

Endogenous development and resilience: The institutional dimension

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Introduction

Three strands come together in this chapter: first, the peer review I carried out for the COMPAS University Consortium on Endogenous Development (UCED) on University for Development Studies (UDS) (Ghana) and Southern African Endogenous Development Programme (SAEDP) (Southern Africa); second, my involvement in the Convergence of Sciences (CoS) Programme in West Africa; and third, my concern with 'risk society' and the search for mechanisms to ensure that we (especially in industrial countries) do not end up where we are going. The three strands have much in common. An analysis of different approaches and experiences in UCED shows that endogenous development is not so much about reviving old ways, but about daring to collectively learn about new ways. The same can be said about risk society. And in CoS we experienced that it is not so much the purely technical issues that matter but the ability of networks of stakeholders to create linkages among key actors and institutions that guide their interaction, so as to allow innovation. In this chapter, I examine whether the innovation system can be a helpful notion to understand all three.

Endogenous development implies development from within that is both biophysical and socio-cultural in nature. Although not exclusively, it draws mainly on locally available resources, local knowledge, culture, and leadership and their implicit cosmovisions, with an openness that allows for the integration of outside knowledges and practices (Haverkort et al, 2002; Millar, 2005).

Haverkort and Millar are two key actors in the COMPAS UCED. I had the pleasure to be invited as a peer reviewer of the work of the UDS in Ghana and the SAEDP, comprising Vaal University of Technology (VUT) and the University of Zululand, both in South Africa; the National University of Lesotho, and the Open University of Zimbabwe, both part of UCED. This chapter draws on that review.

I am also involved as a member of the Scientific Coordination Committee in a research programme called CoS, which is currently being implemented in collaboration with Wageningen University in Benin and Ghana, and in the future hopefully also in Burkina and Mali. CoS focuses on improving the impact of agricultural science on resource-poor farmers in Africa. Eight African PhD students, supervised by teams of social and natural scientists from the University of Abomey at Calavi (UAC) in Benin, the University of Ghana (UoG) at Legon and Wageningen University and Research (WUR) in The Netherlands, have worked with groups of small-scale farmers to identify and capture opportunities for improving their livelihoods. What emerges from this programme is the importance of institutions in

stretching the small windows of opportunity of resource-poor farmers. This paper will also draw on that experience.

Finally, I am involved in research on the sustainable management of water at the catchment scale, first within the framework of a four-country European research project, and now as part of a Community of Practice involving 12 water boards in The Netherlands. The focus of the water research is social learning to allow synergistic concerted action.

A new approach now much favoured by donors such as the World Bank, DGIS and others, is 'innovation systems'. The chapter takes into account the three experiences so as to examine the usefulness of that approach in all three domains.

The UCED peer review: Different meanings for endogenous development

While working through the material that UDS and SAEDP have produced in UCED, endogenous development seemed to be pursued with different implicit meanings. The elaboration below is not meant as a value judgement, but as an effort to tease out what seems to be the critical dimensions of endogenous development.

Anthropology

The pursuit of endogenous development sometimes took on the form of anthropology or ethnography, in the sense of an effort to record traditional customs, practices and institutions. This was the case, for example, in studies of traditional chieftaincy, *tendanas*, spirit mediums and so forth. These studies seemed to emphasize received knowledge, and were carried out without much analysis of the changes that these institutions have undergone, or attention to the way in which the occupants of the various posts were trying to use their position to advantage in a modern world. I became aware of such dynamics when the Achehene, king of the two million Ekyem people in Ghana, visited Wageningen last summer as part of his effort to establish a university of sustainable agriculture. It seems to me that a critical practice of anthropology or ethnography can be a very exciting and valuable aspect of endogenous development.

Anthropology is often (or at least when I lived in Nigeria) considered as a colonial extractive science that misused Africans as study objects and exotic phenomena. However, it seems that the lack of attention to anthropological literature in the UCED documents is to be regretted. A great deal of very valuable knowledge and insight for endogenous development is available. Interviewing everybody aged over 60 years in villages in Southern Africa to find out about food processing customs, for example, can become very meaningful if placed in the context of the food culture analysed by Richards (1939).

Developing stakeholdership

The bush fire management project in Northern Ghana represents an impressive effort to facilitate indigenous natural resource management by platforms for conflict resolution and concerted decision-making. Where traditional institutions for control

have collapsed and modern ones do not function, such local multi-stakeholder platforms that give a voice and a role to various categories of local people and officials seem to represent a dynamic blend of the old and the new, illustrating the best of endogenous development. Endogenous development-informed multi-stakeholder processes could be an important approach to regenerating natural resources, for example, water catchments, forests, communal grazing lands and so on. They could be an answer to the competing claims on natural resources that emerge as a result of growing population pressure, development initiatives and such like.

Facilitating awareness of heritage

A number of UCED activities seem designed to make local people and students aware of their cultural heritage and to raise their pride and self-esteem. In the US, the 'black is beautiful' movement, and in India 'sanskritization' were both based on a need for self-confidence and self-respect. In Senegal, ex-president Senghor invented 'negritude' as a way to raise self-identity in the face of the dominant 'Francophonie' (he himself was a member of the French Assemblée at the time). It seems to me that this meaning of endogenous development, including the attention to cultural villages, music, rituals, historical achievement and so forth, can fill an essential need. But it also seems important to accompany such attention with critical reflection.

A good example of such critical reflection is the recent establishment of a 'native club' in South Africa. The establishment of this club by Titus Magfelo, the political advisor of President Mbeki, apparently aims to establish a think tank for South Africans who are in an 'identity crisis' and need 'black empowerment'. The emergence of this club has led to a great deal of critical comment in South Africa itself (for example, the club was criticized as the product of 'a bunch of arrogant bastards who want to give legitimacy to the party in power'). That there is opportunity for such debate seems to me to be a sign of healthy endogenous development in action. It is also relevant for COMPAS because it is not too difficult to move from endogenous to '*Blut und Boden*' (Blood and Soil, one of the favourite themes of the Nazis), or to calling anyone who does not see the world your way an unwanted alien, if not a terrorist. One has to be very careful with the word 'endogenous'!

Developing locally based economic institutions

Given the need to develop the economic institutions to support demand-driven rural development, the attention paid to local marketing initiatives, microfinance and so forth seems an important way to operationalize endogenous development. One of the real problems, as we experienced in CoS, is dealing with the higher-level framework conditions and with unhelpful governance mechanisms. For example, it is one thing to help small farmers optimize indigenous technology to improve their farm productivity *within the windows of opportunity* that the farmer has, but it is quite another to *stretch* the windows of opportunity through market access, removing corrupt rent seeking officials and so on. Endogenous development, for example by local people organizing themselves to confront the corrupt officials, seems an essential ingredient in development. A problem throughout the world is the development of ways in which small African farmers can cater for urban consumers through the supermarkets. This includes establishing institutions for quality control (for example, organic

certification), packaging and others aspects of developing effective supply chains. Endogenous development, with its sensitivity to local institutions (in the sense of sets of rules), has an important role to play.

Local development projects

Some of the UCED documents suggest that endogenous development also means undertaking small-scale local development projects, for example, drilling boreholes, establishing vegetable gardens and so on. This seems a valuable meaning of endogenous development, especially if these projects are used for learning, empowerment and the development of checks and balances in face of the forces that are out to exploit local people.

The core issues from UCED

The review raised some key issues. Take endogenous development as a form of anthropology. It is understandable that endogenous development places a great deal of emphasis on indigenous culture, including knowledge. A focus on endogenous development promotes interest in local technologies, such as agro-biodiversity that local farmers manipulate as a key weapon to generate stable livelihoods in a risky, unstable and diverse environment, and local institutions (such as chieftaincy). But the review also showed that these local technologies and institutions are sometimes taken at face value. Yet all studies of local farming systems show seed systems to be highly dynamic as farmers seek to adapt to changing markets, loss of organic matter in the soil (and hence reduced water retention capacity), or changes in rainfall patterns. The same goes for local institutions such as chieftaincy. These institutions are highly dynamic as they adjust to changing political conditions. In fact, most chiefs are imaginatively using their traditional titles to gain advantage either for themselves or for their people.

In all, what is 'endogenous' is highly dynamic. But that does not diminish the value of the concept. For example, Vodouhé (1996) shows that indigenous institutions are crucially important for developing accountability mechanisms for modern organizations such as cooperatives. And Lambo (in Leighton et al, 1963) demonstrated years ago that villages in Nigeria with an intact traditional institutional structure (with active masks, age grades and so on) were more effective in capturing the benefits of modernization than villages whose institutions had disintegrated. But that does not mean that traditional institutions were unchanging. Endogenous development concerns this dynamic and its harnessing for development.

In this, adepts of endogenous development should not lose sight of the possibility that endogenous processes lead to outcomes that are far from desirable from a development point of view. In the absence of effective checks and balances that work in modern conditions, traditional rulers can easily change into hubs of patrimonial networks that only serve their own interests. Endogenous processes can institutionalize adaptations to frustrations with development experiences such as escapism, ritualism or conformity, setting back development. Endogenous development, in other words, should be looked at critically.

Where endogenous development has a great role to play, in my opinion, is in generating institutions (in the sense of rules that reduce uncertainty in human interaction) that create opportunities or remove major institutional constraints to reducing poverty. For example, in one West African country, cheap subsidized American rice is imported to a point where local rice producers find it impossible to compete. The wife of one rice producer says she buys imported rice because it is cheaper than her husband's! The government is fully aware of the situation and has even removed a minister who wanted change, the reason being that the urban electorate loves the cheap food, and as long as farmers have no political influence, they can do nothing about the situation. Compare this with the situation in Mali where farmers have strong political influence and where cheap imports of rice would be unthinkable. The example shows the importance of endogenous development in terms of developing self-confidence and local organization among farmers so that they can play their essential role as voiced partners in development.

Endogenous development has much to say and contribute in societies that came out of colonialism with underdeveloped checks and balances, a situation that allowed rent seekers and corrupt practices to set back development for years. But that is not all. Modernity has left many local systems with very unsatisfactory institutions in such areas as marketing and natural resource management. A typical example is bush fire management in North Ghana. The rules and regulations concerning this practice are in the hands of local government that has no means to manage it. Different categories of people have very different interests, with hunters using bush fire to flush animals, herders to ensure new grass, and farmers running the risk of burnt crops and villages. Such complex problems that cannot be solved by simple regulations or technical means. They require negotiation and agreement among local stakeholders if they are to be solved. This has been amply demonstrated by a very imaginative programme of the UDS in Northern Ghana. In similar vein, Hounkonnou (2002) reports on a community that decided to agree to stop rampant stealing and pilfering and set up a system of surveillance and sanction that proved much more effective than the official (and often corrupt) police.

In all, I see endogenous development as playing a crucial role in local people having a *prise de conscience*, as the French call it, and agreeing among themselves to create more satisfactory conditions in the change process that threatens to sweep them along without being able to exert control. This can happen at all levels of aggregation. A good example is the final success in Benin of the plan to have an elected rector of the University d'Abomey at Calavi. The move was opposed by powerbrokers of all sorts who benefited from appointing the rector for political or other gains such as favouritism in admitting students and appointing staff. But finally a new minister pushed the election through and the event galvanized the entire university community.

The Convergence of Sciences Programme

A brief background

CoS started out as a rather technical programme that aimed at improving the impact of agricultural research on the livelihoods of resource-poor farmers. To this end, a number of specific measures were adopted: first, the number of pre-analytic choices about research design that set research on irreversible path-dependency (for example, choice of crops or disciplines) was to be reduced as much as possible; and second, design choices were made on the basis of two exploratory devices, technography that identified broad opportunities, and diagnostic studies that zoomed in on experimental farmer communities and concrete topics for experimentation.⁴ The research itself (eight different African PhD students working with farmer experiment groups, with the ninth student carrying out comparative research of agricultural research), was designed so as to ensure that the outcome would not only work in farmers' conditions, but would also be feasible under farmers' management and desirable from their point of view. Thus CoS applied additional criteria for what would be appropriate agricultural research.

In all, the technography, diagnostic studies and experiments with farmers represent a 'pathway of science' that seems very much more effective than the usual supply-driven approach by which 'cutting edge' science produces scientific breakthroughs that are delivered to 'ultimate users'.

CoS was special in that it soon showed that technical constraints to productivity are not the only or even the most important determinant of rural poverty. The CoS researchers ran into institutional issues that seemed much more important. Some students managed to assist farmers' group to increase their production of maize *within* the small windows of opportunity farmers face, that is, without providing artificial access to fertilizers, credit, markets and so on. The farmers soon accused the researchers of wasting their time; they had not been able to sell their surplus at a profit, and in fact, as soon as they took their produce to the market, prices fell still further. Thus markets and low prices proved to be a key issue impeding increasing productivity. This observation is supported by Hounkonnou's (2002) claim that, provided with better conditions, small-scale African farmers could increase their production considerably with the means they have at hand, never mind science-based innovation. This point is borne out by the fact that Ghana's cocoa production has doubled in the few years that the government, forced by the collapse of the cocoa industry, started paying farmers up to 70 per cent of the FOB price, instead of the customary 40 per cent.

What we learned in CoS is that it is one thing to help farmers improve their outcomes within the very small windows of opportunity that they have, but quite another to stretch those windows by changing the institutional framework conditions within which they operate.

⁴ The diagnostic studies carried out by the eight PhD students and the comparison of these studies by the ninth have been published in a special issue of *NJAS, The Wageningen Journal of Life Sciences*, 52(3–4): 209–448.

Further examples of institutional framework conditions that the researchers experimented with are: first, the non-functioning marketing chain for organic cocoa; second, the exploitative relationships between landlords and immigrants that force the latter to mine the soil; third, the lack of access to Neem seed (for biological pest control) and processing facilities; and fourth, the stranglehold of corrupt pesticide sellers in the cotton *filière* in Benin, which diminishes the incomes of the small-scale cotton farmers and reduces the competitiveness of Benin cotton on the world market.⁵

With these outcomes from CoS, we are currently in the process of formulating a second phase for possible funding by DGIS that uses the lessons of the first phase and will focus on institutional issues, that is, on enlarging the windows of opportunity.

There is nothing more practical than a good theory

Many officials and scientists whom we met during the follow-up identification and formulation missions still consider agricultural innovation the outcome of transfer of technology. One argued that 'In our research stations we get seven tonnes of maize per hectare. Our farmers only get one. The key issue therefore is to transfer our technologies to farmers'. Such old ideas continue to render ineffective technology policies and agricultural research and extension management. They mislead the investment decisions of ministers and directors of agriculture, of director generals of international and national agricultural research organizations and of donors.

Therefore, the philosophy and conceptual framework that guide CoS is important and their choice has to be made explicit. During the first phase, we used the term *pre-analytical choices* for the decisions made early in the design of a project that affect its degrees of freedom to be responsive to a context and that determine its path-dependency (Van Huis, 2005). A typical example is the decision to include soil science as one of the disciplines in CoS. It meant that soil scientists were part of the group that made decisions about the project, that soil fertility became a central problem to be tackled, and that two of the nine PhD students worked on soil fertility issues. This is not to say that it was a bad decision, just that it was a typical pre-analytical choice. The choice of the guiding philosophy or sensitizing concept for CoS is a pre-analytical choice *par excellence*.

Introducing innovation systems

The focus of a follow-up of CoS on 'innovation systems' is pragmatic because this concept is popular among donors such as the World Bank and DGIS. But it has also been carefully and convincingly explicated by Hall et al (2006), who define innovation systems as:

A network of organisations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organisation into economic use, together with the institutions and policies that affect their behaviour and performance.

⁵ The institutional issues and experiments by CoS researchers have been written up and accepted for a special issue of the *International Journal of Agricultural Sustainability* (IJAS) for publication in mid-2007.

For some Wageningen partners in CoS, it is an attractive concept because it builds on their work on agricultural knowledge and information systems (AKIS) (see, for example, Röling, 1986; 1988; Röling and Engel, 1991; Röling and Wagemakers, 1998) and rapid appraisal of agricultural knowledge systems (RAAKS) (Engel, 1995; Engel and Salomon, 1997). Moreover, the choice of innovation systems is promising because it reflects a powerful perspective on innovation that Engel (1995) formulates thus, 'Innovation is the emergent property of synergistic interaction among key actors in "a theatre of innovation"'.

An explicit and shared concept of innovation systems can play a crucial role in guiding the interventions that enhance the performance of the actors in the theatre. The value of the concept is that it draws attention to *linkages* and *interactions* among the actors in the system. For example, it focuses on the quality of service delivery by agencies to farmers, on the effective demand farmers can exert on research institutes, on the quality and pricing of the agricultural products that farmers deliver to consumers, and on marketing rather than on production. When these relationships fall into place, synergy adds value. That is the key idea behind innovation systems.

From that point of view, anything CoS can do to introduce innovation system thinking will benefit small farmers in West African countries and will be an asset in the poverty reduction policies of these countries. A major constraint is that many people in high places still believe in supply-driven technology transfer, which has largely failed to affect the livelihoods of resource-poor farmers. Luckily, the increasing awareness of this failure is creating space for alternative approaches.

Convergence as the key concept of CoS

The CoS pathway of science operationalizes the central idea of 'convergence': convergence between farmers and scientists, convergence between disciplines (especially between natural and social scientists), and between institutions. The second phase will continue to focus on convergence, but with special emphasis on convergence among key organizations, agencies and actors in a theatre of innovation. In this way we hope to affect the development of institutions, in the sense of the rules that reduce uncertainty in human interaction, that is, in the sense of Douglass North, who won the Nobel Prize for economics (North, 1990). Eleanor Ostrom (1992) has also used institutions in this sense, demonstrating that agreed-upon rules for access to, and utilization of, common pool resources can ensure their sustainable management. Her evidence refuted Hardin's (1968) bleak predictions regarding 'the tragedy of the commons' that were based on the assumptions of rational choice theory that underpins neoclassical economics.

Operationalizing institutional development

CoS was able to capture innovation not only from enhancing the productivity of plants and soils, but also from negotiated agreements and concerted action among people. The latter proved an important source of innovation. In addition to the points mentioned above, a typical example in CoS was the key practice of giving farmers a voice in the design and implementation of agricultural research as a prerequisite for ensuring that it benefit would them.

In the follow-up to CoS, we shall work with thematic working groups, communities of practice, or platforms for negotiation and learning to capture innovation that emerges from synergy and coordination among the key players around a certain opportunity or priority. Such groups can form around the supply chain of cocoa, around an issue such as food security, around a production system such as the oil palm production system, or around a challenge such as sustainable watershed management.

In the CoS follow-up, we will typically handle two or three such thematic groups in each participating country. Each thematic group will be supported by a facilitator and by funds to invest in the interaction among key players. The focus of each thematic group will only emerge after a long (we are thinking of at least six months) initiation phase during which systematic technography and diagnosis would identify promising concrete opportunities that can make a difference and provide learning for the key partners on how to work according to an innovation systems approach.

The CoS follow-up will focus on comparative monitoring and evaluation of innovation systems with a view to learning how to go about designing and implementing them. This learning on innovation systems will be the key scientific contribution. In choosing likely topics and issues to work on, their potential to yield useful insights into innovation system management will be a key factor.

The oil palm system as an example of a thematic focus

A good example of a theme is the oil palm system that has been suggested both in Ghana and Benin because it is a presidential initiative in both countries. The oil palm system offers a wide range of concrete possibilities. Brouwers (1993) has shown that including an oil palm fallow in the very intensive permanent land use that is emerging in densely populated areas in West Africa can restore 'comatose' soils and suppress pernicious herbaceous weeds, such as *Imperata cylindrica*.

But the oil palm system could also refer to the complex interaction between producers, processors (women), traders (women) and credit suppliers who would all benefit from greater synergy. An involvement in oil palm could help to prevent that massive international loans are used to make some rich people even richer through the establishment of huge plantations, instead of supporting the small-scale indigenous production of palm oil, palm kernel oil, palm wine, soap and other products. CoS could be involved in developing small-scale irrigation systems to ensure that palms continue to produce female flowers, without which kernels are not produced. Such concern with water management could anticipate climate change in West Africa and help retain palm oil as a vital and very nourishing element in the food security of the region. Oil palm could supply bio-fuel as sources of fossil fuel dry up (see *The Economist*, 26 August 2006). Palm oil production would provide ample opportunity to address the question how farmers' organizations could achieve a greater voice in the configuration of actors.

Furthermore, traditional smallholder oil palm production systems usually include the rearing of small ruminants and these systems can offer interesting opportunities and challenges for innovation to improve smallholder integrated crop/livestock production systems. Finally, CoS could work on oil palm as a polyvalent crop that could supply essential products to emerging middle class markets in West Africa with, as a special challenge, the supply of supermarkets with products

from small-scale farmers, something that has proven exceedingly difficult across the globe (Berdegué, 2001).

We mention these examples for oil palm to explain that identification of a thematic focus that our current partners agree on still leaves open a wide range of opportunities for CoS. Concrete CoS activities can only be identified and prioritized after careful technography and diagnosis. It is only after such an exploratory phase, that the CoS disciplines and concrete activities would be decided upon. We anticipate that the exploratory phase itself could have a significant impact in terms of learning and intelligence gathering. Formulating the final operational plans will be the culmination of a very worthwhile learning process among a wide range of partners.

Back to innovation systems

The issues elaborated above attempt to clarify how the thinking about CoS has evolved from institutionalization and scaling up of the pathway of science identified during the first phase of the project, to removing institutional constraints as pioneered in some CoS studies, to thematic working groups involving multiple stakeholders around a shared issue of common interest.

Comparative participatory research of the thematic working groups in the four participating countries would allow development of second-order reflection about the theories that can inform development interventions by public and private agencies, civil society groups and the public at large. Comparative innovation systems research across the four countries could create a much better understanding among key players in West Africa of the importance of institutions, of synergy among organizations, and of the emergence of innovation through the removal of institutional constraints.

Water management in Europe

At this point, I do not want to go very deeply into the details of the research on water management. My main purpose is to show that in such a totally different theatre, quite similar issues crop up. I draw on my experience in a European research programme called SLIM, (Social Learning for Integrated Management of Water at the Catchment Scale) (<http://slim.open.ac.uk>)

Water managers must be able to deal with competing claims on water use, with resource dilemmas marked by the following: first, water is a common pool resource where use is conditioned by subtractability (the use by one reduces its value by others), high transaction costs incurred by excluding others from the use of the resource, and high risk of degrading water quality; second, multiple stakeholders make different claims on the resource; third, interdependence exists among stakeholders in that they realize they can only reach their own objectives through the actions of others; fourth, there is controversy as stakeholders have strong but divergent values and perceptions of what is at stake; fifth, there is complexity: scientific data cannot resolve the issues because they arise from multiple causes and have multiple effects; and sixth, there is uncertainty; in complex situations surprise is to be expected (SLIM, 2004). The recently established facts about climate change mean that resource dilemma around water use will become frequent and more serious.

The use of technology and regulatory measures, based on hierarchy, can only have limited impact on dealing with resource dilemmas. The same can be said of markets: market forces by themselves do not seem to lead to integrated management of water at the catchment scale. The SLIM research showed that it is useful to assume another coordination or governance mechanism: social or interactive learning among area-based stakeholders and co-creation of knowledge through joint experimentation and facilitated interaction. This coordination mechanism requires different policy tools than either the use of technology and regulation, or relying on market forces. One policy tool, for example, is investment in interaction and in facilitation.

In all, the SLIM experience opened up a different world than one would expect to find in a sector such as water management with its customary authorities, experts, boards and highly intricate regulatory frameworks. Climate change, rapid urban development, the enormous pressure on water resources for multiple uses, and the rapid degradation of the hydrological systems on which European ecosystems and human communities depend, have led to a transformation in thinking about the coordination of human affairs. The new thinking is area-based, sees solutions as emerging from interaction among stakeholders, and emphasizes decentralization over centralized authority and science-based decision-making. Higher system levels remain important in that they must create framework conditions for effective interactive resource management.

It seems to me even from this very brief overview that new thinking about integrated water management is highly relevant for thinking about endogenous development.

Innovation systems?

Hall et al (2006) developed the notion of innovation systems to great effect in terms of impact of ideas. Table 1 provides their overview of the differences and similarities between formal agricultural research systems and agricultural systems of innovation.

The table makes clear that an innovation systems approach has many of the characteristics that emerged in the three experiences described above. The innovation systems approach emphasizes coalitions of stakeholders, negotiation, task networks, interdependent determination of goals and so forth. Innovation systems thinking is far removed from conventional practice, such as the recent decision by the Rockefeller and Gates Foundations (see *The Economist*, 16–22 September 2006) to devote US\$150 million on training crop scientists, breeding of new seeds and on distributing them, all as an answer to the problems of Sub-Saharan Africa. It all sounds so much like more of the same and yet another attempt to impose a green revolution on Africa by intervening in factors that are not the problem.

Institutional features	Agricultural research	Innovation systems
Guiding agenda	Scientific	Developmental
Relationships involved	Narrow, hierarchical	Diverse, consultative

Institutional features	Agricultural research	Innovation systems
Partners	Scientists and other public agencies	Various combinations of scientists, entrepreneurs, farmers, development workers and policy actors from the public and private sectors
Selection of partners	Predetermined by institutional roles defined by the arrangement of the research system	Coalitions of interest determined by the nature of task, national institutional context and skills, resources available
Role of partners	Fixed, predetermined by institutional roles defined by the arrangement of the research system	Flexible, determined by the nature of task, national institutional context, and skills and resources available
Research priority setting	Fixed by scientists	Consensual by stakeholders and depending on the needs of different tasks. Technology foresight and technology assessment approach
Work plans and activities	Fixed at the beginning of the project	Flexible, iterative
Mandate for research/task approach adopted	Fixed by institutional norms of the research system	Negotiated through coalitions of interest
Knowledge produced	Technical/scientific	Technical, scientific and institutional
Indicators of performance	In scientific terms to other scientists	In development terms to donors. In terms of fulfilling role in task network to other partners
Responsibility for achieving impact	Other agencies dedicated to extension and technology promotion	Collective capacity of task networks, social capital, partnerships skills
Capacity building	Trained scientists and research infrastructure	Collective capacity of task networks, social capital, partnership skills

Table 1 Similarities and differences between agricultural research systems and agricultural systems of innovation

Note: This table exaggerates the differences between the two paradigms for illustrative purposes

Source: Hall et al (2004)

The Rockefeller and Gates' initiative once again assumes that it is possible to improve farmers' livelihoods and reduce rural poverty by increasing farm productivity, for example, through better seeds or encouraging the use of fertilizers. As I have said earlier, a totally different entry point is not productivity but opportunity. Where are farmers' opportunities and how can we enlarge the very small windows of opportunity African farmers face at present? A focus on opportunity assumes that African farmers are clever and venturesome enough to increase productivity, if given half a chance. The challenge is the half a chance.

An innovation systems approach can refocus the development effort from a supply-driven technology push from outside, to a demand-driven creation of conditions that stimulate farmers to do what they are best at. Countless efforts have shown that the former tends to be futile, while there is mounting evidence that the latter works.

An innovation systems approach focuses on relationships or linkages in a network or theatre of operations around some opportunity, crop, sector or issue. Such a network might be a supply chain, but it could also be the set of stakeholders in a water catchment, or the actors in area-based development. The focus is on interactive learning, negotiation and concerted action, and on the power balance between the actors in the interaction. Interventions based on an innovation systems approach would, therefore, not seek to strengthen the supply power of formal research or government, but rather the countervailing and claim-making power of clients of such agencies. Interventions based on an innovation systems approach would, as much as possible, refrain from making pre-analytic decisions but instead spend a great deal on exploratory tools to identify what would be promising opportunities and effective innovations to pursue. An innovation systems approach would emphasize investment in interaction. It would focus on the linkages among players, not on individual players. Capacity strengthening would not be focused on the capacities of individual agencies, but on creating effective relationships that improve services, open up markets, curtail corruption and rent seeking, and especially that generate and strengthen the checks and balances without which societies (in South and North) inevitably become corrupt, exploitative and exclusive.

Recent interaction with valued colleagues points to a number of potentially weak points in the innovation systems approach. Paul Richards (personal Communication, 17 September 2006) argues that 'The problem with innovation systems in general is the bias towards the new'. He prefers an emphasis on selection rather than invention: 'Selection aligns technology studies with evolutionary thinking, and is a better way to focus on what works'.

Stephen Biggs (personal communication, 12–14 September 2006) feels that the innovation systems approach, which started as an empirical concept from a careful study of the emergence of East Asian economies, has become a normative model. According to Biggs, institutions emerge in unique ways; they do not diffuse (as implicit in such notions as 'scaling up') and one cannot impose an innovation system.

Like Paul Richards, Stephen Biggs is critical of Hall's definition of innovation systems that I used above, arguing that:

He puts the onus on new. While this is OK at some levels, at the institutional level it places emphasis on the exotic, the outside, the novel, the new. From the way I am thinking about institutional innovation, the onus has to be on the

indigenous, the local, the local institutions are modified, changed, etc., but they are never 'replaced' by the new. Some local actors selectively engage with 'exotic ideas' and use some of them selectively to bring about local change. In this type of analysis, the focus is therefore always on the local and the way it changes, rather than on the 'new'.

These are very valuable points, but if we maintain our commitment to entering development interaction with a maximum degree of freedom to be responsive to context, and invest in participatory exploration to identify important opportunities and promising action, while investing in interaction aimed at changing unhelpful linkages and institutions (in the sense of rules that govern interaction), an innovation systems approach might get us out of the doldrums of more of the same that Rockefeller and Gates seem not to have escaped.

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