is the provision of technical artefacts, developed in other sectors, to improve the welfare of the rural poor, who are dependent on agriculture for their livelihood and income. In this instance, the focus is on innovations that attempt to improve domestic water and energy supply, transport, housing, health and education provision.

What are rural innovation systems?

A holistic perspective of rural innovation systems, which goes beyond the longstanding agricultural bias of rural innovation, is emerging (Hart et al.

- 3 The ways in which poor communities stand to benefit from STI through their own adaptation or invention, or through adoption and diffusion, are often known by multiple names, such as 'bottom of the pyramid', 'below the radar', 'grassroots' or 'inclusive' innovation.

2012; Virkkala 2007). This broader understanding of the nature and purpose of innovation in rural areas has gained momentum in research and policy circles. However, while innovations in rural crafts, tourism and tourism-related conservation have received some attention, the focus is often on the linkages of these innovations to other sectors (energy, natural resource management, ICT, engineering), rather than on actual innovations within activities, such as rural crafts and tourism. Innovations within other rural-based primary economic sectors, such as mining and minerals, and manufacturing, receive little attention when compared to agriculture.

The role of innovation in service provision by rural public service organisations, including NGOs/NPOs, receives even less attention. In Asia, Latin America and sub-Saharan Africa there is evidence of increasing shifts away from agriculture as a major rural employer and exclusive driver of rural economic growth and development (Rigg 2006). The current trend is towards increasing and more stable skilled and semi-skilled employment in the local public sector (health, education, local authorities) and in small enterprises (small-scale manufacturing and retail).

A fairly comprehensive study on rural innovation systems in South Africa was undertaken as part of the Cooperation Framework on Innovation Systems between Finland and South Africa (COFISA) between 2006 and 2009 (COFISA 2010). A COFISA pilot project – Knowledge and Innovation for Rural Development – was established to address the top-down and largely unsuccessful rural development initiatives in the Eastern Cape. Local Action Groups were established to facilitate the identification of local needs and the roles of support organisations in tackling these needs, in conjunction with members of local communities.

The COFISA study noted that rural innovation systems do exist; however, rather than being confined to agriculture, they include various economic sectors and activities, such as community services, natural resource management and rehabilitation, and tourism. These spatially-based systems involve various actors, including rural households, traditional leaders, local councillors, local residents, various forums, government departments, NGOs/NPOs, consultants, research councils and universities. Some of these actors are permanently based in a specific rural area, whereas other key role-players are not. The COFISA study showed that this situation of flux leads to challenges within the system and negatively affects the continuity of innovations. Other contributing determinants of the effectiveness of local rural innovation systems include local political settings, social and economic relations and other historically and institutionally determined contexts.

Snapshot of South Africa's rural innovation landscape – key findings

What is the composition and nature of rural innovation systems in South Africa? Where should government and other actors focus support to maximise investment for rural development? Rural innovations are not easily observable; this compounds the difficulties in systematically mapping and examining their performance. Evidence from a purposefully designed study, involving 482 rural enterprises in four South African RDMs, offers key insights into innovation policies, strategies and programmes.⁴ The narrative from the statistical data largely agrees with and confirms the experiences of rural actors, which were documented through open-ended interviews.

4 For more information on these topics, visit the RIAT Concept Papers at <http://www.hsrc.ac.za/en/departments/economic-performance-and-development/riat-research-project>

Innovations in rural municipalities cut across private, public and not-for-profit enterprises that operate in different economic sectors. The majority of the enterprises interviewed (54%) were suppliers of tertiary services, such as ICT, health, education, trade, finance, hospitality, and community services. Enterprises in the primary sector (agriculture, forestry, mining and minerals) made up 30% of all respondents, while the secondary sector (manufacturing and energy) accounted for only 16% of the sample. Providers of tertiary services are important innovation actors in the sampled RDMs and should not be underestimated with regard to their contribution to rural development, especially that of providing basic services and infrastructure. Although some respondents felt that the services provided by public enterprises could be greatly improved and better planned, it is evident that without many of these services, even in their existing form, matters would be worse. These findings support the earlier observation that rural innovation systems are not exclusively agricultural in their focus and practice.

A widespread perception by study respondents in the sampled RDMs limits innovation to new technological artefacts and 'inventions', especially those related to ICT. However, this perception exists alongside a refreshing eagerness to gain a more holistic perspective of innovation that goes beyond technological inventions. Unsurprisingly, only a handful of the surveyed rural-based enterprises were found to be engaged in the 'traditional' innovation activity of invention of new innovations. Public and non-profit enterprises, many of which are involved in community services, actively adopt and diffuse innovations to communities within the districts. Private sector enterprises tend to be more involved in adoption and subsequent adaptation and do so in order to improve revenue and market share.

Innovation networks

Respondents considered networks to be important to their ability to innovate, allowing them to share resources, pool knowledge and use the skills of others to their mutual advantage. Three-quarters (75%) of the respondents considered themselves to be part of a network that assisted them in their innovation activities. Between 85% and 95% of public and non-profit enterprises are part of networks; however, less than 60% of private enterprises reported being part of such networks. Of the respondents engaged in innovation networks, 86% considered their networks to be formal in the sense that there was some agreement and structure whereby resource and knowledge sharing took place; the actors in these networks were formally registered enterprises. The remainder considered their networks to be informal in that interactions were ad hoc, although the enterprises themselves were as likely to be formal as they were to be informal.

More than 88% of non-profit and public enterprises considered their innovation networks to be formal, while the share of private enterprises was somewhat smaller at 76%, suggesting that a significant share of private enterprises relied on informal relationships. The distinction here is probably accounted for by the fact that public and non-profit enterprises are legally bound to be formally registered as enterprises and are compelled to be in formal networks because of the governance and accountability issues surrounding the use of public and donor funds. Private enterprises in the sample included both formal and informal enterprises, which often rely on their own source of funds and generally include formal and informal enterprises as part of their networks. Given the greater degree of flexibility and less regulation over informal enterprises, in some instances they simply enter into less formal verbal agreements.

Large-scale agricultural enterprises linked to the National Agricultural Research System, either directly or through commodity organisations, were almost exclusively likely to diffuse innovations outside the RDMs to other similar agro-ecological zones, in which the innovations had immediate relevance and a good chance of adoption. In contrast, smallholder farmers often felt they were excluded from this broad system and that their innovation system was confined to the local provincial Department of Agriculture extension services – including the resources that they might make available, neighbouring farmers, peers and family members. Across the economic sectors, innovations tended to be directed towards local markets.

The trend is that innovative ideas and innovations generally diffuse inwards to rural areas from other areas, irrespective of their local usefulness or appropriateness. Qualitative evidence from this study suggests that this is often from the metropolitan areas. Only innovations with commercial purposes, many of which are agricultural, such as new fruit varieties, harvesting machinery and packaging technology, appear to find their way out of the rural areas in which they are invented or adapted. The perception is that local development agents in the rural areas often ignore the innovations of informal innovators, such as incremental modifications in crop-planting patterns or rainwater harvesting, as many of these innovations do not appear to have immediate commercial value.

Government and institutional support for rural innovation

One example of public sector support within the community services subsector, which is fairly common in some rural districts, is that of the multipurpose Thusong Service Centres. These centres are designed to consist of various key government line departments, such as Home Affairs, various local municipal

services and the South African Police Services. These components are all connected to parent bodies by means of the internet, facilitated by microwave technology. Such connectivity ensures speed-of-service provision and access to up-to-date information. This connectivity is made available to local residents, largely free of charge, through computers provided at these centres. Unfortunately, some respondents felt that these centres were top-down in design and did not acknowledge priority local needs, in the sense that the emphasis and expenditure was on internet connectivity and infrastructure, rather than on ensuring the provision of efficient government services.

Lack of efficiency and desired services was compounded by a lack of cooperation among the different government departments involved. This case also emphasises the narrow focus by the public sector enterprises involved, as there is an overemphasis on ICT, rather than on the quality and diversity of services required. The introduction and diffusion of new ICT technology, rather than of improved service provision, was considered by many officials to be the innovation. Resources were therefore generally allocated to the ICT component and some other services never materialised.

Only 28% of the enterprises acknowledged an awareness and understanding of South Africa's STI policies. This knowledge tended to be based on specific sector-related policies, such as those emanating from line departments other than that of the Department of Science and Technology, rather than an awareness of STI policies at a national level. While 63% of all respondent enterprises were aware of government support for innovation activities in the private sector, only 51% of private sector enterprises were so aware. The most aware were the non-profit enterprises (73%). Slightly more than a third (38%) of all enterprises had applied for government support;

private sector enterprises constituted the lowest share of applicants (22%) and non-profit enterprises the highest share at 59%. Given the low share of invention activities across all enterprises (7%), we surmise that government support was largely sought for adoption and adaptation activities by the private enterprises and for adoption and diffusion activities by the non-profit enterprises.

Almost all the public enterprises interviewed (91%) were aware of the NSI, but only slightly more than half of the private (55%) and non-profit (52%) enterprises were so aware. A general pattern found in these rural municipalities is the fact that public enterprises were generally more aware of innovation terminology, activities, systems and sources of support than the other two enterprise types. Furthermore, the institutional and regulatory environment tended to be largely influenced by sectoral policies and regulations, rather than by STI policies at a national level. Likewise, the various sectoral line departments, institutions and councils were more immediately acknowledged as having relevance in providing support and regulating the sector than those linked more directly to STI at a national level. For example, the provincial departments of agriculture were considered more influential at district level than the national Departments of Science and Technology and Trade and Industry, despite the latter two departments heavily influencing innovation policy at the national level.

Conclusion

The evidence clearly demonstrates that rural innovation systems, which until recently have been overlooked by policy-makers, are not limited to agricultural innovation systems. They are broader and include innovation activities across the primary, secondary and tertiary economic sectors. The community services sector is significant,

as are public and non-profit enterprises, in their roles of adopters and diffusers of innovation. Private enterprises are important with regard to adoption and adaptation of innovations. Despite the apparent local nature of these systems, they require strong links to areas outside rural municipalities in order to obtain information relevant for innovation adoption, diffusion and adaptation.

Recommendations

Three immediate policy action plans are recommended to understand the dynamics of rural innovation and provide critical points for public support to rural innovation:

1. Invest in rural innovations with far-reaching and lasting developmental spinoffs for rural communities. Support diffusion, adoption and adaptation activities, especially locally developed and adapted innovations which can be disseminated more broadly across clusters of rural districts. Innovations in social and community service delivery are likely to yield large-scale positive impacts in terms of enhanced quality of life in rural communities.
2. Facilitate the construction of resilient and inclusive actor networks to drive catalytic rural innovations. Set up multi-stakeholder forums, grounded in participatory development and empowerment principles, to overcome institutional and agency gaps that impede rural innovation contributions to inclusive development.
3. Develop appropriate measurement tools to monitor, assess and enhance the performance of rural innovation systems. Promote evidence-based policy support, which fosters learning and enhances innovative capabilities within rural areas. Further research is required to understand innovation pathways and value chains within rural innovation systems to assist

policy-makers, government departments involved in rural development and innovation, the broad spectrum of rural innovators (public, private, non-profit and formal and informal enterprises), and the innovation research community, to utilise and support these pathways and value chains.

References

- COFISA (Cooperation Framework on Innovation Systems between Finland and South Africa) (2010) *Enhancing innovation in South Africa: The COFISA experience*. Pretoria: Department of Science and Technology
- Gupta A (2012) Innovations for the poor by the poor. *International Journal of Technological Learning, Innovation and Development*, 5(1/2): 28–39
- Hart T, Jacobs P & Mangqalaza H (2012) *Key concepts in innovation studies – Towards working definitions*. RIAT Concept Paper Series – Concept Paper 2. Pretoria: HSRC
- Mugwagwa JT, Wamae W & Outram SM (2010) Agricultural innovation and food security in sub-Saharan Africa: Tracing connections and missing links. *Journal of International Development*, 22: 283–288
- Rigg J (2006) Land, farming, livelihoods, and poverty: Rethinking the links in the rural South. *World Development*, 34(1): 180–202
- Sanginga PC, Waters-Bayer A & Kaaria S (2009) *Innovation Africa: Enriching farmers' livelihoods*. London: Earthscan.
- Spielman DJ, Ekboir J & Davis K (2009) The art and science of innovation systems inquiry: Applications to sub-Saharan African agriculture. *Technology in Society*, 31: 399–405
- Sumberg J (2005) Systems of innovation theory and the changing architecture of agricultural research in Africa. *Food Policy*, 30: 21–41

Virkkala S (2007) Innovation and networking in peripheral areas – a case study of emergence and change in rural manufacturing. *European Planning Studies*, 15(4): 511–529

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