

Review

Research in sub-saharan African food systems must address post-sustainability challenges and increase developmental returns

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Post-sustainability challenges to food systems of Sub-Saharan Africa (SSA) include climate change vulnerability, globalisation of agri-food chains and markets and emerging low-carbon energy systems. In addition, the lack of investment in research for development (R4D) in SSA, all underlines need to rethink R4D to pursue policy purposes. A starting point could be the sustainable livelihoods approach, as a research paradigm focusing on sector-related problems, while questioning the salience, credibility and legitimacy of research findings. Even with a sector-related prioritization of the investments in research in agriculture in the south, the north and south has to rethink partnership options to enhance capacity to do research. Without such rethinking, scientific logic will continue to limit the contribution that agricultural R4D can make toward achieving millennium development goals.

Key words: Research for development, livelihood, research paradigm, sub-saharan Africa.

INTRODUCTION

International agricultural research has played an important role to achieve social development for past generations. Food and food security, a land of bounty, has been experienced by increasing proportions of the world's population. Nevertheless, 0.9 billion people are still seriously under-nourished (FAO, 2008) and resource-poor farmers in sub-saharan Africa enjoy the benefits and suffer the costs of being largely decoupled from the transformation of the otherwise rather global agri-food system (McCullough et al., 2008). Despite this situation, investments in agricultural research have largely stagnated in sub-saharan Africa (Beintema and Stads, 2008). Current and future challenges, such as rapid changes in urbanisation rates and losses of soil fertility, will increasingly shape global food chains and food consumption habits over the next few decades. Vulnerable communities will increasingly need to adapt to higher risks, in a context of growing uncertainty and accelerating changes

induced by local and global climatic changes (Abramovitz et al., 2007).

With the 2015 deadline for the millennium development goals (MDG) rapidly approaching, the number of hungry in Africa is increasing again (FAO, 2008) and Africa accounts for half of the 12 million children <5 dying each year as a consequence of chronic hunger (FAO, 2008). Food production is not keeping pace with population growth in sub-saharan Africa. An already low food production per capital faces continued decline. This happens while the doubling of yields obtained in the major cereals in developing countries from 1961 - 1997 (Dixon et al., 2001) also seems to have reached a plateau. In fact, the green revolution, which combined improved seeds, inorganic fertilizers, plant protection products with irrigation has largely bypassed Africa. This problem is rooted in Africa's poor agricultural resource base that, together with socioeconomic and policy environments unfavourable to investments in development of the agricultural sector, explains why the use of external inputs is generally unprofitable.

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These challenges can be viewed as a struggle with post-sustainability issues in the face of climate change, globalisation of agri-food chains and markets and changing energy systems. Or it can be viewed as a matter of R4D having focused on outdated agendas. What ever the case may be, there is an urgent need for approaches which can give raise to environmentally and socially sustainable rural development in SSA, including the agricultural sector and inclusive of its smallholders.

The aim of this paper is identify a possible path forward for R4D after discussing implications that post-sustainability issues should have upon our thinking in R4D. The focus of our analysis will be upon sub-saharan Africa (SSA). The record of accomplishment of international development efforts, coupled with current trends and future challenges facing the continent (e.g. Parry et al., 2007; UNDP, 2007) give rise to the pertinent questions that we raise here with regards how we conduct and implement our research efforts.

CHANGES IN DEVELOPMENTAL THINKING

The thinking behind R4D can be dated back to the 1960s where Paulo Freire, amongst others, emphasised the interactive participatory element in development as needed to empower poor or marginalized groups. In the 1970s, Robert chambers and co-workers again brought attention to the necessity of involving farmers. In 1980s, the sustainability concept emerged, but there was, and still is, little policy guidance of how the specific goals might be achieved. Consequently, a number of concepts have been promoted, common to these concepts are that they can be viewed as paradigms, but often they are topical features, or even ideologies, rather than a precise definition of the problems facing farmers (Bengtsson, 2007).

In the late 1990s and early 2000s, the sustainable livelihood approach (SLA) emerged (review by Scoones, 2009) and was conceptualized by development agencies (Bebbington, 1999; DFID, 2001) as an intentional activity (Cowan and Shenton, 1998). From a chronological viewpoint, the SLA may be the last of its kind in a series of paradigms (Figure 1) in the sense that the SLA positions the farmers centrally, whereas most sustainability approaches focus more on biological systems (Sumberg, 1998). However, lives and livelihoods in rural areas of low-income countries are increasingly becoming separated from farming activities (Bryceson, 2002; Rigg, 2006). Simultaneously, liberalized markets can benefit some smallholders in Africa (Freeman and Omiti, 2003; Omiti et al., 2008). This duality is an emerging challenge to the SLA approach, delinking livelihood and farming may take place due to an asymmetric development rate in various sectors. The duality is also visible when hunger among landless or single-headed households is visible among communities inhabiting fertile land. We see this as the main challenge to SLA.

Some 25 years ago, Bengtsson (1983) stated that “development thinking has long focussed upon modernization according to assumptions of completely Western origin. Using capital and technology, the modern sector gradually was to expand, transform and absorb a large traditional sector”. This thinking remains evident in modern research, for example as approached by/in the CGIAR centres (<http://www.cgiar.org/>) strategy to overcome problems such as crop drought sensitivity, pest resistance, or low nutritional quality. These are all technical problems in essence or at least perceived and often presented as such. Technology transfer is also evident in approaches to mitigate the effects of global climate change - a technical point of view is applied in most cases (Abramovitz et al., 2002). Another example is the concept of integrated soil fertility management (ISFM) adapted by the CGIAR system that focuses on scaling up “... results of best bet soil fertility management technologies to more farmers and communities employing a wide range of dissemination tools (Bationo et al., 2009).

Research into such technical issues are justified and needed, as agricultural development remains a prerequisite for food security and socio-economic development in Africa. However, on a theoretical level, there has been insufficient critical mass regarding agricultural development in the third world and this situation still prevails. The agricultural reforms that the World Bank and IMF introduced during the 1980s and early 1990s were designed to eliminate the overall bias against agriculture and open the sector to market forces (e.g. World Bank, 1981). This may have been achieved to some extent for certain crops and for certain countries (Kherallah et al., 2000). However, decision makers usually manage risk holistically while detailed scientific information may be of limited relevance (Echeverría, 1998; Meinke et al., 2006; Ruttan, 1982). Further, R4D has become privatized, leading to constraints in both the supply and the demand in the market for services (Klerkx and Leeuwis, 2007). Realisation of such conditions emphasise the need to consider new guiding paradigms.

Cash and Buizer (2005) and Meinke et al. (2006), using climate change as their case, argue that translation of information of major changes into real-life action requires salience, credibility and legitimacy. Salience relates to the perceived relevance and appropriation of the information to the user. Credibility addresses the perceived technical quality and validity of the information. Legitimacy concerns the perception that the system has the interest of the users in mind or, at a minimum, is not simply a vehicle for pushing the agendas and interests of other actors.

Some 15 years ago, Byerlee and Morris (1993) argued that we under-invest when it comes to R4D. In 2000, global public agricultural research investment totalled US\$23 billion in 2005 inflation adjusted terms, which represent an increase of 47% compared to the 1981 level. The “under-investment” is however apparent in low-

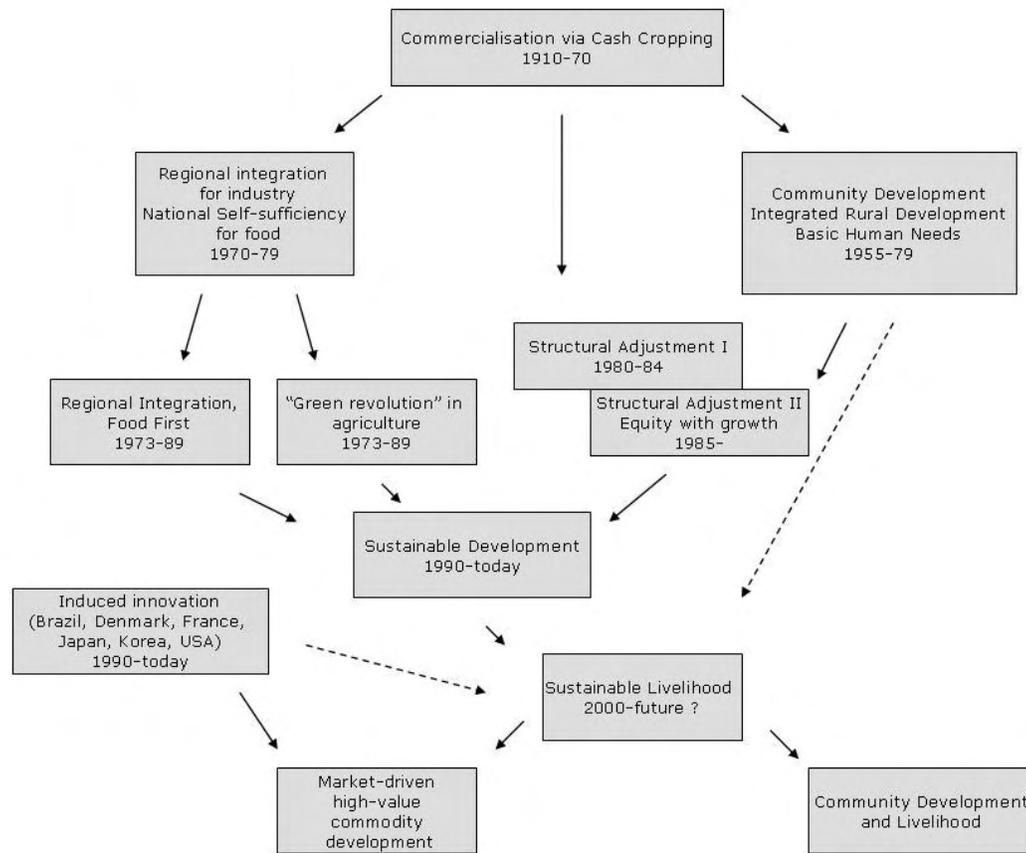


Figure 1. Chronology of paradigms in agricultural development. Export cash cropping took seriously off after the WWII. This developed into two major pathways; one based on the view that growth in agriculture would be the foundation for industrialisation followed by a regional import substitution approach or a "green revolution" high-input approach. Another track moved into community development to benefit rural poor – partly from a political motivation. Structural adjustment programmes and economic liberalisation packages took over in the 1980s in this pathway. Both pathways merged into the sustainable development paradigm which is then, together with parts of rural development and parts of a western agro-innovation paradigm, into sustainable livelihood (partly after Delgado, 1997). This may subsequently divide into two directions depending on political agendas.

income countries which only contributed by 10% of the total investment (Beintema and Stads, 2008).

R4D may have been too occupied by technical aspects in relation to improving food production and food security and may have overlooked the need for salience, credibility and legitimacy. The CGIAR has a long tradition for estimating monetary returns to research on crop varietal improvement and that has resulted in a huge body of rate-of-return and benefit-cost studies. Many of these were undertaken under the auspices of the CGIAR's own standing panel on impact assessment (SPIA) and represent evidence that crop breeding CGIAR centres have generated very high returns to donor investments, estimated monetary returns surpassing those from alternative uses of public funds. Alston et al. (2000) and Evenson and Gollin (2003) reviewed a very large number of monetary return estimates/studies respectively and found returns above or at 40%.

Pingali (2000), reviewing 289 studies and providing a

history of CGIAR impact assessment research, found that impact studies had developed from formal rate of return and benefit distribution studies (1980s) to include spill-overs and inter-sector impacts (1980s and 1990s) and finally to gender and environmental impact studies in the 1990s. Pingali stressed that policy research and policy advice as well as livestock, trees and capacity strengthening are not included in his account, reflecting that much less work has been done in these areas. Recently Raitzer and Kelley (2008) synthesized a wide selection of earlier impact studies of the CGIAR systems impact as a whole and held them against the total investments in the CGIAR. Applying a strict set of quality criteria, including transparency and demonstration of causality, the study conclude that a benefit-cost ratios for research to date range from 1.9 to 17.3.

The old concept of "participation" remains central in development work today although development workers struggle to put the concept into practice under evolving

conditions (Scoones, 2009). This writing argues that inclusive economic growth, sustainable resource management, adaptation to climate change and reducing high population growth rates are closely connected - and most particularly so in the case of Africa. Furthermore, as there are significant limitations to our understanding of how climate change will affect Africans in the coming decades, research is required to understand how African socio-ecological systems will respond to climate change, changing agri-food systems, and new energy systems.

One approach forward could be to apply the SLA (DFID, 2001; Scoones, 2009) as a post-sustainability paradigm, although as indicated in Figure 1, the SLA may not be the last of its kind. Scoones (2009) critically reviews the development of the SLA and argues for a 're-energising of livelihood perspectives with new priorities to meet these new challenges'. New priorities include themes of knowledge, scale, politics and dynamics, which can improve linkages between the micro- and macro-scale. The contours of two possible development paths emerge on the horizon. One is a re-vitalized "development" track where human developments in urban and rural communities regain importance by emphasis on education, health care, sanitation, and human capitals in general. Another is the emergence of an agro-innovation track, emphasising the market, high-value commodities, value gains and innovation along the food chain. Only time will show which one will gain favour in politics.

In any case, developmental returns must be documented and that is an increasingly complex task, as the paradigm has changed from the relative simplicity of the monetary measure towards the various composite and multidimensional development measures and indicators serving the sustainability and post-sustainability paradigm (Egelyng, 2006). The numbers of impact studies are few and few are able to match the benefit-cost ratio of 149:1 that pioneering research at the international research centre IITA in Nigeria did on cassava mealybug control (Pingali, 2000). To get high impacts, we suggest a clear orientation of research in low-income countries to be oriented towards sector-relevant research questions. Further, the research findings should be salient and the messages should be conveyed with credibility. To gain or maintain legitimacy in the eye of the receivers and to get across to policy makers, secondary stakeholders and decision makers may consider connecting better with primary stakeholders along the food chain. Such approaches may be needed to get benefit-cost ratios to exceed what previously has been achieved (Raitzer and Kelley, 2008). Finally, the low investment rate in low-income countries could perhaps be counteracted by forming north-south/south-south partnerships for R4D to build capacity and exceed local critical mass.

Conclusions

In light of the post-sustainability challenges facing SSA,

R4D must confront the situation that (i) Poverty alleviation might be best achieved through increased household earnings, (ii) An agriculture depending on fossil fuel is illusory in a global context, (iii) partnerships are needed to build research capacity on sector-related questions, and (iv) Further orientation towards pro-poor conditions may be needed. Therefore, post-sustainability challenges in SSA may require a rethinking of the guiding frameworks of R4D. We advocate an R4D approach guided by core-elements of the sustainable livelihood approach will can allow researchers to ask the questions of salience, credibility and legitimacy in relation to forecasting natural resource management and climate change in a policy context.

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