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The agricultural extension system in Ethiopia: Operational setup, challenges and opportunities

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Gerba Leta, Girma Kelboro, Till Stellmacher and Anna-Katharina Hornidge

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Acronyms

AAS	Agricultural Advisory Services
ADPLAC	Agricultural Development Partners Linkage Advisory Council
AE	Agricultural Extension
AED	Agricultural Extension Directorate
AES	Agricultural Extension System
AGP	Agricultural Growth Program
ATA	Agricultural Transformation Agency
ATLAS.ti	Qualitative Data Analysis and Research Software
ATVET	Agricultural Technical and Vocational Education and Training
BoAD	Bureau of Agricultural Development
BPR	Business Process Reengineering
DA	Development Agent
FGD	Focus Group Discussion
FTC	Farmers Training Center
GFRAS	Global Forum for Rural Advisory Services
GTP	Growth and Transformation Plan
ISSD	Integrated Seed Sector Development Project in Ethiopia
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture
MoANR	Ministry of Agriculture and Natural Resources
MoFED	Ministry of Finance and Economic Development
NGO	Non-Governmental Organization
NPC	National Plan Commission
NRM	Natural Resource Management
PADETES	Participatory Demonstration and Training Extension Systems
SDG	Sustainable Development Goal
SG 2000	Sasakawa Global 2000
SMS	Subject Matter Specialist
SNNPRS	Southern Nations, Nationalities and People's Regional State
SPSS	Statistical Package for the Social Science
ToT	Training of Trainers
TVET	Technical and Vocational Education and Training
WOAD	<i>Woreda</i> Office of Agricultural Development
WSM	Watershed Management
ZOAD	Zone Office of Agricultural Development

Abstract

Since the 1960s, Ethiopia has been inducing changes in its approaches to agricultural extension through reforms. In 2010, the Ministry of Agriculture and Natural Resources adopted a Participatory Extension System. Farmers' group formation accompanies the reform process. This paper analyzes and discusses how the newly adopted system is structured and operates, the characteristics of extension services, and the evaluation system employed in agricultural extension, and assesses the challenges and opportunities associated with the system. Data are drawn from field research carried out in 2015/16 in two districts of Southwestern Ethiopia. A mixed methods approach was employed, combining qualitative and quantitative data-collection tools: household survey, expert and key informant interviews, Focus Group Discussion (FGD), participant observation, and desk literature review. ATLAS.ti and SPSS were used for data analysis. The findings show that, despite the reforms and a steadily increasing number of development agents, the advisory service has not yet satisfied farmers' demands. The formation of farmers' groups to increase extension coverage and promote collective action has limited effects and lacks uniformity across study sites. High input and low output prices are the other limitations on technology adoption and scaling-up. Despite the emerging opportunities, the agricultural extension system is constrained by multiple challenges and often perceived as an extended arm of the state, and less as a useful service provider. From the analyses, we identified a need to create a national strategy for an agricultural extension system that gives space for pluralistic advisory services while still nurturing the efficiency, effectiveness and inclusiveness of the public agricultural extension service. In addition, proper decentralization needs to be promoted to improve participation and encourage all categories of farmers to develop a sense of ownership and become beneficiaries of the agricultural extension system.

Keywords: Agricultural extension, decentralization, farmers group, participatory extension system, pluralistic advisory services

1 Introduction

In Ethiopia, agricultural extension is playing a crucial role in agricultural development and rural transformation. “Extension is understood as a policy instrument and legitimate tool for a government to bring about desired changes in political, socio-economic, cultural and environmental aspects” (Abate, 2008). The evident goal of agricultural extension is to help farmers to overcome agriculture-related constraints by persuading them to adopt/adapt and use innovations. Behavioral change can be achieved either through coercion or voluntarily. According to Rölting (1988), extension can be more effective when it operates by inducing voluntary change and satisfying customer goals.

In Ethiopia, the approach to agricultural extension has been changing over time (see Davis et al., 2010). Recently, the Ministry of Agriculture and Natural Resources (MoANR) has adopted a Participatory Extension System, a modified version of the Participatory Demonstration and Training Extension Systems (PADETES) implemented in the country since 1995 (MoA, 2010; Belay 2003). In principle, the Participatory Extension System aims at reinforcing farmers’ participation and increasing the agricultural extension coverage through the formation of farmers’ groups and by nurturing social networks. In the recent development of the Ethiopian Agricultural Extension System, the participatory approach is complemented by a “scaling-up” of technologies or the establishing of best practice for technology transfer at larger scales.

In spite of the reforms, implementation of agricultural extension in Ethiopia still features the classical model of technology transfer adopted in the past. Farmers are compelled to adopt new practices recommended as “one-size-fits-all” often with little consideration of socio-economic and biophysical variations across the country – which is contradictory to the “best-fits” approach to agricultural advisory services (AAS) (see Birner et al., 2006). A persistent problem that faced the Ethiopian agricultural extension is a failure to distinguish between behavioral change through “coercion”, and “voluntary” action (Abate, 2007). As a consequence, the two approaches continue to operate together.

There are a few assumptions as to why agricultural extension in Ethiopia is simultaneously employing contradictory approaches. Firstly, agricultural extension services are almost entirely provided and financed by the state (Abate, 2007). Secondly, agricultural extension is used as an instrument for achieving the poverty reduction, food security and sustainable land-management goals of the country (MoFED, 2010; Rahmato, 2008). Thirdly, agricultural extension is a means by which the government can reach out to the majority of the population (Berhanu and Poulton, 2014). Berhanu (2012) argues that rather than merely enhancing technology adoption and increased agricultural production, the government also seeks to maintain its rural support base and strengthen its presence and authority among the farmers.

Despite Ethiopia’s huge investment in agriculture, significant change in the provision of advisory services has not been achieved (cf. ATA, 2014; Spielman et al., 2012; Swanson and Rajalahti, 2010). The available services and the quality of service providers are no more efficient than before. As a result, rural poverty and food shortage still remain a challenge to the country (Stellmacher, 2015; Oxfam, 2016). Agricultural extension creates demand among the farmers but fails to associate this with the necessary supplies such as improved seeds, fertilizer, and crop pest- and disease-management practices. Furthermore, high

input and low output prices, land degradation, climate change, and declining production are other barriers to agricultural development.

Farmers access agricultural inputs in cash. Access to credit services from micro finance institutions demands group collateral of about five to ten farmers. It is challenging for farmers to find peers with common interests and commitment. Practically, this means they have limited access to credit, a lack which impedes technology adoption by resource-poor farmers. Throughout Ethiopia, farmers' cooperative unions have been established starting from the time of the *Derg* military regime (see Stellmacher, 2007) with the aim of increasing production and income by providing them with finance, agricultural inputs, information, and output markets (MoA, 2012). However, some farmers' cooperative unions focus only on strategic commodities such as coffee (Jena et al., 2012). The services other farmer's cooperatives provide are often limited to supplying inputs, and the distribution of consumer goods (see ATA, 2014). Historically, the needs of disadvantaged groups in the society such as the poor, youth, and women lacked emphasis in the extension (Abate, 2008; Abate, 2007).

Agricultural extension staff are involved in multiple activities of agriculture and rural development. In particular, Development Agents (DAs) provide general advisory services in crop, livestock, and natural resource management at the level of the sub-*kebele* or *ketena*, the administrative unit directly below the *kebele*¹ (Abate, 2008). However, DAs' annual performance evaluation is worked out based on their respective disciplinary backgrounds (either crop, livestock, or natural resource management). Therefore, their involvement and contribution as generalist DAs in their respective *ketena* is not eventually accredited (Gebremedhin et al., 2006). DAs also lack proper mentoring support from Subject Matter Specialists (SMS) based in the *woreda*² Office of Agricultural Development (MoA, 2015). On top of the aforementioned issues, agricultural staff in general are the most poorly paid members compared to other sector offices in the *woreda*. The DAs also often lack job amenities and incentives such as daily allowance or top-up, shelter, transportation facility, insurance, or field kits. The starting monthly salary for a DA is ETB 928 (equivalent to 37.98 Euro), which is unattractive (MoA, 2010). Davis et al. (2010) remarked that poor incentives are causes of low job satisfaction among DAs in Ethiopia. As a result, many DAs are hardly able and/or willing to provide efficient advisory services in their area of operation. The *Woreda* Office of Agricultural Development (WOAD) is also characterized by weak institutional decentralization, and lack of capacity to plan and power to make decisions.

The Ethiopian regions and *woredas* have modified the operational structure and approach to implementation of agricultural extension to their own specific contexts in practicing participatory extension. However, little is known in terms of scientific evidence regarding the recently reformed participatory extension system, the characteristics of extension services, evaluation in agricultural extension, and challenges and opportunities associated with the system. Therefore, the aims of this paper are: i) to present the structure and function of agricultural extension in bringing the participatory extension system into practice; (ii) to analyze the characteristics of extension services; and (iii) to understand the evaluation, the challenges, and the opportunities related to the agricultural extension system. We rely on systems theory and evolutionary governance perspectives (Van Assche, et al., 2014) and have adopted the “‘Best Practice’ to ‘Best Fit’: a framework for designing and analyzing pluralistic

¹ *Kebele* is an administrative unit below that of the district, of which sub-*kebele* is a further subdivision, also known as *ketena* in the Amharic language.

² *Woreda* is an administrative unit equivalent to “district”

AAS” from Birner et al. (2006) to analyze the characteristics of extension services with particular emphasis to implementation of the participatory extension system in Bako-Tibe and Yem *woredas* in Southwestern Ethiopia.

2 Concept and theory

The term “extension” and the activity it covers is rather complex (Van Assche, 2016). Countries and scholars define extension differently and contextualize it in terms of their own situations. The uses of the term “extension” also vary between developed and developing countries. The term “advisory services” is an alternative to “extension” in the UK, Germany and the Scandinavian countries (Swanson and Rajalahti, 2010; Christoplos, 2010; Leeuwis et al., 2003; Röling, 1988). According to Röling (1988), “differences in the terminology are not the only sources of confusion with respect to the concept ‘extension’ but the politics and other traditions have made a considerable contribution.” Therefore, *extension* is expected to take on different roles depending on the policy and purposes within which it functions in different countries and among different scholars.

In Ethiopia, for example, the goal of extension goes beyond implementing the national agricultural development goals of achieving food security, improving rural livelihoods, and Natural Resource Management (NRM). According to Berhanu (2012), fostering state ties with farming communities to maintain and strengthen the societal coherence and support base is an underlying interest. Similarly to the evolution of the term “extension,” “the service delivery” transforms based on the emerging development needs, competition, preferences and objectives of the country in question. Accordingly, the methods used in extension service provision vary from country to country. There are two main arguments regarding provision of AAS. The first underlines “public agricultural extension” as the main “development actor” in providing AAS to smallholder farmers with low income, since poor farmers may not be able to pay for the services themselves, as shown in the case of Honduras (Qamar, 2005). Limited ability to secure sustainable budget sources for provision of extension services by either the private or civil society is another threat, as shown in Chile and Uganda by Swanson and Rajalahti (2010). The public extension service also has the advantage of dealing with natural resource management-related problems, which may not be of interest for the private sector (GFRAS, 2010; Leeuwis et al., 2003). Hence, technology transfer through the public agricultural extension is considered advisable as a resort for developing countries.

The second argument highlights the promotion of transition to a pluralistic AAS. In pluralistic agricultural advisory services, a set of stakeholders and institutions or partners engage and support farmers in solving their development goals (Birner et al., 2006). Pluralistic agricultural advisory services are likely to better meet the diversity of rural life and needs. Using more than one organization to deliver services to farmers is gaining popularity in countries such as China and India (Swanson and Rajalahti, 2010; Van Crowder and Anderson, 1997). In places where private organizations are economically competent, government monopoly is not encouraged (Qamar, 2005). In essence, “pluralistic agricultural advisory services is a service orientation and a move away from top-down models of technology transfer” (see Birner et al., 2006; Qamar, 2005; Christoplos and Kidd, 2000).

Apart from an assumed inability of farmers to pay for extension services, fear of job insecurity induced by restructuring in privatized and commercialized AAS, and difficulty in attaching monetary value to extension services, are considered threats to privatization (see Swanson and Rajalahti, 2010; Ajieh et al., 2008). On the other hand, profit-making is the first priority for the private sector. So they are less likely to invest in agricultural extension unless it is financially feasible from their perspective, especially in a country with smallholder-dominated agriculture, like Ethiopia. According to Swanson and Samy (2002),

extension is usually somewhere in between a public and private good. Kalna-Dubinyuk and Stanley (2005) in Danieli and Shtaltovna (2016:159) stated that “mixed private/public models of extension appear to be most suitable under rapidly changing world.” Therefore, along with the public, involving the private sector and NGOs could accelerate improvement in agricultural advisory services especially in providing technical inputs, information, and training (Swanson and Samy, 2002). Thus, striking a balance between public, private, and NGO involvement in AAS could better address the emerging needs of advisory services in the growing economy.

Experience has shown that extension services which accommodate farmers’ varying interests, needs and capacities help to improve agricultural production and thereby to reduce rural poverty and food insecurity in poor countries like Ethiopia. Therefore, improving the public AAS is vital, along with the necessary institutional reforms that create space and an enabling environment for the involvement of the private sector, and which facilitate transformation towards pluralistic approaches. Hence, The AAS, thereby, enables the smallholders to meet the Sustainable Development Goal (SDG-2) by increasing agricultural productivity with the aim of achieving food security, improving nutrition, and nurturing agricultural sustainability (FAO, 2015; Griggs et al., 2013).

Using the framework of Birner et al. (2006) (Figure 1), we analyze and describe the characteristics of Ethiopian agricultural extension services with particular emphasis on: (i) the governance structures (Box G); (ii) capacity, management and organization (Box M), and (iii) the extension techniques applied (Box A).

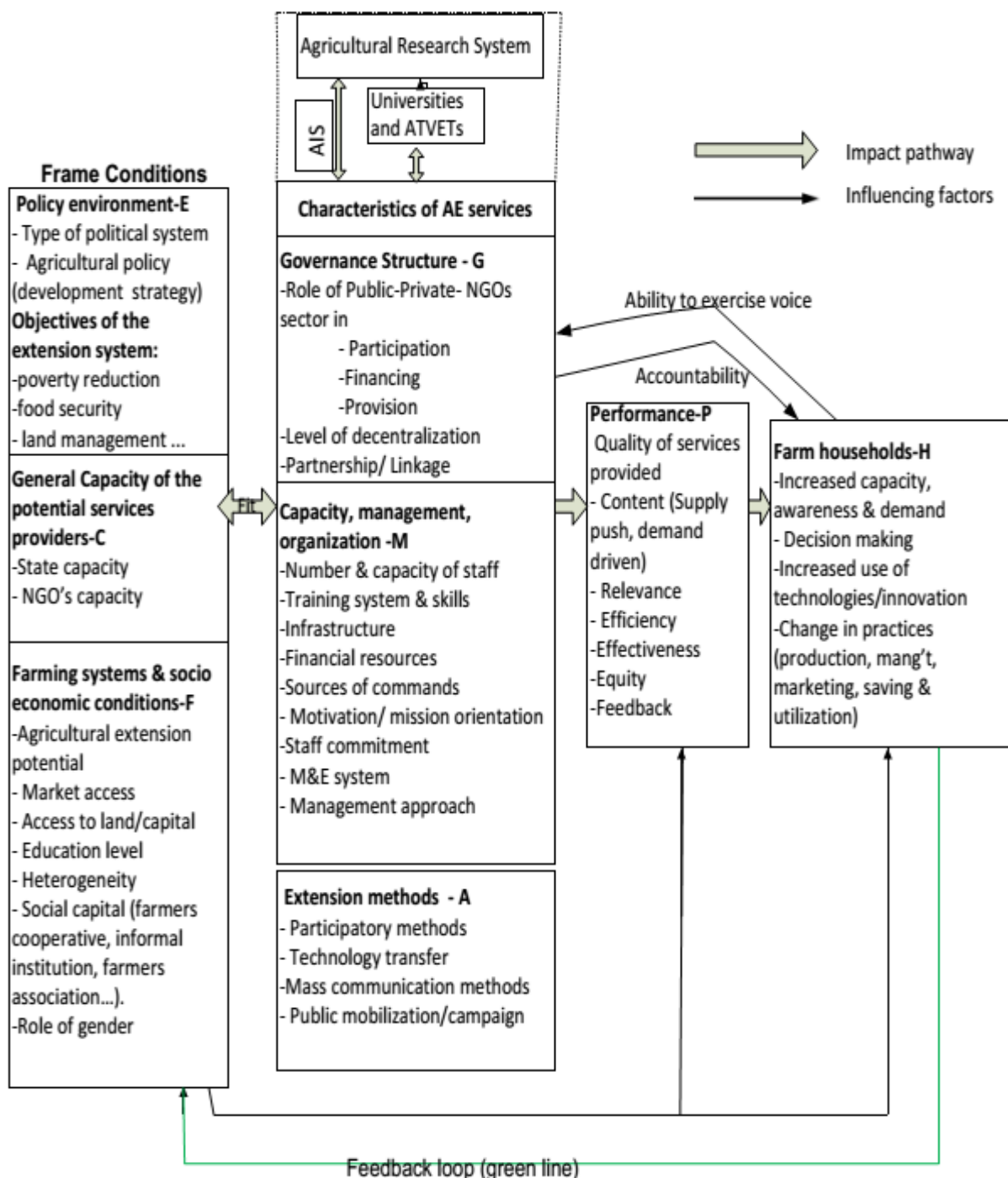


Figure 1 Framework for designing and analyzing the agricultural advisor services.

Source: Adapted from Birner et al. (2006)

The framework was previously applied to study agricultural extension in Ethiopia through a gender and governance lens, and to assess the performance of agricultural extension agents in Congo (Ragasa et al., 2013; Mogues et al., 2009). The framework enables analysis of the role of public agricultural extension; decentralization and its contribution to the Agricultural Extension System (AES); and partnership between actors and their synergy in implementing the agricultural extension, and an analysis of the role

of DAs and the extension methods being applied in the Ethiopian AES. The important frame conditions for agricultural advisory services (Boxes E, C, F), the characteristics that will determine the design of agricultural extension system (Boxes G, M, A), indicators of the performance (Box P) as well as farm households (Box H), which tailor and take up agricultural innovations, are the basic elements of the conceptual framework. Birner et al. (2009:343) remarked that “the ability of the farmers to exercise demand and hold service providers accountable influences the performance of extension.” The variables in Boxes G, M, and A in the framework describe the characteristics or design elements of agricultural extension. These are the variables on the basis of which policy-makers have to make decisions when designing or reforming agricultural extension. The policy environment (Box E) – especially the development priorities and the agricultural development strategy of a country, and the role envisaged for the public sector – has far-reaching implications for the appropriateness of different ways of providing and financing agricultural extension services.

3 Study setting, data collection and analysis

The data for this paper are drawn from empirical field research conducted in 2015/2016 in Southwestern Ethiopia, namely in Bako-Tibe *woreda* (Oromia Regional State) and Yem *woreda* (Southern Nations Nationalities People's Regional State) (Figure 2). We purposely selected the study sites following Bernard (2006) with the aim of capturing the diversity in farming systems and agricultural extension approaches in different regional states and *woredas*.

3.1 Bako-Tibe *Woreda*

Bako is located 251 km west of Addis Ababa on the road to Nekemte, the capital of east Wollega Zone. The *woreda* covers 28 rural and 4 town *kebeles*. Agro-ecologically, Bako comprises highland (12%), midland (37%), and lowland (51%) areas. Bako-Tibe *woreda* is characterized by a mixed crop-livestock system. The average land holding per household of the *woreda* is 1.23 hectares, and average family size per household is six.

Maize (*Zea mays* L.)-based mono-cropping is the major crop production system in the *woreda* (Negassa, et al., 2007). *Teff*, sorghum, haricot beans, wheat, barley, and the oil crop *nug* are other crops grown from the lowlands to the highlands of the *woreda* (Tariku et al., 2014). Bako and the surrounding *woredas* are known as the maize belt of the country. Maize contributes about 75% to the household food intake. The average yield from maize in the study area is about 5.2 tons/ha, as compared to the national average of 2.12 ton/ha (Taffesse et al., 2011). Livestock production is the second most important agricultural activity next to crop farming.

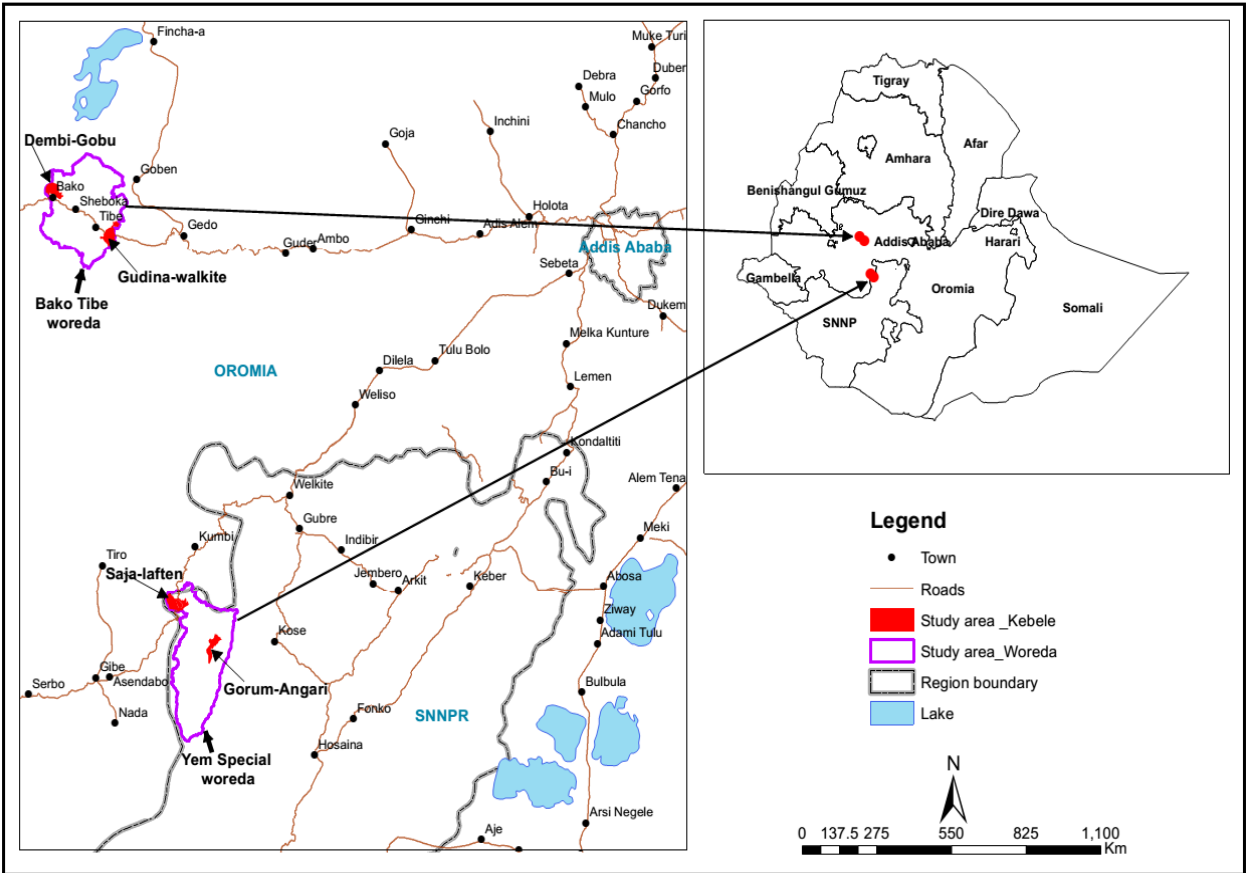


Figure 2 Map of study areas, Southwestern Ethiopia

3.2 Yem Woreda

Yem special *woreda* is located in Southern Nations, Nationalities and People's Region State (SNNPRS), and its capital, Saja, is situated 243 km west of Addis Ababa. The *woreda* is subdivided into 31 rural and 3 town *kebeles*. Agro-ecologically, the *woreda* comprises highland (18.4%), midland (57.7%), and lowland (23.9%) areas. The *woreda* receives bimodal rainfall: *Belg* (short rain) from February to April, and *Meher* (long rain) from June to September/October. Agriculture is the main source of livelihood for 93% of the population, and is characterized by a mixed crop-livestock system. The average land holding per household is about 1.2 hectares, and average family size per household is five. Enset (*Enset ventricosum*) and maize (*Zea mays L.*) are the two main food crops. However, crops such as sorghum and *teff* grow from lowland to midland areas, whereas wheat, barley, faba beans, field peas, and potatoes are grown in the highland agro-ecology. Livestock production is the second important agricultural activity.

3.3 Methodology and Analysis

A mixed methods approach (Creswell, 2009; Ritchie, 2003) was used to collect and analyze both quantitative and qualitative data. A household survey was conducted with 120 male and female farmers

randomly selected based on farm typology (Urbanika and Plous, 2013). Stakeholder mapping and informal discussion with various stakeholders was made to understand the setting before detailed data collection. Focus Group Discussion (FGD) was conducted with eight groups of farmers (male and female) in four *kebeles* to triangulate the data generated through the household survey (see Kelboro, 2013; Bernard, 2006; Ritche, 2003). Expert interviews with 80 individuals working for research and development organizations, the private sector, and NGOs were conducted in the case study *woredas*, zone, and regions. Additionally, participant observation of extension services, watershed management practices and women farmers' groups was conducted. Further, a desk-based literature review was conducted to substantiate the data. ATLAS.ti and SPSS (SPSS Inc., 2012) were respectively applied for qualitative and quantitative data documentation, coding and analysis.

4 Structure and function of the agricultural extension system

A Participatory Extension System has been employed for agricultural extension in Ethiopia since 2010 (ATA 2014). Accordingly, the adopted system is structured from the MoANR to the line regional Bureau of Agricultural Development (BoAD), then to the zone, *woreda*, and the lower administration unit, the *kebele* (Figure 3). Implementation of agricultural extension is nominally based on the decentralized administrative system in which the *woreda* is supposed to play the key role. However, in fact the region continues to play a central role. Particularly, the regional BoAD takes the upper hand in planning, budget allocation, and overseeing the implementation of the agricultural extension by zones/*woredas*. Regional agricultural extension structure and function is identical to that of the MoANR. However, at regional, *woreda*, and *kebele* levels, the bureaus and offices of agricultural development implement the agricultural extension jointly with the respective local administrations.

4.1 The role of the MoANR

The role of MoANR in general is to formulate, issue, and oversee implementation of national agriculture-related policies. In addition, the MoANR supports regions lagging behind with low manpower and capacity for implementation. The Agricultural Extension Directorate (AED) in the MoANR is organized and operates under the agricultural development department – one of the three principal departments of the MoANR. The other two departments are Natural Resources, & Disaster Prevention, Preparedness and Food Security. According to the current organizational structure, the AED is composed of departments or directorates intended to meet the growing demands of the country. It comprises five directorates: (i) Crop Production, (ii) Agricultural Farm Mechanization, (iii) Advisory and Training Services, (iv) Coffee, Tea, and Spices, and (v) Smallholder Farmers' Horticulture Development. It is organized in such a way that each directorate has specific areas of action and roles to play in the AES.

The AED plays a key role in guiding the national extension system. Among others, it is responsible for ensuring appropriate linkages amongst partners, and establishing effective synergies and working relationships within the Directorate and across Departments, Ministries and relevant NGOs. The key goals are increasing crop and livestock production and productivity, and promoting natural resource management, thereby ensuring food security (NPC, 2015). Furthermore, the AED is responsible for developing policy and strategy, formulating implementation guidelines, and identifying and formulating extension packages specific to a given agro-ecology and farming system. The AED also conducts need assessments, provides Training of Trainers (ToT), offers technical support to increase the performance of regional actors, and conducts monitoring and evaluation (M&E) through end-season evaluation forums (interview code no. 72, 2016). The AED directs the regions to stimulate implementation of the five-year Ethiopian national strategic plan. However, practically speaking there is a low level of backstopping and M&E services provided to the regional states.

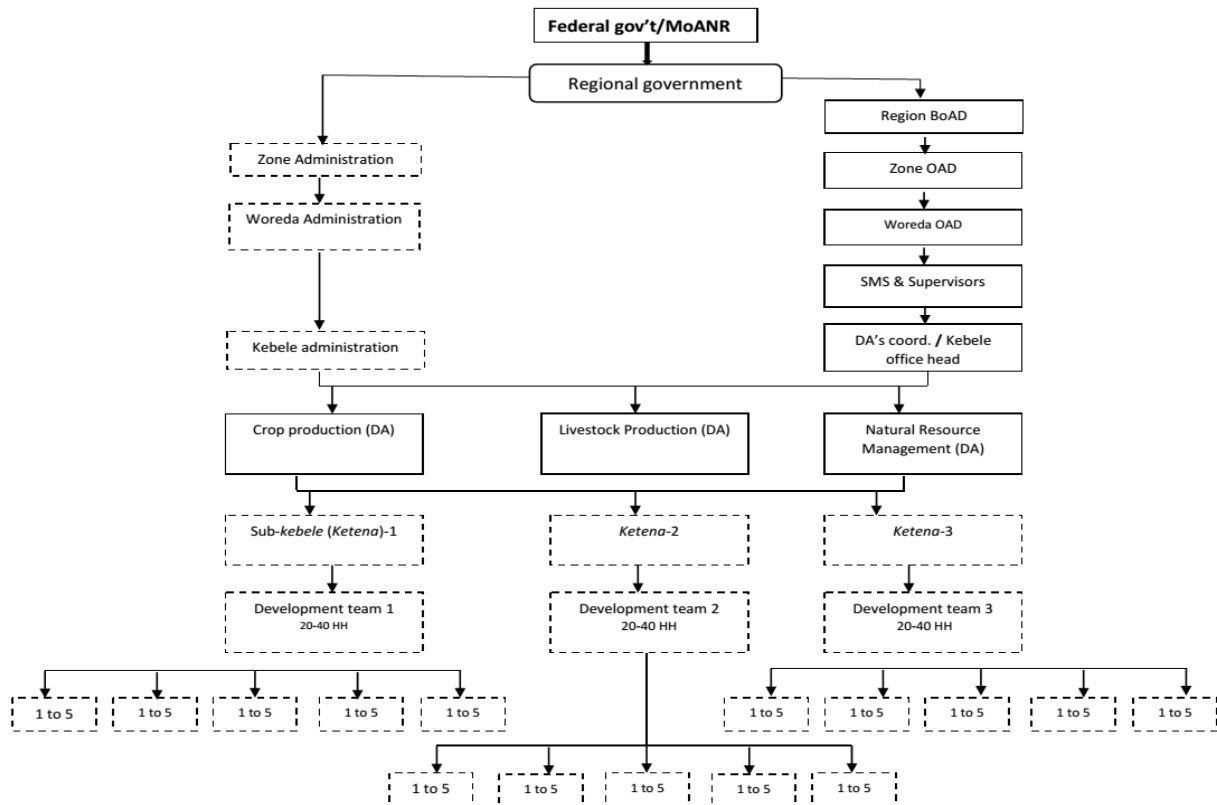


Figure 3 Operational structure of agricultural extension system.

Source: Adopted from MoA report (2015).

Despite the role and power vested in the AED to develop the national strategy for an agricultural extension system, the MoANR has no such strategy. As a result, the actual implementation strategy of the country is vulnerable to spontaneous and frequent changes (Abate, 2008). This is not only an impediment to the establishing of clear long-term goals for the agricultural extension of the country but also influences the interest and commitment of internal and external stakeholders regarding their involvement in the agricultural extension system. So far, there is no enabling policy environment or space that invites the private sector to provide AAS, so pluralism in advisory services is lacking. As a result, advisory services are mainly provided by Ethiopian state bodies, except for a few NGOs and development projects and programs, which are substantially contributing to capacity-building and the introduction of new skills and innovations in pocket areas (see Abate, 2007).

4.2 The role of the regional states

Ethiopia is a federal country with nine regional states and two city administrations (Habib and Mohammed, 2010). Regions play a key role in planning and implementing the agricultural extension and rural development. At regional levels, the head of the regional BoAD is also deputy head of the regional administration. The purpose of power sharing with the administration is to empower the agriculture sector as the backbone of the economy. In the counter-analysis, however, the power sharing of the administration with agricultural sector tends to create uniform political opinion between the agriculture sector and the administration (interview code no. 42, 2015).

The BoAD is structured in similar patterns to the MoANR, though, based on the decentralized governance system, regions can reform the structure to suit their own context up to *kebele* level. In Oromia and SNNPRS, the agricultural extension department of regional BoAD engages in suitable technology generation, identification and adoption, and also organizes the capacity-building of zone and *woreda* actors through ToT. BoAD also conducts M&E of agricultural extension activities, and reviews the progress and annual reports of the *woredas*. It also facilitates coordination and alignment across development partners at regional levels so that coordinated agricultural development services can be delivered at *woreda* level. The regional bureau backstops the zones and *woredas*, develops training guidelines/checklists, and supplies budgets and agricultural inputs.

The implementation modality of agricultural extension also differs slightly from region to region. Apart from their structure, regions also differ in how they supply agricultural inputs and provide credit services. In-kind credit services are still arranged for poor farmers in SNNPRS through the regional government-based Omo microfinance institute. In addition, improved seed and fertilizer are supplied through the Primary Cooperative in Yem *woreda*. On the other hand, agricultural inputs in Oromia region are entirely accessible to individual farmers who pay cash directly. In Bako-Tibe *woreda* in Oromia, for example, improved varieties of seeds are supplied through pilot “dealers”. The pilot dealer system was initiated recently with the support of the Integrated Seed Sector Development Project in Ethiopia (ISSD) and extended by Agricultural Transformation Agency (ATA) with the intention of improving the efficiency of seed distribution and enhancing the accountability of seed producers in producing and handling quality seeds.

Our findings show that the reporting system is one of the prevailing limitations on the effectiveness of the AES. Reports are made through the agricultural development “Command Post”. The Command Post is an integrated information development and reporting system developed by the MoANR to facilitate information flow (MoA, 2010). However, the Command Post often imposes pressure and induces production of exaggerated and logically unreliable reports. In order to achieve the quota plan dispatched by the regional BoAD, some *woreda* experts, and also the DAs at *kebele* level, are tempted and often compelled to manipulate data (interview code 54, 2015). According to an interview with a sector office head, a person who had worked as a WOAD Command Post experienced the following:

He was ordered to process and produce phony information at the direction of the head of zone office of Agricultural Development Command Post; his repudiation eventually exposed him, and he was removed from his position (interview code no. 70, 2015).

Similarly, at lower levels, DAs are commanded to manipulate data to magnify the achievement by the *kebele* administrator who is the head of the *kebele* Command Post. Refusal to comply with the direction from the administrator may have repercussions on DAs’ performance evaluations (interview code no. 70, 2015). However, efforts are currently undertaken in the AES to fight fraud and data manipulation at all levels by developing a “stringent evaluation system” (interview code no. 71, 2015).

4.3 Zone agricultural extension department

The Zone Office of Agricultural Development (ZOAD) serves as a transition between the regional BoAD and the WOAD. The ZOAD is intended to harmonize the bottom-up and top-down planning systems. In addition, it distributes the five-year Growth and Transformation Plan (GTP), the strategic plan of the country adopted by the Council of Ministers and the Parliament and distributed through the MoANR to the BoAD to be further disbursed to the *woredas* for implementation. While *woredas* are targeted to facilitate the implementation of such plans, zones play the role of linking regions and *woredas*

concerning national and regional development policies, strategies, and programs. However, the role and power of zones in Ethiopia differ from region to region. The zones in Oromia region are generally weaker than in SNNPRS. In Oromia regional state, zones do not have councils or independent budgets. In Oromia, therefore, it is the regional BoAD which allocates budgets to the agricultural offices in zones with activities so as to extend the roles of the region. In SNNPRS, however, the zones are autonomous administrative units with their own councils and budgets, which are strongly involved in the agricultural extension system (Yilmaz and Venugopal, 2008). In general, zones in SNNPRS are constituted based on the ethnic backgrounds of their inhabitants. However, Yem special *woreda* is a special case, as the name suggests, as it is autonomous and not part of any zone.

The zone administration reinforces and supports the implementation of agricultural extension by providing political direction, organizing evaluation (*gimgema*) forums, and facilitating the provision of technical support to the *woredas*. The zone Command Post also collates seasonal information from the *woreda* and reports it to the regional bodies. In general, the ZOAD provides support in adjusting and compiling *woredas'* reports and agricultural input demands before reporting to the regions. On the other hand, ZOAD allocates the quota plan dispatched from region to the *woredas* for implementation.

4.4 Woreda agricultural extension department

Since the 1990s, decentralization of governance in Ethiopia particularly empowers the *woreda* (Debebe, 2012; Dickovick and Gebre-Egziabher, 2010). The *woreda* is fiscally independent, with its own budget for staff, infrastructure, and the provision of AAS. The extension department of the WOAD provides training and backstopping services to the DAs through its SMS. In Oromia, the *woreda* agriculture controls the *kebele* activities through its supervisors, but the same job is also conducted by the *Kebele* Office Head in SNNPRS – a role that was instigated in 2014 with the aim of strengthening the coordination of agricultural extension activities at *kebele* level (Debub Negarit Gazeta, 2014). In the past, a DA's coordinator was responsible for provision of extension services and also played a coordinatory role, a situation which still remains the case in Oromia region.

The agricultural extension system operates under the leadership of the BoAD. According to Dickovick and Gebre-Egziabher (2010), the decision to install *woredas* as key administrative units was less motivated by questions of decentralization or ethnic identity than by the intention to extend governing authority down to local levels. Moreover, in practice, the *woredas* do not have adequate planning and implementation capacities (Debebe, 2012; Cabral, 2011). Such limitations might prolong reliance on regional top-down plans and curb community participation and local people's sense of belonging to the processes. Basically, the *woreda* administration is organized into 28 – 32 sector offices. The WOAD is one of the sector offices that strives to address agricultural transformation with a focus on smallholder farmers. Similarly to the region and zone, the *woreda* administration shares the power with the WOAD head. Thus the WOAD and the *woreda* administration jointly support implementation of the agricultural extension and rural development by forming and promoting a farmers group generally known as the "development army"; organizing skill training, involving farmers in seasonal agricultural extension campaigns, enforcing farmers' participation by providing political direction, and encouraging model farmers and DAs to provide AAS at local levels.

4.5 Kebele agricultural extension

Below the *woreda*, the *kebele* cabinet is the final decision-maker in rural governance, agriculture and rural development. The "extension unit", is another decision-making body within the *kebele* agriculture.

All state bodies including the *kebele* Command Post operate under the leadership of the *kebele* administrator. In Oromia, in addition to the supervisors from WOAD, DAs receive direction from the *kebele* administration. This is why 60% of the DA's performance is assessed by the *kebele* administrator and its cabinet members (MoA, 2015; MoA, 2010). Regarding the rest of the evaluation, 30% is made by the supervisors and *woreda* extension coordinator, but the remaining 10% is the DA's self-appraisal (ibid.). The DAs at the local level engage in multiple agricultural and non-agricultural activities. Evaluation of DAs by the farmers is mainly practiced in Oromia; less so in the SNNPRS. In addition, the *kebele* administration has the power to deny a DA the right to serve in his or her *kebele* (interview code no. 74, 2016). This bears witness to the fact that DAs are strongly dependent on and often submissive to the *kebele* administrators, who are politically elected farmer leaders. In SNNPRS, performance evaluation of DAs is fully accomplished by the *woreda* department heads in line with each DA's specialization (crop, livestock, or natural resource management). However, the coordination and supervision of *kebele* extension activities in SNNPRS is performed by the *kebele* Office Head. In Oromia, DA coordinators continue to play their coordination role in addition to providing the extension services in their own specialized fields of study, which still incur additional pressure on the DAs who serve as coordinators. Overall, DA's mandates are to provide training and backstopping services to development team leaders, provide occasional skill training to farmers, visit farmers' fields, facilitate their access to agricultural inputs, demonstrate technologies, and collect information about farmers' needs (in the form of input plans) (see Abate, 2007). The operational structure of the agricultural extension system at *kebele* level is briefly presented as follows.

4.5.1 *Kebele extension unit*

The *kebele* extension unit is a group of people led by the *kebele* administrator who play a key role in making decisions on agricultural extension in the *kebele*. Each *kebele* is further divided into three sub-*kebeles* (*ketena*). The *kebele* extension unit consists of 12 people; every *ketena* is represented, with four members from each (interview code no. 56, 2015). The *kebele* DA coordinator additionally serve as secretary for the *kebele* extension unit in Bako-Tibe. In contrast, in Yem *woreda* the *kebele* council's permanent members – about 25 people – serve as key decision-makers in governance, extension, and rural development (interview code no. 75, 2015). The *kebele* extension unit is expected to play the leading and coordination role in all forms of technical support to the Farmers' Training Centers (FTCs). Most rural *kebeles* have a FTC built by the state, but the degree of their operation and possession of farmland for technology demonstration vary from *kebele* to *kebele*. In the case study *kebeles*, the FTC is not yet effective in uniformly demonstrating technology to all farmers, because two of the four study *kebeles* (Saja-Laften of Yem, and Gudina-Walkite of Bako-Tibe) have very small demonstration plots. The third *kebele*, Dembi-Gobu, gained access to the land and started its actual operation in 2015, as compared to Gorum-Angary *kebele*, which has been in action since 2013. In addition, the *kebeles* had no budget for technology demonstration for years, until 2014/15, when most *kebeles* began accessing block grants or seed money from the regional state for technology demonstration.

4.5.2 *Ketena extension*

Every *kebele* is subdivided into three *Ketenas*, with one DA assigned to each to provide "effective" extension services closer to the farmers. In principle, the three DAs are temporarily assigned by the *kebele* cabinet to one of the three *ketenas* on a rotational basis. In reality, however, the DAs are often permanently working in only one *ketena*. The aim of the *ketena* division is to facilitate networking among farmers to improve information flow and M&E, in groups of about 240 to 300 farmers to each DA (Abate, 2007). Every *ketena* consists of about 6 to 10 development teams with 20 to 40 farmers each, on

average. However, the number of development teams and farmers in each team varies from *woreda* to *woreda*. In contrast to Bako-Tibe *woreda*, the *ketena* in Yem *woreda* is the merely the result of a subdivision of the *kebele* into three to assign and deploy DAs for action. However, the *ketena* is not represented by farmers' representatives to provide the networking services. Neither do the *kebeles* have an "extension unit." Rather, "development teams" are the operational extension structures in each *kebele*. The number of the "development teams" varies from 8 to 10 in each of the study *kebeles*.

4.5.3 *The development team*

A development team (*yelimat budin* in Amharic, and *gare misooma* in Afan Oromo) is a group of 20 to 40 neighboring farmers presumed to support one another in farming, training, and experience sharing. According to the household survey and FGD, the *gare misooma* has one leader and five members. The five members are model farmers who are serving in the development team. In turn, each of the members will be the one-to-five farmers' group leader. On the other hand, the development team leaders are serving as the leaders of the lower-level political cell (*hiwas*). A *hiwas* comprises 20 to 40 farmers. The number of members might be more or fewer based on the size of the village population and farmers' political inclinations. Accordingly, all farmers are members of the development team but may not be members of a *hiwas* based on their (non)-membership of a political party. This reflects the fact that agricultural extension structure is strongly linked to politics.

4.5.4 *The one-to-five farmers group*

The one-to-five farmer groups (*andi-learnist* in Amharic, *tokko-shane* in Afan Oromo) are the very lowest level of farmer organizations in Ethiopia. The one-to-five farmers group is composed of neighbors or an extended family organized around one lead farmer to exchange their experiences and support each other in agricultural activities.

According to the key informant and expert interviews, farmers' groups are formed in nearly all *kebeles*. However, there are cases in which model farmers have been selected based on their political contacts and views, rather than on their performance (interview code no. 62, 2015). According to the findings from the FGD and the household survey, farmers reveal that the one-to-five farmers groups are ineffective in scaling-up technologies, the motive for establishing these groups, since collective action such as labor sharing – one of the aims of farmers' group formation in agricultural extension – has not yet been uniformly realized beyond a watershed management campaign. According to the household survey, 47.5% of the farmers in the study area were not satisfied with the current AAS through the farmers' development team and the one-to-five farmers group. Most farmers considered the "development team leaders" as benefiting most from the system by bridging the state and the farmers. In addition, with very low and naïve mentoring capacity, they poorly address the advisory needs of the follower farmers.

5 Analysis of the characteristics of the extension services

Ethiopia made progress in adopting decentralization for governance. However, in the agricultural extension system, it is not yet nurtured well. The state, organized into manifold bodies, is the sole actor in providing agricultural extension services. The introduction and enhancement of adopting “best practices” has become the key approach in the Ethiopian agricultural extension system. However, the household surveys and expert interviews show that most farmers never learned to demand extension services (interview code no. 42; 62, 2015). According to Birner et al. (2006),

Importing standardized models of extension to a new context is not a promising strategy. Rather they advised to build the capacity among policy planners and extension managers to identify modes of providing extension services that “best-fit” the specific conditions and development priorities of their country.

The design elements of a system of extension services comprises governance structures, capacity and management, and the advisory methods – and their comparative advantages and disadvantages under different framing conditions.

5.1 Governance structure of agricultural extension

In many countries of the world, agricultural extension services had been transformed from training and dissemination of specific innovations to farmers’ group formation and partnership-building with various service providers such as credit institutions (Rivera & Sulaiman, 2009; Birner et al., 2006). According to Christoplos and Kidd (2000), decentralization of the organization and management of the extension is a common tendency in today’s world. Decentralization implies the transfer of political power from central to local governments, and it is a means of improving the efficiency and accountability of the public sectors (Cabral, 2011; Ekpo, 2008; Rondinelli, 1987).

Ethiopia has also embraced decentralization as a process for the transformation of its agricultural extension service to bring it closer to the farmers through farmers’ group formation, thereby enhancing participation. Despite this, the system is highly oriented towards top-down approaches in technology transfer with quasi participation by farmers – often compulsory – based on unrealistic and poorly planned quota systems. The level of “decentralization” in agricultural extension is weak, since the *woreda* still relies on the regional plan. According to our household survey, despite farmers’ involvement in agricultural input planning, 39 percent of the interviewed farmers were unable to implement their plan due to the unaffordability and inaccessibility of agricultural inputs. Basically, both the indicative plan as a target for steering the planning exercise by the *woreda* and the actual implementation plan after the amendments by BoAD are sent back to WOAD for implementation. Accordingly, the WOAD disburse the plan to the *kebeles*. Despite the participation exercise by the *woreda* and *kebeles*, the balance between the top-down and bottom-up planning is greatly limited (interview code no. 81, 2016). In line with Bingen and Simpson (2015), decentralized administration of centrally planned national programs is less responsive to farmer groups, particularly to resource poor farmers.

In addition, there is misunderstanding about the decentralization, in that some WOAD officials ignore federal and regional experts’ technical advice and necessary support. There is a tendency toward territorialism among some *woreda* officials, acting as autonomous entities and as if their knowledge about how to implement the plans is superior to others’ (interview code no. 15; 71, 2015). Lack of

professionalism has also become a common problem. According to Abate (2008), successful decentralization needs competency and leadership quality, which is lacking at *woreda* level. It is not uncommon to observe agricultural experts with no agricultural education at the *woreda* level. For instance, in Bako-Tibe *woreda*, the head of WOAD was a physics graduate with no agricultural background. Often, loyalty to the ruling political party, rather than relevant professional qualification, is considered for installation into an official position (Berhanu and Poulton, 2014; Adem, 2012).

Many of the expected benefits of decentralization have been based on the increasing political commitment. Those officials who are politically strong and compliant with the system could have the chance to make decisions, but most are debilitated by lower levels of education, lack of confidence in their ability to move out of a given political orbit and follow the necessary program, while others are snared by the lure of personal fame and benefits. Therefore, voluntary farmer participation in agricultural extension and rural development has not really happened as expected. Failure of the local officials to understand and better use the decentralized system, and the weak link between the *woredas* and other actors at the top of the ladder limits the establishment of effective and efficient participatory extension approaches in the system.

AED is among the regional and *woreda*-level departments responsible for implementation of agricultural extension. According to Van Crowder and Anderson (1997), it tends to be problematic to expect one single directorate at federal MoANR level and a DA at local level to be able to deal effectively with all farmers, poor and better-off alike, and also to engage with the activities of the three sectors: crop, livestock and NRM. Therefore, pluralistic service is an inevitable and practically emerging need for provision of proper AAS. In line with Christoplos and Kidd (2000), the decentralization process has often been paired with pluralism, involving various actors as a solution to the gaps in service provision prevailing in Ethiopia. For example, pluralistic extension services can help in addressing context-specific needs. Our observation shows that farmers in Bako-Tibe *woreda* need different advisory services than those in Yem *woreda*. According to our household survey and the FGDs, farmers in some *kebeles* of Bako-Tibe *woreda* do not require much technical support with maize production and minimum tillage practices, in sharp contrast to those farmers in Yem *woreda*. Farmers in Dembi-Gobu *kebele* of Bako-Tibe *woreda*, who are producing vegetables, sugarcane and fruits on 3,227 hectares of land through irrigation, need advisory services on irrigation techniques and water use (interview code no. 31, 2015). However, expertise in irrigation development is lacking among the DAs. Therefore, plurality and flexibility of approaches in the agricultural advisory system is greatly needed there.

There has not been an effective mechanism for the interlinkage of agricultural extension, research, and development actors in Ethiopia. The Ethiopian state has tried to support the liaison between the various stakeholders in many ways. Under the leadership of the MoANR, the Agricultural Development Partners Linkage Advisory Council (ADPLAC) was reformed in 2011 to facilitate the interlinking of stakeholders and to provide a permanent platform to bring together various extension, research, and development actors. However, according to expert interviews at various level, ADPLAC is yet poorly financed and only sporadically operating. The situation is similar to that in other Sub-Saharan African countries (Anandajayasekera, et al., 2007; Gebremedhin et al., 2006; Van Crowder and Anderson, 1997).

5.2 Capacity of DAs to provide extension services

The skills of DAs and quality of training are vital to provide effective agricultural extension services. In Ethiopia, however, there is a mismatch between the relatively large number of trained extension experts (DAs) and their relatively low capacities to provide efficient and effective services. A large

number of respondent farmers criticized the skills and efficiency of advisory services provided by DAs. About 47.5% of the households in our case study areas are dissatisfied by the extension services currently offered to them. Davis et al. (2010) show that DAs and other extension staff appear to have limited skills. DAs are currently trained in Agricultural Technical and Vocational Education Training (ATVET) Colleges. This is done based on the recently adopted level-based training, which ranges from L1 to L4, with an intervening Certificate of Competence examination to improve the quality of training. The training curriculum is narrowly specialized with specific focus on crops and/or practices such as horticulture, apiculture, or silviculture... alone. However, after two years when the DAs complete L4, she/he will be employed as a “generalist” DA to provide full extension services to farmers in diverse fields of crop and livestock production and natural resource management. According to a Bako ATVET college instructor, (interview code no. 37, 2015):

The aims of the level-based training is to meet the emerging labor market demands but did not equip the DAs with general and solid technical skills. Besides, there are no extensively specialized development sectors in the Ethiopian economy that can absorb the trained manpower with specific specialization.

The ATVET capacities and structure differ from region to region. In Oromia region, the ATVET Colleges were commissioned by the BoAD from 2008 to 2010. The responsibility was then transferred to the Technical and Vocational Education Training (TVET) Agency, and eventually placed under the TVET Commission in 2011. In SNNPRS, the ATVET Colleges were devolved once from the MoARD to the BoAD, where they are still operating. Under the BoAD, ATVET access an adequate operational budget compared to those under the TVET Commission. However, unavailability of training facilities, poor selection of trainees, limited practical competency of trainers, and problems with the governance of ATVET Colleges have contributed to the production of inadequately-performing DAs. Some experts we interviewed associated the issues to the quality of trainee selection and the training system itself (interview code no. 37; 71, 2015). Furthermore, DAs are tasked to provide “general” services and involve in non-extension activities. Our findings agree with the conclusion of Maguire (2012): “poor quality of DA graduates in Ethiopia is resulting from inappropriate curricula, poor availability and quality of teachers and poor governance of the ATVET system.” The poor quality of the ATVET Colleges was also reported by Lemma (2007) and Abate (2007).

The ratio of the number of DAs to farmers in Ethiopia has been increasing over time, from about 1:700 in 2000 (Ayele et al., 2003) to about 1:476 around 2010 (Lefort, 2012). In our case study areas, it ranges from 1:241 in Dembi-Gobu to 1: 405 in Gudina-Walkite *kebele* in Bako Tibe, Oromia; and from 1:131 in Gorum-Angari *kebele* to 1:170 in Saja-Laften *kebele*, in Yem, SNNPRS. Despite the nationally increasing number of DAs, of the four study *kebeles* only Dembi-Gobu had 3 DAs specialized in crop, livestock, and natural resource management, respectively. The remaining *kebeles* in our study *woredas* were staffed only with two DAs each. In general, the ratio was less than the national average in the two study *woredas*. With the increasing number of DAs and a better agricultural extension coverage, farmers may access extension services closer to their residences. However, the quality of the extension services seems to have declined since the last decade. In addition to the limited competence of many of the DAs, Abate (2008) remarked that the efforts to cover various activities at the same time may prevent the DAs from focusing on some commodities or activities.

At the WOAD, experts from different disciplines are working as SMS to provide training and backstopping services to DAs, and monitor their work. However, the SMS hardly provide technical support to the DAs in an organized manner. This might be associated with a combination of various factors such as budget shortages, transportation problems, and the lack of qualified staff. WOAD is also not an autonomous sector office, but is largely lobbied by the *woreda* administration. According to the expert, the extension staff often lack motivation and commitment to provide efficient services. Eventually high staff turnover is widely experienced. In addition, DAs often lack goal orientation. They often do not envisage their career development as agriculturalists. Instead, many of them strive to leave their DA jobs, while others inclined more towards the political side of things as an alternative to get promoted, including to the non-agricultural sectors (interview code 62, 2015). Thus, professional ethics and organizational culture mixed up with politics might have crippled effective implementation of agricultural extension.

5.3 The agricultural extension methods

The Participatory Extension System and the “scaling-up” of best practices replaced the PADETES in which a large number of farmers were simultaneously trained to adopt certain technologies. Group extension and mass mobilization are core elements of this approach. DAs and model farmers are the key actors using social networks. According to Cabral (2011), social networks at the local level may enable local governments to solve collective action problems.

The DAs provide skill training to development team leaders who are the model farmers. In turn, the model farmers technically support their followers (*hordoftootaa* in the Oromo language) to implement new technology or best practices. Furthermore, the model farmers are expected to pay regular follow-up visits to the one-to-five farmers group and report the progress back to the DA. According to our household survey, 47.5% of the farmers in the study areas are not satisfied with the extension services provided by DAs in collaboration with model farmers. According to most farmers, the participatory extension system pays more attention to the model farmers than to the others. Farmers’ limited access to improved seeds of their choice, and the increasing input prices compared to output prices debilitate their technology adoption capacity. According to the household survey, lower output prices affected about 57.5% of farmers’ technology adoption, since farmers could not afford to access it. Agricultural extension has also placed emphasis on crops at the expense of livestock, with the intention of ensuring food security in a short period of time through increasing crop production and productivity (interview code 42; 62; 64, 2015). Similar to agricultural extension, the focus of agricultural research is also dominated by crops (Flaherty et al., 2010). Generally, an inclusive focus on crops, livestock, and natural resources has not been a feature of agricultural extension.

5.4 Path dependencies in the Ethiopian agricultural extension system

The Ethiopian agricultural extension system is dictated by a strong path dependency, and this may be one of the reasons for the persistence of top-down approaches in practice, as opposed to the decentralization rhetoric in agricultural extension in the country. According to David (2007), path dependency is a dynamic process whose evolution is governed by its own history. In line with van Assche et al (2014) and Shtaltovna (2012), path dependency describes a situation in which the destiny of actors

is dictated by the past. From our empirical research, we learned that technology transfer is carried out in a supply-push fashion, and the model farmers have been retained as key actors to convey or transfer technology since the late 1960s.

Selecting, identifying, and packaging best agricultural practices for their adoption by farmers is considered a vital necessity by agricultural experts at MoANR and BoAD (interview code no 13, 2015). Despite the rhetoric of scaling-up best practices adapted or developed by the farmers, the practical application of such bottom-up approaches was negligible in the study areas. Another approach that prevailed in the past and remains consistent in agricultural extension is the reliance on state structures and the model farmers. Model farmers are often better-off farmers who are favored by the ruling party of the regimes, and who have managed to access large areas of farmland. The local structures linger on despite regime changes. Therefore, efforts to promote the generation and nurturing of new and innovative model farmers is limited. In Gorum-Angari *kebele* of Yem *woreda*, for example, a former feudal “landlord” (*Balabat* in Amharic), who held important local power positions during the Imperial regime is still considered a model farmer (Figure 4). Overall, the path dependency not only remains as a guide but is also adopted as a standard. This strategy could debilitate the efforts to develop and nurture new model farmers who are less reliant on local power structures and on fame they may have gained due to their development and use of new innovations. In addition, the disadvantaged groups of farmers such as the poor, the young, and the female have not been paid the attention they deserve in the AES. Pro-poor investment is lacking in the Ethiopian AES. As a result, some farmers are living under conditions of chronic poverty and food insecurity. The empirical findings from our study areas reveal that 18.3 percent of the residents are still facing seasonal food shortage.



Figure 4 Picture of an imperial regime landlord (Balabat) who is currently regarded as a model farmer in Gorum-Angari kebele of Yem. Photo: Gerba Leta

6 Evaluation in agricultural extension system

In Ethiopia, politically motivated evaluation (*gimgema* in Amharic; *qoranno* in Afan Oromo) was introduced to the government organizations to evaluate the public civil servants in the early 1990s. *Gimgema* is an approach that was developed during the power struggle to topple the *Derg* regime, but was later incorporated into the government bureaucratic system for progress assessment (Keeley and Scoones, 2000). Similarly to its application to the civil servants across the country, the role of *gimgema* has been extended to the farmers. Therefore, farmers and the public agricultural extension staff conduct *gimgema* in Yem and in Bako-Tibe *woredas*. During the watershed management campaign, development team progress is evaluated every Friday by the *kebele* cabinets. However, the one-to-five farmers group meet every three days or during the weekend to assess the progress and performance of one another.

According to the FGD and experts interviews, the *kebele*'s permanent council members, 25 people under the leadership of the *kebele* administrator, conduct monthly evaluations. In principle, such evaluations should have been conducted by the *kebele* extension unit, which is not constituted in Yem *woreda*. Following the permanent council members' evaluation, the *kebele* council of 150 members also undertake a follow-up evaluation once a month on the basis of a summary report of the *kebele* administrator, which is based on the preceding evaluation. After the *kebele* council's feedback, the report goes back to the development team in the *ketena*. However, the evaluation and feedback are not only focused on the agricultural extension but also on multiple seasonal agriculture and rural development activities, as well as political and security issues. Therefore, *gimgema* has an impact on the morale of the farmers and DAs, since the evaluation has implications regarding farmers' access to agricultural inputs and related services. In a similar manner, the career structure and promotion of DAs can be determined by the outcome of the *gimgema*.

Woreda sector offices and *kebele*-based public servants (such as DAs, cooperative agents, veterinary technicians, etc.) jointly carry out weekly and biweekly evaluation as well, through established one-to-five groups. In fact, the actual number involved could vary from 4 to 8 persons. In addition, a team of experts from closely related departments either at *kebele* or *woreda* level, collectively known as "*the change team*", jointly assess and fix technical issues related to professional activities based on their annual or seasonal plans. On the other hand, the one-to-five group of experts or civil servants who are members of the party (the majority) receive political instruction through the established *hiwas* and evaluate participants' political strengths and their professional performance through the political lens (interview code no. 61; 67, 2015).

The government of Ethiopia has increased its interest and belief in the *gimgema* for learning lessons and for creating synergy between actors to nurture the transformation. However, according to the empirical findings, most farmers' evaluations focus on politics and security rather than on the agricultural extension activities. On the other hand, *gimgema* is found to be too intensive to suit model farmers' time management as they involve in various assessments such as in the one-to-five farmers group, with the development team, with the *kebele* cabinet, and with the *kebele* council, since most model farmers are members of the *kebele* council. Such a series of *gimgema* not only enervates actual roles the model farmers are supposed to play in the AES but also discourages their contribution to the system. However, the aforementioned evaluation system is more typical of Yem *woreda* than of Bako-Tibe. The implementation modality of agricultural extension is therefore region- and *woreda*-specific based on the strategy they adopt to reinforce the implementation of agricultural extension and rural development.

The experience of participation in the *gimgema* process is positive, and considered as an opportunity to think about the future of agricultural extension in Ethiopia. However, improving the focus on extension services and on lessons learned from the process, along with a more efficient time planning and utilization system, can help to maintain the dynamics and adaptation to changes in the socio-economic and biophysical conditions.

7 Challenges to the agricultural extension system

In Ethiopia, despite the massive amount of resources being put into the system by the state, the agricultural extension system faces a number of serious challenges. Most of these challenges have persistently rolled over from regime to regime and year to year. Based on the findings of our study, we have identified the challenges as fitting into three main categories: those related to technical; policy; or organizational and institutional dimensions – as will be presented in the following sections.

7.1 Technical challenges

DAs' training focusses on technical skills. According to Davis et al. (2010), DAs lack the required hard skills on issues important to the farmers – such as agricultural marketing (value chain) and agricultural intensification and diversification – and also lack soft skills such as process facilitation, communication, and organization of farmer-producer groups. According to our study, most DAs are rather specialized and lack the comprehensive and applied skills required to combine crop, livestock, and natural resource management. During their early careers, DAs were working hard to make a seasonal impression (images) to win available opportunities such as long-term training by demonstrating hard work (interview code no. 62; 64, 2015). Eventually, most of them do not continue to commit to this work as they had in the beginning. Many DAs' work is not strategic or goal-oriented; rather, they target the short-term benefits (interview code no. 62, 2015). As a result, despite the large local staff and extension coverage in rural Ethiopia, the system has relatively little impact. The intention to cover wider areas of state interest such as provision of generic advisory services in crops, livestock, and natural resources by specialized DAs, and their involvement in non-extension affairs, could influence their capacity to address specific activities (Abate, 2008). According to expert interviews, increasing the number of DAs with specific specialization rather necessitates an intensive monitoring and mentoring system, a necessity that is rather too demanding given the meagre availability of resources and logistic services.

Shortage of skilled personnel is another problem observed in the study *woredas*. Only a few experts are available to represent different divisions of the WOAD as SMS, such as in e.g. crop agronomy, protection, horticulture, natural resource management, etc. The main role of SMS are training DAs, backstopping, and provision of technical support to development centers or the *kebele* office of agriculture as part of a team. According to our interviews with DAs, the SMS do not provide comprehensive and problem-solving technical support. There is also poor coordination between the SMS. According to the expert interviews, the main reasons for inadequate technical support are the shortage of resources, transportation and manpower thereof (interview code no. 54, 2015). As a consequence, the SMS are relying on the checklist to collect progress of the extension activities through the DAs. In Yem *woreda*, lack of interdisciplinarity and multiplicity of techniques is more of an issue than is the lack of physical presence of the SMS in the *kebeles*, mainly because of a shortage of experts. Based on participant observation, SMS in Yem *woreda* appear to frequently travel to rural *kebeles* to backstop the DAs by clustering three to four *kebeles* in one central area. In the process, field-based support is very minimal; rather they focus on *gimgema* based on DAs' reports. According to some DAs, the evaluation is more often full of affronts than it is supportive and motivating for the DAs (interview code 49, 2015). Therefore, lack of soft skills, along with the coercive approaches employed by some SMS, discourage the DAs.

NRM extension in Ethiopia is often based on state-organized campaigns. Röling (1988) asserts that activities implemented through campaigns are often not sustainable. Technically, in the case study

areas, the physical soil and water conservation activities are poorly designed and laid out. Besides this, physical structures are inadequately combined with the biological barriers, such as multipurpose tree species or grass species that could have stabilized the system more and benefited the farmers by providing them with additional products such as fodder. In Yem *woreda*, improper design and layout work negatively affected sustainability of the watershed management activities. Degraded and abandoned lands are retargeted merely to achieve the seasonal quota plan (see Figure 5). The watershed management plan also lacks integration of maintenance work with the new plan for physical soil and water conservation structures. As a result, the campaign ends up with an unpromising outcome. Additionally, *nikinake* that is associated with the punitive norms or approach employed to mobilize and engage the farmers in Watershed Management (WSM) triggers most farmers to associate the WSM intervention to the *Derg* military regime's natural resource management campaign, which farmers learned to be fearful of due to its entirely coercive approach (Merrey and Gebreselassie, 2011; interview code no. 67; 70, 2015).



Figure 5 Farmers reuse the abandoned plots of land to achieve the quota plan for WSM Photo: Gerba Leta

The DA performance evaluation system in Ethiopia differs from region to region and from *woreda* to *woreda*. In Yem *woreda* DAs are entirely evaluated by their immediate bosses, mainly the department heads, based on the Business Process Re-engineering (BPR) plan list initially agreed upon between the DAs and the department heads. BPR is the outcome-based planning system that relies on lists of activities mainly planned in a top-down fashion from BoAD to the WOAD, but a few activities are jointly planned by department heads and *kebele* supervisors with DAs. In Bako-Tibe *woreda*, however, 60% of the operational achievement and involvement in other non-extension activities of DAs are assessed by the *kebele* cabinet (MoA, 2010). However, 30% of the evaluation is done by the supervisor and *woreda* extension coordinator, while 10% is a self-assessment by the DA. Even though DAs are involved in the

provision of broad and generic advisory services that mostly work through campaigns, the performance evaluation is only based on the departmental performance of a DA. Hence, the evaluation system discredits the generic contribution of DAs and is considered as a disincentive to DAs to provide an integrated and interdisciplinary service.

7.2 Policy-related challenges

The government of Ethiopia does not have a national strategy or long-term strategic vision for an agricultural extension system at the time of this study. As a result, the implementation approach has been repeatedly changing. A serious challenge to the Ethiopian agricultural extension system, therefore, is that the policies and foci of agriculture and agricultural extension are frequently changing and inconsistent (interview code no. 69, 2015). Sudden changing of policies and implementation strategies contributes to increasing the number of farmers who do not trust the state extension and planning system. Abate (2008) described it as “rapidly changing policy signals” in which case the state frequently sends signals that induce swift changes. As a result, the system has been rapidly changing, from national-scale activities such as intensive national focus on water harvesting, to rainfed agriculture, etc.

In addition, there are gaps in decentralization and the *woredas*’ decision-making power. Despite the introduction of a decentralized system since the early 2000s (Dickovick and Gebre-Egziabher, 2010), the *woreda* implements regional plans. Concepts of decentralization should theoretically encourage public participation (Swanson and Rajalahti, 2010). However, in our case study area, some DAs are reporting farmers’ agricultural input demands to WOAD and the *woreda* cooperative agency without even consulting farmers, merely based on the previous year’s data. In line with Bingen and Simpson (2015) and Cabral (2011), in a decentralized system, the ruling elites at the central level rather seek to expand and consolidate their support base by integrating with local elites. This happens in Ethiopia through the model farmers and *kebele* administration. Such a nominal decentralization system could deprive the WOAD of the power and authority to make independent decisions in agricultural extension. As a result, the agricultural extension work might lose the emphasis it deserves.

The agricultural extension system in Ethiopia is absolutely state-based. The state has not given sufficient space for the private sector to participate in the provision of extension services (interview code no. 42; 62, 2015). However, an increased involvement of the private sector is believed to bring in efficiency and competition into the system. There is widespread contradictions between the rhetoric of the agricultural extension system and the reality. The agricultural extension system of the government of Ethiopia advocates participation. However, its implementation is still centrally planned and organized. According to the FGD with farmers, the established development teams and the one-to-five farmers groups are not uniformly operating according to the “official” purposes for which they have been established – such as increasing agricultural extension coverage, and promoting collective action, labor sharing, technology scaling-up, etc. – throughout study *woredas* and *kebeles*. Besides, the development teams are simultaneously used for agricultural extension and non-extension activities. Pressure is also employed to engage farmers through the public mobilization practice known as *nikinake* for communal activities such as watershed management.

The agricultural extension system in Ethiopia is strongly linked to politics. The development teams and one-to-five farmers groups are intensively involved in political agendas through *hiwas* and numerous other meetings. According to Berhanu & Poulton (2014), it is hard to create the conditions for “a dynamic demand-driven system” when extension workers are also promoting a political agenda. The influence of politics in the agricultural extension system can be pointed out as one of the reasons for its low effectiveness. DAs themselves could not independently call farmers’ meetings for advisory services.

As a result, they relied on a few minutes granted in the meetings called for political discussions to pass on agricultural extension-related message towards the end of the meetings organized by *kebele* administrations (interview code no. 6, 2015). In general, the priority set for the agricultural extension is very low compared to that given to governance, security, or related affairs.

The focus of the agricultural extension system in Ethiopia is also on technology transfer. According to Abate (2008), agricultural extension in Ethiopia has given little attention on problem-solving skill development and the organizational aspects required to help farmers help themselves. The system is highly structured in a top-down technology-transfer fashion. DAs may urge farmers to “take and use” new technologies, but rarely encourage them to develop and adapt technologies to their own situations.

7.3 Organizational and institutional challenges

Organizational reforms and the splitting of departments into autonomous sector offices and agencies are frequently encountered in Oromia regional state; more so than in the SNNPRS. According to expert interviews, the reform processes often fail to take into account the demand for interdisciplinary collaboration and collective action in AES (interview code no. 54, 2015). Instead, it is subtly planned based on the steering of new ideas or interests by few politically influential individuals. According to a higher-level official in the MoANR, the reform is considered as positive, and as a coping mechanism to deal with the emerging national and global changes along with economic development, and market and consumer demand (interview code no. 72, 2016). In reality, however, the reform process and subsequent movement of staff from an old to a new organization, for example, affect the interdisciplinarity and inter-organizational collaboration between the old and the new. At local levels, the DAs continue to provide services to both the old and new organizations. The reform and multiplication of sector offices is the reason for DAs being overloaded by multiple tasks coming from various *woreda* sector offices. The DAs are expected to implement the activities of every *woreda* sector office in the rural *kebeles* (ibid.). Although the general trend is similar, such issues are more of a concern in Bako-Tibe *woreda* than in Yem *woreda*.

In Ethiopia, the research-extension-farmers linkage platforms are very weak. The weakness of the linkages has been cited repeatedly as one of the major causes of underdevelopment in Ethiopian agriculture (Deressa and Seboka, 1997). ADPLAC was established as a platform to strengthen the linkage between research, extension, and farmers (MoA, 2010). Yet the weakness in research-extension-farmer linkages continues to exist. This is also confirmed in our interviews with several experts. There are periodic ADPLAC meetings, but the ADPLAC has no decision-making power and budget. It does not monitor and evaluate the progress of any planned activities. Lack of commitment of the ADPLAC members is another challenge because the ADPLAC members are temporarily assigned to execute this role as an additional job. ADPLAC is operating to some degree in Bako-Tibe, where partners jointly plan to address serious farming problems of the *woreda* – for example, termite infestation and mono-cropping, the two main concerns. The implementation went ahead to some extent with budget support from the Agricultural Growth Program (AGP) (interview code 54, 2015). In Yem *woreda*, however, ADPLAC is not operating, apart from the workshop organized by the WOAD only once during the last five years (Interviews code no. 55; 60, 2015). Overall, ADPLAC is not actively working across the country.

Credit service is important for resource-poor farmers to invest in, to access agricultural inputs and to conduct off-farm business. However, microfinance institutes in rural Ethiopia are poorly developed and provide only limited services. The initial credit ceiling for a farmer is about 3,000³ ETB/person. The major

³ 1EUR= 24.43 ETB (retrieved on 4 April 2017).

challenge, however, is the “group collateral system” and “in advance saving” requirement to access the services (interview code no. 29; 65, 2015). It needs a group of five to ten farmers with similar interests and commitments. According to women FGD, other challenging issue that keep farmers in the credit cycle is the interest rate. The microfinance loan interest rate in Ethiopia ranges from 15% to over 24% per year depending on the types of microfinances, public or private, respectively. It is difficult for farmers to settle their debt quickly. As a result, farmers are afraid to access loans because of high interest rates and possible debt accumulation. According to a male FGD, apart from the high interest rate, farmers are discouraged by lower output prices and bad experiences of enforcement to repay the debt.

Farmers do not have more choices regarding technology for adoption, particularly when considering improved seeds. The number and capacity of seed producers in the country never match with the demand of farmers. Mellor and Dorosh (2010) remarked that lack of seeds is the most serious problem in meeting agricultural growth targets. For example: there is no adequate improved seed for wheat, barley, *teff*, or faba beans (interview code no. 42, 2015). Since hybrid seed production is a lucrative business for the producers, both government enterprises and private investors focus on hybrid maize seed production. Lack of breeders, and of basic and pre-basic seed supply, are the other issues raised by seed producers (interview code no.33, 2015).

Improved seed supply is another limitation on agricultural extension. Currently, improved seed is accessed through both the regular and direct seed marketing system. The first option is to obtain seeds through bureaus and offices of agricultural development and the farmers’ cooperatives, while the second is to access seeds through agents known as “dealers”, but during FGDs in Bako-Tibe *woreda*, farmers criticized the new “dealers” approach to seed distribution. Smuggling seeds through dealers to sell them at higher prices subjects some farmers to paying nearly double the basic price to access seed from neighboring *woredas*. As the “dealer approach” is still in its pilot stage, flaws could not be uncommon despite strict monitoring system from extension actors. In contrast, in Yem *woreda* improved seed is still supplied through the farmers’ cooperative union. In this *woreda*, seeds are rather underused and carried over to the following year (interview code no. 6; 68, 2015). However, farmers in Yem *woreda* were complaining about the problem of seed impurity. Elias et al. (2015) remarked on the serious seed quality problem the Ethiopian farmers are experiencing.

High input and low output prices discourage farmers’ participation in AES. Ethiopian farmers produce crops on small and fragmented plots of land and their efforts are not organized to gain market power. Besides, farmers deliberately store their crops over extended periods to sell their product when the prices increase and become rewarding (Interviews code no. 5; 34, 2015). Unfortunately, these crops may be subjected to postharvest losses due to poor storage conditions and pests. The crop loss is often coupled with an eventual market failure. These conditions reduce farmers’ interest in agricultural technology adoption.

The Ethiopian agricultural extension system is characterized by a high staff turnover. The main reason for this, as mentioned during experts’ interviews, was the prevailing unattractive staff remuneration and a poor incentive structure in the agricultural extension system. The emerging private education system in the country has also created the opportunity for extension staff to leave the agricultural sector and join the growing and better-paying service sector (interview code no. 64, 2015). The inflexible political system, which compels every DA and expert to become a member of the ruling political party to promote its agenda, is another contributor to the increasing turnover. For DAs, living in rural hardship also desperately motivates them to look for alternative jobs, which eventually stimulates staff turnover (interviews code no. 71, 2015). Unlike the situation two decades ago, during which the first author

served as a DA in the former Ministry of Coffee and Tea, currently there are lots of alternatives for upgrading one's educational level and searching for lucrative job opportunities that allow free mobility of the DAs based on individuals' competencies (interview code no. 64, 2015; personal experience).

8 Opportunities for Ethiopian agricultural extension

The growth in both domestic and global market demands for crop and livestock products provides opportunities for agricultural and rural development in Ethiopia. The reformation within the agricultural sector is another opportunity to cope with the growing changes and to address emerging needs. Improving access to agricultural inputs and technologies that assist farmers in boosting production are among other such opportunities. There are a growing number of DAs that help to improve the AAS and overall agricultural extension coverage (see Davis et al., 2010; Abate, 2007). According to the FGD results, farmers' awareness, motivation and readiness to use the extension services has been increased.

Improving access to all-weather roads and to communication and media services are other opportunities to link the smallholder to the market and information. For example, a hotline advisory service system was established by the Agricultural Transformation Agency (ATA) in collaboration with other partner organizations in 2014; mobile phones currently help farmers to call and access free advice on production technology or agronomic practices (ATA, 2014). According to the DAs, adoption of the participatory extension system and the formation of farmers' groups could better stimulate technology transfer to the grass-roots through the facilitation of and role played by the model farmers. It has reduced the drudgery DAs faced in trying to reach out to as many farmers as possible. However, our household survey findings reveal that organization of farmers into development teams and the one-to-five farmers groups is not functional except for political dialogue, security issues and community mobilization for the watershed management campaign. The specific opportunities associated with the AES are briefly presented below.

The state is politically committed to improving farmers' livelihoods by investing in the agricultural extension service. According to a higher official in the MoANR, "the agricultural policy and strategy is open to reform or to introduce and embrace new approaches" (interview code no. 72, 2016). Therefore, the existing agricultural development policy and strategy is considered supportive of the agricultural extension. In counterargument, however, the state emphasizes agricultural extension in pursuit of twin imperatives: to ensure food security, and to entrench existing political control (Berhanu and Poulton, 2014; Adem, 2012).

Access to credit services and capacity building are among the foundations required to promote agricultural extension. According to the household survey and expert interviews, like the DAs, farmers access seasonal skill training through a development team in Yem as part of regular extension service, but only through *nikinake* in Bako-Tibe *woreda*, where skill training is combined together with multiple other issues. Modular specialized training that eventually culminates with a green certificate to promote specialization in agriculture and enhance access to the market is part of the DAs' approach to motivate and systematically engage voluntary farmers for a period of about 6 months, but none of the four *kebeles* accomplished this in the FTC. However, the level and quality of training services vary from *woreda* to *woreda*. On the other hand, numerous microfinance institutes are also emerging to provide credit services to farmers both in cash and in kind. The in-kind services are only available in Yem *woreda* of SNNPRS. The combined analysis of household survey for study *woredas* shows that only 35% of the respondent farmers accessed the cash credit services, at various frequencies.

Allocation of the seed money or block grants for the operation of the FTC is the other opportunity to conduct pre-scaling-up demonstration of new technologies. Since 2014/15, the seed money has been allocated to almost all FTCs in the country as a working budget for the first time. For instance, Oromia region allocated 50 million birr in 2015/16. Budget allocation vary from region to region. This is only

8,000 birr for each FTC in Oromia, compared to between 10,000 and 15,000 in SNNPRS. In Bako-Tibe, despite the budget allocation to all *kebeles*, some DAs were not informed that they had petty cash for the operation. Hence, the DAs themselves conduct the menial activities of weeding and fertilizer application to demonstration plots (Figure 6). In Yem *woreda*, the *kebele* agriculture office head along with the FTC committees mentioned the bureaucratic challenges they used to encounter, since access to the budget always requires authorization from *WOAD*.

Changes in food behavior and the rising customer demands are among emerging opportunities for agriculture. In line with McDermott et al. (2010), there is an excessive and growing demand for livestock and livestock products in Ethiopia. Demands for livestock products have been increasing along with growing population and changes in consumption behavior and lifestyles. The emerging changes have raised the importance of the livestock sector gaining the attention it deserves, a sector which otherwise remains marginalized in the Ethiopian agricultural extension system.

International donors and NGOs substantially contribute to the Ethiopian agricultural extension system. However, Ethiopian agricultural extension services are popularly considered public, with little official credit given to donors and NGOs despite the immense contribution obtained from them (interview code no. 42, 2015). One of the noble contributions and approaches noticed by the farmers, due to its combined training and introduction of an agricultural extension package, is the role played by the Sasakawa Global 2000 (SG 2000) extension package program. It is an NGO that has focused on introducing productivity-enhancing food-crop technologies (extension packages) through the late Dr. Borlaug's principle of "Take it to the farmer!" since early 1990s in Ethiopia (Abate, 2007). Most farmers in Bako-Tibe *woreda* were more inspired by the SG-2000 development intervention than they were by the present AAS. The current food crisis and shortage faced by the country also motivates the government of Ethiopia and other donors to pay due attention to agricultural extension (OXFAM, 2016). Therefore, donor support to agricultural development is expected to increase. Likewise, growing challenges have motivated farmers to adopt technologies and best practices as a coping strategy.



Figure 6 Gudina-Walkite kebele DA weeding the demonstration plot. Photo: Gerba Leta

9 Conclusions

The most explicit aim of the Ethiopian agricultural extension system is to increase food security, to improve farmers' livelihoods, and to promote sustainable land management. Nationally, participation is acknowledged as the appropriate path to follow for the agricultural extension work in the country. In practice, however, a classical "technocratic" approach, which defines farmers as recipients and the extension system as providers, persists as the main method for knowledge and technology transfer. The regional BoAD are the key architects behind the implementation of *woredas'* agricultural extension on the ground. Farmers' participation and decision-making in agricultural extension is limited. DAs play a key role in the extension system, as the nexus between "the system" and the farmers. The input delivery is not based on farmers' demands but largely on previous year plan achievement records and on the plans developed in the region and *woreda* input coordination unit under the leadership of WOAD. Thus decentralization in the extension system has not been well nurtured in a way that supports bottom-up planning and farmers' participation.

In Ethiopia, the MoANR has reformed the ADPLAC since 2010 to make it inclusive to all partners involved in agricultural activities. Besides this, it is intended to improve their accountability, efficiency and effectiveness in nurturing the research-extension-farmers linkage through integration of efforts to solve farmers' problems in agriculture. However, efforts to strengthen the interlinkage between research, extension, and farmers, and the partnerships and harmonization of efforts for a common goal, continue to be serious challenges. Lack of a sustainable budget from the core state treasury is another limitation remarked upon for decades, as is path dependency. Another critical structural problem in the agricultural extension system is the low planning and decision-making power of the WOAD. The performance evaluation of DAs tends to ignore the immense contribution of DAs as "generalists" in crop and livestock production and natural resource management. The evaluation itself varies from *woreda* to *woreda*. In Yem *woreda*, the DAs' evaluation is carried out by the department heads of crop, livestock and NRM in line with the respective DA's professional background, whereas in Bako-Tibe *woreda* the DAs' performance is largely conducted by the *kebele* cabinet.

DAs get directives from diverse sources. The main sources of order however are the WOAD and the *kebele* administration. DAs engage in multiple extension and non-extension activities. In contrast to their engagement, they are poorly incentivized, with poor infrastructure, and hence low commitment to provide efficient services. The agricultural extension system is also criticized for its weak M&E, which has to be addressed by SMS. The expected on-the-spot presence of SMS to mentor the DAs or conduct M&E of the extension activities in an organized fashion is still lacking. As a result, M&E remains weak, and the contribution of SMS is largely limited to the provision of training to DAs.

In the Ethiopian agricultural extension, the disadvantaged groups of the society such as the extremely poor, landless, youths, and women do not receive enough attention. Although the development team and the one-to-five farmers groups have been formed since 2011, they have not been fully operational in line with the original motives of sharing labor, joint learning, and collective action to scale-up technologies or best practices. Rather, the development team or the one-to-five farmers groups serve as platforms for political dialogue to mobilize communities for campaign work, to resolve local conflicts, and ensure security. In general, politics and agricultural extension are inseparably linked in Ethiopia. The extension system is used as a tool for strengthening the state ties with the farmers.

Based on the empirical research findings, we suggest that having a systematic and inclusive national strategy for an agricultural extension system and a long-term strategic vision with political commitment to achieve clearly defined goals can help in providing equitable and effective extension services for all farmers. We also suggest the importance of opening space for pluralistic advisory services to enable various beneficiaries' access to competitive quality services in agricultural extension. Making the *woreda* office of agriculture more autonomous in terms of staff and budget would help to improve both commitment and accountability. Making the decentralization more effective through building the capacity of actors at various levels could improve their planning capacities and ensure local participation.

For most farmers in Ethiopia, the combination of both crops and livestock is important, in terms of both diversifying outputs and cultural values attached to them. Therefore, concretely orienting the agricultural extension services to the demands, knowledge, experiences, and values of farmers may increase the acceptability of the service. Finally, as a “public good”, agricultural extension has to provide inclusive benefits to the poor and disadvantaged groups of the society, particularly in rural areas, so as to actively bring forward the entire agricultural transformation in the country.

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10 References

- Abate, H., 2007. Review of extension systems applied in Ethiopia with special emphasis to the Participatory Demonstration and Training Extension System (PADETS). FAO, Addis Ababa, Ethiopia.
- Abate, H., 2008. Agricultural extension in Ethiopia: Historical Evolution, Relevant Policies and Challenges. In: Taye Assefa (ed.) Digest of Ethiopia's national policies, strategies and programs. Addis Ababa, Ethiopia. ISBN 13;978-99944-50-19-0
- Agricultural Transformation Agency (ATA). 2014. Transforming Agriculture in Ethiopia. Annual Report 2013/2014. Addis Ababa, Ethiopia.
- Ajieh, P.C., Agwu, A.E., Anyanwu, A.C., 2008. Constraints to privatization and commercialization of agricultural extension services as perceived by extension professionals and farmers. *Afr. J. Agric. Res.* 3 (5), 343- 347.
- Anandajayasekeram, P., Davis, K., Workneh, S., 2007. Farmers Field Schools: An alternative to existing extension system? Experience from Eastern and Southern Afr. *J. Int. Agric. Ext. Educ.* Spring, 15, 1, 81-93. DOI: 10.5191/jiaee.2007.14107
- ATA, 2014. National strategy for Ethiopia's agricultural extension system: vision, systemic bottlenecks and priority interventions. Agricultural Transformation Agency, Ministry of Agriculture, Addis Ababa.
- Ayele, G., Kelemework, F., Alemu, D., 2003. The provision of rural services and agricultural productivity in Ethiopia: a characterization. Phase 1 'report for the 2020 Vision Network's East Africa Regional Project. Assessing the impact of policies for rural service provision on agricultural productivity and food security, EARO/IFPRI, June 2003. International Food Policy Research Institute, Washington, DC.
- Belay, K., 2003. Agricultural extension in Ethiopia: the case of participatory demonstration and training extension system. *Journal of Social Development in Africa*, 18 (1), 49-84.
- Berhanu, K., 2012. The political economy of agricultural extension in Ethiopia: Economic growth and political control. Working paper 042. Future Agricultures
- Berhanu, K., Poulton, C., 2014. The political economy of agricultural extension policy in Ethiopia: Economic growth and political control. *Development policy review*, 32 (2), 197-213.
- Bernard, H.R., 2006. Research methods in anthropology: qualitative and quantitative approaches, 4th ed. ed. AltaMira Press, Lanham, MD.
- Bingen, R. J., Simpson, B. M., 2015. Farmer organizations and modernizing extension and advisory services: A framework and reflection on cases from Sub-Saharan Africa. MEAS Discussion Paper.
- Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., Mbabu, A., Spielman, D., Horna, D., Benin, S., Kisamba-Mugerwa, W., Cohen, M., 2009. From best practice to best fit: A framework for designing and analyzing pluralistic agricultural advisory services. IFPRI, Washington, DC, USA.
- Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., Mbabu, A., Spielman, D., Horna, D., Benin, S., Cohen, M., 2006. From best practice to best fit: A framework for designing and analyzing pluralistic agricultural advisory services Worldwide. Discussion paper: DSGD-37, EPID-155, FCND-210 and ISNAR-5. IFPRI, Washington, DC, USA.
- Cabral, L., 2011. Decentralisation in Africa: Scope, motivations and impact on service delivery and poverty.
- Christoplos, I., 2010. Mobilizing the potential of rural and agricultural extension. Food and Agriculture Organization (FAO) of the United Nations and Global Forum for Rural Advisory Services. FAO, Rome.

- Christoplos, I., and A. Kidd., 2000. Guide for monitoring, evaluation and joint analysis of pluralistic extension support. Lindau, Switzerland: Neuchâtel group and Swiss Centre for agricultural extension and rural development.
- Creswell, J.W., 2009. Research design: qualitative, quantitative, and mixed methods approaches, 3rd ed. Sage Publications, Thousand Oaks, Calif.
- Danieli, F.D., and Shtaltovna, A., 2016. Competition within the state, with the state and beyond the state: Agricultural Extension in Tajikistan and the struggles of Market Formation. In: Hornidge, A-K., Shtaltovna, A., and Schetter, C. (eds). 2016. Agricultural knowledge and knowledge systems in Post-Soviet Societies. Interdisciplinary studies on central and Eastern Europe Vol. 15. Peter Lang publisher.
- David, P.A., 2007. Path dependence: a foundational concept for historical social science. *Cliometrica* 1, 91–114. doi:10.1007/s11698-006-0005-x
- Davis, K., Swanson, B., Amudavi, D., Ayalew, D., Flohrs, A., Riese, J., Lamb, C., Zerfu, E., 2010. In-depth Assessment of the public Agricultural Extension System of Ethiopia and Recommendations for Improvement. IFPRI discussion paper 01041. Eastern and South Africa Regional Office. Addis Ababa, Ethiopia.
- Debebe, M., 2012. Decentralization in Ethiopia: Concept and process. The case of Dendi District, West Shoa Zone, Oromia. PhD dissertation, University of Dortmund, Germany.
- Debub Negarit Gazeta. 2014. Article developed to organize and operationalize the “*Kebele* Agriculture Office head” position. Article 110/2014, Awassa, Ethiopia.
- Deressa, A., Seboka, B., 1997. Research achievements and technology transfer attempts in Southeastern Ethiopia. Proceedings of the second technology generations, transfer and gap analysis Workshop, 9-11 July 1996, Nazret, Ethiopia.
- Dickovick, J.T., Gebre-Egziabher, T., 2010. Comparative assessment of decentralization in Africa: Ethiopian desk study. Review of USAID.
- Ekpo, A., 2008. ‘Decentralization and service delivery: a framework’, paper prepared for the African Economic Research Consortium, Nairobi.
- Elias, A., M. Nohimi, Yasunbou, K., Ishida, A., 2015. Farmers’ satisfaction with agricultural extension services and its influencing factors: *J. Agr. Sci. Tech.* 17, 39-53.
- Flaherty, K., Kelemwork, F., Kaleb, K. 2010. Recent Development in Agricultural Research. Ethiopia country note. IFPRI, Rome.
- Food and Agriculture Organization of the United Nations (FAO). 2015. FAO and the 17 Sustainable Development Goals. Rome, Italy.
- Gebremedhin, B. Hoekstra, D., Tegegne, A., 2006. Commercialization of Ethiopian agriculture: Extension service from input supplier to knowledge broker and facilitator. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 1. ILRI, Nairobi, Kenya.
- Gezahegn, A., Kelemework, F., Alemu, D., 2003. “The provision of rural services and agricultural productivity in Ethiopia: A characterization.” Phase 1 report for the 2020 vision network’s East Africa regional project, “assessing the impact of policies for rural service provision on agricultural productivity and food security,” EARO/IFPRI, June 2003. Washington, D.C.
- Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M.C., Shyamsundar, P., Steffen, W., Glaser, G., Kanie, N., Noble, I., 2013. Policy: Sustainable development goals for people and planet. *Nature* 495, 305–307. doi:10.1038/495305a

- Global Forum for Rural Advisory Services (GFRAS), 2010. Five key areas for mobilizing the potential of rural advisory services. Brief number 1, Global Conference on Agricultural Research for Development (GCARD), Montpellier.
- Habib, M., Mohammed, A., 2010. The Ethiopian federal system: the formative stage. Friedrich-Ebert-Stiftung, Addis-Ababa, Ethiopia.
- Jena, P. R., Stellmacher, T., Grote, U., 2012. The impact of coffee certification on small-scale producers' livelihoods: Evidence from Ethiopia. Selected paper prepared for presentation at the International Association of Agricultural Economists (IAAE). Triennial Conference, Foz do Iguaçu, Brazil, 18-24 August, 2012.
- Keeley, J., Scoones, I., (2000) 'Knowledge, Power and Politics: The environmental policy-making process in Ethiopia', *J. Mod. Afr. Stud.* 38(1), 89–120.
- Kelboro, G., 2013. Unraveling the parks and people dichotomy local interests and conflicts in Nech Sar National Park, Ethiopia. Margraf, Weikersheim.
- Leeuwis, C., Ban, A.W. van den, 2003. Communication for rural innovation: rethinking agricultural extension, 3rd ed. ed. Blackwell Science ; Iowa State Press, for CTA, Oxford : Ames, Iowa.
- Lefort, R., 2012. Free market economy, “developmental state” and party-state hegemony in Ethiopia: the case of the “model farmers.” *J. Mod. Afr. Stud.* 50, 681–706. doi:10.1017/S0022278X12000389
- Lemma, M., 2007. The agricultural knowledge system in Tigray, Ethiopia: recent history and actual effectiveness. Margraf, Weikersheim [Germany].
- Maguire, C. J., 2012. Education and training for technical development. In: *Agricultural Innovation Systems. An investment source book.* The World Bank, Washington D.C.
- McDermott, J.J., Staal, S.J., Freeman, H.A., Herrero, M., Van de Steeg J.A., 2010. Sustaining intensification of smallholder livestock systems in the tropics. *Livestock Science* 130, 95-109.
- Mellor, J.W., Dorosh, P., 2010. Agriculture and the economic transformation of Ethiopia. ESSP2 Working Paper 010. IFPRI, Addis Ababa, Ethiopia.
- Merrey, D.J., Gebreselassie, T., 2011. Promoting improved rainwater and land management in the Blue Nile (Abay) basin of Ethiopia. NBDC Technical Report 1. ILRI Nairobi, Kenya.
- Ministry of Agriculture (MoA), 2015. DA tracking study report for Oromia region. Development Studies Associate. Addis Ababa, Ethiopia.
- Ministry of Agriculture (MoA), 2012. Agricultural cooperative sector development strategy (2012-2016). Addis Ababa, Ethiopia.
- Ministry of Agriculture (MoA), 2010. Development Agents career structure guideline (Amharic version). Addis Ababa, Ethiopia.
- Ministry of Agriculture (MoA), 2010. Participatory Extension System (Amharic version). Addis Ababa, Ethiopia.
- Ministry of Agriculture (MoA). 2010. Agricultural development information system organizational guideline. October 2010, Addis Ababa, Ethiopia.
- Ministry of Finance and Economic Development (MoFED), 2010. Ethiopia: Country report on the implementation of the Brussels Program of Action (BPOA). Addis Ababa, Ethiopia.
- Mogues, T., Cohen, M. J., Birner, R., Lemma, M., Randriamamonjy, J., Tadesse, F., Paulos, Z., 2009. Agricultural extension in Ethiopia through a gender and governance lens. Ethiopian Strategy Support Program 2 (ESSP2). Discussion paper No. 007. IFPRI, Addis Ababa, Ethiopia.
- National Plan Commission (NPC), 2015. Growth and Transformation Plan II (GTP-II) 2016-2020. Amharic version, Addis Ababa, Ethiopia.

- Negassa, W., Getaneh, F., Deressa, A., Dinsa, B., 2007. Integrated use of organic and inorganic fertilizer for maize production. Tropentag, Witzenhausen.
- OXFAM. 2016. El Niño in Ethiopia: Program observations on the impact of the Ethiopian drought and recommendation for action. OXFAM El Niño Briefings.
https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/bn-el-nino-ethiopia-240216-en.pdf
- Qamar, M.K., 2005. Modernizing national agricultural extension systems: A practical guide for policy makers of development countries. FAO, Rome, Italy.
- Ragasa, C., Ulimwenigu, J., Randriamamonjy, J., Badibanga, T., 2013. Assessment of the capacity, incentives, and performance of agricultural extension agents in western Democratic Republic of Congo. IFPRI discussion paper 01283.
- Rahmato, D., 2008. "Ethiopia: Agricultural policy review", in Taye Assefa (ed.), Digest of Ethiopia's national policies, strategies and programs: Addis Ababa: Eclipse Printers. ISBN 13;978-99944-50-19-0
- Ritchie, J., 2003. The Application of Qualitative Methods to social Research. In: Qualitative research practices. A guide for Social Science students and researchers. Ritchie, J and Lewis, J. edition. SAGE publication. London.
- Rivera, W.M., Sulaiman, V.R. 2009. Extension: object of reform, engine for innovation. Outlook on Agriculture. 38 (3), 267-273.
- Röling, N.G., 1988. Extension science: information systems in agricultural development, Wye studies in agricultural and rural development. Cambridge University Press, Cambridge [England], New York.
- Rondinelli, D. A., 1987. Chapter 2. Administrative decentralization of agricultural and rural development programs in Asia: A comparative analysis. In: Rivera and Schram. 1987. Agricultural Extension Worldwide: Issues, practices and emerging priorities. Croom Helm Ltd. USA.
- Shtaltovna, A., 2012. Servicing transformation: Agricultural service organizations and agrarian change in Post-Soviet Uzbekistan. PhD dissertation. Center for Development Research (ZEF), University of Bonn, Germany.
- Spielman, D.J., Kelemework, D., Alemu, D. 2012. Seed, fertilizer and agricultural extension in Ethiopia. In: Dorosh, P.A., and Rashid, S. 2012. Food and agriculture in Ethiopia: Progress and Policy Challenges. IFPRI Publishing, USA. University of Pennsylvania press.
- Statistical Package for Social Science (SPSS) Inc., 2012. IBM SPSS Statistics 21. SPSS Inc., Chicago, IL. URL [http:// www.spss.com](http://www.spss.com)
- Stellmacher, T. (ed.), 2015. Socio-economic Change in Rural Ethiopia. Understanding Local Dynamics in Environmental Planning and Natural Resource Management. Peter Lang. Frankfurt.
- Stellmacher, T., 2007. The historical development of local forest governance in Ethiopia. From imperial times to the military regime of the *Derg*. In: Afrika Spectrum 42(3). GIGA Institute of African Affairs, Hamburg.
- Swanson, B.E., Rajalahti, R., 2010. Strengthening agricultural extension and advisory systems: Procedure for assessing, transforming, & evaluating extension systems. World Bank, Washington, DC. 20433.
- Swanson, B.E., Samy, M.M., 2002. Developing an extension partnership among public, private and Non-governmental organizations. 9(1), Springer.
- Taffesse, A. S., Dorosh, P., Asrat, S., 2011. Crop production in Ethiopia: Regional patterns and trends. Ethiopia Strategic Support Program (ESSP- II). Working paper No. 16. IFPRI, Addis Ababa, Ethiopia.

- Tariku, M., Mengist, S., Tolossa, D., Senbeta, F., 2014. Drivers of adoption for improved agricultural practices in the central highlands of Oromia, Ethiopia. CASCAPE Working paper. Addis Ababa, Ethiopia.
- Urbanika, G.C., Plous, S., 2013. Research randomizer (Version 4.0) [computer software]. Retrieved on June 22, 2013, from <http://www.randomizer.org>
- Van Assche, K., 2016. Afterwards: Expertise and rural development after the soviets. In: Hornidge, A-K., Shtaltovna, A., and Schetter, C. (eds). 2016. Agricultural knowledge and knowledge systems in Post-Soviet Societies. Interdisciplinary Studies on Central and Eastern Europe Vol. 15. Peter Lang, Frankfurt.
- Van Assche, K., Beunen, R., Duineveld, M., 2014. Evolutionary Governance Theory, Springer Briefs in Economics. Springer International Publishing, Cham.
- Van Crowder, L. and Anderson, J., 1997. Linkage research, extension and education: Why is the problem is persistent and pervasive? *Eur. J. Agr. Educ. Ext.* 3(4), 241-250.
- Yilmaz, S., Venugopal, V., 2008. Local Government Discretion and Accountability in Ethiopia. International Studies Program Working Paper 08-38. Atlanta, GA: Andrew Young School of Policy Studies, Georgia State University.

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