

Acronyms

ATMAs	Agricultural Technology Management Agencies
BMZ	German Federal Ministry for Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung)
CA	Conservation Agriculture
CAADP	Comprehensive Africa Agriculture Development Programme
CASU	Conservation Agriculture Scaling-Up
CBO	Community Based Organisation
CPP	Country Partnership Programme on Sustainable Land Management
EIAR	Ethiopian Institute of Agricultural Research
FACs	Farmers Advisory Committees
FAO	Food and Agriculture Organisation of the United Nations
GIZ	German Society for International Cooperation (Gesellschaft für Internationale Zusammenarbeit)
IASS	Institute for Advanced Sustainability Studies
ICAR	Indian Council for Agricultural Research
IFPRI	International Food Policy Research Institute
IISWC	Indian Institute of Soil and Water Conservation
IMF	International Monetary Fund
ISFM	Integrated Watershed Management
IWM	Integrated Watershed Management
KALRO	Kenya Agriculture and Livestock Organisation
KAPSLMP	Kenya Agricultural Productivity and Sustainable Land Management Project
KVK	Krishi Vigyan Kendra
NGO	Non-Governmental Organisation
NMSA	National Mission for Sustainable Agriculture
NRM	Natural Resource Management
ODA	Official Development Assistance
PADETES	Participatory Demonstration and Training Extension System
PBAs	Programme Based Approaches
PES	Payments for Ecosystem Services
PRA	Participatory Rural Appraisal
R&D	Research and Development
SAP	Structural Adjustment Policies
SDGs	Sustainable Development Goals
SEWOH	Special initiative „One World, No Hunger“ (BMZ-Sonderinitiative „Eine Welt ohne Hunger“)
SHM	Soil Health Management
SLEM	Sustainable Land and Ecosystem Management
SLM	Sustainable Soil and Land Management
SLMP	Sustainable Land Management Programme
SLWMP	Sustainable Land and Water Management Project
SNVACA	Systeme National de Vulgarisation et d'appui Conseil Agricoles
UNCCD	United Nations Convention to Combat Desertification
WOCAT	World Overview of Conservation Approaches and Technologies

Theo Rauch / David Kersting Making service systems work for food security and sustainable land management

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Strategic recommendations for targeting smallholder farmers in sub-Saharan Africa and India



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O. Summary and recommendations

Land and soil degradation is a global problem and combating it is the key to sustainable development. Around the world roughly 52 percent of arable land is deemed to be moderately to severely degraded. This increasingly leads to yield risks and, by extension, to food risks that can be further exacerbated by climatic extremes. In total more than 1.3 billion people are affected, in particular small-scale farmers on the African continent, in India and Latin America. Furthermore, soil degradation also leads to the destabilisation of ecosystem services and the impairment of ecosystem services (particularly water and CO₂ storage). The halting and reversal of soil degradation is, therefore, one of the Sustainable Development Goals (SDGs) approved by the United Nations in 2015.

Agricultural practices to avoid soil degradation are widely known and supported around the globe through numerous programmes by development cooperation. Frequently, however, the continuation of the introduced measures fails as soon as the provision of inputs (equipment, fertiliser, seeds and seedlings) from the respective project comes to a halt. Long-term successes are mostly limited to geographical stand-alone solutions. In order to improve the food security of small-scale farms on a long-term basis, practices and technologies for soil protection and rehabilitation need to be tailored more to their respective situation and needs.

Agricultural advisory services can play a central role in identifying and spreading suitable agricultural practices. These services need to be provided from the public sector: Although soil protection is in the direct interest of the landowner, the benefit for society as a whole often far exceeds that of the private user. Moreover, many soil protection measures are only successful if they are implemented on a landscape scale.

As a consequence of the public debt and structural adjustment policy, state advisory services aiming to promote small-scale agriculture were privatised in many regions from the mid-1980s. Consequently, the share of the agricultural sector fell both in the national budgets of African countries (formerly around 10 percent) and also in terms of the funds made available globally for development work (official development aid [ODA], formerly 20 percent) to approximately 5 percent. The funds were mainly allocated in a one-sided manner to increasing production. Even today the share of programmes for sustainable land use management in Uganda, Ghana and Burkina Faso account for less than 5 percent of the agricultural sector budget whereas the lion's share of the funds is used for mineral fertiliser subsidies. Expenditure of USD 400 million a year, like in Ethiopia (20 percent of the sectoral budget), is a rare exception.

The current pluralistic service systems do not fill the resulting gap in an adequate manner. State services and non-governmental organizations only have very limited capacities but private service providers generally have little interest in soil protection and rehabilitation. These topics are only addressed selectively in the context of commercially successful value chains. Mainly poorer small-scale and food insecure farmers are excluded from agricultural services for soil protection due to the inadequate resources of state services and the lack of monitoring and coordination of various non-government stakeholders. ●

Recommended actions to provide specific support to small-scale farmers

a Identification of target group-specific techniques under realistic conditions:

→ **Page 42**

Land users must be actively involved in the development of new techniques that they are to continue using with no further external support. The type and intensity of this support should be adapted to the actual circumstances of these test farmers to ensure that they can maintain the promoted practices after the end of the programme. Against this backdrop, numerous factors must be taken into account that extend far beyond field management (e.g. market potentials) in order to test innovations of sustainable land management in a representative socioeconomic spectrum of small-scale farms. Social inclusiveness can only be achieved if the situation of the poorer farmers in their ranks receives special attention.

b Advisory schemes for the introduction and establishment of innovations:

→ **Page 43**

In principle, a distinction must be made between the introduction of innovations and the routine advice provided after they have been successfully taken on board. The former is dependent on an intensive, very supply-oriented approach that state advisory services usually can provide only with external support. The latter can largely be organized by or sourced from farmer's organizations. In this context, aspects like the dominance of elites and the lack of social inclusiveness must be taken into account. They often lead to neglect of the concerns of women, adolescents, poorer small-scale farmers and minorities like pastoralists or landless farmers.

c Access to inputs and financial services:

→ **Page 44**

The transition to sustainable, soil-conserving farming systems normally requires investment, which poorer small-scale farmers cannot afford without external financial backing. Subsidies of this kind are justified given the positive external effects they generate in line with the Payments for Ecosystems Services (PES) logic. To avoid undermining the assumption of direct responsibility through unrealistic subsidies, the appropriate distribution of investment costs must be negotiated with the users of the resources. In general, the small-scale farmers provide the labor and the locally available inputs. Instead of monetary compensation (cash-for-work) labor-saving equipment or long-term yield-increasing inputs could be provided to reduce the burden.

d Establishment and strengthening of farmers' resource user organizations:

→ **Page 45**

Inclusive and steady user organizations are an integral part of the participatory and sustainable management of natural resources. What is needed here is a reliable yet flexible legal framework for their recognition with regards to the transparency and legitimisation of internal decision-making processes and to the targeted support of disadvantaged members. As these user organizations have to effectively defend their interests vis-à-vis the state and external service providers (accountability), support from non-government organizations is recommended.

e Institutionalisation of the service relationship:

→ **Page 47**

An exchange between strong farming organizations and the advisory service must be anchored in institutionalised forms of dialogue between the respective representatives. For this, farmer's organizations must be represented in participatory consultation fora on both decentralised and local levels of government.

The enduring, comprehensive upscaling of sustainable land use is dependent on large-scale upfront investment in services, particularly for farmers with limited resources. Local user organizations are a central component of a lastingly efficient system. They should be supported during the establishment phase until they themselves can act as service providers. These investments must be made above all during the innovation phase, during the introduction of techniques, by means of external funds from international, national and regional programmes. Over the course of time, the need for external services will diminish and user organizations will then be able to provide them. ●

1. Introduction: context and goals of the study

Land degradation is a worldwide problem. Controlling it is one of the concrete targets of the Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly in 2015. For smallholder households in developing and emerging economies, soil degradation increasingly results in risks to yield, and affects food security. Additionally, it leads to destabilization of the ecological system and deteriorates its performance.

The topic of soil protection and rehabilitation is a major one in the context of the special initiative: “Eine Welt ohne Hunger” (SEWOH — “One World, No Hunger”). This program is run by the German Federal Ministry for Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung, abbreviated to BMZ).

The “Soil Protection and Rehabilitation for Food Security” program, is commissioned by the BMZ, and organized by the German Society for International Cooperation (GIZ), in Ethiopia, Kenya, Burkina Faso, Benin, and India. Its goal is to identify and implement appropriate measures for a policy of soil protection and rehabilitation geared toward food security.

The Institute for Advanced Sustainability Studies (IASS) in Potsdam was commissioned by the BMZ to support this program through research, as part of a cluster of SEWOH accompanying research projects. The goal of the research project “Accompanying Research on Soil Protection and Rehabilitation for Food Security” is to identify locally adapted mechanisms for overcoming structural hindrances faced by smallholders to protect and rehabilitate soils, and to develop these further together with relevant actors. Interventions and technologies have to be tailored to the needs of intended target groups (resource poor, systematically disadvantaged households and individuals), in order to improve their food security.

Interventions for soil protection and rehabilitation need to equally consider long-term soil health, equality of access to land, and equitable distribution of benefits (IASS, Research Framework, July 2015).

Agricultural practices to prevent soil degradation are well known, and are promoted and supported by a multitude of programmes for cooperation and development on a global scale. The problem is that although they are successfully implemented by smallholder households wherever (and for as long as) they are directly supported by development projects, they usually remain isolated solutions. There is no extended dissemination and continuation of successfully tested practices.

Related studies on the reasons for low acceptance among the majority of small-scale farmers reveal that lack of access to the services (consulting, financing, inputs, outlet markets) necessary for successful adoption were a major obstacle to the dissemination, and sustained application of such techniques. This applies particularly to target groups that do not have adequate resources, and are more severely affected by lack of food security. Hence, this research project focuses its analysis on the necessary framework conditions for lasting and broadly effective implementation of sustainable soil and land management. Access to agricultural services is a key element.

Therefore, the goal of the present study is to contribute to identifying a context-appropriate institutional framework for sustainable soil and land management, with particular reference to agricultural service systems in regions of developing and emerging economies farmed mainly by smallholders. Based on an analysis of the relevant expert literature on smallholder service systems, existing models of agricultural services provision will be analyzed in terms of their strengths and weaknesses, to derive policy recommendations for socially inclusive and sustained arrangements.

Key questions answered in this study are:

- a** To what extent should the service systems/ advisory systems be adapted to the needs of the various different smallholder groups and locations? Which smallholder target groups are being reached? Which are not? Why?
- b** To what extent are the service systems/ research and advisory systems adapted to the specific requirements of sustainable soil and land management?
- c** What role do farmers' organizations play (as service user organizations) in the context of these service systems/ research and advisory systems? What is the role of participatory development of practices of sustainable land and soil management in this?
- d** How can service gaps for underprivileged smallholders, especially in the area of sustainable soil and land management, be reduced?

The specific thrust of these questions is based on the following assumptions:

- a** Public tasks such as soil conservation tend to face neglect in a policy environment that is dominated by the paradigm of privatization of services.
- b** Designing socially inclusive services for smallholders as well as enabling access for the great majority of poorer smallholders is a great challenge.
- c** Permanent and inclusive access to services for soil conservation will only be possible through organization of smallholder land users, which is a challenge in itself.

The conceptual basis for the present study is the "service systems approach". **Chapter 2** describes this approach, and examines for its relevance to sustainable soil and land management. **Chapter 3** analyzes the existing agricultural service systems and the role in soil and land management. It offers criticism, and suggests good or interesting alternative service approaches. **Chapter 4** builds on this to develop strategy proposals for designing context-specific inclusive service systems for sustainable soil and land management. The study concludes with a short summary of the main findings and recommendations.

The Appendix provides an annotated bibliography for further reading. ●

2. Conceptual framework: the service systems approach

This study starts from the central hypothesis that the spread of known and appropriate practices of sustainable soil and land management (hereafter abbreviated to SLM) in developing and emerging economies, usually fail because many smallholder farmers lack access to the necessary services.

Such service gaps are widespread in rural regions, and particularly affect the poorest groups that often form the majority of the population. Those are the central subject of the service systems approach. We first describe the service gaps and then look at approaches to bridging them (Section →**2.1**). The next section (→**2.2**) gives an account of the service systems model for public services. In →**2.3** we shall explain why SLM belongs to the area of public tasks, and requires public services. The specific service requirements of smallholder SLM are then listed in →**2.4**.

An outline of the possibilities and limits of this service system model for the special case of SLM is given in →**2.5**. In →**2.6** we derive the questions for the empirical analysis in **Chapter 3**.

2.1 The service gap in rural regions and approaches to bridging it

The population's efforts to improve their socioeconomic situation, whether in relation to food security, higher income, clean drinking water or health care and education depend largely on the access they have to these services. Humans can rarely satisfy their own needs, which are beyond just pure subsistence. In every system of division of labor, human beings as producers or consumers are reliant on specialized service providers. These providers can be public, private or non-profit stakeholders. The success of many services often depends on active participation by the service users in the implementation. Prominent examples from everyday life in industrial countries are garbage collection (in which users provide bins, and sort waste) or medical treatment (in which patients often have to observe specific codes of conduct in the context of the treatment). In service systems, different types of providers are faced with a heterogeneous range of users.

In rural regions of poor countries, three features frequently characterize the provision of services:

- a** Large distances, and poorly developed infrastructure make provision of services for a widely scattered rural population very expensive.
- b** In the first decades of development (1960–end of the 1980s) the provision of many services, including economic ones (financial credit, transport), was seen as the responsibility of public providers in most countries.
- c** However, in a majority of cases, governance and public capacities were weak, and rural regions were not given high political priority.

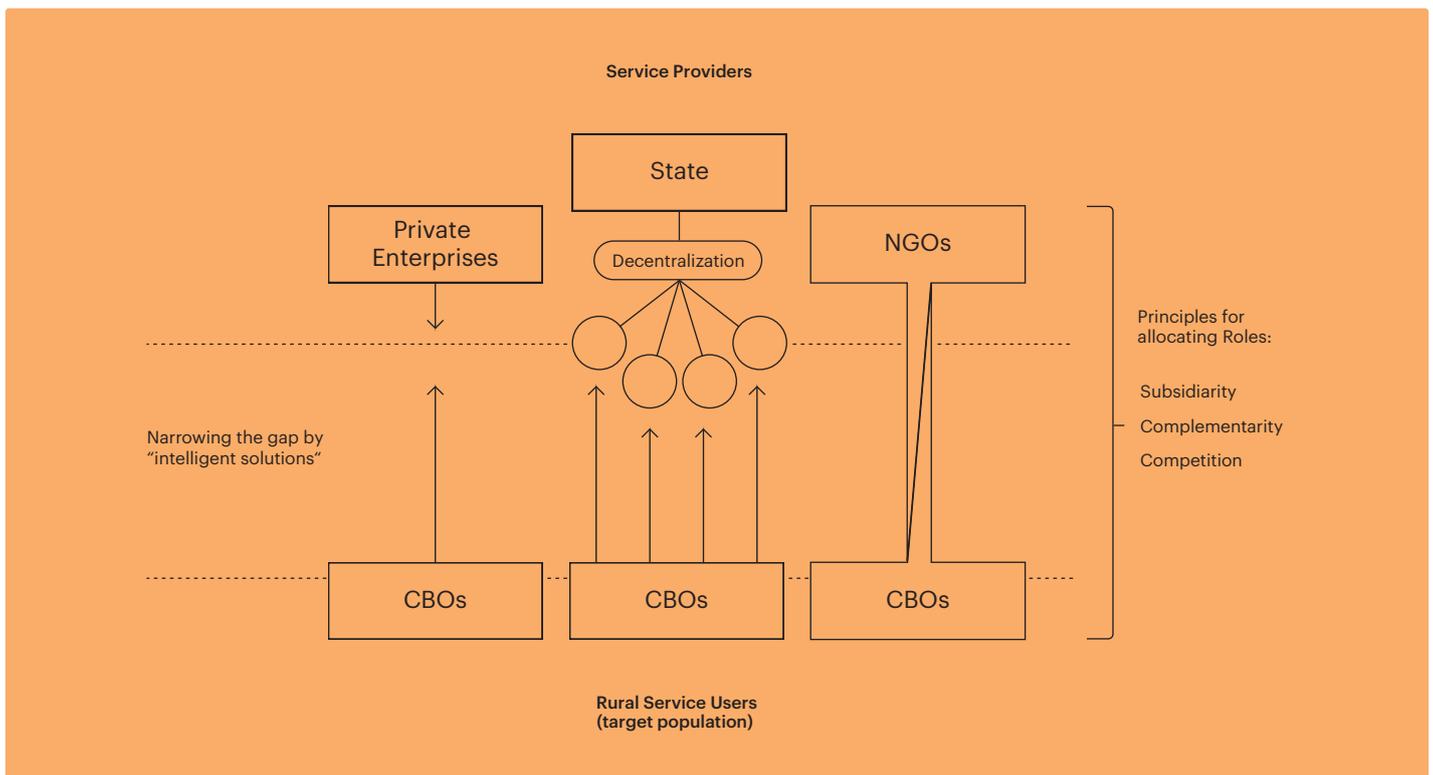
The service gap in rural regions results from the three features stated above. Externally financed rural development projects tried to bridge this gap with ODA (Official Development Assistance) resources but with little success. This lack of sustainability of project impacts resulted from a failure in making the national providers capable enough to close the gap on their own.

The alternative attempts by advocates of a self-help approach to close the gap from below—by strengthening target groups' ability to solve problems on their own largely independently of external services—usually failed because they over-burdened the target groups, especially those with limited resources.

At the beginning of the 1990s it became evident that, firstly, the gap could only be closed by efforts on both sides. Secondly, public administrations were over-burdened as the sole providers. And finally, not only limited capacities but also lack of political will,

and power structures, were responsible for the gap (Rauch/ GIZ 1993). This led to the following strategy package for bridging the service gap (Fig. 1):

- a** Diversification of the spectrum of service providers up to private entrepreneurs, and non-profit stakeholders/ stakeholders from civil society. This was intended (in line with structural adjustment programs of the World Bank and International Monetary Fund) to not only relieve the state of responsibility but also to arrive at a more pluralistic range of competing service providers.
- b** Decentralization of the state to bring the planning and provision of state services closer to the population. This was also intended to help in abolishing the central state’s monopoly position in favor of diverse, citizen-oriented local authorities.
- c** Organizing service clients or users to manage services in order to improve their accessibility to external services, and to strengthen their power to demand services or to negotiate for fair and appropriate service conditions.
- d** A stronger orientation toward demand is intended to help in avoiding unnecessary, and often very elaborate, bureaucratic provision of services that do not correspond to the population’s priority needs, and waste scarce capacities.
- e** Services should be designed to be context-specific (“best fit” instead of world-wide “best practice” or one-size-fits-all blueprints). This will also help to use scarce resources more effectively.



Organisation of producers and user groups was done with a view to help them become more attractive market partners on one hand, and stronger negotiating partners, in relation to private enterprise partners, on the other.

In relation to civil society, partner user organizations were supposed to form a strong membership base. In relation to state service providers and decentralized government offices, they should be able to take their place as a strong lobby grouping. In line with this concept, in many countries an almost dense, more or less inclusive and stable network of credit and extension groups, marketing organizations, water user committees, parents’ associations, and health committees, has been emerging.

Fig. 1:
Bridging the service gap
 (from Rauch 2009)
 *CBO= Community Based
 Organisation

Serious controversies arose in the academic and policy debates concerning the degree and type of privatization of services. Privatization of sectors such as telecommunications, retail and wholesale businesses, and agricultural marketing found acceptance in many countries, but there was massive resistance to the neoliberal or radical pro-market agenda of extensive privatization of what had originally been public responsibilities such as: health care, education, provision of drinking water, and agricultural extension services.

2.2 The service systems model for public services

The debate about which services should be categorized as public is a political one, and is still as controversial as ever (Section →2.3 for the classification of sustainable land use as a public responsibility). Services are defined as public if the state ultimately bears responsibility for providing them. In other words, public services are the subject of political decisions, and not the result of market mechanisms or membership in specific civil society organizations. One key feature of public services is their inclusive character. They are designed to benefit all intended users. This distinguishes them from market-based private services, which are selective depending on purchasing power. It also distinguishes them from membership-based services provided by civil society organizations, which are targeted at selected user groups. Three stakeholder groups always play an important role in provision of public services: the state as a political decision maker, represented in democratic societies by an elected parliament or local council, the service providers, and the service users.

The service systems model (World Bank 2004, Rauch 2009) elucidates the collaboration between these three stakeholder groups (**Fig. 2**). It assumes that decisions on provision of public services, and the political accountability, is in the hands of the state, i.e. of elected political decision makers. This involves responsibility for securing financing. However, the provision itself, is not done by the political decision makers but by authorized service providers. These can be public administration units, independent public companies, authorized private enterprise companies, or civil society organizations. These providers are responsible to the political decision maker, in the framework of a contractual relationship, for the professional and technically appropriate provision of services and the corresponding use of public funds. In the case of many public services, their users are not only mere recipients of the service but also make a contribution. Some of them may become independent service providers. For individual services (e.g. municipal water supply with tap water) this can be done through financial charges to users. In case of communal services, clients may organize themselves as user groups for managing physical or organizational contributions (e.g. self-help wells, maintenance of public facilities, collective loan management, self-organized extension groups for facilitating group consultation).

The reality of public services often involves patronage or corruption in awarding of contracts, particularly in the context of poor countries. As a result, services do not reach users fully, and sometimes not at all. According to the logic of the service system model, this can be prevented by ensuring that user organizations not only assume ownership for providing their own contribution, but are also empowered to articulate their interests more effectively. On one hand, this can occur in relation to the providers—for example, in cases of technical and operational problems during the provision of the services. On the other hand, if the desired improvement does not occur, the representatives of user organizations are in a position to address their concerns to the political authority in charge such as their local councilor or Member of Parliament.

This political, democratic relationship of accountability is the real key to the service system model for bridging the gap between providers and users of public services. This turns organized users into empowered citizens. According to this theoretical model, a local council that is not able to secure the agreed provision of services will not be elected again.

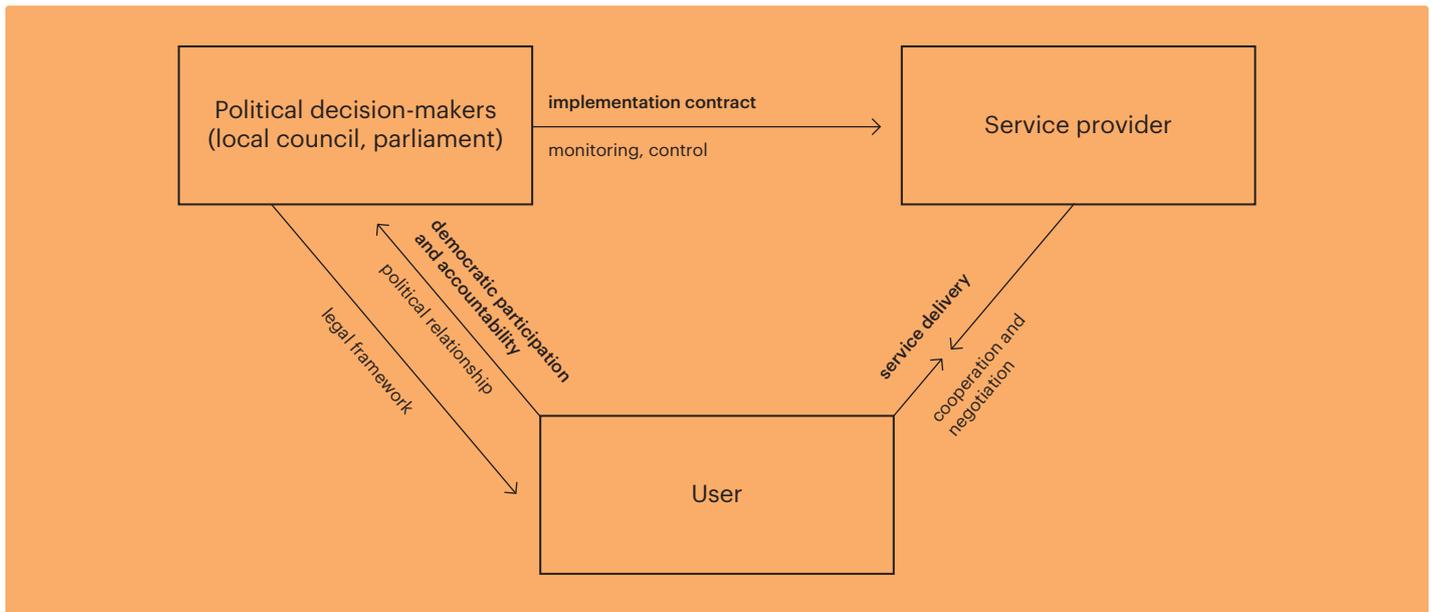


Fig. 2: Service system models (diagram by the authors)

The functioning of this political relationship is based on the following preconditions:

- a** The formation of user organizations should not be solely oriented to shifting the burden of contributing to services onto these organizations; it must also empower and facilitate them to represent their interests effectively. Since no one usually expects governmental representatives to promote such empowerment of their citizens, independent stakeholders from civil society should play a key role in the development of such user organizations.
- b** If underprivileged groups, local minorities and women are to be among the beneficiaries of services, and not only powerful local elites are to profit, socio-economic, ethnic and gender-specific inclusiveness of user organizations is decisive for public services that have a broad impact and are geared to poverty reduction. As this can sometimes contradict the interests and privileges of local elites, these organizing processes should be externally moderated.

The service systems model offers a conceptual context for linking a technical and pragmatic service system approach with a political and economic model of democratic accountability. In other words, this is a pragmatically operationalized governance approach. The key to this is the construction of a comprehensive network of user organizations in civil society that are based at grassroots level, inclusive, and capable of exercising control from below.

2.3 Sustainable soil and land management as a public responsibility

Whether land as a resource is a public good is a matter of controversy. Wherever land is mainly privately owned, there are strong political tendencies, and schools of scientific thought, which assume that soil conservation is best done by its owners. It is argued that this corresponds to their most fundamental interests as well as their sphere of competency (de Soto 2000). Contrary to this idea is the widespread opinion that the market has failed in relation to conservation of the natural environment and that it is therefore a matter of public responsibility. Two particular arguments support the view that this also applies to privately used land and in cases of private enterprise interests in sustainable land management:

- a** Although the owner may often have a direct interest in soil conservation, SLM is frequently linked with positive external effects. This applies, for example, to

soil conservation on hillsides or along riverbanks. In such cases, the public benefit of soil conservation often far exceeds private benefit. This also applies to ecosystem services such as conservation of biodiversity and climate change mitigation (emission reduction). Soil conservation measures that may not be worthwhile from a private enterprise perspective may be viable from a macro-economic and societal perspective. Again, this results in a state responsibility.

- b** Soil conservation often produces the desired result only if it is practiced area-wide and across farm-boundaries in a specific geographical zone, e.g. in a landscape approach. This applies to terracing work, for example. In such cases, individual landowners who do not use their land and have no interest in the project can ruin the efforts of their neighbors. This leads to the obligation of political regulation.

If we regard soil protection and rehabilitation at least partially as a public responsibility that cannot be adequately ensured by relying on private enterprise, the conclusion is that services to facilitate sustainable soil and land management must remain public services. Unlike private services, they cannot be entirely based on the principle of demand. They also have to be provided in places where landowners do not show any direct interest. This means that, in general, the service systems model is applicable to the services required for soil conservation.

Stating that SLM requires public services as private interest often is not sufficient to care for it does not mean, however, that private responsibility and interest should be discouraged. While it is true that protection of nature is a public good, it is also true that the principle of subsidiarity is to be considered in order to ensure that tasks are accomplished by those agents, who can do it more effectively. This means that public responsibility for SLM-related services only becomes relevant when and where private landholders and private business services providers are not in a position to ensure soil protection and rehabilitation on their own. For example, in cases where it is in the direct interest of private agribusiness partners to ensure appropriate soil management practices as part of their value chain governance efforts, there is not necessarily a need for the government to provide services.

2.4 Service needs for sustainable smallholder soil and land management

The idea that disseminating relevant knowledge about appropriate techniques of soil protection and rehabilitation is enough to guarantee broad-based application of these techniques has proved to be erroneous. Many projects that focused on the identification of appropriate land use practices had to learn that adoption of these practices by the majority of farmers remained far below expectations. This was usually due to lack of the necessary complementary services.

The following services are usually required to ensure that the majority of farmers are ready and able to adopt practices of sustainable soil and land management, to practice them on a long-term basis, and to adapt them if necessary:

- a** Research and development: Technologies must be made available that are appropriate for the context (location and target group specific). Ideally, they should be developed with reference to existing farming techniques or knowledge, which means with the involvement of the farmers themselves.
- b** Training & consulting: These technologies need to be approved as part of the extension messages by the authorities in charge. The responsible staff members for agricultural training must be familiar with them and all the rural target groups, for which these techniques are designed, should have access to the necessary

knowledge. Often these techniques require additional adaptation to the specific location or target groups.

- c** Access to inputs, means of production, logistic support and market outlets: Soil conservation and rehabilitation often implies changes related to cultivation technology (e.g. terracing, planting of trees or bushes). This often requires new equipment, means of transport, stones, planting material, or the construction of sheds. In some cases it is only worth investing in sustainable systems if the products can be marketed, and yield income. For the poorer farmers with smallholdings in remote regions it is often impossible to organize this access on their own.
- d** Financial services: It usually takes several years for the investments connected to the introduction of sustainable management systems to pay off in the form of increased or stabilized yields. Resource-poor smallholders often cannot afford them. In places where a large proportion of the benefits goes to external stakeholders or ecosystems, in other words, where an environmental service is created through these investments, it would be unreasonable to expect individual farmers to take over full funding of investment costs. The resource users need access to financial services in the form of subsidies and/ or loans.
- e** Organisational development: In line with the service systems model, organization of service users is a necessary precondition for permanent access to services. Moreover, in the case of sustainable land and soil management, organization of resource users is necessary to ensure effective collective application of the new technology. Resource user organizations may well develop into service organizations taking over service provision.
- f** Organisational development services are required to help these organizations set up and fulfill their functions, and to include representation of poorer and less influential farmers as well.

The lack of such services is often a plausible explanation for non-adoption of seemingly adapted innovations developed on a participatory basis. In other words: scaling-up does not happen without complementary services.

2.5 Possibilities and limits of application of the service system model to sustainable land management by smallholders

The key aspect of appropriate provision of public services for neglected sections of the population is that these services are demanded by organized user groups. The service systems model assumes an active demand for the services in question. This is usually present in the case of “felt needs” such as drinking water, transport, fertilizers or health services. Better knowledge about sustainable use of natural resources—similarly to knowledge about improved child nutrition or preventive health care—is not usually part of these energetic demands for services. Elections can be won by providing subsidized mineral fertilizer or a road link rather than by the promotion of sustainable soil management. In the case of innovations that require changing familiar practices, creating awareness beforehand along with informational campaigns is often necessary. HIV/AIDS prevention is regarded as a prominent example for this. Active representation of interests of organized user groups usually starts operating only after the users have accepted an innovation, are practicing it and then find that needed complementary services are missing. This occurs in the above-mentioned example when somebody has been convinced by HIV/AIDS prevention but does not obtain access to contraceptives. In the case of sustainable land use, this means that the service systems model based on user demand does not start working in the innovative initial phase. Only when the target groups are convinced of the new prac-

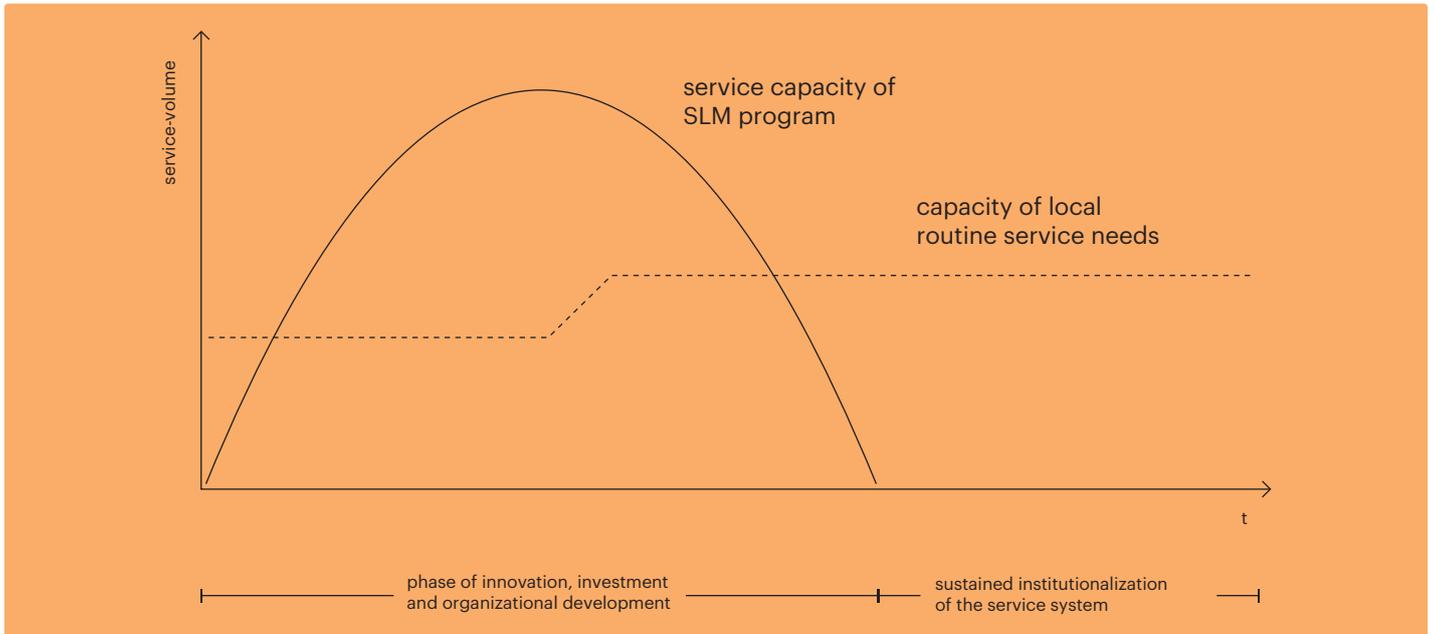


Fig. 3:
Time dimension of service
needs (diagram by the authors)

tices and have teamed up in a resource users' organization to apply them, but necessary financial services are not provided, would they start demanding such services.

The time dimension is another important characteristic of services for promoting practices for sustainable land use. As with many services connected with the introduction of innovations and with initial investments, there is a need for intensive and manifold services during the start-off period. As soon as the innovations are accepted and adapted to local conditions, and investments made for restructuring the resource management system, the need for services reduces. Ideally, the change will be highly appreciated, and be largely operated and further developed by the user organizations on their own without continuous external aid—unlike medical care, for instance. Given the limited capacities of governmental service providers, we should take the time dimension of service requirements, and of the users' service demand, explicitly into consideration (Fig. 3). ●

3. Situation analysis: service systems for sustainable soil and land management in developing and emerging countries (focus on sub-Saharan Africa and India)

In this chapter, we shall describe the real existing rural service systems for smallholders in developing countries and emerging economies. We shall refer particularly to the services for sustainable land management listed in Section →2.4 above. The regional focus of the analysis is on the countries of sub-Saharan Africa and India. We shall look specifically at the five countries of the SEWOH program (Ethiopia, Kenya, Benin, Burkina Faso and India) for the project "Soil protection and rehabilitation for food security" but the study will also refer to interesting findings from other developing countries and emerging economies. In →3.1, we shall first describe the agricultural and SLM-related services in general supranational terms (→3.1.1 and →3.1.2) and then analyze the individual services in more detail (→3.1.3 – →3.1.6). →3.2 will summarize the strengths and weaknesses and derive good or interesting approaches or practices from them. Subsequently, they will be specifically examined in terms of their contribution to food security.

3.1 Analysis of agricultural service systems

3.1.1 Rural service systems in general

In the 1960s, 1970s, and even as late as the 1980s, services for supporting small-scale farming were seen as the government's responsibility in the majority of developing countries and emerging economies. The respective ministries in charge carried out agricultural research and extension. Provision of farm inputs and marketing of many agricultural commodities were usually done under a public monopoly and carried out by government-run marketing boards or state-reliant cooperatives. This indeed implied input and output prices fixed by the government. Loans were offered to smallholders by national agricultural banks. These service systems were supported by international development agencies. In many countries the World Bank promoted the self-developed "Training & Visit" (T&V) system, in which extension officers fortnightly visited groups of smallholders on the village-level in order to train their representatives ("contact farmers") as educators in modern farming techniques. The practical implementation of these systems revealed numerous deficits—at least wherever they were not massively supported by donor organizations. The services merely reached the more resourceful 10–20% of all smallholders (the "emergent farmers"). The state-controlled prices were set so that city dwellers had access to the cheapest foods. Farmers only saw them as profitable if they belonged to the select few with access to subsidized loans and inputs. The services were designed under the heading of a "Green Revolution," based on the model of conventional input-intensive agriculture but sustainable land management was not among the main priorities. The complex T&V system, as well as the associated credit schemes with extremely low repayment rates proved to be very costly, and could not be maintained properly without external donor support (Anderson and Feder 2004, p. 50). As unattractive producer prices prohibited the targeted productivity increase, the substantial service effort was not rewarded. With rising national debt, governments could not continue to finance these systems. Under the auspices of the structural adjustment policies of the World Bank and the IMF (SAPs), the mid-1980s saw a deregulation of agricultural policy and most agro-services were privatized.

As a result, African countries as well as donor organizations drastically reduced agricultural shares in national budgets and ODA from around 10 % and 20% to 5% in the 1990s (FAO 2011a). Publicly funded services for smallholders, particularly agricultural research and extension at the village level, were discontinued or reorganized into demand-driven advisory systems. Farmers seeking advice had to travel to the extension offices. The remaining service vacuum was only filled selectively by private sector providers. Knowhow, inputs, loans, and markets were only accessible for those producing commodities demanded by large-scale agribusinesses at central, internationally competitive locations as well as for the more resourceful and better off smallholders. The private sector driven value chains that were now regarded as the main facilitators of rural services did not reach the vast majority of poorer, staple crop producing peasants at remote sites. This increased the service gap even more, at least compared to those regions in which the public services had previously been funded by development agencies. Non-governmental organizations were able to fill a small part of this gap by supporting the development of sustainable land management techniques and micro-financing projects for poorer smallholders. However, they lacked the funds and structures to achieve comprehensive dissemination of their approaches and innovations.

Since around 2005, we have seen a revival of agricultural policy intervention and state-based agricultural services. This tendency is also represented by the Comprehensive Africa Agriculture Development Programme (CAADP)¹, whereby its African member states committed to raising the agricultural sector's share in their national budgets to at least 10%. Yet, most countries remain far behind this target while currently spending some 5–6% (Be-

¹ CAADP targets: a) strategic commitment to agriculture-led growth, b) 6% annual agricultural growth rate, c) 10% public expenditure on agriculture

Areas of intervention: 1) Extend the area under SLM and reliable water control systems, 2) Improve rural infrastructure and market access, 3) Reduce hunger and respond to food crisis, 4) Improve agricultural research and technology dissemination.

nin and Yu 2013, p. 19). In addition, a large part of the budget is used for fertilizer subsidies to support staple food production (usually in the form of monocultures, which are ecologically problematic and do not contribute to soil health improvement). The proportion of farmers' households that have access to agricultural advisory services is below 20% in most African countries and only at 6% in India. The share for small farms can be expected to be much lower.

Against the background of significant donor budget increases for the agricultural sector following the food price hike of 2008 (e.g. the BMZ's SEWOH initiative among others) and the revived awareness of the need for public agro-services (FAO 2014, p. 58), there is some hope that the service gap may be bridged for the majority of smallholders. The extent to which this is possible with particular regard to soil conservation and for the benefit of the target groups' food security is the subject of the present study.

3.1.2 SLM-related service systems in general

The focus of overarching agricultural and rural development policies in most developing countries has traditionally been placed on increasing productivity. Depending on whether the respective government favours national self-sufficiency or world market integration, the emphasis on increasing productivity was directed to either local staple foods or cash crops. This basic policy orientation would be reflected in public agricultural research, extension and other associated rural services. Consequently, these were commonly based on the introduction of high-yielding varieties, and the optimal application of yield-enhancing inputs such as fertilizers and pesticides (FAO 2014, p. 49). Topics addressing the sustainable management of natural resources on the other hand, rarely entered the mainstream of agriculture-related services. In most agricultural ministries and development agencies, they were not assigned to the units for agricultural support and promotion but to the sections for resource preservation, environmental management or land use planning. Commercial rural advisory services were, and still are, mostly embedded in particular value chains, and are therefore primarily product-related. Soil conservation methods only play a role when they represent a relevant link within that value chain (such as in certification according to organic or fair trade standards).

As a result of the CAADP commitments (Pillar I) and multi-stakeholder campaigns, such as the TerrAfrica partnership, SLM has recently moved up on the policy agendas of many African governments. Its importance has been increasingly recognized in national development plans and poverty reduction strategies. However, this recognition so far has only been translated into effective national policies or programs in a few cases (Jones 2010, p. 9). Ethiopia, Burkina Faso, and Uganda developed specific investment frameworks for sustainable land management with a runtime of five to 15 years. In Kenya, the finalization is still pending, and Benin seems to have not made a targeted effort yet. While all assessed case study countries, except for Burkina Faso, seem to favor agricultural modernization and export-orientation to varying degrees, Beninese agricultural policies show the least recognition for SLM, and seem to consider it an issue of environmental preservation (GoB 2010, p. 32). India, which is not among the CAADP signatories, also does not have a comprehensive SLM policy framework. Instead, the 12th five-year plan introduces the National Mission for Sustainable Agriculture as a broader approach to climate change adaptation.

The available investment plans generally show similar features as they, besides from field-level promotion of SLM practices, also aim to support research and development with regard to sustainable land use techniques and improve the legal and institutional environment. Despite their recent launch, associated political commitment and de facto impact on the ground may be called into question (Jones 2010, p. 40). Marginal shares of less than 5% of the total agricultural budgets, such as the ones in Uganda, Burkina Faso and Ghana, reveal government priorities when compared to substantially bigger fertilizer

promotion programmes (the five-year Ugandan fertilizer programme accounts for 40Bn USD, while the decennial SLM investment framework is budgeted at 245M USD). Notably high expenditures on SLM, such as the annual 450M USD in Ethiopia (over 20% of the agricultural budget), are rather the exception than the norm.

SLM-related services in sub-Saharan African countries were, just like services for farmers' natural resource management in general, predominantly offered in the context of donor-supported programs. However, we should distinguish between the following two types of service systems:

Country	Specific SLM Policy	Programme	Funding	R&D for NRM	Advisor/Farmer Ratio
India	No	SLEM NMSA	World Bank national budget	8 %	1:5000
Ethiopia	Yes	SLMP	World Bank and bilateral Donors (60%)	7 %	1:200
Kenya	Pending	KAPSLM	World Bank and bilateral donors (79%)	12 %	1:1500
Burkina Faso	Yes	CPP	World Bank, UNDP	n. d.	1:7800
Benin	No	n. a.	bilateral	8 %	1:670

Large national or regional donor-financed programs that are implemented under the auspices of national agricultural ministries, their local offices and advisory services. The previously mentioned SLM-specific investment frameworks ideally form the basis of such Programme Based Approaches (PBAs). Examples include the programs funded by the World Bank in Ethiopia (Sustainable Land Management Programme 1 & 2, abbreviated to SLMP 1 & SLMP 2), Kenya (Kenya Agricultural Productivity and Sustainable Land Management, abbreviated to KAPSLMP) and India (Sustainable Land and Ecosystem Management Partnership Programme, abbreviated to SLEM), and the EU-financed Conservation Agriculture Scaling-Up (CASU) in Zambia (**Tab. 1**). Implementation is usually not spatially comprehensive but focused on prioritized regions or selected pilot sites. The selection is usually based on criteria such as urgency (e.g. the extent of soil degradation), the potential for improving productivity or the local population's willingness to cooperate (the applicant principle). The programs are usually of a temporary nature. They aim to introduce improved sustainable land management systems with the help of comprehensive and relatively intensive service packages. Pertinent training of the national extension service as well as the formation and empowerment of local resource user organizations can ensure sustained continuance and maintenance of these systems. In India, nationally financed programs promoting sustainable resource use on a catchment area basis employ a similar approach.

Local projects for funding sustainable management of natural resources carried out by national or international NGOs either on behalf of the government or merely with its endorsement. These local projects mainly aim for participatory identification of SLM/NRM techniques that are context-appropriate (suitable for the site and target groups). Such practices are identified through on-farm research, which is accompanied by support for setting up farmers' organizations. Many of these projects are based on the hope that the identified sustainable land management practices will either spread horizontally or be taken over and scaled-up by public institutions and/ or development agencies.

In places where no such external support is available, the departments for soil and land management within ministries of agriculture are usually badly equipped and often lead a marginal existence. Against this backdrop, they attempt to impart SLM-related

Table 1: Design and capacities of SLM-programs in the case study countries (Akuku 2014, FAOSTAT 2013, Conseil Agricole Benin 2011, Davis et al. 2010, MoA Burkina Faso 2010, ASTI 2010)

concepts and technologies via training courses to field-level extension officers. However, despite donor support, local chapters often face severe time and resource constraints, which prevent them from translating the acquired knowledge into practice. Besides, many tend to prioritize technologies that improve yields of staples and main cash crops in the short-term. This applies particularly to demand-driven advisory systems where cash crop producers tend to have more resources at their disposal and thus, are more likely to demand such services. In addition, without external support there is often a lack of complementary services necessary to fully implement extension messages (e.g. rural credit schemes).

In summary, we can state that in many developing countries and emerging economies, national programs exist to support sustainable soil and land management (including watershed management programs, climate change adaptation, conservation agriculture etc.). The construction and reinforcement of respective service systems, including funding of local farmer and resource user organizations, is part of these programs. They are generally carried out by the responsible government institutions on various administrative levels. The implementation, which depends on external financing, does not occur as a routine task with a spatially comprehensive approach but focuses on selected target regions instead. It is linked to the temporary provision of a wide range of services intended to assist the identification of context-appropriate technological solutions (innovations, locally adapted practices of land management) as well as the facilitation of necessary investments, and the creation of organizational structures that are required for long-term maintenance.

The temporary nature of external support services is based on the assumption that once land management systems have been established and accepted, user organizations will be able to maintain them with greatly reduced service inputs.

An example of empirical evidence for this hypothesis is provided by a cross-sectional BMZ evaluation in 2005. The study retrospectively examined the impact of several rural development projects carried out worldwide. It concluded that while the undertaken efforts were very successful on the target group level, the institutional and regulatory innovations introduced on the level of public administration turned out to be untraceable (GIZ 2012).

Additionally, many NGOs contribute to extending the available body of knowledge on sustainable land management practices. They do so by emphasizing farmers' local knowledge through the employment of participatory methods. The successful scaling-up of the knowledge acquired, however, usually depends on the service packages offered by major national or regional programs.

3.1.3 Agricultural research and development of adapted technologies

More than in other fields of agricultural research (such as plant breeding), successful soil and land management depends on the development of locally adapted innovations. Thus, the capacities of national and local research institutions need to be strengthened in order to support farmers' efforts to manage their soil and resources sustainably. This section will begin with a general outline of the status quo of agricultural research in the case study countries. We will then focus mainly on SLM-related research and its institutional foundations. Finally, we shall describe the research approaches currently practiced.

The growth of public spending for agricultural research in most developing countries has steadily decreased since the 1960s (when it was around 6% annually). In the 1990s it fell to around 1%, as a result of structural adjustment policies and the widespread decline of public funding, lagging significantly behind the growth of general government expenditure (FAO 2014, p. 47; **Fig. 4**).

Agrarian research was increasingly left to the private sector. The focus of public institutions turned to adopting the findings of major international agronomist institutes (FAO 2014, p. 49). Most agricultural research institutes in the countries of sub-Saharan Africa largely depend on donor organizations. They are often constrained by tight budgets, and are rarely in a position to equip local personnel with lucrative and durable contracts.

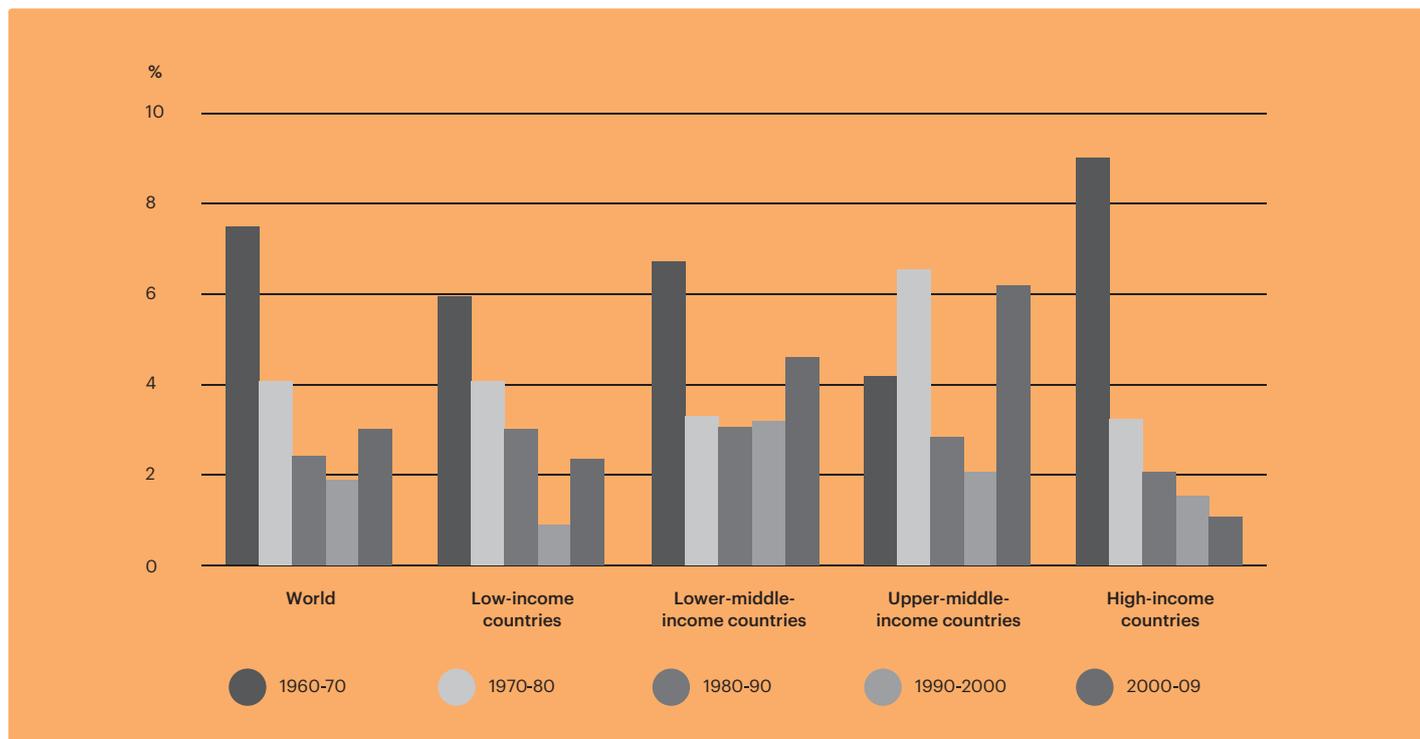


Fig. 4: Average growth rate of public expenditure for agricultural research (FAO 2014, p. 47)

This results in high levels of staff fluctuation, and failure to attract junior staff. Resources for R&D being extremely scarce—also due to the dependence on different donors—they are scattered among different institutions that lack coordination, and are competing for funds (Anderson and Feder 2004, p. 46). An example of this is the rivalry between governmental research institutes, public universities, and private companies in Kenya, as well as to agricultural institutes in Benin and Burkina Faso, which are constrained by extremely limited budgets. Among the case study countries, India has the most integrated system for the coordination of agricultural research, whereby the Indian Council for Agrarian Research (ICAR) covers state-run research institutes as well as public universities. Yet, the fragmentation of public funding for SLM remains a challenge and a substantial degree of competition for external funds persists among NGOs, private actors and local branches of international research institutions. In Ethiopia, the Institute of Agricultural Research (EIAR) is at least in charge of coordinating public agronomist research bodies. Kenya has pursued a similar approach since the fusion of various institutes in 2014 under the auspices of the Kenya Agriculture and Livestock Organisation (KALRO) (The Kenya Agriculture and Livestock Research Act 2013, No. 17).

Within the rather modest terms of agricultural research, sustainable land management, and natural resource management, in general, play a comparably marginal role. With regard to the case studies countries, the percentage of the agricultural budget devoted to these thematic areas varied between 7% and 12% (ASTI 2010). In Uganda, the agricultural budget's share specifically allocated towards research on SLM accounts for less than 1%. However, India has its own specialized research body in the form of the Indian Institute of Soil and Water Conservation (IISWC). This modest equipment with funds and capacities present a strong contrast to the necessities required for participatory development of site-specific solutions in these topic areas.

Worldwide, research centres have a long, deep-rooted, top-down tradition (Poniah et al. 2008, de Graaff et al. 2013). Different farming methods, and plant breeds, are tested comparatively by means of a network of regional facilities that organize experimental field tests according to scientific criteria. The results are then used to derive recommendations that are disseminated to the farmers by the extension service. As early as the 1980s, it was recognized that it was partially due to this top-down approach that farmers were accepting technologies only very selectively or rejecting them completely. Participatory and more decentralized methods, such as on-farm research and adaptive research, began to be used complementarily to experimental plots. This was to take account of farmers' local knowledge and site-specific conditions at various locations. When governments and development agencies reduced agricultural funding in the 1990s, these approaches with stronger emphasis on the local context and the target groups came to a standstill as well. Hence, they were only pursued by non-governmental organizations' spatially limited efforts to identify locally adapted practices.

Given the limited capacities of national research institutions, their focus on fundamental research as well as their top-down attitude, the search for context-specific practices of sustainable land management in sub-Saharan Africa is mainly conducted by large donor-supported programs or local NGO projects. Only big emerging countries like India have the capacities to carry out such programs with their own budget funds. The national Soil Health Card Programme is an ambitious example in this regard. It aims to test soil samples of 140M farmers and give tailored advice on efficient and sustainable fertilizer use. However, critics have been arguing that the approach is inappropriate to deliver results accurate for farm-level interpretation. Nonetheless, they are perceived as superior over the local knowledge of land users. In addition, India employs rather generic externally-supported schemes (such as the SLEM program supported by the World Bank) as well. These programs use a range of participatory methods in the search for locally adapted farming practices or the context-specific adaptation of well-known techniques, including on-farm tests and adaptive research approaches. The procedure developed by the World Overview of Conservation Approaches and Technologies (WOCAT) for identifying best practices in land management and their adaptation to differing contexts (Box 1) is a typical example of such standardized participative approaches to research and development.

Identification of best practices through the WOCAT Decision-Support Approach

(FAO 2011)

Step 1—Identification Extension officers, land users and other relevant stakeholders reflect together on local issues of land degradation, established and innovative solutions and choose a set of measures for further examination. The equal consideration of both, local expertise and scientific knowledge facilitates a common understanding for further procedures.

Step 2—Documentation Collection of existing practices, their benefits as well as the investments required according to a standardized format, which ensures comparability between different options and makes spatial dissemination easier.

Step 3—Selection The stakeholders assess the different technical options based on jointly defined criteria (e.g. complexity, cost/benefit ratio, political or cultural acceptance). By means of a ranking derived in this way, best practices are identified and for chosen for further "scaling-up". This process should be shaped as inclusive as possible to ensure broad acceptance for the planned innovations among land users.

Step 4—Testing Under the direction of the extension service, the chosen techniques are tested under local conditions. It is important to simulate realistic framework conditions, e.g. with regard to the selection of participating land users or the inputs provided. Also, the role of the different stakeholders within the experimental phase should be clearly defined.

Step 5—Implementation Practices that have proven themselves during the test phase will be incorporated into the routines of the extension service and thus, implemented on a spatially comprehensive scale.

In summary, we can conclude that the indispensable service of developing and adapting context-appropriate land management technologies in low-income countries is presently provided only in the framework of temporary donor-supported programs. It is most likely that they may be maintained only with their support. Embedding such research and development measures in a state-run program that incorporates and disseminates these techniques on a national scale, through the public extension service, is decisive for scaling-up of identified practices.

3.1.4 Agricultural extension systems

Starting from the assumptions that SLM practices should be applied as widely as possible in regions affected by soil degradation where private extension services are neither interested nor mandated (Section → **2.3**) to facilitate their dissemination, state-run extension services are indispensable for soil conservation and rehabilitation, especially in rural areas dominated by smallholders. We shall begin this section by generally describing the state of public extension services as well as their capacities and coverage. Then we shall examine their role in the area of soil and land management. Finally, we shall discuss the methodology of the prevalent advisory systems.

The agricultural advisory systems of the countries of sub-Saharan Africa and India differ widely (Box 2). The Ethiopian system constitutes an exception in the sense that it remained largely unaffected by the structural adjustment policies promoted by international donor organizations as outlined above. It is thus very powerful in terms of staffing and resources, organized in a rather centralistic manner and almost exclusively implemented by governmental services. Although it aims at integrating farmers and facilitating participation via the “Participatory Demonstration and Training Extension System” (PADETES), the system has been found to remain rather supply driven, still relying on many elements of the T&V system that make it difficult for farmers to really voice their demands (Davis et al. 2010). The Indian system is relatively strong but more decentralized. A widely acclaimed institutional innovation with formalized participatory bottom-up elements at the district level has been recently introduced in form of Agricultural Technology Management Agencies (ATMAs). In contrast to the Krishi Vigyan Kendra (KVK) agricultural centres that operate at the local level but have been working rather top-down so far, these are financially autonomous multi-stakeholder forums, which aim to include representatives from farmers’ organizations (such as advisory or marketing groups) in the design local extension programs. Since the nationwide implementation of the ATMA-model is less than ten years old, systematic reviews of its effectiveness are still lacking, especially with regard to social inclusiveness and the cooperation of the ATMA and the KVK.

The advisory system in Kenya is pluralistically structured with a reduced role and capacity for the public extension service, which implies reliance on private sector advisors in high potential regions while remote areas are left to NGOs. Yet there is no coordinating framework to harmonize the activities of the different stakeholders involved. Pluralistic systems of this kind are also found in Benin and Burkina Faso. There, however, farmers’ organizations play a more important role in providing agricultural advisory and other services beyond. These include strong political advocacy and even the provision of rural infrastructure such as roads and electricity. Usually, such services are financed through membership fees and levies on jointly marketed produce (Nederlof et al. 2008, p. 25).

A crucial deficit of all public, private and cooperative advisory services is that they only reach a minority of farmers, predominantly those who are better off.

As we have already described in →**3.1.2**, sustainable land management practices are rarely the subject of extension messages. Similar to their low significance within agricultural research, these issues are addressed and disseminated primarily via the integrated service packages of donor-funded special programs. These programs are implemented through the existing public service systems, which mostly require strengthening of their respective capacities. However, acknowledging that these can be improved only to a certain extent, new organizations that are supposed to take over at least some of the necessary services in the long-term are set up simultaneously on the beneficiaries' side. For example, the donor-supported national programs for integrated watershed management in Ethiopia and Kenya are implemented not only through extension providers but also in cooperation with village management committees. In the Indian NMSA as well as in the long-standing watershed-based SLM programs, extension officers and farmer representatives collaborate to plan local measures or to disseminate information. However, there are continuing complaints about a lack of inclusivity in the composition of the local ATMA Farmer Advisory Committees (FACs). Apparently, poor smallholders, despite recent institutional reforms, remain underrepresented thus far (Glendenning et al. 2010, p. 14, Babu 2013, p. 170). For dissemination of extension messages, the common advisory tools such as farmer field schools, farmer-to-farmer extension, exchange visits between different villages and organizations, demonstration plots, community contracting and incentives or rewards for outstanding technical implementation are employed.

Conclusion: The situation for SLM-related advisory services is similar to that for identifying context-appropriate land management techniques through agricultural research: at least in sub-Saharan Africa, these are offered only in the framework of donor-funded programs. In doing so, the existing state-run services are involved in implementation, undergo concurrent training and are strengthened in organizational terms. In line with the service systems approach, new land user organizations are set up simultaneously or existing ones are supported. Assuming that they are able to cooperate with the public extension system after the end of project intervention, they are expected to guarantee their members access to relevant information and services.

Ethiopia and Uganda – two different approaches to Service Provision

(Benin et al. 2007, Davis et al. 2010, Okoboi et al. 2013 and Berhanu and Poulton 2014)

Ethiopia

The Ethiopian public extension system is considered one of the strongest worldwide in terms of personnel, resources and area coverage. In this regard, it certainly is the most capable on the African continent. In spite of being hierarchical in nature, its structures are highly decentralized. 46,000 officers stationed at the lowest administrative level and 8,500 training centres (FCTs) are available to advise and educate farmers. A team of three extensionists is based in every location, one of them specifically concerned with natural resource management. The Ethiopian advisor/farmer ratio at 1:200 is one of the lowest worldwide.

Maintaining such a sophisticated service system requires substantial resources. Financial commitment to the agricultural sector in general ranged around 15% of the national budget in the recent years. Therein, expenditures in frame for SLM account for a remarkable 25%.

The service system is primarily supply-driven, since programme contents are defined at the national level. Emphasis is placed on food security and poverty reduction, the transition from subsistence to commercial farming is not prioritized. Its educational approach can be characterized as a combination of early T&V methods and more recent bottom-up elements. Accordingly, extension officers are required to advise at least 120 farmers per year and provide them with modest amounts of agricultural inputs. This way, the system so far has covered 40% of the country's farming households.

It has been argued that the complex and expensive system is not only intended to enhance agricultural growth but also ensure political control. Non-state actors only play a minor role in coordination platforms at the district level. Furthermore, the system's efficiency is restricted by a lack of equipment, resources and inputs as well as insufficient communicative and organizational skills on the side of extension agents.

Uganda

Improved rural incomes and food security through commercialization and market integration are the main objectives of Ugandan agricultural policy. The foundation was laid in the late 1980s when the government, in the course of Structural Adjustment Programmes, removed most relevant trade policy interventions. Since then, the country's agricultural sector can be characterized as uniquely liberal. On the other hand, this was accompanied by a dramatic cut in public expenditure. Although absolute outlays for agriculture increased recently, they remain below 5% of the national budget. Therein, funding for SLM accounts for a meagre 0.8%.

As public extension services were unable to carry out their tasks with fewer resources, they were replaced by an innovative public-private partnership agency in 2001. Under the new system, independent advisors are employed on a short-term contract basis if farmers themselves request their services. This demand-driven approach promised to improve financial and operational efficiency as well as acceptance among the target group.

Today, the new system is operational in all districts. However, since services can only be accessed via group formation, the better off farmers in terms of labor, tangible assets and social capital are more likely to benefit. Moreover, despite the overall system's demand-orientation, extension agents' teaching culture remained rather top-down and supply-driven. Hence, de facto coverage in terms of households remains modest, and results regarding technology adoption and increased productivity have been mixed at best. As SLM-related issues do not necessarily rank high on the farmer's agenda, the environmental sustainability of the promoted innovations can be called into question as well. General dissatisfaction with the new approach resulted in the agency's temporary suspension in 2007.

3.1.5 Inputs and Financing

The transition of farming systems to sustainable soil and land management is not only associated with innovation but also requires investments, i.e. in terms of land, labor or capital, that do not immediately lead to increased yields and improved income. Instead, these investments serve long-term stabilization or increase of crop yields and the preservation of the ecosystem. Soil conservation through stone walls, plant material or the transition to integrated livestock husbandry (zero grazing) for instance, require additional labor input, transport of stones and the purchase of tools, seedlings or construction materials for animal housing. Besides, space which has been used for crop cultivation or livestock grazing has to be revoked from purposes serving immediate consumption needs (e.g. to be assigned to the cultivation of fodder plants or trees). This kind of investment often equals cutting consumption in the short-term—something poor smallholders are unable and unwilling to afford. The yield-related benefits of sustainable land management tend only to occur in the long-term. Smallholders' lack of investment capabilities often results in failed adoption of SLM practices, even among those farmers who are principally convinced of its advantages. Some SLM practices permanently require greater inputs in terms of labor and/ or means of production. Mixed cultivation is generally more labor-intensive than monoculture; livestock housing takes up more time than extensive grazing, etc. Even if this additional effort is rewarded by higher yields and income, poor and especially female-headed households are often constrained by labor shortages. Hence, external support in the form of production means, inputs and financial services is indispensable for the majority

of smallholders in order to adopt SLM practices. Due to the positive external effect of these practices (Section →2.4), this is also economically justifiable.

While the available SLM investment frameworks barely address the aspect of how to finance the transition to sustainable land management, all public and donor-funded programs provide material and financial services to the participating communities, at least during the investment phase. Thereby, the usual cost-sharing model requires farmers to invest their own labor on individual plots without compensation, whereas materials and tools are provided free of charge by the public funds. The allocation of costs is often done using appropriate fixed shares. The SLMP-2 in Ethiopia, for example, finances a maximum of 25% of local project costs as an external subsidy (GIZ 2015, p. 74). The KAPSLMP in Kenya, on the other hand, local communities are simply supposed to bear at least 10% of local investment costs (World Bank 2010, p. 17). The same principle applies for the Sustainable Land and Water Management Project (SLWMP) in Ghana: the costs for seeds, seedlings, and tools are covered by the projects while there is no compensation for labor efforts. However, the project documents show no evidence of fixed cost allocations between facilitators and beneficiaries. The corresponding information within project documents tends to be inadequate. As a result, interpretation varies on the local level as well.²

Responsibilities and funding modalities are even less clearly regulated when it comes to labor investments which address natural resource management beyond the individual concern (e.g. for rehabilitation of gully erosion or communal forests). In the past, cash-for-work or food-for-work schemes were often employed as funding mechanisms. This has frequently resulted in the local population's perception of respective efforts as a temporary occupation and source of income without developing a sense of ownership for the structures created. Thus, the work (e.g. tree planting) was often not properly done, and nobody felt responsible for the necessary maintenance. A more appropriate financing model is currently being tested within the Ethiopian SLMP-2 framework. Therein, local communities receive fixed grants for collective land management investments based on performance-related contracts.

The question of how to allocate permanent additional operating costs is similarly difficult to answer. Some SLM concepts such as Conservation Agriculture require permanent additional efforts that may exceed the capacities of resource-poor smallholders. Yet, they entail significant benefits for the public such as reduction in greenhouse gas emissions. Against the background of claims for environmental justice, this raises the question of how to allocate additional running costs in a fair manner. Under the SLWMP in Ghana, financing the maintenance of soil conservation infrastructure is based on a performance-based incentive system. Based on an index, the respective value of the rendered environmental service is assessed (see below) and subsequently compensated in the form of cash or goods such as small livestock, bicycles, etc., or further SLM-relevant farm inputs. In cases such as Zambia, where the adoption of proposed techniques is achieved through artificial incentives such as food aid, one can observe that these lack local acceptance and tend to be abandoned after the subsidies' phase out. Hence, where the external subsidy is too high, it impedes durable adoption. If the incentive is too low, however, ability and willingness to invest the necessary extra efforts are significantly diminished.

The challenge in all these cases is to identify context-specific funding models. It is crucial to find a fair cost-sharing framework under which local land users' own contribution is so clearly felt that it creates a feeling of responsibility, self-reliance, and genuine acceptance. On the other hand, this contribution has to present an affordable and reasonable extra effort with respect to the benefits accruing for the target group. Such context-specific funding models are increasingly oriented to the principle of "Payments for Ecosystem Services" (PES).

This initially purely market-based mechanism for compensating environmental services (e.g. beneficiaries at the lower reaches of a river bear a negotiated contribution to financing investments of resource users at the upper reaches; consumers in industrial

² GIZ (2015): "The project document for SLMP foresees the support for interventions on farmland and homesteads not exceeding 25% of project costs. However, different interpretations of the concept were observed by different project areas. Some areas were given a top up of 25% to inputs received by a farmer, while others were contemplating to pay 25% of the labor as compensation. The major assumption during the design of the project was that there do exist needs for farmland and homestead interventions which require inputs beyond the capacity of farmers: the project has to pay for those inputs."



1

1 Gully erosion on communal land in Dendegeb Kebele in the Woreda of Baso Liben, Amhara, Ethiopia.
© Girum Alemu



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2 Cotton delivery to a central government market Yavatmal, Maharashtra, India. © Keerthi Kiran Bandru

3 Female farmers weeding on an onion field Ahmednagar, Maharashtra, India. © Keerthi Kiran Bandru

4 Street scenery in Benin
© Larissa Stiem-Bhatia



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1 Cotton harvest in Kabanou, Northern Beninn. © Larissa Stiem-Bhatia

2 Farmers preparing demonstration fields at the farmers training center (FTC) in the Kebele Dendegeb in the Woreda of Baso Liben, Amhara, Ethiopian. © Girum Alemu

3 Stone bunds in Southwestern Burkina Faso. © Larissa Stiem-Bhatia

4 Agroforestry with oil palm trees in Kakamega County, Kenya. © William Onura



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5 Mixed cropping in Bungoma County, Kenya. ©Serah Kiragu-Wissler

6 Open air cereals market in Kakamega town, Kenya. ©Serah Kiragu-Wissler

7 Goats on a cotton field in Burkina Faso. ©Larissa Stiem-Bhatia

8 Market scene in Parakou, Benin. ©Cheikh Abdel Kader Baba



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1 Shea nuts collected in the village of Kabanou, Northern Benin. © Larissa Stiem-Bhatia

2 Landscape protected with physical and biological SLM measures in Woreda Gozamin, Amhara, Ethiopian. © Girum Alemu

3 Tribal women purchasing pulses on the weekly market in Mocha, Mandla, Madhya Pradesh, India. © Keerthi Kiran Bandru



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countries pay a higher price for certified sustainably farm products from developing countries) is increasingly applied in the area of public subsidies for sustainable resource management. The United Nations Convention to Combat Desertification (UNCCD), for example, has developed a classification system for sustainable-oriented funding models that differentiates between:

- a** Public funding of environmental services.
- b** Negotiation of payments in the framework of governmental regulation (e.g. emissions trading).
- c** Self-organized negotiation of financial compensation between beneficiaries and providers on environmental services (direct PES).
- d** Payments for sustainably produced consumer goods based on certification ('eco label').

In the area of smallholder soil and land management, market-based mechanisms such as emissions trading are: (a) inappropriate due to problems of individual accountability. Direct PES mechanisms (b) are being tested particularly in the context of water catchment projects, for example in the catchment area of the Kenyan Sasu water processing plant that provides drinking water for Nairobi. Consumer-financed ecological certification systems (c) are only suitable for product-dependent soil conservation methods in exceptional cases. Thus, the model of publicly funded PES appears to be the only viable option for the majority of cases. Rules have to be developed for identifying context-specific (best fit) mechanisms for fair and realistic cost-sharing. Binding rules intend to prevent governmental and non-governmental development agencies from opportunistically using artificial financial incentives to motivate farmers to adopt promoted techniques, primarily to achieve their own program goals.

We can conclude that sustainable land use by smallholders is not feasible without external grants linked to free provision of the necessary material inputs. The land users themselves usually perform the additional labor efforts required at the farm level. In the case of larger-scale collective action for maintaining common resources, contractually regulated and performance-based grants offer an ownership-conducive alternative to earlier cash-for-work approaches. In order to replace the rather uncoordinated variety of donor-specific financing methods, attempts to develop context-specific funding models that aim to ensure an appropriate balance between farmers' own contribution and external financing are currently being made based on the PES logic.

3.1.6 The role of farmers' organizations and accountability

In Section → **2.2**, we described and explained the decisive importance of user organizations for the functioning of public service systems. Services users must be organized to adequately make a collective contribution to their provision as well as to effectively request and negotiate the providers' external due if necessary. In the case of services aiming at poverty reduction, and increasing food security, it is of crucial importance that these user organizations are socially inclusive, i.e. that they also represent the interests of poorer, underprivileged, or marginalized sections of service users. In → **2.5** we indicated that in the case of soil and land management the logic of the service systems model based on an articulated demand by users mostly does not function at the initial stage but only when the users are convinced of the respective technological innovations. The present section will begin by generally summarizing experiences in facilitating smallholder or rural service user organizations. Then we will analyze the role of farmers' organizations in the framework of SLM programs (focusing on experiences in the case study countries). Finally, we shall have a detailed look at the issues of social inclusivity of organizations and mechanisms of empowerment accountability.

Facilitating active, effective, and inclusive grassroots organizations in rural areas is one of the most difficult challenges of development policy. Whereas a high level of social organization holds a key role to improved service provision as well as to strong, locally rooted civil society and better governance in general, people in the rural areas of sub-Saharan Africa often show a low level of commitment. The reasons are plenty and diverse: organization mostly is a complex process and smallholders, especially female-headed and less resourceful farmer households, lack the time to engage in it. Often, respective efforts do not generate corresponding benefits. Moreover, the villagers are targeted by a number of different services and are required to join a broad variety of user groups: advisory groups, health committees, water user groups, parents' associations, forest user organizations etc. Many African farmers have also had bad experiences with organizations sponsored by government and development bodies. Stories of cooperative leaders who have absconded with the cash box are especially engraved in the local memory. Often the addressees of planned services have been encouraged to gain access through self-organization. Yet the promised external contributions failed to materialize. Furthermore, user organizations have often been influenced by local elites, who steered them towards their own interest. In many cases, representatives of poorer social groups lack the necessary self-assurance to stand up for their specific concerns within the organization. Prevalent client-patronage dependencies between smallholders and the local elite also hamper the creation of democratically structured organizations. Hence, it is hardly surprising that in many rural regions of Africa today people are increasingly tired of organizations. On the other hand, many reports show that rural dwellers are able to organize themselves efficiently if they expect access to support services. Such organizations usually remain active only as long as the external support continues. In other words, the successful development and maintenance of inclusive user organizations largely depends on the continued availability of external services, the accruing benefits, and their allocation among members.

Like most resource user groups, farmer organizations for the purpose of sustainable soil and land management are not primarily service user associations but are primarily self-help organizations for collective natural resource management. Such institutions have a long tradition in many societies of sub-Saharan Africa. Their potential in relation to sustainable land management relates to the fact that most soil conservation efforts are only carried out successfully if organized and coordinated above the individual smallholding level. In the much-cited success story of the Kenyan district of Machakos at the beginning of the 1990s traditional mechanisms for mobilizing collective labor played a key role (Tiffen et al. 1994). At an advanced stage of organizational development these NRM groups also take on service tasks for their members. This applies especially to advisory services. Shape and size of the respective organization greatly depend on the type and extent of the ecosystem that has to be managed collectively. Small village organizations with committees for planning and controlling relevant activities are usually sufficient to coordinate individually conducted soil conservation measures and those carried out on village-level commons (such as pasture or common woodlands) of moderate spatial extent. For catchment areas in mountainous regions, more formalized multilevel organizational structures are needed which extend beyond individual villages. They are also more likely to have the capacity to take on service functions.

Farmers' organizations play a major role with regard to collaborative management of land resources in all SLM programs implemented in the case study countries. The empowerment of local management committees to fulfill their responsibilities is an important element of external support mechanisms. However, this can be designed in widely differing ways. In the national SLM programs in India and the donor-financed projects in Ethiopia and Ghana the development of smallholder resource user organizations is usually supported on the basis of small-scale catchment areas. In contrast, the KAPSLMP in Kenya works only with existent local organizations. In all cases considered here, the primary benefit of organizational development and empowerment work lies in the participatory

identification of context-appropriate SLM practices and inclusive project planning, intended to achieve the greatest possible degree of local ownership. Similarly, the World Bank project completed in Senegal in 2012 focused on working through pre-existing producer groups that already had received support from earlier projects. Beyond the strengthening ownership for sustainable land management, the program reinforced their capacities to provide SLM-relevant services independently, and to represent the political interests of farmers. Farmers' organizations in many West African countries, including Benin and Burkina Faso, seem to take up functions as service providers more often than those in the East African case study countries or India (GFRAS 2014a). However, they often fail to provide the services in a socially inclusive manner. Producer organizations that are linked to a specific value chain (e.g. cotton) and require their members to contribute certain minimum amounts tend to exclude women, youth and other groups which often face disadvantages with regard to land, labor or inputs. According to Nederlof et al. 2008's case studies in Benin, large-scale farmers who can invest more resources in terms of capital and time are more likely to benefit from producer organizations.

The sustainable success of services provided by user groups themselves beyond the donor-funded program essentially depends on their financial and personal capacities. To secure them, it is advisable to establish internal financing mechanisms already during the project phase, e.g. membership fees, special levies on provided farm inputs or generated outputs, or the sale of products from collectively cultivated plots. In this way, the Bangladeshi Samriddhi Program built up a narrowly branched network of efficient locally embedded and regionally organized service providers. In addition, long-term co-financing, for example in the framework of cooperative North-South or South-South cooperation, offers further options (GFRAS 2014b, p. 18). Finally, the continuing existence of user and producer groups and their performance as service providers depends on their members' social capital. In many cases, lack of trust and mutual responsibility among members of externally funded smallholder organizations have led to elite capture, mismanagement and corruption (ibid.). While these "soft" attributes of local organizations are difficult to assess for external stakeholders, they are elementary for the success of similar development policy interventions.

The Indian ATMA System (→ **3.1.2**) assigns an important role to farmers advisory committees (FACs) in planning and coordinating rural services at the district level. These can involve representatives of loosely organized interest groups, for example in relation to specific crops, as well as of formally recognized cooperatives. Their assigned task is to protect smallholder interests that were previously articulated in the participatory planning process facilitated by extension agents.

Social inclusiveness of farmers and resource user associations is a precondition for successful collective action for sustainable land management. In most of the respective programs conducted in Sahel countries during the 1990s, entire village communities were involved in planning and implementation of soil conservation measures through the "village-level land use planning" approach. While farmer participation has been formally institutionalized in some cases (such as the ATMA model), de facto inclusion seems to be the exception rather than the norm. Especially in upper level committee structures, such as the Indian FACs, poorer groups, minorities and women are less represented or are not in a position to adequately articulate their interests. The types of quota guidelines that exist in some parts of the ATMA model (30% female members in the ATMA Governing Board or block-level FACs) have so far failed to solve these problems. (Birner et al. 2009, p. 75, Glendenning 2010, p. 14, Babu et al. 2013, p. 170.)

The crucial question is now whether and to what extent farmer organizations created or reinforced by temporary SLM programs will be able to demand and negotiate (e.g. in the case of funding models) the necessary public services after the phase-out of external support. In other words, to what sense will suitable institutional mechanisms be implemented to ensure accountability and bottom-up control from the responsible au-

thorities? Empowerment and the accompanying control from below particularly depend on four factors:

- a** Organized user groups with elected legitimate and appropriately trained representatives. Such groups are usually more articulate and self-assured than affected individuals. Such groups exist in all assessed SLM programs.
- b** Forums for participation. These create transparency about the type and scope of the expected services on the one hand, and familiarity with providers, local administration and decision makers on the other.
- c** Despite its current shortcomings described above, the Indian ATMA model presents a promising approach in this regard because it aims to involve resource users on a twofold basis. Thereby, smallholders initially specify the future programs' main contents during Participatory Rural Appraisal (PRA) assessments. The Farmer Advisory Committee, constituted by elected or appointed farmer representatives, provides an opportunity to warrant these claims in the plan's final wording.
- d** Special communication channels or institutionalized mechanisms for representing interests (e.g. complaints channels, feedback procedures, participatory monitoring, user questionnaires). These reduce the inhibitions of service users to articulate their interests effectively. Such monitoring mechanisms have been introduced in the Kenyan KAPSLMP, e.g. in form of social audits or participatory budget control.
- e** Independent choice of service providers by the users themselves. This can be ensured through innovative financing methods such as vouchers for inputs or services that can be redeemed from different providers. This interlinks public responsibility for service provision with a model of market competition regarding the choice of respective providers. Such mechanisms are widespread in Latin America. Zambia has also launched a voucher system for the purchase of subsidized inputs.

It will be decisive for the long-term impact of these institutionalized mechanisms of accountability, whether and how far they are rooted within the responsible government agencies outside the program context. However, even where this may be not the case, experience shows that supporting organizational development greatly strengthens the empowerment of service users.

In →**3.2** we shall summarize the results of this analysis according to the prevailing service systems' strengths and weaknesses.

3.2 Synthesis: strengths and weaknesses of service systems

3.2.1 Challenges and weaknesses of service systems for smallholder land management

Smallholder access to service requisite for sustainable land management tends to be provided only in places where respective programs supported by development agencies do exist. On the one hand, this is due to the magnitude of the related challenges while, on the other, institutional deficits have to be held responsible as well. In the following we will summarize these deficits and their basic causes:

- a** **Difficulty of the task:** The introduction of sustainable practices of soil and land management is not a routine assignment. As it implies identifying adapted, i.e. context-specific technologies, it is an innovative research and development task. It can only be done successfully when all landholders collaborate, which means it requires an inclusive advisory system with a broad impact. The transition to sustainable land management is tied to investments that the majority of poor

smallholder households cannot afford, even if they pay off in the long run. Thus, the dissemination of sustainable techniques is constrained by major obstacles. Eventually, farmer organizations need to play a substantial role for widespread implementation of sustainable land management and for securing the required services. However, these face widespread scepticism among large sections of the rural population, which is based on negative experiences. The service systems face correspondingly high and complex expectations.

- b Limited capacities of service providers:** As sustainable land management presents a public task, the government is primarily responsible for it. Staffing and financial capacities of governmental institutions for agricultural development (agricultural research institutes, extension services, financing agencies etc.) are often insufficient. For various reasons, including the privatization of agricultural services in the past two decades, they fail to reach the great majority of smallholders. Private service providers are largely uninterested in the issue of soil conservation unless it is in the context of lucrative value chains. Non-governmental organizations may provide considerable resources for promoting sustainable land management but usually do not have the capacity to offer corresponding services on a broader scale.
- c Low priority given by service providers to sustainable soil and land management:** Governmental agricultural services tend to focus on short-term yield increases. Although governmental programs for sustainable management of natural resources exist, these, unless they are financed through development aid, mostly receive only a small part of the national agricultural budget. This applies to agricultural research expenditure as well as the thematic priorities of extension services and the assignment of subsidies (which are mostly related to mineral fertilizer use).
- d Low priority given by land users to sustainable soil and land management:** Many smallholder farmers are either unable or unwilling to bear the costs associated with sustainable agricultural intensification. Whereas in the first case rural service providers can provide various incentives for SLM adoption, the second case relates to framework conditions that advisory services can barely influence. Against the background of climatic fluctuations, insecure land tenure or low and volatile producer prices, many rural households tend to risk-averse behaviour. Significant changes in the status quo and the associated investments rarely occur. Particularly when—as in the case of many sustainable land use practices—these amortize after decades. The existing programs do not address the responsible socioeconomic conditions.
- e Socially selective services:** Even during the days of better financial provision of governmental agro-services only the better off and market integrated farmers had access. The services rarely reached more than 20% to 25% of smallholders. As a result of reduced capacities in many countries, the service gap has increased for the majority of poor rural households.
- f Unadapted forms of service provision: These include:**
 - The deeply rooted top-down tradition in state-provided services. This applies particularly to agricultural research, as well as to field-level extension. In this respect the more participatory programs to support sustainable land use partly contradict common practice in the partner countries' agricultural advisory systems. The 'client mentality' of land users emerged under the top-down system, and makes it difficult to succeed with more recent demand-driven approaches.
 - Pluralistic service systems lack coordination of different providers.
 - Disproportionately generous or inappropriate subsidies as an 'incentive' for the adoption of sustainable land use practices. These tend to under-

mine self-reliance of resource users, and hamper the effects of the methods.

- g Dominance by elites and lack of social inclusivity:** These factors often lead to neglect of the needs of women, young people, poor smallholders or minority groups, such as livestock owners or landless people, with regard to sustainable land management matters. These groups are also neglected in representation of interests towards service providers, and political decision makers.
- h Lack of permanence of user organizations:** Many user organizations function as long as they receive external support. Without access to external resources they often lack incentives to deal with internal difficulties.

In other words, an extremely ambitious task is encountered by a rather lukewarm stakeholder interest, and low levels of experience and competency with regard to possible solutions. We suggest the approaches summarized in the following section on 'good practices' as possible starting points for overcoming these major challenges.

3.2.2 'Good practices' and potentials

- a Knowledge on sustainable land management technologies:** There is a great wealth of experiences and knowledge about SLM techniques referring to a broad spectrum of agro-ecological zones and agricultural land use systems. Research and development activities do not have to start from scratch in searching for context-specific solutions, but can build on a broad spectrum of recognized concepts. This potential makes the task easier.
- b Program approach with international financial and professional support:** Temporary and spatially concerted support programs that intensively deploy services were able to achieve remarkable success in soil conservation and rehabilitation among poor smallholder in the past. In developing countries ("low-income countries") these programs were usually backed by significant financial and personnel contributions from development agencies. This made it possible to overcome the particular challenges of the innovation and investment phase in the transition to sustainable farming methods. Simultaneously, this facilitated the institutional preconditions for the continued existence and further development of the implemented SLM practices. Hence, the gap between the limited capacities of local service providers and the high level of requirements during the innovation and investment phase was closed effectively. Recently, several developing countries launched long-term policy frameworks specifically tailored towards sustainable land management that can provide a basis for improved ownership, self-determination and efficient coordination of internal and external contributions.
- c Focus on priority regions a.k.a "hot spots":** Sustainable soil and land management systems were never introduced comprehensively across all regions of a country. In all cases, the programs focused on regions with urgent land degradation problems and/ or areas with potential for quick rehabilitation. In other words, they targeted regions where rapid success and high impact could be expected. This ensured the efficient use of limited resources to solve the existing problems.
- d A strong role for user organizations combined with greater emphasis on methods of organizational development:** The programs focused on support for setting up and strengthening, resource user organizations. While on one hand this addresses the necessity for collective land use management, it also lays the foundation for the successful maintenance of the introduced SLM practices as well as the continued demand for, and effective provision of, associated external services after the program's end.

- e Close links between service providers and user organizations in decentralized multi-stakeholder forums:** The Indian ATMA model is intended to provide an institutionalized platform for service providers and farmer representatives to jointly plan and monitor service delivery. Yet, two key challenges remain. One is to establish such institutionalized bottom-up elements in systems that have previously operated on a top-down basis. The other is to ensure de facto social inclusion and empowerment of marginalized groups within such forums.
- f Adaptive research and systematic procedures for identifying context-specific innovations:** The adaptive research approach that equally involves farmers and researchers of various disciplines jointly conducting on-farm tests, has proven to be a useful mechanism to identify context-specific land management practices. The WOCAT method applied in Ethiopia for gradual and participatory identification of adaptive techniques presents another feasible alternative to the widespread top-down attitude of governmental agricultural services. Considering the limited professional resources available, such approaches are unlikely to be comprehensively institutionalized. Nonetheless, they play a crucial role during the innovation phase.
- g Identification of adapted funding models on the basis of PES logic:** Context-appropriate funding models have to be identified on the narrow line between being over-demanding and over-supporting. Burdening resource poor farmers unreasonably, and destroying their sense of local responsibility and ownership, have to be equally avoided. Against this backdrop, the logic of PES can serve as a meaningful guideline on how to apply external subsidies. Contractually agreed contributions of local communities and appropriate external services have proven to provide reasonable approaches to a fair, realistic and transparent division of responsibility for sustainable natural resource management as well.
- h Innovative mechanisms for boosting accountability and control from below:** Accountability is supported in most of the programs by enhancing empowerment of farmer organizations through training of legitimate representatives and their participation in specific planning processes. In addition, special instruments serving an increased control from below have been introduced. Examples include participatory monitoring procedures to assess the quality of service provision or—in the case of a choice between different service providers—a voucher system that allows the target group to choose the providers themselves.
- i National coordination institutes:** Some countries have set up coordination agencies to deal with the issue of pluralistic but uncoordinated service delivery by a range of public, private and civil society providers. The Indian Council for Agricultural Research (ICAR) coordinates the activities of public universities, agricultural research institutes, and extension services. Similar attempts exist in Ethiopia and Kenya. However, private enterprises, and civil society stakeholders, have not been included so far.

Overall, there is not only a considerable wealth of more or less context-appropriate sustainable technologies but also a broad range of plausible and promising approaches to address the institutional challenges connected with disseminating such technologies. Although we cannot always assume that the approaches described as successful in the literature produced by development agencies have actually proved their worth in the long-term (this would have to be demonstrated by on-site analysis), they offer a sufficient basis for preliminary strategic recommendations. ●

4. Strategy recommendations for the appropriate design of the institutional framework for sustainable land use

Strategies and mechanisms for soil rehabilitation must be adapted in a context-specific way. It follows that they should be developed in the local context with the involvement of local stakeholders. Nonetheless, the generalized strategic recommendations on the global level that we shall propose in the following pages have an important function, which is that: if they are derived from generalizable worldwide experience, they can be used as universally accepted strategy guidelines for concrete strategy debates at national and local levels. In the present study, we are concerned with strategic guidelines for the appropriate design of an institutional framework for sustainable smallholder soil and land use in developing and emerging economies. As a rule, these are poor countries or regions with limited institutional capacities and characterized by deficient governance. This already gives an idea of the central challenge to shaping the institutional framework. Specifically, the institutional framework is about rules and standards and about service provision. Important rules and standards for sustainable land management include land legislation. But the focus of the present study is on service provision for sustainable land management. In the following, we shall present proposals for appropriate shaping of service systems for sustainable land use. We shall focus particularly on the involvement of underprivileged groups.

These proposals are partly based on the practices on the countries under review that were described in **Chapter 3** as ‘good’, i.e. promising. However, we shall also include other findings about the structuring of viable service systems. We shall begin in Section → **4.1** by specifying the goals to be achieved with the aid of services and by summarizing the most important assumptions about the conditions and challenges the strategy must carefully consider. In → **4.2** we shall give a broad description of a proposed strategy package and explain it. In → **4.3** we shall make detailed recommendations on the structuring of individual components of the strategy.

4.1 Goals and assumptions

The design of the institutional framework and of the service system for sustainable land management should be directed toward the following goals as the normative frame of reference:

- a** It should contribute to the effective and long-lasting application and adaptation of appropriate technologies of sustainable soil and land management by the overwhelming majority of farmers (including poorer sections, marginalized social groups and the landless).
- b** It should help to stop or reverse the process of soil degradation.
- c** It should also make a significant contribution to improved food security, that is to eliminating famine.

The unique challenge associated with these goals is that it requires comprehensive, socially inclusive, non-discriminatory access to the necessary services. Sustainable land management will only contribute to eliminating famine in places where everybody is able to farm his or her land more sustainably and, by doing so, reduce the risk of crop failure, and only where even resource-poor farmers have the possibility to gain the necessary purchasing power to buy food.

These goals should be achieved in poor, developing countries, and in poor regions of countries such as India. As we cannot wait until the remote goal of good governance along with the elimination of institutional deficits is achieved, an institutional strat-

egy must take account of the prevailing adverse institutional conditions; in other words, it must be based on realistic assumptions. In line with the problems and challenges outlined in Section →**3.2.1** these assumptions can be summarized as follows:

- a** The institutional capacities of governmental stakeholders are very limited, particularly in rural regions, and can only be improved to a limited degree by instrument such as capacity development.
- b** Public and private service providers tend toward selectively privileging smallholders who have more resources and are better off.
- c** Sustainable land management is not a political priority in most countries.
- d** Many of the regions particularly affected by soil degradation are peripheral ones with badly equipped infrastructures and mostly marginalized smallholders.
- e** The market integration of these regions is often inadequate. Even smallholdings that produce for national or international demand often suffer from low or strongly fluctuating producer prices. Consequently, they are not very keen to invest.

These strategy proposals are guided by these rather pessimistic, but experience-based assumptions. In other words, this is not an idealistic, falsely-optimistic strategy but an attempt to deal with the prevailing framework conditions. In places where the framework conditions are better (such as in China or Thailand), it will be easier to create permanent conducive institutional framework conditions, and there will be less need for external financial and human resources. What we have not considered in the strategic recommendations are the circumstances in failing states—countries that are collapsing from the effects of civil war.

4.2 The outlines of the strategy package

The ability of smallholders to apply sustainable land use practices in the long-term depends on five basic institutional preconditions:

- a** Development of context and target group specific land management technologies. This is a task that requires innovation.
- b** Access to knowledge and acquisition of skills to make appropriate use of these technologies for all resource users. This is the task of the extension services.
- c** Access to required inputs and to appropriate financial support or compensation for adoption of sustainable land management practices on farm and community level. This is particularly important for the investment phase of changes in the land use system but can also be necessary on a permanent basis.
- d** The organization of smallholder farmers and resource users for the purposes of:
 - Collective, regulated and coordinated management of use of land or resources
 - Taking over of a bigger share of the service provision at a later stage
 - The capacity to effectively represent the interests towards external providers.
- e** An organizational framework for linking farmers and user organizations with service providers to deliver requisite long-term external services.

Components 1 and 2 form the basis for the target groups to be willing and able to use the sustainable technologies on principle. Component 3 is necessary to transform this basic willingness into practical action, i.e. changing land use practices. Components 4 and 5 form the basis for the newly adopted practices to be retained and further developed in the long-term (also **Fig. 5**). The latter also depends on other external factors that determine whether the effort required for sustainable land use is actually worthwhile. This depends on factors such as access to attractive markets for production surpluses.

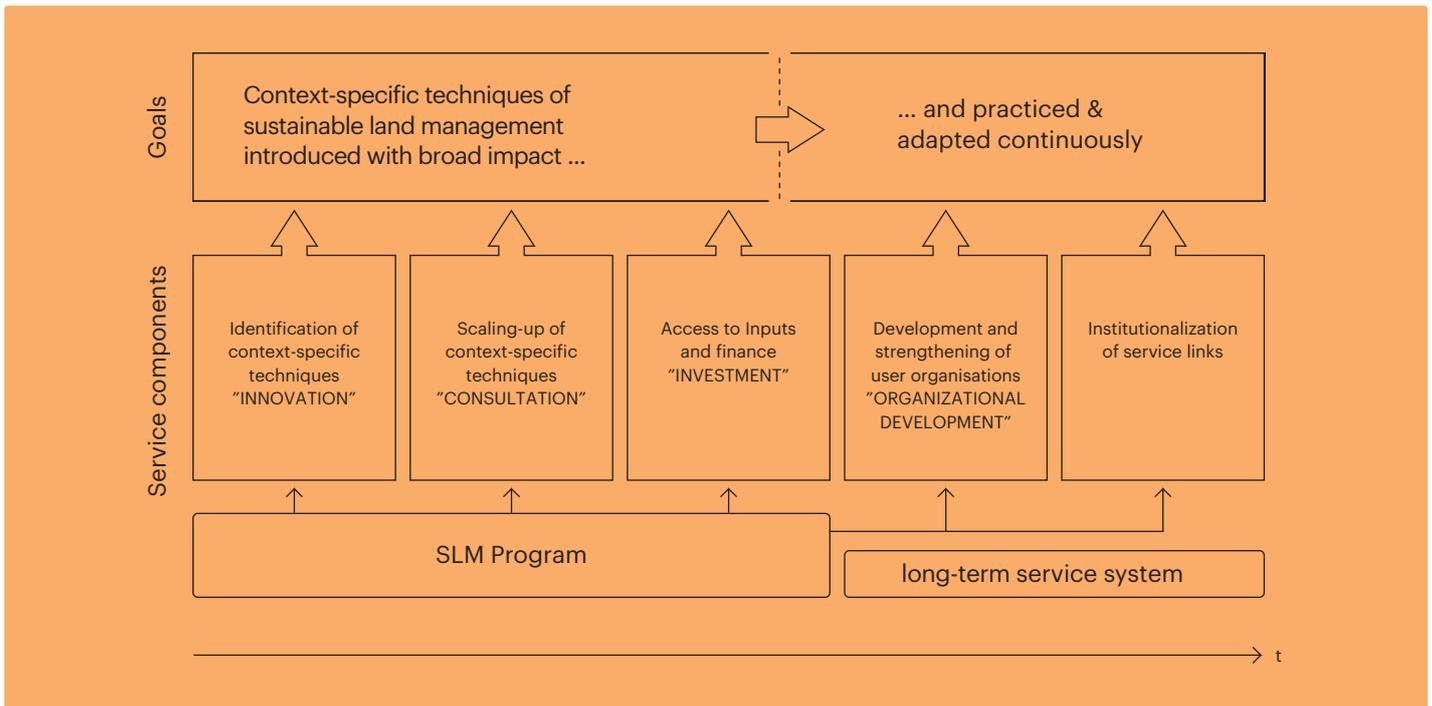


Fig. 5:
Service pillars for sustainable
land management (diagram
by the authors)

The time dimension is decisively important for Components 1 and 3. They require a very high intensity or a very high level in the initial innovation and investment phase until the transformed land management system is established, and has become routine. After this we can assume that land users will largely carry out further adaptation of the system independently, with the assistance of user organizations or available private service providers and that the major share of the increased costs associated with sustainability practices will be offset by the increased yields that will result after several years. Implementation of Components 4 and 5 will also involve greater organizational effort to begin with, but we can assume that in the long-term, once the organizations are established, they will be able to fulfill their reduced routine tasks with a low input of resources.

Involving underprivileged groups requires a determined approach oriented to these target groups. In the case of Component 1, identification of context-specific technologies, it is crucial to take into account the limited resource facilities of poorer smallholder households and those run by women. For Components 2 and 3, the extension services and provision of inputs and financial services depends on surmounting the usual access barriers for poorer households. For Components 4 and 5, the development of smallholder organizations and institutions for permanent linking between them and external service providers, it is important that the local organizations are inclusive and represent all social groups. The question of how these requirements can be met will be examined in Section → 4.3 on concrete designing of the components.

These strategic outlines lead to a temporally and spatially differentiated institutional strategy as it was practised in nearly every case where sustainable land use systems were successfully introduced: identifying and introducing permanent innovative sustainable land management systems that have a broad impact (are socially inclusive) through spatially focused and temporary programs—supported by external resources if necessary. These programs create the prerequisites for permanent continuation of the practices introduced on the basis of a modest level of services largely provided by the user organizations themselves with support of accessible private and public routine service providers (Fig. 6).

The spatial dimension of this strategy consists of implementing these programs first in “hot spot” regions prioritized according to the urgency of the problems and/ or available potential.

In order to avoid a mushrooming of a multitude of uncoordinated regional or local programs or projects that are planned and managed by external development agencies, and NGOs following different developmental approaches, it is crucial that these regional program interventions are a part of one joint, and politically approved, national program.

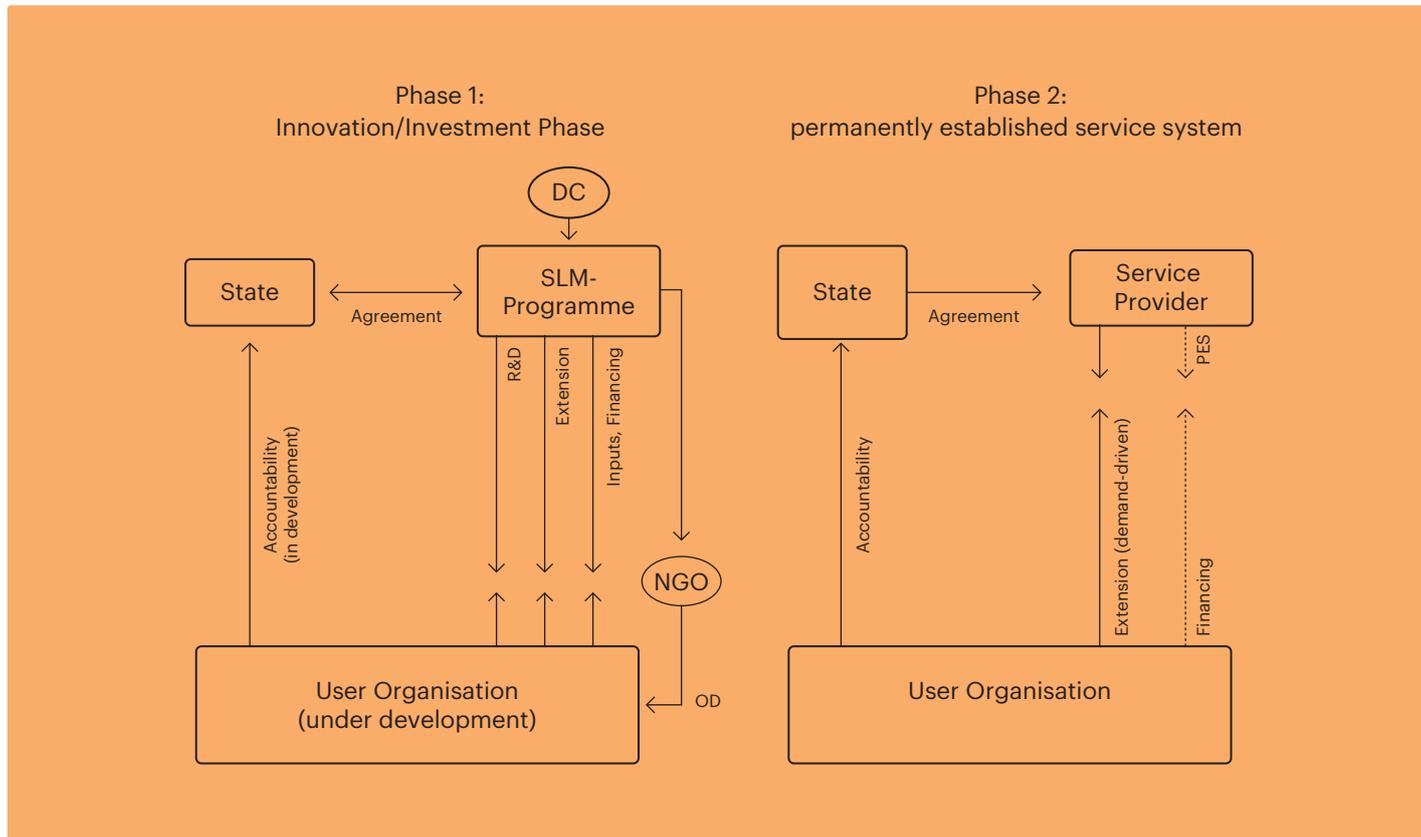


Fig. 6: Service strategy over time (diagram by the authors)

The approach proposed in this study is not about setting up an ambitiously intensive and complex service system on an area-covering and permanent basis. Instead, it is advocating for temporary efforts into the transformation towards sustainable land management systems, and the establishment of permanent low-scale service systems necessary for their long-term maintenance.

This approach corresponds indeed to what is actually already being done in many donor-supported soil protection and rehabilitation programs and sustainable natural resource management programs. Many of these programs, however, were not that successful in reaching the majority of poorer smallholders on a lasting basis. Hence it is the specific ways and means how such programs design and implement the five strategy components that decides on whether or not they are likely to achieve a socially inclusive and lasting impact on land management practices. This will be dealt with in →4.3.

4.3 Strategic recommendations for socially inclusive designing of individual strategy components

Component 1:

Identifying context-specific technologies:

The difficulties that are often seen in spreading or in scaling-up apparently adaptive, local technologies that have been tested with farmer participation often result from deficient testing procedures of agricultural research professionals. Thereby, good practic-

es are developed through on-farm-tests together with contact or model farmers who are better equipped with resources (labor, land) and who are provided with considerable service input during the testing period. The staff involved in testing often tend to aspire to technologies that are ideal from an agro-ecological perspective, which are, however, usually highly labor-intensive for the smallholders or require larger farm sizes. Typical examples of this are agro-silvo-pastoral systems based on cow dung or green manure, which are often unsuitable for poorer households with limited livestock holdings, and lack of acreage for feed crops. Therefore, important rules for identifying technologies that are appropriate not only for the site but also for the target groups are:

- a** Local tests for identifying adaptive techniques should be carried out with a representative socioeconomic range of farmer households.
- b** In this regard the situation of households with poorer resources should be prioritized. In particular, the often limited labor force at their disposal should be taken into account. The situation of households run by women deserves special consideration in this context. The diversity of resource users (e.g. livestock owners) and the utilization of commons require particular consideration.
- c** If there is a discrepancy between what is optimal in agro-ecological terms, and what is feasible in terms of available resources for poorer households, it is important to find acceptable adaptations and compromises specifically for the poorer target groups. For example, it has often been the case that due to lack of required local resources, farmers cannot work entirely without mineral fertilizers to maintain soil fertility.
- d** The type and intensity of support to test farmers should be realistic, i.e. it should not deviate too strongly from the range of normal services for the great majority of people who are to adopt the identified technologies. If, for example, cost-free inputs are provided for test farmers, there is little likelihood that the innovations developed in the process will be adopted if farmers have to later pay for these inputs.

In summary, it is important to identify technologies for specific target groups under realistic conditions.

**Component 2:
Dissemination of adaptive technologies through
extension services for smallholders:**

It is important to distinguish here between agricultural extension in the framework of introduction of innovations and routine extension services after the successful adoption of these innovations. The former requires an intensive and supply-driven approach. The latter can be organized to a large degree by smallholder organizations themselves, and demand-driven access to external advisory services is usually sufficient. In this context, the following strategic guidelines should be observed:

Dissemination phase:

- a** Dissemination should be closely linked with the test process for identifying context-specific technologies. The locations for “on-farm tests” should be widely scattered geographically to ensure that the maximum possible number of farmers can follow the tests in their neighborhood and through demonstration and exchange meetings on the test fields. The staff of existing state and private extension services should be fully involved in the innovation phase in order to be well equipped for the competent dissemination of the identified techniques.
- b** Even context-specific adapted technologies usually require further adaptation of details to the different conditions that tend to vary from place to place. Therefore, even cultivation methods developed in a participative manner require still

a participatory and dialogue oriented dissemination process to achieve “adoption with adaptation.”

- c** A group approach of extension is the key to efficient and inclusive dissemination of new technologies. This applies particularly to land management technologies that require collective application to be effective. For this reason, neighborhood groups for dissemination of soil and land management technologies are generally the preferred option. They usually farm under similar site conditions and need similar techniques.
- d** Social inclusion of underprivileged groups can be ensured by taking care that all households or land users in the neighborhood are involved and that all neighborhoods within the program region (e.g. up-hill settlers, farms at peripheral locations, ethnic minorities, immigrants, livestock owners) are invited to join in.
- e** Extension work for introduction of innovations in the context of special programs usually has the character of a campaign and greatly overloads the capacities of public routine extension services. Furthermore, it exceeds the sphere of interest of private business advisory services, which is usually focused on specific commodities and related value chains. Nonetheless, care should be taken to fully involve the public extension services responsible for the region, as well as available private providers of agricultural knowledge, in the dissemination campaigns. This is the way they can be sensitized to the importance of sustainable soil and land management. It will help to improve their competency and create a prerequisite for an adequate long-term advisory system in this area.
- f** On a methodical level, we recommend making use of the well-known range of participatory advisory methods such as farmers’ field schools, farmer-to-farmer exchange, and exchange visits with farmer groups from other regions.

Routine consultation after successful adoption of innovative technologies:

- g** After successful adoption of sustainable soil and land management technologies the need for advisory services usually diminishes considerably and only continues to appear in special needs situations. This means it can mostly be covered by farmers’ resource management organizations on their own (Component 4). If external specialized experts should be needed, their help should be requested via the service links to the agricultural extension department or to competent private providers in the area.
- h** On the district level a specialist for soil and land management within the public agricultural extension service or the office for land use planning should be available for consultation if needed. We can assume, however, that those field extension workers at sub-district level that have been involved in disseminating the new technologies will be competent to address land management topics and be suitable as professional contact persons.

In summary, what is crucial is to ensure that the dissemination of adapted techniques is done through a socially inclusive and area-covering landscape approach to soil conservation and rehabilitation. This demands a non-discriminatory approach that includes all land users. A supply-driven dissemination phase will be followed by demand-driven consolidation and adaptation phases.

Component 3:

Access to inputs and financial services:

The need for inputs and financial support is highly concentrated on the innovation and investment phase in which the land management system must be modified. We have already established, on the one hand, that external (part-) financing is needed for this

in the case of the poorer smallholders, and on the other hand that it is also justified in terms of the positive external effects of sustainable land use (in the sense of PES logic). But the risk is that overly large external subsidies will undermine farmers' self-initiative and the sense of ownership that is indispensable for sustained success. An appropriate finance strategy must take this into consideration. The following rules should be observed in relation to this:

- a** There are no standard rules that apply worldwide for appropriate and fair sharing of costs for sustainable management of natural resources. Rather it is necessary to identify context-specific cost-sharing and financing models with due consideration of the level of respective costs, the expected increase of farm output and the external effects of SLM.
- b** In general, however, the rule applies that external inputs should be provided free of charge, whereas the labor costs on the individual farm and local inputs should be met by the farmers' households.
- c** For community works on collectively used lands (e.g. community forests), contractually agreed external financial contributions should be provided in order to avoid discouraging community ownership of their resources. This mode of payment is preferable to financial contributions in the form of cash- or food-for-work that has usually not functioned well by establishing wrong incentives (cf. Section → **3.1**).
- d** A particularly problematic issue is the compensation for the increased long-term requirement for farm labor that is often associated with more labor-intensive sustainable land management methods. Such compensation is particularly indispensable for involving resource-poor households that suffer from labor shortages. At the same time, it is usually justifiable in terms of environmental economics as payment for environmental services (including climate change mitigation), or as a compensation for costs of climate change adaptation measures related to SLM. But it is difficult to manage subsidies for recurrent expenditures after the end of a regional land management program. In this case we would suggest subsidizing provision of labor-saving devices (e.g. ploughing services, grinding mills, firewood saving stoves or water wells) that can reduce the labor requirement for other activities. In this context particular consideration should be given to the workload of women.
- e** Loans are generally not an appropriate financing tool for smallholder sustainable land management. Grants or subsidies are usually justified for this purpose because at many of the marginal sites affected by soil degradation there is no additional monetary income to offset the extra costs, and repay loans (but only a reduced risk of failed crops and increased food security).

Finally, for the majority of poorer smallholders, due to difficulties of attributing the environmental impact to their individual recurrent farm-level efforts, there is no administratively manageable possibility for providing them with direct compensation for their environmental services. As a result, the proposed financing systems are based on the principle of indirect subsidy through external subvention of investments that have a long-term impact on increasing yields or saving work.

**Component 4:
Promotion and strengthening of farmer/ resource
user organizations:**

This is not the place to formulate all the well-known rules for the promotion and strengthening of grassroots organizations. We shall restrict the strategy recommendations to the particularly important aspects related to a socially inclusive and sustainable service system for sustainable land management, which are the legal status; the size and the functions of SLM-related community-based organizations; the aspect of social inclusiveness

of community-based organizations; the aspect of effective articulation of interests and accountability in relation to external service providers; and the question of conditions for sustainability of organizations.

- a** Community-based organizations in charge of sustainable land management usually have to fulfill three major functions: a) Managing the utilization of their natural resources on their own by establishing rules for resource utilization and controlling their observance. b) Providing services (e.g. knowledge dissemination, seed multiplication) for their members in the long run, thereby partly replacing external service providers. c) assuming the role of a contact partner and lobby organization towards external service providers and political representatives.

In order to fulfill all these roles, these organizations need to become legally recognized formal bodies, regulated by national legislation. Not much can (and should) be said here about the size of such organizations on a general level. The shape and size of local organizations for natural resource management depends once on the scale of the resource to be controlled by them and secondly on the way the villagers have been organized traditionally. Big catchment areas may need big organizations, small community forests may well be managed by smaller village-based groupings. Where there are well established village-level community structures, it is not advisable to replace them by new structures unless there are strong reasons to do so. Consequently, it may be necessary in many cases, to compromise between functional requirements of the natural resources to be managed and the advantages of building up on established community structures. In any case, the legal framework for natural resource management organization needs to be wide enough to cater for that broad diversity of local conditions.

- b** To avoid dominance by elites within the village resource user organizations, and a related one-sided acquisition of external services by better-off farmers, it is necessary not only to strengthen the organization but also to deliberately empower the weaker and underprivileged socioeconomic groups in order to ensure that they are represented with seats and voices in the management committees of the resource user organizations. This is a challenging and time-consuming process of social mobilization for which local non-governmental organizations usually provide the necessary competency. Sufficient financial resources need to be made available for their organizational development work in the framework of land management programs.
- c** To create effective accountability in relation to the state and external service providers it is usually not enough to strengthen grassroots organizations and train leaders in effectively representing the interests of their members. Effective representation of interests also requires adequate mechanisms and institutional frameworks for participation to help institutionalizing the link between user organizations and service providers as well as political decision makers (municipal or district councils). This recommendation also relates to Component 5.
- d** The sustainability of user organizations is generally dependent on the continuing benefit that the members gain from it. In the area of sustainable management of natural resources where the need for services diminishes after successful application of the new systems, this benefit may relate to long-term payment for environmental services or access to value chains for the surpluses resulting from sustainable land management. This topic still requires more detailed research on experiences with post-program phases of programs that have been completed some years ago.

In conclusion, the successful promotion of inclusive and lasting resource user organizations that are a part of an institutionalized system of participatory natural resource man-

agement is a key prerequisite for a sustainable SLM service system related to food security. Such a system needs a wide and flexible legal framework and it needs to be based on long-term tangible benefits for all members.

**Component 5:
Institutionalizing service links:**

Strong and socially inclusive farmers' organizations are a necessary but not sufficient prerequisite for ensuring well-functioning service links. They have to be supplemented by institutionalized and formalized communication links. A two-way approach is recommended here in order to avoid an elite-biased representation which tends to emerge if only the leaders of community organizations stay in touch with state institutions and service providing agents:

- a** Representation of farmers' organizations in district-level participatory planning and consultation committees. These institutionalized participation channels are necessary to design services in an appropriate manner and to ensure necessary feedback mechanisms and a system of checks and balances. There is, however, a considerable risk of establishing or reinforcing privileged links between local elites and the administration. This risk can be reduced by getting more representatives from each community involved.
- b** Village-level meetings with participation of representatives from district-level service providers. Only this allows for direct communication between all sections of a community and officials of service provider organizations. It also helps service providers to get a realistic picture of the situation on the ground.

Interlinking both communication channels can help to ensure a socially inclusive participation and accountability mechanism. ●

5. Summary and conclusions

Sustainable soil and land management is a necessary precondition for food security and the preservation of ecosystems. In the light of its relevance for the environmental and climate policy, its importance for guaranteeing right to food—as private cost-benefit calculations will not always result in sustainable land management (due to external effects)—SLM is a public responsibility. In smallholder land management this leads to the necessity for public services.

Appropriate technological solutions for sustainable land management are known and recognized for the majority of land use zones. However, they often need further site-specific adaptations. Above all, they are often not sufficiently targeted to different categories of smallholders, and are especially not adapted to the limited resources of poorer households. But even well adapted technologies often need complementary external services to enable their implementation. It follows that the establishment of a socially inclusive public service system for smallholder sustainable land use is a great challenge. Since the introduction of sustainable land use practices usually involves an innovative and an investment task, alongside agricultural extension services, research and financing also play a major role. These are usually temporary tasks.

Within the conceptual debate about public service systems, user organizations play a crucial role. Particularly in remote rural regions they should not only make their own contribution to providing services, and thereby help to offset the limited capacities of the providers; through organizing, farmers should also be able to articulate their demand for services effectively—in other words, to exert political pressure. The support in promoting

these kinds of user organizations should consequently be seen as an important further service task.

In the reality of most developing countries, and of some emerging economies, smallholder services are usually not adequately resourced. They mostly reach only the better-off smallholders. The dismantling of state-run agricultural services under the auspices of the structural adjustment programs of the 1990s weakened them even more, and they were only partly replaced by private service providers. The latter have no particular interest in technologies of sustainable land use unless those are related to commercially interesting value chains. But the topic of sustainable land use does not receive high priority in the context of state-run advisory and research activities either. Thus, service systems for sustainable land management that function well were set up almost exclusively in the framework of internationally supported development programs. They attempt to facilitate the shift to sustainable land management systems through intensive temporary support in the areas of agricultural extension, provision of inputs, and financial contributions, and at the same time create the institutional preconditions for their dissemination.

Strategy proposals for shaping an inclusive service system for sustainable land use should take into account the weaknesses of existing routine service systems, the temporary nature of service needs, and previous experiences of relevant development programs. Considering these factors, it becomes obvious that the response to the service systems challenge does not consist of establishment and institutionalization of an intensive and elaborate service system on a permanent basis and an area-covering scale. Instead, the appropriate answer is temporary programs for identifying sustainable technological solutions that have a broad impact (are socially inclusive), combined with logistic, financial and organizational support during their introduction and the creation of organizational and institutional preconditions for their long-term application. What is decisive for a positive impact on food security is that identification of sustainable technologies should be done in a target group differentiating manner with special reference to resource-poor farmers, and that fair and context-specific financing models should be developed for covering investment costs (with reference to PES logic). For long-term maintenance and further development of adapted land use systems, as well as for securing of the remaining permanent service requirements, strong and socially inclusive user organizations play a decisive role.

The sustained success of SLM-related service systems not only depends on the design of the program interventions but is also influenced by natural, institutional, and market-related factors. In fact, effort must be made before and during the innovation and investment phase to ensure that appropriate institutional and economic framework conditions for the profitability of sustainable land use are established. Securing land rights for marginalized population groups, insurances against crop failure, or more efficient structuring of the value chain used by the target groups could make an important contribution to the long-term existence of the transformed service and production systems.

International cooperation in the area of establishing sustainable natural resource management systems such as soil conservation and rehabilitation in developing countries (and partly in emerging economies) should be seen as the normal case rather than the exception. This is justified from a normative perspective, as it concerns a global challenge and global-scale environmental services. It also corresponds to the practical requirements of an innovative task that implies a fundamental change in systems of resource use and high initial investments. Such challenges tend to greatly exceed the capacities of normal routine service systems—even in well-governed countries. ●

Annotated references

A

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After briefly summarizing the historical development of agricultural advisory services, the author extensively elaborates on recent

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The report examines the general trends of African governments in financing their agricultural sectors. Accordingly, despite increased investment most countries still lack behind in achieving the proclaimed targets of the Maputo Declaration.

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F

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Rural advisory services will contribute to improved rural livelihoods and poverty reduction if they are demand-driven and pluralistic.

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A policy document with a brief outline of India's major SLM-related program on sustainable agriculture, mainly focusing on Integrated Soil Fertility Management (ISFM). The rather supply-driven Soil Health Management (SHM) component is described more in detail.

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The report briefly elaborates on the private and social incentives for SLM practices in sub-Saharan Africa before identifying four main areas of policy intervention. These include profitability of SLM, extension services, incentives and distortions, PES and land tenure. It concludes with recommendations on appropriate and effective public expenditures within these sectors.

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M

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N

Nederlof, E. F.; Wennink, B. and Heemskerk, W. (2008): Access to agricultural services. Background paper for the IFAD Rural Poverty Report 2010. Amsterdam (Royal Tropical Institute)

A desk study concerned with improving access of the rural poor to service systems in general and to agricultural productivity and finance related services in particular. After highlighting recent trends and key challenges as well as successful initiatives by the rural poor themselves to access service systems, the authors conclude with recommendations regarding enhancing the capacities of service users, quality of the services provided and pro-poor oriented policies and institutions.

Nyanga, P. (2012): Factors influencing adoption and area under Conservation Agriculture. A mixed methods approach. In: Sustainable Agriculture Research 1 (2), pp. 27-40

An empirical assessment of quantitative and qualitative factors affecting the adoption of Conservation Agriculture in Zambia, ranging from number of trainings received to trust and reciprocity with other farmers. The role of artificial incentives such as seeds, food aid packages and planting materials are also discussed.

P

Pal, S.; Rahija, M. and Beintema, N. (2010): India. Recent trends in agricultural

research. Washington D. C. (Agricultural Science and Technology Initiative)

A comprehensive overview on institutional arrangements, financial capacities and human resources of agricultural research and development in India.

Ponniah, A.; Puskur, R.; Workneh, S. and Hoekstra, D. (2008): Concepts and practices in agricultural extension in developing countries. Washington D. C./ Nairobi (International Food Policy Research Institute/International Livestock Research Institute)

A source book produced against the background of reestablishing agriculture on international development agendas. It elaborates on current challenges faced by the sector, past paradigms of R&D, the evolution of agricultural extension systems in developing countries, methods and approaches to participatory research, monitoring and evaluation.

Q

Qamar, M. (2006): Modernizing national agricultural extension systems. A practical guide for policy-makers in developing countries. Rome (Food and Agriculture Organisation of the United Nations)

The paper presents a normative framework to review and reform present rural and agricultural extension systems in a context-specific manner. It provides a set of guidelines for extension reform, arguing for the maintenance of supply-driven systems in the case of SLM among others.

S

Shiferaw, B.; Okello, J. and Reddy R. (2009): Adoption and adaptation of natural resource management innovations in smallholder agriculture. Reflections on key lessons and best practices. In: Environment Development Sustainability 11 (3), pp. 601-619

Since neither top-down or participatory SWC programs have resulted in the desired rates of adoption a shift in perspectives towards the market and institutional environment is necessary. The main aspects addressed are the impacts of output prices, labor markets, off-farm income opportunities, subsidies and tenure security.

Stads, G.-J. and Hinvi, J. (2010): Benin. Recent trends in agricultural research. Washington D. C. (Agricultural Science and Technology Initiative)

A comprehensive overview on institutional arrangements, financial capacities and hu-

man resources of agricultural research and development in Benin.

Stads, G.-J. and Sawadogo Kaboré, S. (2010). Burkina Faso recent trends in agricultural research. Washington D. C. (Agricultural Science and Technology Initiative)

A comprehensive overview on institutional arrangements, financial capacities and human resources of agricultural research and development in Burkina Faso.

Swanson, B. (2008): Global review of good agricultural extension and advisory services. Rome (Food and Agriculture Organisation of the United Nations)

The most recent meta-study on good practices among extension services worldwide with regard to technology transfer, human capital development, social capital generation and farmer organization as well as sustainable NRM. It argues for decentralized public services working with producer groups in order to disseminate farm innovations as well as increased collaboration between public, private and civil society service providers according to the respective comparative advantages.

Swanson, B. and Rajalahti, R. (2010): Strengthening agricultural extension and advisory systems: procedures for assessing, transforming, and evaluating extension systems. Washington D. C. (The World Bank)

An extensive report including the evolution of extension systems globally, an overview on different models and approaches, a classification of the clientele served by extension services, policy issues towards more pluralistic, decentralized and demand-driven advisory systems as well as case studies from India and China.

T

Takoutsing, B.; Tchoundjeu, Z.; Degrande, A.; Asaah, E. and Tsoibeng, A. (2014): Scaling-up sustainable land management practices through the concept of the rural resource centre: reconciling farmers' interests with research agendas. In: The Journal of Agricultural Education and Extension 20 (5), pp. 463-483

Formal agricultural research has generated vast amount of knowledge and fundamental insights on land management, but their low adoption has been attributed to the use of public extension approach. This research aims to address whether and how full participation of farmers through the concept of Rural Resource Centre (RRC) provides new in-

sights for the development of alternative and farmers-based extension methods.

The World Bank (Ed.) (2006): Sustainable land management. Challenges, opportunities and trade-offs. Washington D. C.

An earlier report of the World Bank about the necessity of and options to promote SLM. Includes a agro-technical overview on different SLM approaches, a strategic section on knowledge sharing and extension as well as the bank's early involvement in the field.

The World Bank (Ed.) (2010): Project appraisal document on a proposed grant from the Global Environment Facility Trust Fund in the amount of US\$10 million to the Republic of Kenya for a Kenya agricultural productivity and sustainable land management project. Washington D. C.

Project proposal for the major SLM-related extension program in Kenya. Of particular interest are the used approaches for identifying and scaling-up best practices, a sub-project piloting PES and mechanisms employed to ensure social accountability.

The World Bank (Ed.) (2013): Project appraisal document on a proposed grant from the Global Environment Facility Trust Fund in the amount of US\$42.65 million to the Federal Republic of Ethiopia for a sustainable land management project II (SLMP-2). Washington D. C.

Project proposal for the major SLM-related extension program in Ethiopia. Of particular interest are the used approaches for identifying and scaling-up best practices in a participatory manner, capacity building of local extension staff and formation of resource user organizations.

Tiffen, M.; Mortimore, M. and Gichuki, F. (1994): More people, less erosion. Environmental recovery in Kenya. London/Nairobi

Probably the most-cited success story on environmental recovery facilitated by innovative and sustainable land management practices. Also includes a section on the institutional environment in Machakos District from the colonial days to the 1990s including market conditions, public or donor-funded development initiatives and extension services. Despite considerable efforts by the administration, most innovation and investment was facilitated by the farmers themselves.

U

United Nations Convention to Combat Desertification (Ed.) (2012): Incentive and market-based mechanisms to promote sustainable land management. Framework and tool to assess applicability. Bonn

The document describes four different types of incentives and market-based mechanisms to promote SLM practices and proposes a practical methodology for identification of appropriate models for implementation in developing countries.

W

Westermann, O.; Thornton, P. and Förch, W. (2009): Reaching more farmers. Innovative approaches to scaling up climate smart agriculture. Copenhagen (Consultative Group on International Agricultural Research)

The paper provides insight into use novel approaches can be used to scale up research findings on climate-smart agriculture (CSA). The approaches described include those based on value chains and private sector in-

volvement, policy engagement, and information and communication technologies and agro-advisory services. The paper draws on 11 case studies to exemplify these new approaches to scaling-up.

Wongtschowski, M.; Belt, J.; Heemskerk, W. and Kahan, D. (2013): The business of agricultural business services: Working with smallholders in Africa. Amsterdam (Royal Tropical Institute)

Agricultural business services do not only include technical advice but financial and management capacity building as well. The report describes three basic models of business services based on their funding modalities and concludes with a number of case studies from African countries.

Worku, A.; Adugna, B.; Wubeshet, H.; Sisay, S. Gebreegziabhe, T. and Hailu, Z. (2015): GIZ Ethiopia. Lessons and experiences in sustainable land management. Eschborn/Addis Abeba (Gesellschaft für Internationale Zusammenarbeit)

The publication summarizes fundamental concepts and approaches to watershed management, applied technologies and major outcomes of the recent SLM programs of GIZ in Ethiopia. Of particular interest are the sections on identification and scaling-up of best practices.

This study was developed in close exchange with the team of the accompanying research project “Soil Protection and Rehabilitation for Food Security” at the “Institute for Advanced Sustainability Studies” (IASS) Potsdam. The project is funded by the German Ministry for Economic Cooperation and Development (BMZ) in the context of the special initiative “One World—No Hunger” (SEWOH). It is implemented in close cooperation with the German Agency for International Cooperation (Gesellschaft für Internationale Zusammenarbeit/ GIZ) in Benin, Burkina Faso, Ethiopia, India and Kenya.

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