

Does the Agricultural Extension System in the Kingdom of Saudi Arabia Need to be Reformed?

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Abstract: The government of Kingdom of Saudi Arabia (KSA) is increasingly emphasizing the importance of institutional rearrangements. One area of current interest to the ministry of environment, water & agriculture involves reforming the national agricultural extension system. The purpose of this research is to 1) recognize whether the agricultural extension system in KSA needs to be reformed or not, 2) determine reform alternatives for better extension system in KSA. The framework for determining the need for extension reform was used to determine the need of extension system to reform. Extension personnel's opinions on extension reform alternatives were determined. Data were collected using questionnaire form within personal interviews with 81 extension personnel around the nation during May-August 2016. Frequencies and percentages were used for data presentation. Findings revealed that all aspects of the extension system in KSA are good candidates for reform. Result also show that the most appropriate arrangements of decentralization are: Transfer of specific extension activities to NGOs, FBOs and private firms at different levels, and Deconcentration. The participatory extension, farming systems development and educational institution approaches are the most appropriate approaches. Participation of elected groups of farmers and NGOs & FBOs are the most appropriate alternatives of extension program planning followed by bottom-up approach. Findings also show that extension personnel prefer provision of extension services through public sector with any of financing mechanism. The Public-Public mechanism was the most accepted alternative followed by FBOs-Public and NGOs- Public alternatives, while, they do not accept financing extension services by farmers with any of service provider.

Key words: Agricultural extension, Reforming, FDNER, Saudi Arabia

Introduction

The agricultural sector in the Kingdom of Saudi Arabia is one of the most important developmental sectors. It plays an important role in increasing national income, achieving food sufficiency for many important foodstuffs, and labor force. National developmental plans and policies are developed to improve the plant, animal and fish departments to achieve the development of rural and urban areas in a balanced manner. Moreover, the private sector was encouraged to invest in agricultural sector in the Kingdom (Ministry of Agriculture and Water, 1999, 143). The agricultural extension organization in Saudi Arabia is one of the main pillars of the agricultural development. It was established in 1945 as a sector of the Ministry of Agriculture and Water (Alsaghan, 2006, 9). By 2005, the General administration of Agricultural Extension was established including three departments (Plant, Aquaculture, and Livestock) (Ministry of Environment, Water and Agriculture, 2017).

In developing countries, bureaucratic inefficiency and poor program design and implementation have led to poor performance and incoherent links with client farmers and the research sector (Abdel-Ghany and Diab, 2013, 143). In the kingdom, Extension and Education are viewed vital and essential in the developmental process that provides numerous services and undertakes multiple activities. Extension can help making the villages more attractive by reviving rural economies and creating more economic activities to create productive and healthy rural communities. In extension and education “one size fits all” sort

of business does not work at all. There is no single strategy, method or model that would address all issues and work on all of its clientele. However, any extension model that focuses on: gap-filling initiatives, address prime issues faced by the farming; capacity building, regular in-service training of extension staff; the development of skilled human resources capable of working towards better farming; and finally establishing a strong professional links among research, teaching and extension may hold great potential in the kingdom. (Al-Shayaa et al., 2012, 244-245).

There are changes in the context of agricultural development as follows (The World Bank, 2007, 1-4 and Rajalahti et al., 2008, 4-5): i) Markets drive agricultural development, ii) Production, trade, and consumption environment for agriculture and agricultural products are growing more dynamic and evolving in unpredictable ways, iii) Knowledge, information, and technology are generated, diffused, and applied through the private sector, iv) Exponential growth in information and communications technology (ICT) has changed the capacity to take advantage of knowledge developed in other places or for other purposes, v) Knowledge structure of the agricultural sector in many countries is changing markedly and vi) Agricultural development progressively happens in a globalized setting.

Moreover, the environment of agricultural extension is changing (Qamar 2000). Extension has gone under pressure by changes (Collion, 2004, 1) such as: i) The money related emergencies that prompt a sharp decrease in overall public investments, leading to pressure to downsize and consider more cost-efficient extension methods away from the labor intensive, ii) The expanding criticisms of poor performance of public services extension such as: (a) their absence of responsibility to clients; (b) the absence of significance and quality of their programs, due to poorly trained extension agents; (c) their restricted scope, in terms of area and type of clients, as they insufficiently address the needs of the poor, women farmers, and farmers in disadvantaged areas; and (d) their absence of sustainability, iii) The emergence of different actors and service providers that can disseminate agricultural knowledge and information; in particular, producer organizations, NGOs, and private sector, iv) The political strengths linked to democratization, liberalization, and decentralization which in conjunction with financial constraints and emerging new actors, leads to redefining the role of public services and rethinking extension methods away from top-down, supply-driven approaches, v) The revolution in information and communication technologies which provides new vehicles for supplying information and vi) The adjustments in agriculture and, therefore, in the information needs of farmers.

With the changing conditions of agriculture and the expanding patterns of globalization, commercialization and the drive towards sustainability, extension is being looked upon to assume an expanded role with a diverse set of objectives, which include: a) Better linking of farmers to input and output markets; b) Reducing the vulnerability and enhancing the voice of the rural poor; c) Developing micro-enterprises; d) Poverty reduction and environmental conservation; and e) Strengthening and supporting farmers' organizations (Sulaiman and Hall, 2004, 1).

This requires adopting systems of innovative extension which is achieved by: a) recognition and utilization of multiple sources of knowledge; b) Focusing on ability problem solving problems rather than just training for technical capacity building; c) Adopting an interactive communication function; d) Viewing extension as a co-learning process; and e) Institutional pluralism (Ponniah et al., 2008).

The role of agricultural extension is pivotal to the dissemination of agricultural innovations, but in many nations, extension is currently failing or moribund, it is in disarray or barely functioning at all, staff are under-trained, not mobile, and therefore not proactive. There is also little, if any, coordination between extension and research, and even less

between extension and agricultural higher education. Meanwhile, other forces are affecting the development of agricultural and rural extension services emphasizing issues and difficulties for much needed reforms (Qamar 2000, Rivera et al. 2001, 15). The organizational structure of agricultural extension should be reformulating in light of the review of literature in this area (Al-Zaidi & Al-Haj, 1995; Al-Zahrani et al., 2003). Also obstacles facing the extension workers during their field work should be faced (Alsaghan, 2015, 741).

In spite of the vital role of agricultural extension in agricultural development in KSA (with 13 public administrations of agricultural affairs, 12 Directorate of Agriculture, and 107 agricultural branches) (Alsaghan, et al., 2017), there are shortages on research activities aiming at reforming the national agricultural extension system. The government of KSA is increasingly emphasizing the importance of institutional rearrangements. One area of current interest to ministry of environment, water & agriculture involves reforming national agricultural extension system. From this starting point, the purpose of this research is to 1) determine whether the agricultural extension system in KSA needs to be reformed or not?, 2) determine reform alternatives (decentralization, approaches, programs' planning & implementation, and services provision and financing) for a better national agricultural extension system in KSA.

The Framework for determining the need for extension reform

The modernization and reform of national agricultural extension systems is a major undertaking requiring cautious investigation of the circumstance, comprehension of national policy on rural and agricultural development and food security. The leadership's vision of development for the country over the following 20 years or so, and lastly taking intense policy decisions – some of which may have political implications, cost considerable amounts in terms of time, money and energy, and require effective monitoring of progress. It is therefore of paramount importance that the policy-makers first have a look at the existing national agricultural extension system to determine whether the system needs to be reformed or not. The Framework for determining the need for extension reform (FDNER) is a valuable tool for such mission. The marking results will also help to make a decision about which aspects to concentrate on while reforming the system (Qamar, 2005, 21).

Alternatives of reforming agricultural extension

Extension decartelization

Decentralization is frequently considered as the shifting (or devolution) of authority for extension to lower levels of government. In general, decentralization includes the transfer of financing and management authority to sub-national government levels (Rivera *et al.*, 2001, 37). The justification of decentralization is to (a) react more effectively to local needs; (b) take into consideration mechanisms to ensure accountability to farmers; (c) attract local government funding to increase financial sustainability; (d) result in more effective and evenhanded allocation of government assets; (e) build local capacity; and (f) guarantee lower-cost service delivery (Collion, 2004, 3; The World Bank, 2000, 2).

The term “decentralization” has been utilized in the literature to depict four alternative institutional arrangements (Swanson, 2008, 28; Rivera and Alex, 2004, 2; Rivera *et al.*, 2001, 29):

1. *Deconcentration*: Under this institutional arrangement, selected managerial functions (e.g. program planning and implementation) are assigned to district and local levels within the national/provincial/state-level agricultural extension system.
2. *Delegation*: In this form of decentralization, a semi-autonomous government office may be assigned responsibility for providing or coordinating extension services on a

regional basis. Also, some managerial, priority setting and fund allocation functions are delegated to district-level extension systems.

3. *Devolution*: Under this arrangement, program planning, management and co-financing obligations are transferred to local and/or district-level governments. These local governments have discretionary authority to exercise their responsibilities and are bound just by national policy guidelines.
4. *Transfer of specific extension activities to NGOs, FBOs and private firms*: Decentralization in this form involves shifting responsibilities for specific extension activities from the central government to FBOs, NGOs and/or private firms at different levels. This approach is much more commonplace in industrially developed countries as the technology transfer function is progressively privatized.

Extension approaches

The eight approaches of extension to which Axinn (1988) refers have been supported by several authors i.e. Nagel (1998), Rivera, et al. (2001: 11-12), Ponniah, et, al. (2008: 84-93). These eight main approaches are recorded below:

1. *The general agriculture extension approach*. This approach assumes that technology and knowledge that are appropriate for local people exist but are not being used by them. The approach is usually fairly centralized and government-controlled. Success is measured in the adoption rate of recommendations and increases in national production. This approach is considered as a top to bottom government, Through which decisions making, assets, and major assistance to the farming communities are directed by the government arm responsible for extension services in different regions, zones, and at the county level.
2. *The commodity specialized approach*. The key characteristic of this approach, brought together all functions for increased production – extension, research, input supply, marketing and prices – under one administration. Extension is fairly centralized and is oriented towards one commodity or crop and the agent has many functions.
3. *The training and visit approach*. This approach is depends on a thoroughly planned schedule of visits to farmers and training of agents and subject matter specialists, SMS. Close links are kept up amongst research and extension. Agents are only involved in technology transfer. Success is related to increments in the production of particular crops or commodities. There are three strategies used in the T&V which include the individual, method group method, and the mass media method.
4. *The project approach*. This approach focuses endeavors on what is needed and required by the beneficiaries and the donors, meaning that projects to be implemented must be a consensus of the general audience and must be necessary and demand driven as projects identified must meet the immediate needs of the recipients or the end users.
5. *The cost-sharing approach*. This approach assumes that cost-sharing with local people (who do not have the means to pay the full cost) will advance a programmed that is more likely to meet local situations and where extension agents are more accountable to local interests. Its motivation is to give counsel and information to encourage farmers' self-improvement.
6. *The educational institution approach*. This approach utilizes educational institutions which have specialized knowledge and some research ability to provide extension services for rural people. Implementation and planning are often controlled by individuals who determine school curriculum. The emphasis is regularly on the transfer of specialized knowledge.

7. *The agricultural extension participatory approach.* This approach frequently concentrates on the expressed needs of farmers' groups and its goal is increased production and an improved quality of rural life. Implementation is often decentralized and flexible. Success is measured by the quantities of farmers actively participating and the sustainability of local extension organizations. This approach is completely participatory with both parties feeling a sense of belonging of the project to be executed.
8. *The farming systems development approach.* A key characteristic of this kind of extension is its systems or holistic approach at the local level. Close ties with research are required and technology for local needs is developed locally through an iterative process including local people. Success is measured by the degree to which local people adopt and continue to use technologies developed by the programmed. Through this approach is implemented with the full participation of the general audience.

Extension programs' planning and implementation

There are two approaches that could be used for extension programming, namely top-down approach and bottom-up/participatory approach. The bottom-up approach is a two-way information flow system that considers prior consultation with target beneficiaries about their needs/problems and aspirations for effective planning. On the contrary, the top-down approach is simply a one-way information delivery system that reinforces the hierarchical relationship between the extension agent and the client (Cristóvão, et al., 1998; Gao, 2016).

Extension services provision and financing

It has been universally perceived that institutional pluralism in extension's improvement contributes to success. The consensus of opinion also holds that to accomplish differing agricultural objectives and serve diverse target populations, a combination of public, private and voluntary extension efforts is needed. Experience shows that diversity is the only way to address ever-changing circumstances and various categories of users (Ameur, 1994: 12). Various cases illustrate the fact that other actors can give certain types of extension services more proficiently and more successfully than public sector agencies. Different service providers can be related with public services depending upon the domain or type of users targeted, thereby complementing public extension services in areas where these service providers are more productive than public services (Collion, 2004, 1-2).

Many services that were managed in the past by governments are presently being managed and delivered by the private sector, particularly in developed countries. The fundamental reason is decreasing budgets of public institutions, which makes them relatively inefficient and less productive, causing not only financial loss to the government but also creating discontent among individuals. The private sector, on the other hand, has generally more assets, innovative ideas, and a motive for profit and is thus keen to offer efficient and better services to its customers (Qamar, 2005, 11). Private extension is not a single element, but includes an extensive varieties of modalities, from the spontaneous emergence of private markets for certain types of advice and service to carefully guided public support for the development of private extension provision. A vital component to understanding private extension is the fact that it is conceivable to separate the provision of funding from the provision of service. If privatized extension is to make a contribution, it will not embody the replacement of a monolithic public extension system by a similarly undifferentiated private system; instead, it will permit the development of a scope of extension modalities and funding strategies (Chapman and Tripp, 2003, 1).

To distinguish strategies for making agricultural extension demand-driven, it is valuable to consider the scope of institutional options by which these services can be provided and financed, considering that organizations of the public, private, and third sectors can collaborate in various combinations (Birner & Anderson, 2007, 5). Table 1 classifies the institutional options.

Table 1. Options for providing and financing agricultural extension services

Provision of Service	Financing of Service				
	Public sector	Private sector: farmers (individuals)	Private sector: companies	Third sector: nongovernmental organizations (NGOs)	Third sector: farmer-based organizations (FBOs)
Public sector	(1) Public sector extension	(5) Fee-for service extension, provided by public sector	(9) Private companies contracting public sector extension agents	(11) NGOs contracting public sector extension agents	(15) FBOs contracting public sector extension agents
Private sector: Companies	(2) Publicly financed contracts or subsidies to private sector extension providers	(6) Private extension agents, farmers pay fees	(10) Information provided with sale of inputs or purchases of outputs	(12) Extension agents from private company hired by NGOs	(16) FBOs contracting extension agent from company
Third sector: (NGOs)	(3) Publicly financed contracts or financial support to NGOs providing extension	(7) Extension agents hired by NGO, farmers pay fees		(13) Extension agents hired by NGO, service provided free of charge	
Third sector: (FBOs)	(4) Public financial support to supplied to extension provision by FBOs	(8) Extension agents hired by FBO, farmers pay fees		(14) NGO financing extension agents who are employed by FBO	(17) Extension agents hired by FBO, service free to members

Source: Birner and Anderson, (2007: 5)

Methodology

The framework for determining the need for extension reform (FDNER), developed by Qamar (2005: 21- 24), was used to determine whether the national system of agricultural extension in KSA needs to be reformed or not, the framework contains 32 statements for key aspects of the extension system, which are marked as true or false. If false is marked for most of the statements, then the extension system is a good candidate for reform and possible restructuring.

Alternative to decentralization (Swanson, 2008: 28; Rivera and alex, 2004: 2; Rivera et al., 2001: 29), extension approaches (Axinn, 1988; Nagel, 1998; Rivera, et al., 2001: 11-12; Ponniah, et. al., 2008: 84-93), extension programs' planning and implementation (based on Cristóvão, et al., 1998; Gao, 2016), and those of providing and financing services (Birner and Anderson, 2007: 5) were used to determine extension personnel's opinions on extension reform alternatives.

Data were collected using questionnaire form within personal interviews with 81-extension personnel represent all extension directories around the nation during the period from May-August 2016. Frequencies and percentages were used for data presentation

Results and discussions

Determining the need for reforming agricultural extension system in KSA

In order to determine whether the national system of agricultural extension in KSA needs to be reformed or not, the extension personnel were asked to determine their opinions on the statements included in the framework for determining the need for extension reform (FDNER). Then, statements related to each aspect are combined and responses are divided into two categories: 1) the extension system is needs to be reformed with about 50% or more of statements are false and 2) the extension system is does not need to be reformed with about 50% or more of statements are true.

Findings indicated in table 2, show that all aspects of extension system are good candidates for reform and possible restructuring, they could be ranked as financing, policy & organizational structure, field operations and staffing, as reported by 77.8%, 75.3%, 63.1%, and 50.6% of respondents, respectively. Concerning the overall extension system, about 66.7% of respondents reported that the extension system in KSA is a good candidate for reform and possible restructuring.

Table 2. Distribution of respondents according to their responses about aspects of the framework of determining the need for extension reform (FDNER) (N= 81)

Aspects of the framework	Number of statements	Categories of extension officials' responses			
		Need to be reformed*		Does Not need to be reformed**	
		F	%	F	%
Policy & organizational structure	11	61	75.3	20	24.7
Financing	1	63	77.8	18	22.2
Staffing	3	41	50.6	40	49.4
Field operations	17	51	63.1	30	37.0
The overall extension system	32	54	66.7	27	33.3

* = False is marked for about 50% or more of the statements

** = True is marked for about 50% or more of the statements

Source: the study's findings

Alternatives of reforming agricultural extension system in KSA

Alternatives of extension decartelization

In order to determine which alternative of decentralization is appropriate for reforming and restructuring of the Saudi Arabian extension system, respondents were asked to determine their opinions on some arrangements of decentralization namely: Deconcentration, Delegation, Devolution, and Transferring of specific extension activities to NGOs, FBOs and private firms at different levels. Findings revealed that extension personnel in KSA welcome all alternatives of decentralization. All types of decentralization gained the agreement of more than four fifths of respondents.

Findings in table 3 show that the top priority decentralization alternative is transferring of specific extension activities to NGOs, FBOs and private firms at different levels which represented by shifting responsibilities for specific extension activities from the central government to FBOs, NGOs and/or private firms at different levels as reported by 87.65% of respondents. The second preference which reported by 86.42% of respondents was the deconcentration or assigning selected managerial functions (e.g. program planning and implementation) to district and local levels within the national/ provincial/ state-level agricultural extension system. While devolution (transferring program planning, management and co-financing responsibilities to local and/or district-level governments) is located in the

third priority of 85.19% of respondents. Delegation (a semi-autonomous government agency may be assigned responsibility for providing or coordinating extension services on a territorial basis) was at the end of list as reported by 83.95% of respondents.

Table 3. Opinions of respondents about alternatives of extension decentralization (N= 81)

No.	Alternatives of extension decentralization	Appropriate		Inappropriate		Rank
		F	%	F	%	
1.	Deconcentration	70	86.42	11	13.58	2
2.	Delegation	68	83.95	13	16.05	4
3.	Devolution	69	85.19	12	14.81	3
4.	Transfer of specific extension activities to NGOs, FBOs and private firms at different levels	71	87.65	10	12.35	1

Source: the study's findings

Alternatives of extension approaches

In order to determine which alternative of extension approaches is appropriate for reforming and restructuring of the Saudi Arabian extension system, respondents were asked to determine their opinions on the eight extension approaches. Findings in table 4 revealed that the most accepted approach was the agricultural extension participatory approach as decided by 91.36% of respondents, followed by the educational institution and the farming systems development approaches that gained the agreement of 87.65% respondents. On the other hand, results also show that general agriculture extension approach was the most rejected approach of extension in case of reforming and restructuring of extension system in KSA, it gained the acceptance of only 51.85% or respondents.

Table 4. Opinions of respondents on alternatives of extension approaches (N= 81)

No.	Alternatives of extension approaches	Appropriate		Inappropriate		Rank
		F	%	F	%	
1.	The general agriculture extension approach	42	51.85	39	48.15	8
2.	The commodity specialized approach	50	61.73	31	38.27	7
3.	The training and visit approach	63	77.78	18	22.22	4
4.	The project approach	56	69.14	25	30.86	6
5.	The cost-sharing approach	58	71.60	23	28.40	5
6.	The educational institution approach	71	87.65	10	12.35	2.5
7.	The agricultural extension participatory approach	74	91.36	7	8.64	1
8.	The farming systems development approach	71	87.65	10	12.35	2.5

Source: the study's findings

Alternatives of extension programs' planning and implementation

In order to determine which alternatives of extension programs' planning and implementation are appropriate for reforming and restructuring of the Saudi Arabian extension system, extension personnel were asked to determine their opinions on the five extension alternatives. Findings in table 5 show that the two common alternatives of planning and implementation of extension programs (Top-down / Bottom-up) were inappropriate nowadays in Saudi Arabia as mentioned by respondents. On the other hand, the approach of representing farmers through elections in program planning process is the most appropriate alternative as mentioned by most of respondents (88.89%), followed by involving NGOs and FBOs in program planning and implementation as indicated by 85.42% of extension personnel in KSA.

Table 5. Opinions of respondents on alternatives of extension programs' planning and implementation (N= 81)

No.	Alternatives of extension programs' planning and implementation	Appropriate		Inappropriate		Rank
		F	%	F	%	
1.	Top-down planning of extension programs	46	56.79	35	43.21	5
2.	Bottom-up planning of all extension programs	62	76.54	19	23.46	3
3.	Bottom-up planning of all extension programs except programs of public goods	61	75.31	20	24.69	4
4.	Forming elected farmers groups to be involved in program planning and implementation	72	88.89	9	11.11	1
5.	NGOs and FBOs participation in program planning and implementation	70	86.42	11	13.58	2

Source: the study's findings

Alternatives of extension provision and financing

In order to determine which alternatives of providing and financing extension services are appropriate for reforming and restructuring the extension system in KSA, respondents were asked to determine their opinions on seventeen alternatives.

Results in table 6 show extension personnel prefer provision of extension services through public sector with any of financing mechanism. The Public-Public mechanism was located in the top priority alternative of services financing and provision as mentioned by 90.12% of extension personnel. The alternatives of FBOs-Public and NGOs- Public were at second and third position alternatives of preferences of services financing and provision as indicated by 82.72% and 81.48% of respondents, followed by the alternative of Companies-Public for financing and provision as indicated by 80.25%.

Findings also revealed that extension personnel do not accept financing extension services by farmers with any of service provider. All alternatives included financing extension services by farmers were located at the end of list of respondents' preferences of alternatives of providing and financing extension services are appropriate for reforming and restructuring the extension system.

Table 6. Opinions of respondents about alternatives of providing and financing extension services (N= 81)

No.	Financing of services	Provision of services	Appropriate		Inappropriate		Rank
			F	%	F	%	
1.	Public sector	Public sector extension	73	90.12	8	9.88	1
2.		Private sector (companies): Publicly financed contracts or subsidies to private sector extension providers	65	80.25	16	19.75	5.5
3.		Third sector (NGOs): Publicly financed contracts or financial support to NGOs providing extension	60	74.07	21	25.93	10
4.		Third sector (FBOs): Public financial support to supplied to extension provision by FBOs	65	80.25	16	19.75	5.5
5.	Private sector: farmers	Public sector: Fee-for service extension, provided by public sector	25	30.86	56	69.14	17
6.		Private sector (Companies): Private extension agents, farmers pay fees	34	41.98	47	58.02	15
7.		Third sector (NGOs): Extension agents hired by NGO, farmers pay	36	44.44	45	55.56	14

		fees					
8.		Third sector (FBOs): Extension agents hired by FBO, farmers pay fees	32	39.51	49	60.49	16
9.	Private sector: companies	Public sector: Private companies contracting public sector extension agents	65	80.25	16	19.75	5.5
10.		Private sector (Companies): Information provided with sale of inputs or purchases of outputs	64	79.01	17	20.99	8
11.	Third sector: NGOs	Public sector: NGOs contracting public sector extension agents	66	81.48	15	18.52	3
12.		Private sector (Companies): Extension agents from private company hired by NGOs	48	59.26	33	40.74	12.5
13.		Third sector (NGOs): Extension agents hired by NGO, service provided free of charge	65	80.25	16	19.75	5.5
14.		Third sector (FBOs): NGO financing extension agents who are employed by FBO	55	67.90	26	32.10	11
15.	Third sector: FBOs	Public sector: FBOs contracting public sector extension agents	67	82.72	14	17.28	2
16.		Private sector (Companies): FBOs contracting extension agent from company	48	59.26	33	40.74	12.5
17.		Third sector (FBOs): Extension agents hired by FBO, service free to members	61	75.31	20	24.69	9

Source: the study's findings

Conclusion

According to the research results, it could be concluded that national system of extension is a good candidate for reform and possible restructuring. Aspects of reform could be ranked as financing followed by policy & organizational structure, followed by field operations and lastly the staffing aspect. It also became clear that the most appropriate arrangements of extension decentralization are: 1) Transfer of specific extension activities to NGOs, FBOs and private firms at different levels, 2) Deconcentration, and 3) Devolution and lastly 4) Delegation.

From the alternative extension approaches, the participatory approach is the most appropriate, followed by farming systems development and educational institution approach, while the general agriculture extension approach came at the end of list. Participation of elected groups of farmers and NGOs & FBOs were the most appropriate alternatives of extension program planning and implementation followed by bottom-up approach of extension programs. On the other hand, the top-down approach of extension programs is the most inappropriate alternative for program planning and implementation.

With regard to the alternatives of providing and financing extension services, it came out that extension personnel prefer provision of extension services through public sector with any form of financing mechanism. The Public-Public mechanism was the most accepted alternative followed by FBOs-Public and NGOs- Public alternatives. On the other hand, extension personnel do not accept financing extension services by farmers with any service provider.

In addition to the previous reforming alternatives, following actions could be valuable and interesting:

1. formulate a clear national extension policy using strategic thinking,
2. direct the extension policy toward demand-driven and market oriented approaches in addition to public goods issues,
3. establish an enabling environment for extension workers
 - providing and supporting allowances and incentives,
 - hiring more extension workers
 - increasing the financial resources of extension services
 - redistributing and identifying work responsibilities,
 - liberating extension workers from administrative work.
4. tack initiative to recruitment of qualified extension personnel with required competencies for the job,
5. promote public-private partnerships (PPPs) and institutional pluralism,
6. establishing national agricultural innovation system to improve a more profitable relationship among the institutions, the for-profit and not-for-profit organizations, the producers and other stakeholders engaged in agricultural development.

References

- Abdel-Ghany, M. M. and Ahmed M. Diab (2013). Reforming agricultural extension in Egypt from the viewpoint of central level extension employees. *Arab Univ. J. Agric. Sci.*, 21(2): 143-154.
- Alsaghan, Bander M. (2006). The reality of agricultural extension work in Riyadh and Qassim from the perspective of extension workers. MSc. diss., College of Food and Agricultural Sciences, King Saud University, Riyadh, KSA.
- Alsaghan, B. M., Ahmed M. Diab, and Abdullah S. Alhotan (2017). Social network sites utilized in agricultural extension services in Kingdom of Saudi Arabia. *AGROFOR International Journal*. 2(1): 19-27.
- Alsaghan Bander M., Emad M. El-Shafie , and Abdel-halim Abbas Keshta (2015). Obstacles of Agricultural Extension Work in The Kingdom of Saudi Arabia. Sixth International Scientific Agricultural Symposium “Agrosym 2015”. Book of Abstracts, Jahorina, October 15 - 18.
- Al-Shayaa, M. Shayaa, Mirza B. Baig, and Gary S. Straquadine (2012). Agricultural Extension in The Kingdom of Saudi Arabia: Difficult Present and Demanding Future, *The Journal of Animal & Plant Sciences*, 22(1): 239-246.
- Al-Zahrani, Khodran. H. (1990). The Status of Agricultural Extension in the Kingdom of Saudi Arabia. *Bull. Fac. Agric., Cairo Univ.*, 41(3): 1101-1128.
- Al-Zahrani, Khodran H., and Emad. M. El-Shafie, Al-Hajj A. Al-Hajj (2003). The strategy of developing the role of agricultural extension to activate knowledge, information agricultural technology systems to achieve sustainable agricultural development in the Kingdom of Saudi Arabia. Unpublished report, College of Food and Agricultural sciences, King Saud University.
- Ameur, C. (1994). Agricultural extension, a step beyond the next step, World Bank Technical Paper Number 247, The World Bank, Washington, D.C.
- Axinn, George H. (1988). Guide on Alternative Extension Approaches. Food and Agriculture Organization of the United Nations, Rome.

- Birner, R., and J. Anderson (2007). How to make agricultural extension demand-driven? the case of India's agricultural extension policy, Discussion Paper 00729, International Food Policy Research Institute, Washington, DC.
- Chapman, R., and R. Tripp (2003). Changing incentives for agricultural extension – a review of privatized extension in practice, Network Paper No. 132, Overseas Development Institute, London.
- Collion, M. (2004). Introduction to revitalization within public sector services, In Rivera, William and Gary Alex (eds). Extension reform for rural development: volume 4, revitalization within public sector services, Agriculture and Rural Development Discussion Paper 11, World Bank, Washington, DC.
- Cristóvão, A., T. Koehnen, and J. Portela (1998). Developing and delivering extension programmes. In Swanson, B. E.; R. P. Bentz; A. J. Sofranko (eds) Improving agricultural extension. A reference manual. Food and Agriculture Organization of the United Nations, Rome.
- Gao, Yun (2016) Top-Down and Bottom-Up Processes for Rural Development and the Role of Architects in Yunnan, China. Buildings 6(47): 1-21. MDPI, Basel, Switzerland.
- Ministry of Agriculture and Water (1999). A Challenges and Achievements over 100 Years of Agriculture and Water in the Kingdom of Saudi Arabia. Riyadh. KSA.
- Ministry of Environment, Water and Agriculture (2017). General administration of Agricultural Extension . Unpublished data.
- Nagel, U. J. (1998). Alternative approaches to organizing extension. In Swanson, Burton E., Robert P. Bentz and Andrew J. Sofranko. Improving agricultural extension. A reference manual. Food and Agriculture Organization of the United Nations, Rome.
- Ponniah, A.; R. Puskur, S. Workneh, and D. Hoekstra (2008). Concepts and practices in agricultural extension in developing countries: A source book. IFPRI (International Food Policy Research Institute), Washington, DC, USA, and ILRI (International Livestock Research Institute), Nairobi, Kenya. 275 pp.
- Qamar, K. (2000). Agricultural extension at the turn of the millennium: trends and challenges. In Human resources in agricultural and rural development, Food and Agriculture Organization of the United Nations, Rome.
- Qamar, K. (2005). Modernizing national agricultural extension systems: a practical guide for policy-makers of developing countries, Food and Agriculture Organization of the United Nations, Rome.
- Rajalahti, R., W. Janssen, and E. Pehu (2008). Agricultural Innovation Systems: From Diagnostics Toward Operational Practices. Agriculture and Rural Development Discussion Paper 38, Washington, DC.
- Rivera, W., G. Alex, (eds.) (2004). Extension reform for rural development: Volume 1, decentralized systems, Agriculture and Rural Development Discussion Paper 8, World Bank, Washington, DC.
- Rivera, W., K. Qamar, and L. Van Crowder (2001). Agricultural and rural extension worldwide: options for institutional reform in the developing countries, Food and Agriculture Organization of the United Nations, Rome.
- Sulaiman, R. V., and A. Hall (2004). Towards extension-plus: opportunities and challenges. Policy brief 17. National Centre for Agricultural Economics and Policy Research (NCAP), India

Swanson, B. (2008). Global review of good agricultural extension and advisory service practices, FAO, Rome.

The World Bank (2007). Enhancing Agricultural Innovation: How to Go Beyond the Strengthening of Research Systems. Washington, DC: World Bank.

The World Bank. (2000). Decentralizing Agricultural Extension, Lessons and Good Practice, Washington, D.C.