

**Private Sector Involvement In Agricultural Extension Service Delivery in Mali:
Views and Constraints from the Pilot Phase**

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Abstract

In Mali, as in some other African countries, privatisation is emerging as an important factor to cut down Government expenses. The majority of the farmers (medium scale) and extension personnel favour private agency involvement in agricultural extension service delivery; the small-scale farmer,s due to their level of operation, do not seem to support this idea. A lot of constraints need to be overcome for successful private agency involvement in the delivery of agricultural extension programs in Mali. Due to the socio-economic, cultural, and climatic differences all over the country, a multi-private agency approach may be tried out depending on the prevailing situation in each zone of the country.

Key words: Agricultural Extension, private agency, farmers, attitudes, constraints.

Introduction and Problem

Recent increased interest in alternatives to the practised model of a publicly provided and financed agricultural research and extension system in Mali has been prompted by three main factors. First is the fiscal crisis facing African states in the era of structural adjustment; the second is the global impetus towards a reappraisal of the role of the state in providing service, reflected in the collapse of socialist economic models and experiments with privatisation; the third is the perceived failure of most African agricultural technology systems to generate and apply successful innovations, compared to the Green Revolution experience in Asia, and despite the considerable donor resources involved in these countries (World Bank Report, 2002).

Governments have traditionally taken the dominant role in the provision of agricultural extension services because of the important contribution of the agricultural sector to the economy. Increasingly, in African countries such as Senegal, Chad, Benin, Cote D'Ivoire, and Mali, privatisation is emerging as an important factor to cut down on Government expenses, improve extension education, and increase efficiency for large scale recognition of the extension system. In light of liberalization of global economies and the establishment of the World Trade Organization, privatisation of extension is imminent for enhanced agricultural production and competitiveness.

Agricultural Extension Situation in Sub Saharan Africa

Numerous definitions of extension exist (Garforth, 1993), but essentially agricultural extension refers to the diagnosis of constraints and the transfer of advice, information, knowledge and skills to farmers to help overcome them. Some authors include the provision of physical inputs or innovations. Increased fiscal deficits in many developing countries and in several cases, problems of poor management of public programmes over the last decade have redirected attention towards how to make extension cost-effective and responsive to specific farmer's needs. At the same time, this has generated increased attention towards reforms of public sector agricultural service provision in many countries in which government extension services are criticized for being inefficient and out of touch with needs of their clients and the wider society (Carney, 1998). Swanson et al (1988) stated that Africa spent the least (US \$6,800) in 1988 per extension worker. This is likely to have compromised the quality of the service (regardless of the relevance of the extension message delivered), particularly given the more severe infrastructural constraints that characterise much of Africa. Swanson et al (1990) also indicated that Africa had the lowest ratio of farmers per field agent (1809:1) amongst developing regions, and a below average ratio of arable land (ha) per field agent (2245:1)

Privatisation of Agricultural Extension Delivery Service

The privatisation of extension, in the strictest sense has actually taken place only in a few developed countries such as the Netherlands, New Zealand, and Australia. The term 'privatisation' means a full transfer of ownership from Government to private entity, usually by way of sale, (Rivera, 1997). It is a term often broadly conceived to include efforts by countries to decentralize and/or fiscally redesign their extension systems. Under private extension ownership, changes demand for modernization of working methods and private extension professionals being capable of training and motivating farmers for best use of resources available to them (DNA, 2006).

Hence, it should emerge as a policy instrument to integrate technical advice, production inputs, credit, marketing service and specialized services (Antholt, 1994). Private extension

system for agricultural development should be a tailor-made programme, designed for a situation, time, place and audience. It means careful selection of media, techniques, participants and actions to be taken at different stages of the programme (DNA, 2006) with the goal of helping to increase production, and income and to have higher-level participation and influence of farmers.

Purpose and objectives

Since 2002, , the Malian Government with the support of the World Bank has embarked on the pilot phase of the transfer of Agricultural Extension Service delivery to the private sector in selected zones of the country. It was the intention of this study to analyse the views of the farmers and extension agents in the test zones about the prospects and constraints of this approach to extension delivery in Mali. Specifically, the study was to:

- Present the model of private service extension delivery currently implemented in Mali.
- Discuss the eligibility criteria for beneficiaries and private practitioners
- Examine the attitude of farmers and extension personnel towards privatisation of extension service.
- Ascertain the yield of major crops before and during private involvement
- Verify the areas of Agricultural delivery service in which farmers and extension personnel prefer privatisation of extension service and the reasons for their choice.
- Analyse the perceived constraints of farmers and extension agents in privatising the agricultural extension service.
- Make recommendations for improved private sector extension delivery in Mali.

Methodology

The study was carried out in Koulikoro Region of Mali, selected because it is one of the test zones for the pilot test of the transfer of Agricultural Extension service to the private sector. The study was conducted with two types of respondents (viz.,) Private Extension Workers (35) working in Banaba commune, 40 public extension workers from the regional office in Koulikoro and 80 farmers randomly selected from a list obtained from the community office.

To investigate the attitudes and preference of extension workers, a questionnaire was used, while attitudes and preferences of the farmers were collected using an interview schedule. An attitude scale was developed for the study using standard procedure. The reliability coefficient of the scale was found to be 0.87 indicating high internal consistency.

From the extension workers, responses were collected during a weekly regional workshop, while those of the farmers were collected by direct interview at villages. To know about how the respondents perceived constraints about privatisation, 11 statements exposing various constraints were constructed and investigated as against a two-point continuum viz., agree and disagree. To investigate the extension workers' attitudes, a questionnaire was used whereas the responses from the farmers were collected from interview schedules containing the same statements. The collected data were analysed using percentages and means.

Results

Current Model of the Transfer of Agricultural Extension Delivery Services to the Private Sector In Mali

The transfer model of agricultural extension delivery service to private sector as implemented in Mali since 2002 is a tripartite model involving the National Directorate of Agriculture, the commune, and the private sector. At the district level, the local advisory committee organizes sensitization days when the new approach of contracting agricultural extension to private practitioners is introduced. The communities eligible for the new approach would write to the Regional Directorate of Agriculture with proofs of their conformity to the criteria mentioned in Table 1.

At the Regional Directorate level, communities that meet with the criteria are selected and jointly with the community, a programme is developed (through need analysis, using the diagnostic participative approach tools) by the extension agents at the community levels and the result submitted at the community office. The regional Directorate of Agriculture has the list of all NGOs and other private practitioners currently involved and working in the domain of rural development in each region. They do a pre-selection of NGOs after evaluating them and make a short list of these NGOs.

The Regional Technical team translates the needs of the various communities into technical objectives which form the content of the terms of reference for the advertised document of offer requesting NGOs and other private practitioners to apply. Each private application is addressed to the Regional Directorate of Agriculture and the opening of bid done at the regional level by the regional agricultural advisory committee in the presence of members of the technical team, the presidents of the district agricultural advisory committees, the mayors, and representatives of the NGOs and private practitioners that applied, with the support of the National Technical team.

Validation of results of the analysis of the technical themes and costs as well as the adjudication of the markets is done at the regional level by the regional agricultural advisory committee with the participation of the regional technical team and the support of the National technical team.

A contract-signing ceremony is organized where the regional governor or his representative presides in the presence of members of the regional agricultural advisory committee, the Regional Technical team, the prefects, chairmen of the district advisory

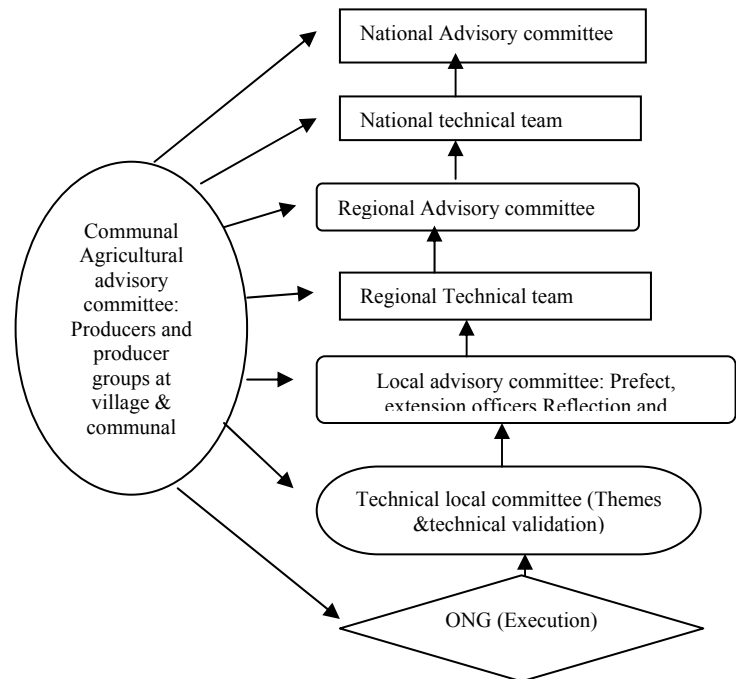


Figure 1. Transfer model of agricultural extension delivery services to the private sector in Mali.

committees, mayors of the communities concerned, the NGOs, and their lawyers as well as the Regional Director of Agriculture and the National Director of Agriculture or his representative.

The regional Agricultural advisory committee and the regional technical team carry out the follow up and supervision of the activities. The regional advisory committee conducts supervision quarterly while the regional technical team conducts supervision twice every three-months. They analyze reports of executed activities submitted by the private practitioner every trimester to ascertain if the activities conform to the terms of reference and the technical offers. The National Directorate of Agriculture deploys all public field-level extension agents in the various communities where the private practitioners operate. Only one government agriculture and rural engineering technician is retained as chief of service (community level). The World Bank through the National Directorate of Agriculture pays 80% of the contract cost while the groups of farmers pay the balance of 20% through the commune.

Eligibility Criteria for Producer Groups, Communities, and Private Extension Practitioners

The level of financial viability of the intended beneficiaries at the community level is the most important factor (30%) in their selection for participation in contract activities. This is considered vital because the benefiting community has to pay 20% of the cost of agricultural extension activities executed with them by the private practitioner. Variables considered in the level of financial viability of the beneficiaries include: statement of bank account, proof of good financial management, level of tax payment, level of realisation of annual budgets at the community level, and presence of a local credit and savings unit.

The level of agricultural activity (25%) and ease of zonal coverage of these activities (25%) constitute the second set of factors in the selection of beneficiaries.

They must be actively involved in production activities in vegetable, food crops and commercial crops, livestock, food transformation and commercialisation as well as some research and development activities at the community level. They must have a proven record of activities with public extension agents in these areas.

Variables considered are ease of coverage, accessibility for easy movement and execution of activities, level of security at the village as well as community levels, and the receptivity of the population to Agricultural advisory services.

The technical viability (20%) of the beneficiaries concerns technology-adoption rate, (which must be at least 60%), existence of production infrastructures and transportation, availability of viable economic activities, satisfactory level of equipment, a satisfactory level of literacy, good level of organisation and production, availability of infrastructures for processing and commercialisation, good level of diversification of activities, capacity to negotiate and

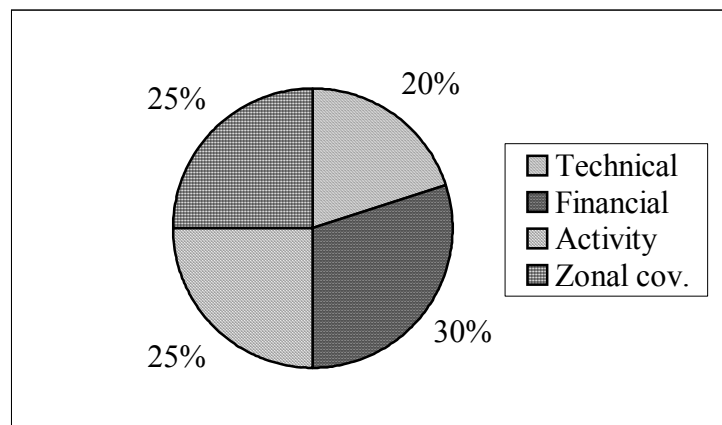


Figure 2. Factors in the selection of beneficiaries.

mobilise resources, social cohesion, voluntary membership and gender consideration in their activities.

Beneficiaries are evaluated on these criteria and those that score between 80% and 100% are selected. According to National Directorate of Agriculture officials, most intending communities score less on financial viability and ease of coverage largely due to farmers' level of production, which is generally at the subsistence level, coupled with climatic problems, lack of credit, and poor organisation. Most of the communities in Mali are not accessible due to poor access roads. Among the technical variables, illiteracy rate (75% at the rural level) is also a major problem.

Eligibility Criteria for Private Extension Practitioners in Mali

Most important among the factors in the selection of private extension practitioners are their level of job experience (25%) and the human resources available to them (25%). Under job experience, variables such as number of years of practice, results obtained, the groups of producers worked with, the number and types of technologies introduced to them, prizes obtained and their other

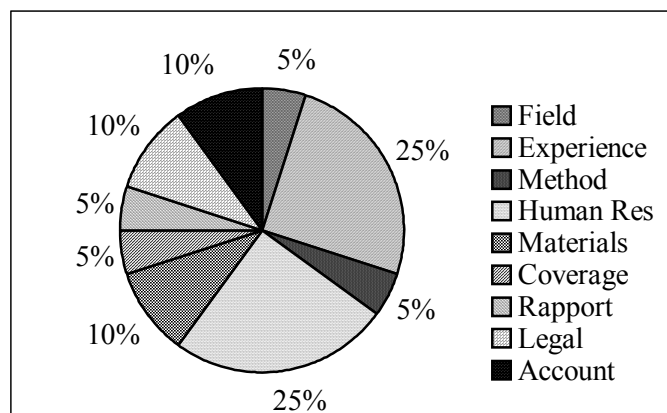


Figure 3. Factors in selection of private practitioners.

partners are considered. For human resources, the number and qualification

of personnel, professional experience of their extension agents, and the types of motivation made available to their workers (salaries and fringe benefits) are important variables. According to the officials of the National Directorate of Agriculture, most of the private practitioners did not have the necessary personnel for their work, especially at the field level. This had prompted most of them to hire public extension agents on a part time basis.

Under materials and financial viability (10%), the factors considered include: the statement of bank account, their registration papers, registration number, available materials for their extension work, office and meeting rooms as well as proof of ownership of these materials. Most of the private practitioners do not have materials to do their work. They do not have vehicles or motorcycles for field officers, and this has been a major obstacle to their selection or even if they are selected, they withdraw later for their inability to cope.

The coverage areas as well as rapport with the population, field of specialisation, methodology of work and tools used to diagnose producers' problems were other factors considered in the selection of the private extension practitioners. The number of villages, communities, districts and regions covered, their level of collaboration with the communities and other partners in the zone, and their relationship with the local administrative authorities are all variables considered in their rating on these factors. Any private practitioner scoring between 70% and 100% on all of these factors was considered for selection.

*Attitudes of Public and Private Extension Officers as Well as Farmers
Towards Privatisation of Agricultural Extension Delivery in Mali*

The results from Table 1 showed that the majority of the public extension agents (N: 40) had favourable attitudes (65%) towards privatisation of Agricultural Extension delivery services in the Koulikoro region of Mali. According to the public extension officers involved in this study, Mali is considerably too large (one million two hundred km land area and 7 million rural population) to be covered effectively by the 720 field-level public extension officers. They also asserted that private involvement would ease the financial burden of government. A majority of the private extension agents (77%) were in favour of a private extension delivery service. They claimed that it enhanced the overall efficiency of the agricultural extension system, provided farmers need-based advisory services, and farmers are more committed to the services.

Table 1

Attitudes of Extension Officers and Farmers Toward Privatisation of Agricultural Extension Service Delivery in the Koulikoro Region of Mali, 2007

Category	No	Percentage	Mean attitude score
Public extension officers:	<i>N: 40</i>		
Least favourable (less than 82.45)	14	35	80.22
Favourable (82.45 to 110.67)	10	25	99.59
Most favourable (greater than 110.67)	16	40	119.31
Private extension agents:	<i>N: 35</i>		
Least favourable (less than 86.37)	8	22.9	82.43
Favourable (86.37 to 116.79)	6	17.1	100.67
Most favourable (greater than 116.69)	21	60	118.97
Middle level participating farmers:	<i>N: 162</i>		
Least favourable (less than 89.56)	43	26.5	83.98
Favourable (89.56 to 115.82)	21	12.9	105.21
Most favourable (greater than 115.82)	98	60.5	110.23
Small scale participating farmers:	<i>N: 48</i>		
Least favourable (less than 85.47)	36	75	84.55
Favourable (85.47 to 109.99)	12	25	101.23
Most favourable (greater than 109.99)	nil		

Note. Source: Field survey; 2007.

Only about 23% of the private extension officers were least favourable to privatisation of Extension delivery services in Mali, claiming that most private practitioners did not have the materials and human resources necessary to work with the farmers in the field and that most local governments within the country could not afford to pay the 20% cost of private extension delivery.

About 73% of the middle level farmers favoured private involvement in Extension delivery in Mali, affirming they have improved their production level and income with privatisation. They claimed that they moved from farming for food production to commercial and even cash crop farming and as such they needed to get the right services at the right time. They also claimed that with privatisation they can participate better in the analysis of their needs as well as the planning and execution of their farm projects and that the extension officer is

accountable. The results in Table 1 revealed that 75% of the small scale farmers were grouped in the “least favourable” attitude category, whereas 25% and 0% of them were grouped in “favourable” and “most favourable” attitude categories, respectively. The least favourable accounted for the majority of the small scale farmers and this was explained by the fact that the majority in this group were women who are highly limited by cultural factors and do not have access to land easily and who still find it difficult to obtain credit to buy the necessary farm equipment. Also, they claimed that culture hindered them from direct, full, and active participation with male private extension practitioners.

Advantages of Private Involvement in Agricultural Extension Delivery in the Koulikoro Region of Mali

The three categories of respondents in Table 2 (public extension officers (90%), private extension officers (97.1%) and farmers (86.2%)) were of the opinion that private extension delivery made extension service demand driven. This, according to the public extension officers, had increased farmers’ participation and collaboration as well as their financial involvement in the farming activities. The three groups of respondents also agreed that privatisation had increased the voices of farmers in problem definition and in resource allocation for extension service. With 80% of public extension officers, 91.4% of private extension officers, and 78.7% of farmers, there was consensus that the extension service becomes more cost effective with efficient and quality service and that research activities are well adapted. Table 2 also shows that the three categories of respondents agreed that private extension complements the activities of government and allows other actors to have access to finance.

Table 2

Advantages of Private Involvement in Agricultural Extension Delivery Service by Respondents in the Region of Koulikoro, Mali, 2007

Themes on private extension delivery	Percentage of public extension officers	Percentage of private extension officers	Percentage of farmers
Provides demand driven extension service	90	97.1	86.2
Increases the voice of farmers in the in problem definition & resource allocation for extension service	95	100	88.75
Extension service is more cost effective with efficient and quality service and well adapted research activities	80	91.4	78.7
It complements and supplement the efforts of public extension and allows other actors to have access to finance	100	91.4	83.78
Extension personnel become more client accountable	92.5	100	88.75
Clients are more committed to service	95	100	97.5
Availability of specialized services to specific clientele groups.	90	100	80
More market and export oriented due to more concentration on crops earning valuable foreign exchange.	85	97.1	97.5
Support and control by clients leading to client orientation	80	88.57	92.5
Private Extension staff and researchers are more result oriented	50	97.1	88.75
Increased accountability and commitment of Extension Personnel due to job demands and compulsion.	97.5	100	88.75
Private extension increases staff professionalism	67.5	74.3	No response
It restricts flow of information	32.5	11.4	20
Less contact between worker and farmer	25	05.7	22.5
Concentrates on cotton and commercial crops	20	11.4	10
Concentrate on commercial farmers only	10	08.6	10
Women are left behind	22.5	17.14	33.75

Note. Source: Field survey, 2007

The farmers and the public extension explained that farmers as clients were interested in improved yield and the private extension officers would have to prove this as a measure of their efficiency and productivity. Apart from this, farmers claimed that if they put in their meagre income into paying for agricultural extension services, they had to see the results.

However, while both the public extension officers and the private extension officers agreed, 67.5% and 74.3% respectively, that privatisation improved staff professionalism; the farmers had no response on this item. Public and private extension officers claimed that private extension officers strived to acquire skills needed for on-the-job performance, as well as

respected the codes of conduct and ethics of their profession in order to continue to work well with the farmers.

They all disagreed with the fact that privatisation reduced the flow of information among farmers; rather it ensured that every member in the group participated and was well informed about all the activities. It was also generally agreed that there was more contact between the extension worker and the farmer and that all crops and livestock were treated. About 34% of the farmers as compared to 22.5% for public extension staff and 17.14 % of the private extension officers were of the view that women farmers were still left behind in the whole process whereas small scale agriculture in Mali is still largely a family occupation. The women respondents claimed that due to their culture, they couldn't participate as actively as their male counterparts because they were limited in both finance and land necessary to improve their scale of operation.

The Yield of Major Crops Before and During Private Involvement in the Koulikoro Region of Mali

Table 3

Crops and Animal Production Before and During Privatisation of Agricultural Extension Service Delivery by Farmers in Koulikoro Region of Mali, 2007

Type of crop	Mean Kg/H before privatisation	Mean Kg/H after privatisation	Difference	Percentage
Millet	600kg/H	900kg/H	300Kg/H	50
Sorghum	750kg/H	1200kg/H	450KG/H	60
Maize	1200kg/H	2000kg/H	800kg/H	67
Groundnut	500kg/H	650kg/H	150kg/H	30

Note. Source: Survey data: 2007

Table 3 shows that production of the four major crops grown in the region (millet, sorghum, maize, and groundnut) increased more during privatisation than under the government extension services. For three of the crops, millet, maize and sorghum, they had increased about 50% in average yield per hectare. The farmers claimed to use improved seeds, apply fertilizers, pesticides and herbicides at the right time, and that except for the late start and early end of rains, they would have recorded even better yields.

Preference for Crops, Animals, and Other Revenue-generating Activities Proposed by Farmers and Extension Officers for Privatized Agricultural Extension Service Delivery in the Koulikoro Region of Mali

Soil fertility improvement was generally considered by the public (80%) and private (100%) extension officers as well as men (92%) and women (57%) farmers as an area that needed private intervention. According to the public extension officers, the government does not currently subsidize fertilizer, putting it beyond the reach of small-scale farmers. Also, farmers were of the view that the work of any private extension agent starts from the improvement of soil because the soil in the region is poor that if not treated, it cannot produce any meaningful yield. This is in support of the assertion made by FAO (2003) that soil fertility degradation is the single most important constraint on food security in SSA and tackling this constraint requires long-term

attention and a holistic approach that is beyond the capacity of public extension and public researchers alone.

Production of cotton, poultry, cattle, shea butter, milk, and animal health and vaccination are other areas in which the public extension officers, private extension officers and farmers agreed that private intervention was necessary. According to them, these are all commercial ventures that required heavy financial investment, as such, they require a maximum of up-to-date information and management to have the best results. Farmers in these categories also claimed being used to engaging a private extension specialist so that they could get good production and meet export-market specifications. All of the respondents in the four categories agreed that the private agencies should not handle fisheries, onions, and okra. Fisheries activities in Mali are still largely non-intensive, and so do not need expert advice. Okra and onion are vegetable crops produced by women and could be handled by public extension officers. However, while the male farmers and the public agents did not want the private extension officers to handle tomato production, women farmers and the private officers agreed that private intervention is needed in this area due to diseases, transformation, and marketing problems around the crop. Women farmers wished that soap making and dyeing should be privatized because these were income-generating activities which are not handled presently by public extension officers and required current information on production and marketing.

Table 4

Preference for Crops, Animals, And Other Revenue-generating Activities Proposed by Farmers and Extension Officers for Private Extension Delivery in the Koulikoro Region of Mali, 2007

Agriculture/other revenue generating activities	Percentage of public Ext. officers	Percentage of private ext. officers	Percentage male farmers	Percentage of female farmers
Soil fertility management and production of compost	80	100	92.1	57.14
Tomato prod./transformation	20	57.14	34.2	64.28
Potatoes production	27.5	51.4	71.05	90.47
Okro	05	20	34.2	30.95
Onion	10	22.86	10.5	26.19
Maize	65	80	92.1	40.47
Mil	40	88.57	92.1	42.85
Sorghum	45	80	71.05	21.42
Groundnut	35	71.4	63.15	30.95
Cotton	100	100	100	69.04
Animal health & vaccination	90	100	97.36	78.57
Poultry	75	100	100	85.71
Cattle	87.5	100	100	69.04
Fisheries and processing	22.5	20	34.2	11.90
Cloth dyeing	nil	22.86	13.15	88.09
Soap making	nil	34.28	nil	83.33
Shea butter cream	55	88.57	63.15	100
Milk production	85	9.4	97.36	85.71

Note. Source: Field survey, 2007.

Constraints of Private Involvement in Agricultural Extension by Extension Officers and Farmers

Lack of credit, high illiteracy rate of farmers, varied agro climatic/crop/animal as well as socio-economic conditions of farmers, poor infrastructures in the villages and communities, land ownership problems for women, desert encroachment and drought, soil fertility problems and other socio-cultural issues coupled with ethnic unrests were some of the constraints agreed on by the public extension officers, the private extension officers, and men as well as women farmers. The requirements of credit houses, inappropriate timing of the credit received coupled with the distance between the villages and the credit houses were some of the problem issues in the existing credit system in Mali. The majority of the farmers, as high as 75%, were still illiterate and this, according to the private extension officers, was adversely affecting their understanding, participation, and performance. The varied climate within the country coupled with desert encroachment and drought would make it difficult for private extension officers to have uniform approaches, even within a zone. The frequent ethnic unrest in the northern part of the country has virtually made it impossible for any non-indigeneous person to stay there and work with the rural population. Also, 85% of the public extension workers and 51% of the private extension officers agreed that lack of human resources by the privates was a problem and about 88% of public extension officers also agreed that the quality of research by private agencies would be poor.

Table 5

Perceived Constraints of Farmers and Extension Agents in Privatising the Agricultural Extension Service, Mali, 2007

Constraint	Public officers A %	Public officers D %	Private officers A%	Private officers D %	Farmers A %	Men D %	Females A %	Females D %
Illiteracy rate of farmers	90	10	94.28	05.72	78.94	21.06	100	
Agro/climatic/ socio-econ	92.5	07.5	77.14	22.86	89.47	10.53	71.42	28.58
Women land ownership	80	20	71.4	28.6	65.78	34.22	100	nil
Desertification/ drought	100		100		89.47	10.53	88.09	11.91
Poor infrastructure/	92.5	07.5	94.28	05.72	97.36	02.64	100	
Poor marketing	75	25	82.85	17.15	100		100	
Human resource problems	85	15	51.42	48.58	nil	Nil	nil	nil
Credit	100		100		100		100	
Dependence on external funding	100		97.1	02.9	78.94	21.06	42.85	57.15
Poor private research quality	87.5	12.5	37.14	62.86	nil	Nil	nil	nil
Soil fertility	90	10	77.1	22.9	100	Nil	100	nil
Socio cultural issues	67.5	32.5	74.28	25.72	78.94	21.06	100	nil

Note. Source: Field survey, 2007

Conclusion and Recommendations

A majority of the medium-scale farmers and extension personnel favoured private agency involvement in agric. extension service delivery; the small-scale farmers due to their level of operation were not in favour of such involvement in agriculture. Many constraints need to be overcome for successful private agency involvement in agricultural extension delivery in Mali. Due to socio-economic, cultural, and climatic differences around the country, a multi private agency involvement may be tried out depending on the context in each zone of the country.

Lessons Learnt

The attitude towards private agency involvement in providing extension service implies that extension personnel in general realised the need for private intervention in certain areas of agriculture in Mali. Farmers were still divided in their attitudes, as medium-scale farmers favoured private involvement while small-scale farmers, especially women, were against private involvement. Farmers and extension personnel cited many constraints to be overcome before full private agency involvement in providing extension service can take place or be effective.

Educational Importance

The purpose of this paper and its educational importance is to cause the Malian Authority and the Ministry of Agriculture in general to think twice on the implication of the private sector involvement in the Agricultural extension delivery service in Mali. The study is an eye opener that will help the authority know which category of farmers can support privatisation and which are the areas in agriculture that need private involvement. It will also add to the body of literature on this aspect for the Ministry of Agriculture as well as the University.

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