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## Reader: Funding of Services





**Services for Rural Development  
Reader: Funding of Services**

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## I Introduction

Economic rural development has been identified as one of the most challenging objectives involved in reaching the Millennium Development Goals and reducing poverty. Contrasting information has been identified regarding the regional economic growth potentials on the one hand and worsening rural poverty on the other. The main impediments to utilising these potentials are demonstrated by the slow progress in economic diversification and technological upgrading of manufacturing and processing capacities, due to weak private sector development, lagging incomes, a shortfall of development outcomes and the marginalisation of Africa in world trade.

Agricultural research and extension services dominated development support for rural areas over a long period of time. However, today and in comparison with the situation two decades ago, the visible presence of internationally funded pure extension service projects and large-scale agricultural research projects have almost completely vanished from the portfolios of international donors and national public budgets contradicting the trend of rising financial allocations towards reaching the Millennium Development Goals. With shrinking international donor financing and implementation of pure extension and research projects, the question arises, if the topic of agricultural extension and research as typical representatives of service for rural development is “still alive” as a subject of international development support and what are the prospects of future involvement? What are the relations between the objective of reducing rural poverty and the decline of finance allocation to agricultural extension and research?

We would like to answer the question by presenting the topic out of the finance angle meaning who provides financing for agricultural extension and research in the past and today (chapter II), what are the financial consequences of the recent economic growth (chapter III), what are the relevant financing instruments of today (chapter IV). In this context agricultural services are understood as services that make new knowledge available to farmers and assist them to develop their farming and management skills (Neuchatele Initiative 2005). Advisory services for market orientation assist small to medium scale farmers and other actors in agricultural value chains in increasing their access to and benefits from markets and commercialisation.

## II Flashback

### 1. Extension

Public extension expenditures grew rapidly in the 1970s and were estimated at US\$6 billion globally for 1988 (Swanson, Farmer, and Bahal 1990). Since then, structural adjustment programs, public sector retrenchment, and reallocation of expenditures suggest that there may have been a substantial decrease in funding for extension; however, total funding often remains high (up to 2 percent of agricultural GDP). In some countries the extension service is still one of the largest agencies in the government.

Public extension systems in some European countries have been substantially downsized or phased out altogether. In North America and Western Europe, technical support to farmers is largely provided by highly qualified agricultural specialists who work for private firms, especially input supply companies. At the same time, some Eastern European countries, such as Poland and Hungary, still maintain large public agricultural extension systems. Other European and Commonwealth of Independent States (CIS) countries are attempting to privatize their extension systems, with mixed results. In general, farmers are hesitant to pay for agricultural extension services on a continuing basis unless these services are integrated with the sale of inputs or with other technical (e.g.: veterinary) and/or marketing services.

The total number of personnel in extension systems in most developing countries appears to be stable, but these systems are also being transformed to become more effective and cost efficient. For example, China continues to have the largest extension system in the world (371,350 extension workers in crop-related extension, and a comparable number in livestock extension), but it has moved rapidly to shift the cost of extension to farmers. It now recovers most of the cost of extension through the sale of inputs and services to farmers at the county and township levels.

India, which has the second largest number of extension workers in the world (110,000), is undergoing a different type of transformation, decentralizing its extension system and making it more “market driven.” Under this new decentralized approach, farmers are beginning to direct extension priorities at the district and block levels, but at the same time they are being asked to pay for some extension services, particularly those related to the production and marketing of high-value products.

Less information is available about national extension systems in Africa, the Middle East, Latin America, and Southeast Asia, but based on current data from selected countries, it appears that the number of extension workers in most countries remains relatively stable. For example, Indonesia

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continues to have the third largest public extension system, with 30,000 staff members; Iran has 10,372 public extension workers across all subject matter areas; South Africa has 3,034 public extension workers; and Tanzania has 7,290 public extension workers. Mozambique, on the other hand, has a total of 1,838 extension staff, including 777 public extension workers, 840 extension agents working for NGOs, and 228 private extension workers. During the coming decade, it is expected that many national extension systems will shift their efforts towards organizing farmers into groups (building social capital) and then helping these groups increase farm income and contribute to increased rural employment by focusing on high-value commodities and products. (Worldbank, Investments in Agricultural Extension and Information Services)

## 2. Research:

Worldwide, public investments in agricultural research increased by 51 percent in inflation-adjusted terms over the past two decades, from an estimated \$15.2 billion (2000 international dollars) in 1981 to \$23.0 billion in 2000 (Table 1). These data reveal a significant structural shift: during the 1990s, developing countries as a group undertook more of the world's public agricultural research than the developed countries.<sup>6</sup> The Asia–Pacific region has continued to gain ground, accounting for an ever-larger share of the developing-country total since 1981. Just two countries from this region, China and India, accounted for 39.1 percent of the developing world's expenditure on agricultural R&D in 2000, a substantial increase from their 22.9 percent combined share in 1981. In stark contrast, Sub-Saharan Africa has continued to lose market share, falling from 17.3 to 11.4 percent of the developing-world total between 1981 and 2000. Similarly, just five developing countries—China, India, Brazil, Thailand, and South Africa—undertook 53.3 percent of the developing world's public agricultural research in 2000, up from 40 percent in 1981. Meanwhile, only 6.3 percent of agricultural R&D worldwide was conducted in 80 (mainly low income) countries—home to some 625 million people in 2000 and accounting for nearly 14 percent of the world's agricultural land area. Notably, this 80-country share of global agricultural R&D spending is slightly more than their corresponding value share (5.8 percent) of worldwide agricultural output (IFPRI 2006).

Among rich countries, public agricultural R&D is increasingly concentrated among just four countries — France, Germany, Japan, and the USA — which account for two-thirds of agricultural R&D spending in rich countries. Of the global spending on agricultural R&D — amounting to US\$36.5 billion — about 37 percent comes from private firms, which direct 94 percent of these resources to developed countries. In the Asia-Pacific region, 8 percent of agricultural research spending is private, compared with only 2 percent in Sub-Saharan Africa. (Source: CGIAR Science) Council 2005

Box I: Public and private agricultural research and development expenditure, (2000)

	Expenditure (million 2000 international dollars)			Share (%)		
	Public	Private	Total	Public	Private	Total
Developing countries	12,819	869	13,688	93.7	6.3	100
Developed countries	10,191	12,577	22,767	44.8	55.2	100
<b>Total</b>	<b>23,010</b>	<b>13,446</b>	<b>36,456</b>	<b>63.1</b>	<b>36.9</b>	<b>100</b>

Source: based on data from Agricultural and Science Technology Indicators Initiative (ASTI) of the International Food Policy Research institute (IFRPI)

The graphic I summarizes the thematic changes of research topics out of the CGIAR's perspective. In the mid 60s rice, wheat, and maize dominated the research agenda giving way to topics of biodiversity, genetic improvement, diversification, natural resource management, and policies.

In the early 1980s, Worldbank recognized the major contribution of R&D to increasing agricultural production, lending for agricultural R&D increased rapidly to become a priority in the agricultural loan portfolio.

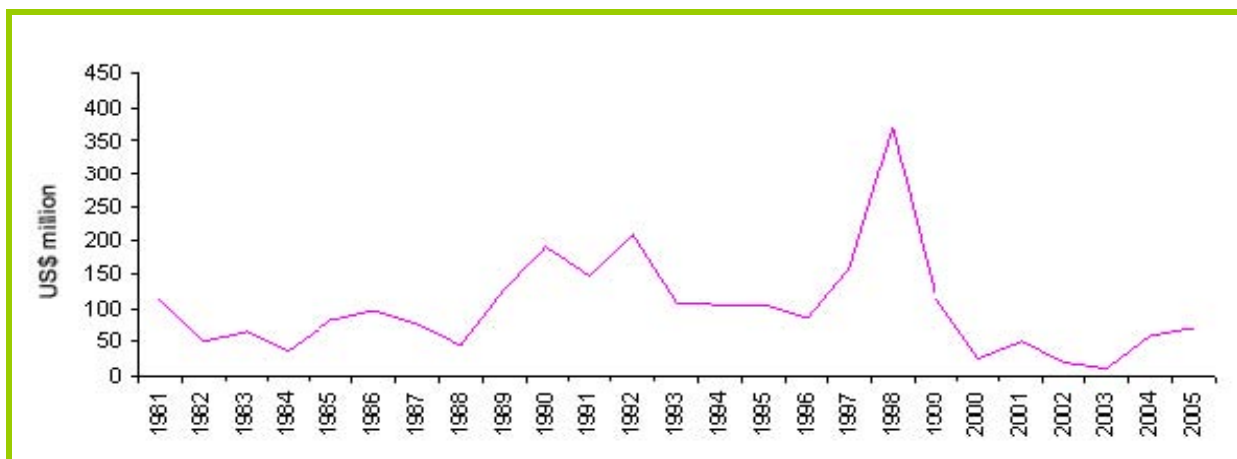
Since 1980, the Bank has provided over US\$2.5 billion for agricultural research in about 100 countries (figure 2.1), accounting for a large share of all external support for agricultural research in developing countries. In addition, the Bank is one of the leading contributors to the Consultative Group on International Agricultural Research (CGIAR), granting US\$50 million annually to the system. Despite the high priority accorded to agricultural S&T in the Bank's rural strategies, lending has fallen sharply since 1998. This trend is especially marked in Africa and South Asia, where past investments often failed because borrowing countries had not committed to a program of sustainable institutional development. However, since 2004, lending in agricultural research has again increased, and annual investments exceed US\$70 million.

Box II: CGIAR's research orientation in its adaptation to new challenges



Source: <http://www.cgiar.org>

Box III: Worldbank's Lending for agricultural research, 1981-2005



Source: Worldbank, Agricultural Investment Source Book, 2006

World Bank support to agricultural technology programs has evolved over time. A “bricks and mortar” period up to the early 1980s emphasized expanding public sector research through investment in physical infrastructure, equipment, and human resource development, in many cases to create centralized national agricultural research organizations/institutes (NAROs/NARIs). From the late 1980s, emphasis shifted to improving the management of existing public sector research organizations through better planning, improved financial management, greater accountability, and increased relevance of programs to clients. In the mid-to-late 1990s, the instability and inefficiency evident in many public research organizations (box 2.5) led to an emphasis on developing institutionally pluralistic agricultural knowledge and information systems (AKISs) with greater client participation and financing. The approach has further evolved during the past five years towards supporting agricultural innovation systems.

### **3. Shifting ODA Focus, Less Attention to Agricultural Development**

Since 1960, official development assistance (ODA) from the Development Assistance Committee (DAC) countries, including both multilateral and bilateral assistance, grew in real terms to a peak of US\$72.6 billion (2000 prices) in 1992, dropping to \$51.2 billion by 2001 (and increasing thereafter to \$74.5 billion in 2004). There was no clear shift in the bilateral ODA share over time—during the 1990s, bilateral (country-to-country) aid averaged around 70 percent of total aid. Data on the sectoral orientation of aid are available for bilateral but not multilateral funds. In contemporary times, the agricultural component of bilateral assistance grew steadily, to peak at \$6.5 billion in 1988 and decline thereafter to just \$2.0 billion in 2003. The data suggest a strong shift away from agriculture in aid funding priorities. As a share of all bilateral aid, agriculture fell from 15.2 percent in 1988 to only 4.2 percent in 2003. (IFPRI 2006)

Looking into GTZ’s implementation portfolio for the year 2007 there is not a single agricultural extension and research project, where in the year 1987 you would have found more than 25 projects. The tendency reflects the general world trend, that many developing countries find sufficient local know-how in numbers and quality to operate the traditionally known local extension service and implement national research priorities. Former trainees of extension projects (e.g.: in Kenya, Zimbabwe) are employed as managers and trainers for the new flower farms in Ethiopia or find employment as experts for internationally operating NGOs.

The Federal Ministry of Economic Cooperation and Development (BMZ) still finances agricultural extension and research work. Food security agriculture and rural development still are a special focus in 22 partner states. In 2004, BMZ allocated more than 360 million for bilateral cooperation in food security, agriculture and rural development.

However with the available finance the implementation structure has changed following the general world trends (compare Worldbank). The “brick and mortar” approach has given place to a decentralised rural development support where rural services including extension are only one element out of a bundle of support measures. Today, investments in extension work are generally combined with other support to rural and agricultural support. In Jamaica agricultural extension is organised at district level and combined with business development services (e.g.: tourism) and community support.

Secondly, funds for agricultural development have shifted from GTZ or KFW to NGOs. Many internationally operating NGOs (Worldvision, Care, German Agro Action) in conjunction with local NGOs provide more intensive extension work on communal basis mobilising local resources than two decades ago.

Thirdly, many rural development programmes consider research and extension as services that can be contracted out and that do not need to be developed as such.

Fourthly, if extension and research are supported, the focus lays on rather specific aspects (quality assurance, producer groups etc) or innovations (organic farming, bio-tech, value-chain linkages) where in former periods organisational development and capacity building stood in the foreground.

### **III Rural Services and Recent Economic Growth**

Although agriculture remains critically important for the economic growth of many developing countries, rural people need other options and expect more information than in the past, including information on healthcare and nutrition, consumer products, and government and other programs. Many farmers want to stop farming (or will be forced to stop because of lack of competitiveness) and will seek information, education, and alternative skills to prepare for new off-farm employment.

In a thematic change away from primary agriculture extension services increasingly contribute to environmental protection and sustainable management of natural resources by promoting conservation of land, water, and forests; conservation of biodiversity; pesticide safety and residue

minimization; livestock waste management; water quality preservation and watershed protection. The client base for environmentally oriented extension goes beyond the small-scale farmer because the varied activities of rural residents, such as hunting, disposal of waste materials, and harvesting of fuel wood and other products, all affect the environment.

Most public agricultural service organisations (notably research and extension) rely for most of their income on general tax revenues disbursed through the government budget system. Over the past 20 years, many governments have tried to improve the relevance and efficiency of government agencies by placing more emphasis on outputs and outcomes rather than on inputs. This has led to new models for the funding of public services, changing the mechanisms for disbursement of public funds and mobilising private resources. A common element in many of these reforms is to improve the cost-effectiveness of government resources. Enhanced relevance and accountability is achieved by giving the ultimate clients a greater say in what is being produced. In addition to the greater emphasis on efficiency and relevance, another important consideration is the fact that many government services are not exclusively "public" in nature. Greater awareness of what is truly a "public" good and what is not (forced in part by tight or declining government funds), has triggered a greater interest in use of alternative financing mechanisms in order to mobilise private funds and to share funding between private and public sources. The strategy is to reduce the scope of state financing.

The introduction of new funding mechanisms is an important element in public service reform and it is irreversible. The mechanisms allow public money to be targeted more precisely, cost-effectiveness to be enhanced. Future investments must avoid past mistakes and seek more sustainable institutional arrangements for providing knowledge and information services to rural people. The emerging view is that the **farmer is a responsible entrepreneur**, managing complex agricultural and off-farm activities to maximize well-being within many constraints. To achieve this goal, the farmer is a key innovator who interacts with a wide range of actors, including input suppliers, extension agents, traders, NGOs and community members to acquire information and knowledge for his/her farming operation. But not all people living in rural areas are farmers. Accordingly, specific programmes need to address the needs of professional agriculture in the presence of other social support programmes dealing with the hidden unemployment in rural areas. A de-coupling of these two dimensions is essential towards more professionalism and entrepreneurship in agriculture.

The underlying realization is that effective and efficient Agricultural Knowledge and Information Systems (AKISs) integrate farmers (often in producer organizations), researchers, extension workers, various private sector actors (including traders, input dealers, and supermarket procurement officers) and civil society organizations active in rural areas to harness knowledge and information from various

sources for better farming, processing, and marketing to improve livelihoods and agribusiness development.

Providing diverse extension and information services to rural people necessitates a **diversity of public and private service providers on both the supply and demand side of the extension services market**. The functioning of this market is conditioned by the institutional and policy environment for innovation, as well as by the quality of services provided. The diversity in extension service suppliers reflects also the diversity in types of information and cost of providing information. Mobile phones, internet, television, input suppliers, agribusinesses, newspapers, neighbors, public extension agents, religious organizations, bankers, NGOs, and other agencies each have their own strengths, weaknesses, and motivations, but are all in intensive use thus replacing the traditional face-to-face extension approaches.

Advisory services can only be driven by demand if there is a functioning market for service provision. A choice of advisers must be available who are able to offer quality advisory services at an appropriate price. This in turn requires that the services are financially viable as a business for the providers. It also requires that farmers are well informed about the different services and service providers. (Neuchâtel Group 2006)

Agricultural development is about climbing up the ladder from subsistence farming with a small and irregular sale of surplus production towards greater integration into a profitable market. Access to markets is obviously a precondition for succeeding in development of demand driven agricultural advisory services. Improvements of access to markets as well as increasing the farmers' share of benefits from commercial agriculture are therefore key issues. (Neuchâtel Group 2006)

## 1. Worldbank Lending, Concept Change and Future Directions

Future investments must not only recognize a diversity of clients and client needs; they must also recognize that clients function within different innovation systems characterized by varied approaches to generating, managing, and sharing technology and knowledge, and they must give attention to facilitation, capacity building, and information services. Making services more responsive to clients will entail focusing more on human and social capital development, as well as on giving the farmer more influence over the extension agenda and the way in which services are delivered. To develop effective, flexible extension systems to better serve the functioning of a productive innovation system, investments are needed to clearly define public and private sector roles, enhance financial sustainability, strengthen clients' ability to express demand for services, support extension system

reforms, improve quality of services, address key poverty and environmental issues, and exploit the potential of mass media and communications technologies.

Investment in agricultural science and technology (S&T) has been critically important to past growth performance, and it is likely to be even more important for achieving future global development priorities, especially the Millennium Development Goals (MDGs) of halving poverty and hunger by 2015. In 2000, the total global spending on agricultural R&D was \$36.5 billion (Pardey et al., forthcoming). Regional variation in research investments is considerable. The challenge in deciding future investments in agricultural R&D is to maintain past productivity gains, while supporting technological innovation in more diverse agricultural systems that will differentiate products and add value by processing, which will enable rural producers to capture a larger share of the gains. Accordingly, the World Bank's current rural strategy, *Reaching the Rural Poor*, places high priority on investments in agricultural S&T.

*Economic returns to investment in science and technology.* Studies consistently show high returns to investments in agricultural research in developing countries, averaging over 40 percent (table 2.2). Rates of return tend to be higher for research in industrial countries and for commodities with short production cycles. Paradoxically, despite evidence of high returns, funding for agricultural R&D is stagnating in many countries, and funding for agricultural education and training (AET) is declining

A 1997 evaluation of World Bank lending for agricultural research from 1980 through the early 1990s suggested that portfolio performance should be rated "unacceptable" (Purcell and Anderson 1997). The evaluation recommended that the Bank provide comprehensive assistance for research systems only when the borrower makes a clear commitment to fund the system adequately and to adopt sound management principles.

More recently, the Bank's agricultural research and extension approach has moved towards the concept of "agricultural innovation systems." An agricultural innovation system (AIS) is made up of the institutions, enterprises, and individuals that demand and supply knowledge and technologies and the rules and mechanisms by which these different agents interact. The ultimate objective of a well-functioning AIS is to serve the needs of the economy by achieving better integration of the S&T infrastructure with production needs, by increasing private sector participation in technology development, and by developing stronger linkages between producers, industry, universities, and research institutions. The focus of an AIS is not on the science suppliers but on the totality of different actors and practices that are involved in innovation, application, and generation of growth (ARD 2006). The China Agricultural Technology Transfer Project, initiated in 2005, is an example of a project that

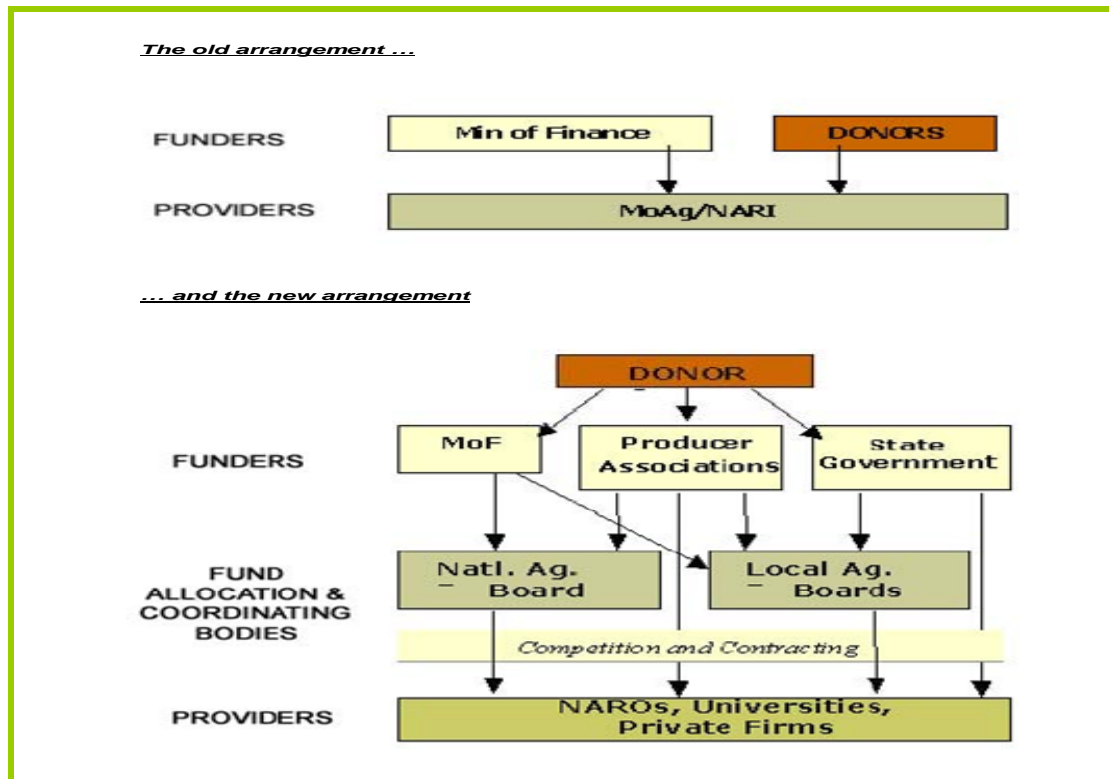
already applies this concept and brings together various public and private sector representatives along with farmers and their associations.

Based on past experiences Worldbank has formulated new investment principles in agricultural research, which correspond with the present line of thinking in funding research.

- I. *Promoting pluralistic systems.* Public research agencies will remain central to providing coherence to and facilitation of many research efforts.<sup>1</sup> Strategies, however, must enhance, not restrict, participation by the full range of research providers, including universities, private firms, NGOs, and farmer organizations. Full participation will require a) *defining public and private roles*, b) *improving science and technology policy*, c) *delinking funding and execution* and d) *promoting partnerships*.
- II. *Strengthening demand for research products.* Past investments in science and technology have focused mostly on the supply of research products. Farmers, especially poor farmers, generally lack the ability to participate in funding, priority setting, execution, and evaluation of research programs. To be effective and sustainable, research systems must become more responsive to clients' demands and interests and become more accountable to clients *encouraging participation of various actors* and decentralizing and deconcentrating research.
- III. *Sustainability of R&D investments.* Many public research organizations have suffered financial crises as declining budgets have led to minimal operating budgets and salaries and incentives have eroded. Financing a recurrent cycle of expansion and decline of public research organizations under consecutive Bank projects is inefficient. Instead, greater attention must be given to a) *right-sizing*, b) *ensuring sustainable financing*, c) *improving management* and d) *accountability*.

## 2. Public agricultural research funding

### Box IV: The old arrangement - and the new arrangement



IV. *Changing research priorities.*, derived from national development strategies and policies, with the demand-driven and market-oriented priorities arising from clients. Generally, however, future investments are likely to give priority to several areas of global and national importance:

- *Improved poverty targeting.* Poverty targeting leads to quite different strategies for different types of farmers.
- *Aligning R&D to market trends.*, especially at the postharvest stage, is essential to orient farmers to market needs, reduce costs, improve product quality and food safety, meet more demanding grade and standard requirements, and diversify to higher-value and niche products. Nontraditional exports (for example, horticultural exports, cut flowers, and organic foods) offer potential for major increases in rural employment and incomes, but they frequently require substantial research and an entirely new base of knowledge and skills, which generally are not available locally.

- *Natural resources and environmental conservation.* The degradation of natural resources and public concern over environmental issues are shifting research priorities and funding toward broader issues, many of them global in nature, such as sustainable use of land, water, forests, and biodiversity; adaptation to climate change; pesticide safety and residue minimization; livestock waste management; water quality preservation; and watershed protection. Increasing opportunities are available for agriculture to provide environmental services through carbon farming and conserving biodiversity.
  - *Health and nutrition.* The dearth of knowledge about the health of the rural population, the impact of health problems on the productivity of rural labor, and the spread of HIV/AIDS in the developing world has brought health and nutrition issues to the forefront in the recent past. The demand for knowledge along these lines will grow as more is learned about the nexus of agriculture, health, and nutrition and as new tools are available to advance this agenda (for example, molecular biology has already demonstrated the potential to create vitamin- and micronutrient-enriched food crops).
- V. *Social science and policy research.* Many research systems find it a perennial challenge to maintain the capacity for socioeconomics research, but this capacity will be needed more than ever to support the development of public policy, poverty reduction strategies, a more market-oriented agriculture, and natural resource management strategies. Inclusion of this expertise in interdisciplinary teams is also essential to help target the natural sciences and to optimize application of technologies.
- VI. *Accessing new knowledge.* Developing countries will need to make use of the latest advances in S&T to address intractable problems in agricultural production and exploit new opportunities. Country size and level of technological development will shape different strategies for different countries, as they seek to overcome both scientific and institutional constraints associated with the use of new technologies. Key strategies to tap benefits from new technologies include:
- Investing in advanced science and technology. Biotechnology and information and communications technologies provide new tools to address the needs of the rural poor. To a large extent, developing countries are not sharing in the benefits from these advances, thus creating “molecular” and “digital” divides. While strategies to access these new technologies will vary depending on the science capacity and level of development in a given country, all countries will need to strengthen their policy and regulatory frameworks for IPRs, biosafety and food safety, and identity preservation (that is, the traceability of products from farm to consumer).

- Strategic alliances and partnerships. All countries can benefit from regulatory frameworks favoring technology spill-ins, public-private partnerships, and regional and international alliances. Links to the CGIAR enable many developing countries to tap sources of new knowledge and innovations.
- Managing IPRs. Proprietary technologies are important in providing incentives for private sector research investments. Even within a single country, the requirements and conditions are not uniform, and countries may consider legal options that address this variability. Public research institutions need the capacity to form partnerships or contractual arrangements to use proprietary scientific knowledge and to patent their own research in ways that will protect the interests of resource-poor farmers.
- Strengthening uptake pathways. Linear systems of research that pass recommendations to extension, which then transfers them to farmers, are largely obsolete. Agricultural innovation systems effectively bring together the various actors involved in different stages of knowledge and innovation generation, management, and use.
- *Commercializing research products.* Public research institutions increasingly will rely on private sector market mechanisms to disseminate research products. Establishing links early in the research process is often critical to ensure that appropriate partnerships are formed and that the final research product can be used.
- *Linking to demand-driven extension systems.* Decentralized extension services accountable to local user groups should facilitate client “purchase” of research services and products that respond to their needs. Matching grant programs for farmer and community groups can allow them to test and disseminate new technologies. A number of countries have introduced competitive grant programs to provide such alternatives to farmer groups.

Biotechnology is also a key investment priority, but monitoring of risks, both actual and perceived, must be an integral part of Bank support. Complementary investments in agricultural education have been neglected, but they are essential to ensure a new generation of agricultural scientists and leaders

Finally, several important gaps in established good practice need to be addressed in future work, including new approaches to promoting innovation and research-extension linkages in decentralized systems, public-private partnerships and commercialization of research products, decentralizing research, involving producer organizations in financing and executing research, and multi-country research investments

## IV Funding Mechanisms for Extension and Research in Practice

In line with the long-term changes in the agricultural extension and research systems, funding mechanism were adjusted, withdrawn or newly introduced. Central public allocation were reduced, the cooperation with private actors encouraged and the active involvement of local administration and the target groups uplifted. These changes required a rethinking and adjustments in utilizing appropriate financing mechanisms of extension and research:

### 1. Extension:

The reform of extension funding aims at mobilising funds from private sources, e.g. by supporting the provision of extension services outside the public sector. Another important concern is to enhance the control of extension clients by redirecting the flow of funds. By disaggregating the functions of services into finance, provision, delivery and monitoring of services, quite a range of combinations between private and public funds and actors seems possible. Frequently discussed possible alternative funding mechanisms include the participation of traders in extension (e.g.; agricultural inputs), subcontracting extension to non-public actors, cost-sharing of services, charging levies on commodities as a form of cost participation by producers. Extension funds and out-grower systems are also potential options. An important feature of alternative funding mechanisms remains the control of extension quality by the end users. Less important ones include sharecropping (Ecuador) of farmer and extension agent, sharing of risk and payment after harvest (China), using mass media for improved coverage and selling of extension material. Looking at available experiences in altering the funding mechanisms for agricultural extension it becomes clear that no funding mechanism warrants universal application. The specific situation is critical in finding the appropriate funding mechanism. Each particular service needs to be analysed and the question who benefits to be answered.

#### Direct User Charges

Direct user charges represent a direct application of the principle that beneficiaries pay for services received, and have been introduced to finance services where beneficiaries are clearly identifiable and the service has strong private good characteristics (e.g. operational advice based on book keeping results). The introduction of user charges improves the accountability of extension services. While user charges are initially unpopular with farmers, this may be overcome by evidence of improved relevance and quality. User charges may also be informal. For example, in-kind contributions in the form of materials, land, labour, housing, and transport may be used where cash is limited and credit constrained.

**Extensions Funds (outside ministerial management)**

They are either part of a technology fund for research and extension or solely for extension services. This type of demand-side subsidy channels funds directly to farmers, farmer groups or farmer organisations through an application procedure. The recipients of the funds purchase extension services from private extension companies or non-for-profit organisations. Contracts exist between the source of funding and the recipients and also between the farmer and the extension company. An interesting example is the set-up of a foundation in Bolivia (Fundaciones Para El Desarrollo De Tecnología agropecuaria (FDTA's) providing funds for research and extension on a competitive basis.

**Voucher Systems**

In voucher systems clients obtain vouchers from government or another funding source which entitle them to specific extension services rendered by an extension organisation whether private or non-profit. The clients pay for the service with the voucher. The extension organisation submits the voucher to the funding source and gets the corresponding amount reimbursed. The famous example of a voucher system for extension was for years Chile. The importance of voucher systems in extension is declining, since most currencies have been stabilised and rural finance systems allow a cash-payment procedures or other methods of financing are in place (e.g.: user charges).

**Contracting out**

The mechanism of contracting out maintains the use of public funds paying for the services. The delivery of services is usually contracted out through competitive tendering. This requires specifying the terms of reference for the service and the bidders have to specify how the service will be rendered and in which quality. Based on the offers by private companies or NGOs or professional organisations government makes contracts with the successful bidder. Contracting out creates for governments more flexibility because it is certainly easier to stop contracting than starting with a large staff retrenchment. An example where contracting out of extension services has become the order of the day is Uganda.

**Out-grower Systems**

Out-grower models offer opportunities for sharing the cost of extension services. The product is controlled via marketing and charges can easily be subtracted. Commodity companies (cotton, coffee, cocoa, etc.) have been operating outgrower schemes. They provide out-growers with inputs and advice from own sources or guaranteeing credit or inputs. In the case of export crops, the schemes are accepted and perform quite well, a kind of entrepreneurship is developed. Several types of out-

grower schemes are possible. Outgrower extension system remains a niche solution for farmers with a very tight links to a processor or market company (example: out-grower scheme for macadamia nuts in Malawi).

### **Extension Services in Value Chains**

The idea of developing new value chains via bio products has gained popularity in many developing countries. Services are also needed here as a prerequisite for sustainable development. Besides regular certifications, one focus is residue management. These services are often centrally managed and financed e.g.: by contracting one service company taking care of the extension service in quality management along the entire chain.

The qualification of channel captains or bottleneck operators is a second strategy often used in value chains supporting and improving the extension requirements. Practical examples are the qualification of rural agricultural input suppliers providing e.g.: information about fertilizer applications or the feedback mechanisms of central sales organisations providing information about the sales performance of a single farmer's deliveries against the total supplies (e.g.: in milk collection, flower auctions etc.).

### **Extension Services provided by Marketing Associations or Cooperatives**

The formation of producer group is an important instrument of linking small agricultural farms into the market or providing market access. In line with growing importance of quality aspects and quality management along the supply chain, marketing associations and cooperatives are part of the quality assurance system of the chain. In addition of complying to the quality task associations have started to provide extension service to farmers concerning quality aspects including advice on integrated plant protection, market price information, supply and demand assessment etc. These services are paid as part of the service fees (approx. 7 % of sales value) farmers are charged for using the facilities of the marketing association or cooperative. (Example: Producer markets operated by association in EU)

### **Levies or taxes on commodities**

Cost recovery can be implemented as compulsory levies on export commodities which are processed or channelled through a single marketing channel which make levy evasion difficult. Extension services are delivered by commodity producer, marketing or processing organisations. These can be farmer organisations, para-statal boards, private for profit firms, or even not-for-profit NGOs. There are many and long-existing examples in developing countries where associations of commodity producers or commodity processing and marketing organisations maintain their own extension set-up (auctions in the Netherlands, or producer associations in Germany providing advise in quality management).

Financing may be through levies on marketed produce, deducted from the price paid to the producers, or through membership fees.

### **Privatisation of Extension Services**

The segments of highly market-integrated, better-off producers are the preferred clients of private extension enterprises, because they offer a profit potential. Private extension organisations tend to operate in areas with good infrastructure and high potential in agricultural production. Based on positive results in the operation of CEFE (CEFE = Competency based Economies through Formation of Enterprise) advisors in Asia and following the BDS approach, private extension services has been encouraged in several developing countries. The results are mixed and seem to depend on the status of market development and the number of already existing small and medium enterprises (SMES). In the Philippines with a rather large SMES basis CEFE-extension works very successful, in Cambodia or many East European countries with a weak SME-basis CEFE extension results are rather discouraging, since the rural market conditions limit the survival rate of private extension services.

## **2. Research**

There is a major trend towards the diversification of funding sources for public agricultural research agencies. In addition to traditional government contributions in the form of a budget allocation, public agricultural research organisations increasingly obtain funding through alternative financing mechanisms. In practice, the most important new funding mechanism is the competitive agricultural technology fund (CATF). Other options for financing agricultural research include matching grants, contract research, Levies & Check-offs, commercialisation and cost recovery and research endowments.

Nowadays most research agencies depend upon a mix of different funding sources and financing mechanisms. This requires substantial managerial skills in the receiving agency and usually leads to higher administrative costs. Such higher costs may be warranted, however, if additional resources are being mobilized or the resources are being spent more effectively and efficiently.

### **Competitive Agricultural Technology Funds (CATF)**

Dissatisfaction with traditional mechanisms of funding agricultural research and dissemination (AR&D) in developing countries has led to the introduction of competitive agricultural technology funds (CATFs) in an increasing number of them. The fund is a pool of money designed to support the development of agricultural technology. When it is established a set of rules guiding its use, management and accountability arrangements are put in place in support of its objectives. The CATF

can cover research, technology delivery and uptake processes. There is advance identification of priority areas in which activities will be supported. The availability of funds in the agreed thematic areas is then widely advertised, and proposals are solicited. The key is open competition to work on sections of an agreed agenda for the development and delivery of agricultural technology. (Example: Kenya ARF: The Agricultural Research Fund managed by the Kenya Agricultural Research Institute, est. 1990 on initiative of national researchers: funded by DFID and USAID grants and IDA loans).

This model was favoured by many donors during the 90ies, despite the fact that available information on its modalities and performance has been fragmentary. With a decline in international funding of agricultural extension and technology development CATFs are on the decline as well.

### **Matching Grants**

Over the 1990s matching grant facilities (MGF) were increasingly used to support enterprise development and research. They are thematically open for agricultural and non-agricultural subjects. Normally matching grants are used for larger measures and those, which include significant “public good content” such as the support of creation of common facilities shared by industry clusters or investments benefiting a large number of enterprises. MGF are normally being used for larger entities. They are applied for business development and research. At present almost all international development agencies (e.g.: ADB, Worldbank, CGIAR. EU) operate and manage MGFs.

In a matching grant scheme, the contribution of funds by the government is tied to the level of funding obtained by a partner institute (e.g.: research institute from other sources such as producer associations. They are useful in opening up additional funds and shifting certain types of funds of research from the public to the private sector. Governments can, for instance, encourage greater use of commodity levies or check-offs for agricultural research by providing matching support for programs funded by levies and check-offs. Not only governments offer matching grants, however: there are also several private foundations which offer matching grants — usually for specific projects (e.g.: Agha Khan Fund).

### **Contract Research**

Research contracts can be drawn up between a public research institute and a private client as well as between a public research institute and a public financing agency. Restrictions on the ability of public research institutes to engage in contract research on behalf of the private sector often have to be removed first. The advantages of this type of funding mechanism are the enhancement of user-orientation as it is more demand-driven, a splitting of research costs with the private sector and

decrease of overall spending. Last but not least contract research can increase the information flow between the public and private sectors

Countries with considerable experience with the latter type of contracts include New Zealand, the Netherlands, and the UK. Several (private) contract research organisations exist, although increasingly public research organizations are also beginning to engage in this type of research, mostly in the developing world. Several universities have for instance opened up the possibility of engaging in contract research, or encouraging academic staff to undertake contract research and consultancy work. There are also a few examples of developing countries in which this kind of funding mechanism has been used. KARI (Kenya Agricultural Research Institute) has undertaken research in Kenya on behalf of or in collaboration with a number of private sector companies on a shared-cost basis. Companies participating in shared projects include Kenya Breweries Limited (on barley research) and East African Industries (researching oil crops) and horticultural export companies (KARI 2005).

### **Levies**

Research levies are taxes (e.g. per ton of agricultural production) collected from a specific industry (agricultural producers, processors, or exporters) to fund research relevant to that industry. These levies can also be used for extension, stabilization funds, or marketing board operations. They have the advantage of allowing research on certain commodities to be funded directly by producers. Where levies are collected by governments, they are often channelled to the research institute through the treasury.

The principal argument against the use of levies and check-offs is that as a result of this commodity-specific research may adopt a narrow focus that ignores the fact that cash crops are part of a broader farming system, are often intercropped with food crops, and are always affected by what happens elsewhere in the system. Another potential shortcoming of the industry-driven model is a bias towards the short-term production constraints of the more influential industry players. Environmental sustainability and constraints most relevant to smallholders are among the concerns that may, therefore, be neglected (SPAAR, 1999).

### Commercialisation and Cost-Recovery

Public agricultural research agencies in Africa, as elsewhere in the world, have been told to generate more of their own income. Many of them already have a long tradition of generating some income of their own, although usually this does not represent a major contribution to their budget. Three different types of commercialization can be identified:

- commercialization of research results
- commercialization of in-house expertise and research facilities and
- commercialization of non-research facilities owned by the research agency.

The first type of commercialization includes instruments such as patents, plant variety rights, licenses, charging for research reports, and research contracts. These all try fully or partially to recover the costs of research and/or appropriate some of the benefits that the research may yield. From a societal point of view, the first four instruments should be exploited as much as possible once the research has been done. However, the income-generating potential to the research agency should not be a criterion in selecting research projects. Strictly speaking, research that can generate sufficient appropriable benefits should be undertaken by the private and not the public sector. In a similar vein, research contracts with private businesses may divert the research agenda of a public agricultural research agency away from societal toward private interests.

The second type of commercialization is the use of in-house expertise and research facilities for non-research activities, such as consulting, soil analysis, seed multiplication, and vaccine production. All these activities are technically non-research activities, although they very much depend on the specialized expertise and equipment available at the research agencies. Given the limited technical capacity in these areas in many countries, it makes sense to exploit this synergy between these research and non-research activities (as research agencies mature, non-research activities are often syphoned off to separate agencies; the dual use of laboratory facilities, however, is still quite common even in developed countries).

The third type of commercialization comprises commercial activities that have relatively little relation to the core business of an agricultural research agency, such as the exploitation of plantations and farms that are far larger than strictly needed to conduct research, as well as the renting out of land, tractor services, and sale of agricultural inputs. Although these activities may generate income, they also can be an enormous burden on the management capacity of an agricultural research agency. The large number of support staff per researcher found in many agricultural research agencies in sub-Saharan Africa (on average 9.7 per researcher, but at some institutes more than 40 per researcher) can be explained to a large extent by the non-research activities being conducted at agricultural research agencies. It would make sense if agricultural research agencies could dispense with these non-

research activities and focus on their core business – agricultural research. However, many African research managers consider these self-generating income activities as one of the few secure sources of cash income and are not willing to give them up. In addition, the revenues from selling assets, such as land and buildings, usually have to be returned to the treasury. In other words, there are no incentives for research managers to rationalize the management and exploitation of the assets of the research institute. As long as this situation cannot be resolved at the political level, it may make sense to organize these commercial activities in a separate business unit within an agricultural research agency and with the exclusive mandate to generate income. Such a unit should be led by a good farm manager rather than a good researcher.

### **Research Endowments**

An endowment is created when a sizable sum of money is set aside as a financial investment and research expenses are paid out of the net returns (i.e. after taking into account inflation and fund management costs). Usually, the funds are invested in financial assets (e.g. stocks, bonds) and the net return from these assets is allocated—the principal of the fund is designed to remain intact indefinitely. There are two types of endowments. A sinking fund is an endowment that is designed to disburse the entire principal over a fixed period. A revolving fund is an endowment that is replenished or augmented as existing funds are spent. The replenishment may come from a donor, government, or regular source of income such as a levy or check-off on production (SPAAR, 1999).

An endowment needs a management body, usually a foundation, to ensure that resources are invested with the appropriate combination of risk and likely returns; and to define and implement a policy for allocating the net returns of the invested funds.

The advantage of an endowment fund is that it can provide a secure annual stream of funding. In this way, research can pursue more long-term research goals. However, there are several disadvantages too. First, the foundation managing the fund may not be fully accountable to anyone and this may result in funding research that is not demand-driven or in line with national objectives for agricultural development. Secondly, good management of the fund is crucial. Returns to investment may not be stable especially in developing countries and there is a risk that with disappointing returns, the endowment itself will be used to fund research, thereby endangering the basis of the endowment itself.

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