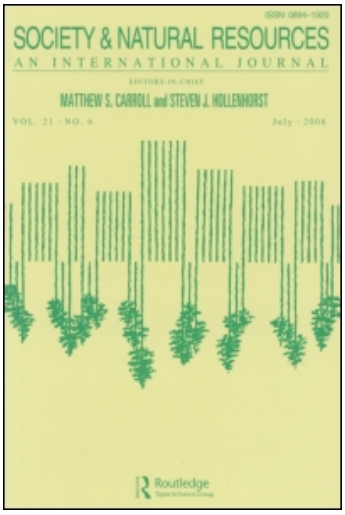

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New Challenges in Underprivileged Regions Call for People-Centered Research for Development

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New Challenges in Underprivileged Regions Call for People-Centered Research for Development

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The need for enhancing food production and availability in underprivileged regions of the world requires the attention of scientists. This article explores the possibilities for rethinking agricultural research for development (R4D) in the light of new challenges characterized by a high degree of scientific uncertainty along with associated intense political differences of interest. New challenges that particularly influence food production in underprivileged regions include global climate change, globalization of food chains, and emerging low-carbon energy systems. We argue that by applying the people-centered sustainable livelihoods approach as a research paradigm in R4D, researchers may be more successful in producing knowledge that is useful to entrepreneurial smallholder farmers. Without such rethinking, traditional scientific approaches and logic may limit the contribution that agricultural R4D can make toward the achievement of the Millennium Development Goals of halving extreme hunger by 2015 and improving the livelihoods of all.

Keywords Africa, livelihood, people-centered research, research for development, research paradigm

While 1.7 billion people are overweight worldwide, 0.8 billion people remain seriously undernourished (WHO 2003). While the 2015 deadline for the United Nation's Millennium Development Goal (MDG) of eradicating extreme hunger and poverty is approaching rapidly, the problem of hunger is increasing

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again (FAOSTAT 2008). Ongoing rapid urbanization will continue to impact global food chains and food habits over the next decades, which will lead to an increased demand for meat and milk. As stressed both by the World Development Report 2008 on Agriculture for Development (World Bank 2008) and by the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD 2009), there are strong reasons to find ways to support the agricultural sector in order to enhance its contribution to pro-poor development, including enhancements of food availability. These challenges for underprivileged regions must be addressed by researchers and development agencies.

The track record of international development efforts, coupled with current trends and future challenges facing the less favored regions of the world (e.g., Parry et al. 2007; UNDP 2007), gives rise to the questions we raise here regarding how the international community conducts and implements research efforts to underpin development. Such development must take place in the rural areas of developing countries where up to 75% of the poor and hungry derive their livelihoods from agriculture and related activities (World Bank 2008).

The challenges of initiating and sustaining such development are not new (see, e.g., the review of Mitlin et al. 2007) but the 21st century adds new dimensions to these challenges as we face the consequences of global climate change (Abramovitz et al. 2002), globalization of food chains and markets (FAO 2004), and changing energy systems (Flavin 2008). These new challenges differ from some of the earlier challenges in the sense that scientific uncertainty is high and because differences of interest influence how challenges and options are perceived. Earlier, the scientific responses to challenges related to development, such as the need for increasing world food production, built on the very influential seminal report by Vannevar Bush (1945) that led to the metaphoric model that societal benefits will emerge downstream from the scientific knowledge pool, that is, basic research → applied research → application of research results → development → societal benefits. This linear model is characterized by a fairly high degree of scientific certainty and general political agreement. Much research connected to the so-called "Green Revolution" followed this model; a well-known example is the development of new varieties of wheat. Many challenges related to development can still be addressed by applying this linear model; this article argues, however, that the model is of less value when it comes to the new challenges previously mentioned.

Agricultural research for development (R4D) is based on the understanding that research contributes to development in underprivileged countries and regions by the research process itself, that is, asking fundamental questions about the type of research needed to alleviate particular problems. Initially, R4D followed the linear model: scientists would in most cases define the research themes and questions—not the communities or farmers. However, since the 1970s, R4D has gradually moved downstream, that is, to the right of the linear model in the sense that social organization and stakeholders' attitudes and behavior are taken into consideration.

The aim of the article is to discuss some possible implications that the emergence of new research challenges, characterized by high degrees of scientific uncertainty and intense political differences or conflicts of interest, could have upon future thinking in R4D and to review the context that modern R4D operates within.

Historical Development of Research for Development

The thinking behind R4D can be traced back to the 1960s when Paulo Freire, among others, emphasized the need for an interactive participatory element in development to ensure empowerment of poor or marginalized groups. In the 1970s, Robert Chambers and coworkers argued that farmers should be involved in research. In the 1980s, the sustainable development paradigm emerged and gradually made an impact on research (Conway 1987).

In an attempt to take into account the sustainability concept and, simultaneously, accommodate the need for further involvement of the primary stakeholders, that is, the farmers, the sustainable livelihoods approach (SLA) emerged in the late 1990s and early 2000s (Bebbington 1999; Chambers 1995, 2005; DFID 2001). According to the generally accepted definition, a livelihood comprises the capabilities, assets and activities required for a means of living, where assets are divided into natural, human, physical, financial, and social capitals. Further, decision making is done on-farm in the SLA approach, which stimulates a shift from viewing the producer in a passive sense to seeing the producer in a more innovative and entrepreneurial light. Increasingly, SLA is used as a guiding concept in R4D.

Agricultural Development Paradigms

From a chronological viewpoint, SLA may be the latest in a series of agricultural development paradigms (Figure 1) that have influenced R4D. The two major paradigmatic pathways depicted in Figure 1 are characterized by two different ideologies. One is based on the view that growth in agriculture would be the foundation for industrialization, followed by a regional import substitution approach or a "green revolution" high-input approach, and the other is based on the motivation to create better opportunities for people living in rural areas. However, "despite the difference in development ideologies influencing the two pathways, decisions to push food versus export crops or support large versus small units had adherents and detractors situated on both side of the main ideological divide" (Delgado 1997, 2).

According to Bengtsson (1983), the developmental thinking in what can be called the industrialization paradigm (see Figure 1, left track) is characterized by a modernistic approach to development; capital and technology are used to gradually expand the modern sector, subsequently transforming and absorbing the traditional sector. The economic liberalization programs that the World Bank and the International Monetary Fund introduced during the 1980s and early 1990s were designed to generate investment in agriculture and open the sector to market forces (see, e.g., World Bank 1981). This may have been achieved to some extent, for certain crops and for certain countries (Kherallah et al. 2000), but the paradigm has not yet brought prosperity to any wide majority of rural areas in underprivileged countries.

The developmental thinking inherent in the community development paradigm (see Figure 1, right track) was characterized by nonrevolutionary sources of change in rural areas, in particular following independence in many countries. In African countries, this was based on the fact that the agricultural sector accounted for an average of 70% of all employment. In the 1970s, there was a shift of focus in this paradigm in that there was an increasing emphasis on meeting the basic needs of the poor. This shift of focus was stimulated by major droughts in the eastern Sahel and Ethiopia, expansion in development assistance, and scholars who argued that

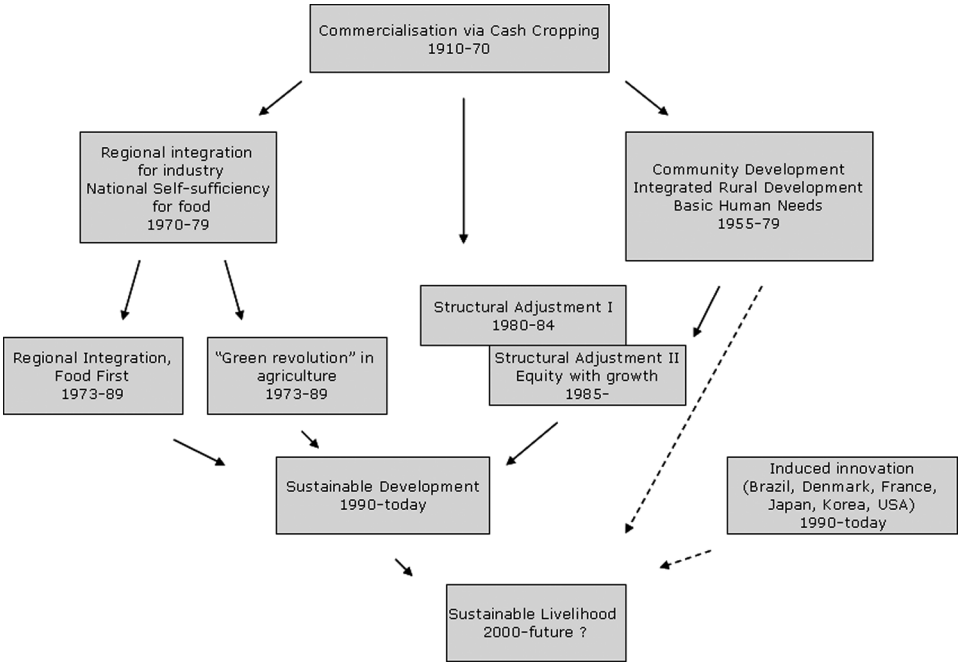

Figure 1. Chronology of paradigms in agricultural development. Export cash cropping took seriously off after World War II. This developed into two major pathways: One was based on the view that growth in agriculture would be the foundation for industrialization followed by a regional import substitution approach or a "green revolution" high-input approach. Another track moved into community development to benefit the rural poor—partly from a political motivation. Structural adjustment programs and economic liberalization packages took over in the 1980s in this pathway. Both pathways merged into the sustainable development paradigm, which moved then, together with parts of rural development and parts of a Western agro-innovation paradigm, into sustainable livelihood. Partly after Delgado (1997).

smallholders were efficient food producers. However, unacceptable budget deficits and foreign exchange shortages led to the structural adjustment programs that were based on the simple and clear concept that liberation of markets and free trade, free exchange rates, and prevention of parastatal substitution would enable trade benefits to reach the producers.

In the 1990s, the two major pathways merged into the sustainable development paradigm, which eventually also fell out of favor. Subsequently, the need for supporting decision making and innovation on-farm were accommodated by the SLA approach (see Figure 1) along with other elements, including what was reminiscent of the rural community development paradigm, in particular the involvement of primary stakeholders, as well as parts of a market-based agro-innovation paradigm, and the increasing concern for natural resources.

Current Examples in R4D and Societal Requirements

There are many active R4D agents in underprivileged regions. However, due to the iconic status of the Consultative Group on International Agricultural Research

(CGIAR), two examples are here extracted from CGIAR center research programs, to illustrate how the linear science model and the modernization paradigm remain evident in modern R4D.

CGIAR's plant breeding strategy to overcome drought sensitivity, pest resistance, or low nutritional quality of crops (CGIAR Science Council 2005) is largely based on basic research—the modification, selection, and dissemination of suitable crop varieties, that is, a linear science model. Another example is the concept of integrated soil fertility management (ISFM), adopted by the CGIAR system and strongly supported by international donor communities. With an ISFM approach, soil fertility management technologies are scaled up and disseminated to more farmers and communities (Bationo et al. 2009).

The focus of the international research system on developing better crop germplasm, natural resource management, and technology adaptation work is without question much needed. Also, a higher degree of farmer involvement and an increased focus on poverty alleviation and sustainable food security is acknowledged by the CGIAR centers (CGIAR Science Council 2005). Yet the social science capacity in the CGIAR system remains weak (Kassam 2005), so a significant shift toward the right of the linear model cannot be expected at this point. This situation is aggravated by diminishing or stagnating research and innovation capacity in many underprivileged countries.

Some 15 years ago, Byerlee and Morris (1993) argued that the international community or most countries underinvested in R4D. Similarly, recent scenario analyses demonstrate that if the MDGs are to be met, substantially more funds must be invested in R4D (Fan and Rosegrant 2008). If the public is to invest more in R4D, on the assertion that R4D creates development in underprivileged regions, the produced knowledge must be directly relevant to primary stakeholders: the farmers. This is important, not least for an international agricultural research system working hard to document the impact of its research activities on poverty and development (e.g., Chambers 2005; Spielman et al. 2009). No doubt, the SLA concept alleviates a mostly technological research approach that lacks a balanced recognition of social and/or institutional constraints. However, the lack of social research capacity in many underprivileged countries may limit a wider use of the SLA paradigm.

In order for scientific information and research findings to be relevant and useful to policymakers and farmers, researchers have to make them accessible in an understandable, trustworthy, and suitable form (Ruttan 1982; Echeverría 1998; Cash and Buizer 2005; Meinke et al. 2006). A wider adoption of SLA would contribute to ensuring these criteria. However, current trends may not support this process as R4D is increasingly privatized, leading to constraints in both supply and demand in the market services (Klerkx and Leeuwis 2007) as well as altering the moral obligation for outreach that the publicly funded research sector typically has.

Conclusions and Perspectives

The scientific research approach connected to the sustainability agenda has mostly been based on the linear science model, as challenges generally have been characterized by a fairly high degree of scientific certainty and political consensus. In this article, we argue that a downstream linear science model may be less applicable in

the case of research on what we call the new challenges. The point of departure need not be the knowledge pool within the scientific community. Instead of starting with basic research that eventually becomes a resource for applied research and policy developments, it may be no less important to look at the specific challenges and at society where the needs are and where decisions are being made. New challenges such as global climate change, globalization of food chains and markets, and changing energy systems differ from some of our earlier challenges. They are characterized by a high degree of scientific uncertainty and there are intense political differences and conflicts of interest influencing perception of the new challenges and therefore also influencing views on policy options. Whether or not a particular response to climate change is desirable, whether the benefits following globalization of our food chains exceed the potential losses of local livelihoods, and whether one type of energy system meets societal needs more effectively than others cannot be resolved by scientists alone. These challenges must also be handled through political processes. The policy level feeds back to science, and primary stakeholders define and articulate their preferences and perceived needs.

Agriculture and food will remain essential for human survival. The SLA may currently be the best framework available to individual researchers and organizations involved in R4D due to its people-centered approach, where the scientific knowledge pool is drawn upon after the research questions have been formulated in cooperation with relevant stakeholders. In other words, while the assumption in the linear model is for research to influence policy, policy also influences research. The use of the SLA concept in R4D holds the potential to accommodate questions like adaptation and mitigation of local climate change, livelihood changes following communities' linkages to global food chains, or development of alternative energy systems, because it is firmly people-centered and simultaneously based on a tradition of working with natural resource-based economy at microlevels.

The linear model has been tremendously successful in justifying why basic research deserves and requires special protection and support (Bush 1945, 83; Pielke and Byerly 1998). However, there are possibilities for making a paradigmatic shift toward SLA-like research approaches. These possibilities will increase, as the calls of decision makers and society at large sound louder, asking scientists and research institutions to contribute directly to the needs of society.

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