



# The Network Relationships Among Multiple Service Providers in Agricultural Extension Program Planning in Iran

Seyed Mahmood Hosseini, Erfan Alimirzaei, Yoysef Hejazi, Hamid Movahed Mohammadi

**Abstract** – Agricultural extension can be seen as a multi-sectorial network which is linked with other relevant organizations providing various sociotechnical services to address a wide range of farmers' demands. The effectiveness of such a system, depends primarily on the existence of powerful linkages and closed collaboration among its institutional components and subdivisions. The main purpose of this applied study was to determine the existing level of work relationships amongst different extension actors in the field of program planning processes in Iran. A mixed methods research design was developed and relevant key informants were purposively selected. Qualitative data were gathered using unstructured interviews and analyzed according to the fundamental assumptions of soft system methodology (SSM). In contrast, quantitative data were collected through a survey using a researcher-made questionnaire and analyzed by social network analysis (SNA). Results showed there was not an appropriate linkage among multiple extension actors in program planning activities. However, public extension as a popular node, had a central position in the networks. There are several concerns with such a highly centralized network. So that, it does not seem to be suitable for handling the complex extension program planning responsibilities.

**Keywords** – Agricultural Extension, Pluralistic System, Program Planning, Social Network.

## I. INTRODUCTION

Agriculture extension is an essential tool for dealing with the serious challenges facing agriculture while helping to increase productivity and reduce poverty [1]. At the beginning, agricultural extension focused very much on increasing production, improving yields, training farmers, and transferring technology in most developing countries. Today extension is no longer viewed as an agency but as a system that is integral and central to innovation systems which focuses on facilitating interaction and learning rather than solely on training farmers and has a vital role to play in helping to strengthen capacities to innovate and broker linkages [2]-[1]. An important element of an innovation system is the array of social networks within which innovation actors interact with one another, or the sets of individuals or organizations in which each has connections of some kind to some or all of the other members of the set [3].

The mixture of public and private extension activities which exists in most countries, and their relationships with surrounding communities, organizations and institutions, constitute an extension system [4]. In this regard, extension can be seen as a multi-sector network of knowledge and information support for rural people within

the context of a wide rural development agenda where different organizations from the public and the private sectors provide differentiated services to meet the complex and wide-ranging needs of farmers [5]-[6]. Especially in developing countries, extension services cannot use a single-sector approach, but rather, should operate as part of an integrated rural economy that incorporates agriculture and other sectors (e.g. education, health, finance, forestry, environment) to ensure sustainable development. So, the extension organization would have to view extension activities as an integrated part of a larger extension program, which is linked with other relevant organizations dealing with research, inputs, training, marketing, and other social services to address a much wider range of farmer needs than they have in the past [7]-[6]. Accordingly, the effectiveness of an agricultural extension system and its related services depends fundamentally on its organizational structure and professional linkages among its components with themselves and with other relevant development actors in both local and national contexts.

Nowadays, many countries are concerned with strengthening their national agricultural extension and advisory systems in which, a current problem is their top-down management structure and the failure of policy makers to understand how extension systems must continue to change, reflecting the needs of all farm households [8]. Furthermore, many governments have realized that due to some reasons such as budget deficits and limited resources, they are not able to provide all agricultural services as before [9]. So, extension organizations would have to foster a pluralistic extension system in which, there is more than one extension service provider involved in the provision of extension services in a community [6]. Pluralistic extension recognizes the inherent differences that exist between farmers and farming systems and the need to address challenges in agriculture development with different approaches [10]. The central idea is that farmers should be given opportunities for obtaining the advice and information they seek from those most able and willing to do so [11]. Actually, demand-driven extension requires pluralism in service provision on the supply side. As farmers can only exercise choice if there is a range of service providers to choose from [5]-[12].

A recent assessment of global extension systems has shown that many different types of advisory service providers and approaches exist. While public rural advisory service provision has played a major role in development, private companies, NGOs, and farmer organizations are becoming more important today, often



through synergies with other types of service providers involved with other sectors [13]. So that, accessing resources and knowledge, creating new knowledge and disseminating that knowledge require collaborative activities that often cut across geographical and institutional boundaries [14]. As a result, the question is no longer how the State should administer a national agricultural knowledge and information system, but rather how government agencies, NGOs and others can support the agricultural needs of specific social groups and meet specific objectives [15]. Under the new policy, a demand-driven extension system will be created by providing farmers with access to linkage mechanisms through which they would be provided all relevant information to help them articulate their problems and needs in relation to their production and marketing plans. The new extension regime recognizes the need for multi-agency collaboration to combine strengths [16].

In Iran, the agricultural sector by representing about 27% of GDP, 30% of employment opportunities, 82% of food supply and 35% of non-oil exports [17] is one of the most important sectors of the economy. Although in the last two decades agriculture's contribution in GDP has declined, it has still a vital role in national and regional development especially in rural areas. Among diverse supportive institutional services required for enhancing agriculture development, agricultural extension is one of the main components which its provision has been an important responsibility of the government attached to the Ministry of Agriculture since the beginning in 1950s.

However, after more than 50 years, agricultural extension providers have still not been able to reach and support all potential clientele [18]. Worse, analysis of extension services shows that they also lead to negative impacts such as environmental degradation, poverty, uneven development and inequality. As a result, agricultural extension as a professional practice in Iran needs to change [19]. During the past six decades, the structure of agricultural extension system has experienced many different forms and institutional adjustments which most of them were concentrated on conventional top-down approach and were often abolished one after another without any meaningful achievements. Now a days, the agricultural extension system in Iran is facing a serious crisis. In parallel with changing trends in the sector, the general belief is that hierarchically structured public extension is too heavy and inefficient so that it can no longer respond to the contemporary multi-dimensional demands of Iranian farmers. On the other hand, the complex problems and diverse evolving needs of heterogeneous categories of farmers cannot be individually addressed by segregated extension agencies from any other sectors. Accordingly, improving the participation of other sectors especially non-governmental agencies in agriculture extension provision has been one of the main objectives regarding agricultural development in the country's policy frameworks in recent decade. Because, Iranian policymakers have realized that in a coherent and integrated multi-sectorial system, the agricultural extension programs have a greater chance of

fulfilling their responsibilities and professional expectations.

Today, agricultural extension and advisory services are provided in a wide range of topics by several often independent actors from public, private, and non-profit sectors who trying to respond to the farmers' society demands. However, despite of many common interests, program goals and target clientele, there are no obligatory functional interactions or effective work relationships among them as the related components of an integrated extension system especially in program planning processes.

As some scholars (such as Qamar, 2000; Garforth et al., 2013) have noted, poor networks and the lack of coordination and closely work relationships among different extension actors, can lead to duplicating, wasting scarce resources, consuming time, conflicting redundant technical recommendations, occurring probably disputes and consequently, distrusting confused farmers about the extension services in general. So, there is a perceived need to establish a holistic structural platform couple with an effective executive mechanism in order to synchronize and coordinate the various extension programs and activities delivered by multiple extension actors. Despite of essential need to develop a pluralistic extension system in Iran, there has been little, if any, attention paid to investigate the collaborative extension program planning among various actors involved in the provision of different agricultural extension-related services. In this regard, the present contextualized applied study aims to explain the existent situation of professional relationships among multiple extension actors in the field of extension program planning activities. Undoubtedly, understanding the nature and the level of work relationships amongst different extension actors can be increasingly important to develop the agricultural extension program planning processes and their intended outcomes.

## II. METHODOLOGY

This study is part of an applied scholarly work based on the mixed methods research design carried out in Alborz and Tehran Provinces in the center of Iran. The specific purpose of the study was to determine the existing level of work interactions and professional relationships amongst different extension actors in the field of extension program planning processes. In this regards first of all, the accessible executive regulations and formal documents were carefully reviewed about the missions and functions of various extension service providers at the national as well as the regional perspectives. In the qualitative phase, data were gathered using in-depth unstructured interviews from 28 extension experts to identify the institutional boundary of the extension system and categorize multiple extension actors. In the quantitative section, a descriptive survey study was conducted using a researcher-made questionnaire to investigate the viewpoints of 45 key informants about the work relationships among various extension actors. This group of informants were purposively selected as representatives of different actors



involved in delivering various types of extension- related services across the region. To determine the existing work relationships among extension actors, people were asked to choose a number from 0 to 10 in each pair wise comparison. Qualitative data were analyzed according to the main assumptions of Soft System Methodology (SSM). In contrast, quantitative data were analyzed by Social Network Analysis (SNA) using UCINET 6 software. Although, there were several ways to determine the *centrality* in a social network at the level of individuals, two important indexes namely *degree* and *betweenness* were quantified in this study to illustrate the status of each extension actor's centrality in the program planning relationships' network.

### III. RESULT

According to the results obtained from qualitative data analysis, the different natural and legal persons from both governmental and non-governmental sectors who were involved in the provision of various kinds of the agricultural extension-related services, were classified in 21 distinctive institutional categories as explained in table (I).

Table 1. Title of extension actor categorizes, their abbreviations and individual centralities

| Betweenness Centrality | In-Degree centrality | Out-Degree Centrality | Abbreviation | Title of Extension Actor  |
|------------------------|----------------------|-----------------------|--------------|---|
| 137.13                 | 13.00                | 14.00                 | PBLC         | Public extension agencies affiliated with the Ministry of Agriculture   |
| 3.23                   | 3.00                 | 5.00                  | GULD         | Agricultural Guild System and subsubbureaus   |
| 19.00                  | 6.00                 | 2.00                  | FOs          | Farmers' Organizations  |
| 4.00                   | 1.00                 | 5.00                  | COPR         | Ministry of Cooperatives, Labor and Social Welfare and subsubbureaus  |
| 42.68                  | 5.00                 | 10.00                 | ENVR         | Department of Environment and subsubbureaus   |
| 0.00                   | 11.00                | 0.00                  | PROG         | Progressive farmers and rural facilitators  |
| 0.33                   | 4.00                 | 2.00                  | CMRL         | Commercial farmers and agro-industries  |
| 1.33                   | 2.00                 | 7.00                  | NGOs         | Non- Governmental Organizations (NGOs)  |
| 0.50                   | 2.00                 | 6.00                  | MOBL         | Agricultural Engineers' Basij Organization and subsubbureaus  |
| 1.73                   | 3.00                 | 2.00                  | ASOC         | Scientific Associations related to agriculture affiliated with the Ministry of Science, Research and Technology |
| 0.20                   | 2.00                 | 2.00                  | HELT         | Ministry of Health and Medical Education and subsubbureaus  |
| 0.00                   | 3.00                 | 4.00                  | IDON         | International Donors (such as FAO, Word Bank, UNDP, etc.)   |
| 0.00                   | 3.00                 | 2.00                  | DDON         | Domestic Donors (such as Religious Boards, Red Crescent Society, mass media, etc.)                              |
| 2.48                   | 3.00                 | 4.00                  | BANK         | Agricultural Bank and other related credit institutions   |
| 96.22                  | 13.00                | 8.00                  | PRVT         | Private extension firms   |
| 2.45                   | 11.00                | 2.00                  | UNTY         | Agricultural universities and other higher education institutions   |
| 0.00                   | 0.00                 | 3.00                  | PARK         | Science and Technology Parks  |
| 0.25                   | 1.00                 | 4.00                  | PACK         | Packing and processing enterprises  |
| 9.50                   | 7.00                 | 4.00                  | INPT         | Agricultural input and equipment suppliers  |
| 0.00                   | 0.00                 | 2.00                  | MNCP         | Municipalities and subsubbureaus  |
| 19.95                  | 6.00                 | 11.00                 | RSRC         | Forests, Range and Watershed Management Organization and subsubbureaus  |

Although all of these actors participate at least in delivering of one extension-related service at a large or small scale, according to the documents, most of them have no official status in the formal agricultural extension system and dependent functions' management such as decision-making and program planning processes. As a result, there is not an integrated operational strategy in programing and most of the extension actors, serve rural community without any necessary coordination with the others.

On the other hand, the results of SNA showed the network's density 0.236 which implies that the cohesion of

the extension program planning's network is very low at present. So that in comparison to the total number of 421 possible links in the network, only 99 links were observed amongst multiple extension actors. Also, the whole reciprocity index estimated 0.303 which indicates from every 10 existent links in the program planning network, only 3 of them are mutual and two-way. Accordingly, it can be concluded that many extension actors in the network do not feel the need to contact and coordinate with the others. Furthermore, the total centrality of the network which assesses the degree to which centralities of multiple extension actors differ among each other, was calculated



0.513.

Findings show, although there is a moderate diversity in the structure of work relationships' network to cope with the general and common rural problems, but many of the extension actors do not have work linkages with the others in the extension program planning's network to deal with the complex situations and related bottlenecks in rural areas. Still worse, complementary qualitative finding indicate which many of existence linkages amongst the extension actors are not voluntary and most of the time, occur in a symbolic or obligatory executive manner without necessary effectiveness.

However, as information in the table (I) illustrate, the public extension agency with the highest degree centrality, has a concentrated status in comparison to the other extension actors in the program planning's network

especially in terms of betweenness index. So, on one hand, the public extension agencies receive comparatively much more information from the others and on the other hand, along with the private companies are two active institutional components of the extension system in giving information to the rest extension actors in the program planning relationships' network. As figure (I) symbolically illustrates, the overall program planning's network is highly centralized. Few actors such as public extension are densely tied to the other extension actors and at the same time, most of the rest have a little work connections within the existent *core-periphery* network.

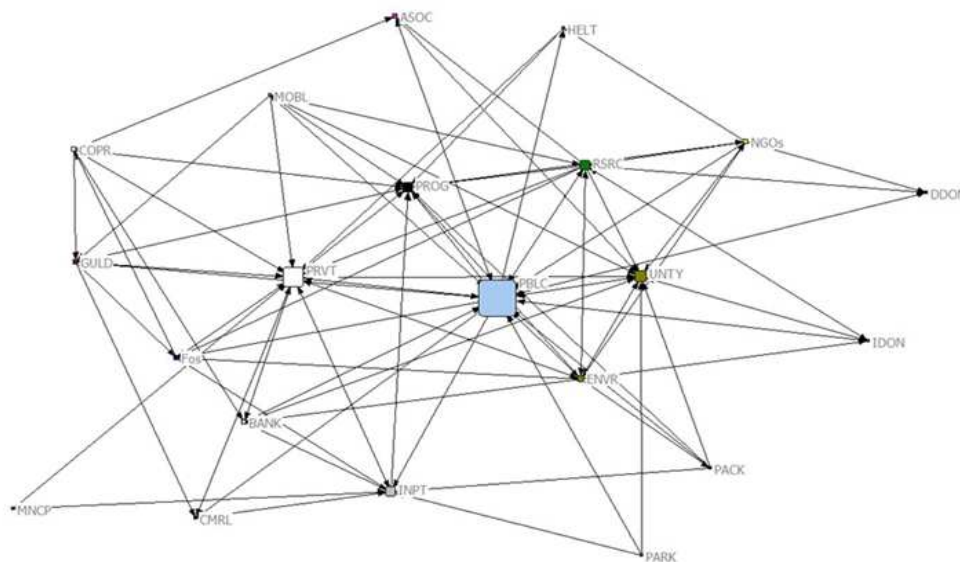


Fig. 1. Multiple actors' relationships in the field of extension program planning activities

So, it can be concluded that the public extension agency as a popular node, has a unique powerful influence in the extension program planning's network and can induce or dictate a few government desired programs and priorities to the others. So, many other important functions and extension priorities will be unintentionally ignored. Furthermore, very high betweenness centrality of the public extension in contrast with the other actors, implies that the public agency has a strongest capability to act as a communicational bridge and can strongly influence and control the flow of program planning-related information among the other multiple extension actors and link them indirectly to each other in the present network. However, most of the rest multiple extension actors are not associated with the others and can be regarded as periphery nodes at the margins of the existence program planning's network. These periphery nodes have little power, if any, and cannot contribute efficiently in the extension programming. So, they prefer to program their services individually and operate away from others in an isolated manner. It is no secret that program planning is the heart of the any extension activities and bringing

various stakeholder together as much as possible couple with collaborating among them can improve the outcomes intended from the agricultural extension services.

According to Frank *et al.*, (2007) and Ernstson *et al.*, (2009) there are however, several concerns with such a highly centralized network [20]. So that, the uneven distribution of ties in itself leads to asymmetric relations of influence and power. This means that issues of legitimacy and accurate representation of peripheral actors need to be brought into the any analysis. Also, such a centralized extension network may not be optimum and even suitable for program planning responsibilities of the extension system to deal with complex and sophisticated agricultural and rural context in Iran and related problems. Furthermore, such a highly centralized network is also more vulnerable to the removal or dysfunctionality of the few central actors, specifically public extension agency hereon.

Furthermore, figure (I) shows apart from public agencies; Private extension firms; Forests, Range and Watershed Management Organization with subbureaus; Agricultural universities and other higher education



institutions; Department of Environment with subetbureaus; and Progressive farmers and rural facilitators; are rather central nodes and therefore influential in the extension program planning's network. However it seems that these actors don not have notable formal positions in the agricultural extension system in the country whilst they should be seriously considered.

#### IV. CONCLUSION

If Iranian agricultural extension system is willing to serve all categorizes of farmers at national and regional levels, it must develop a coherent pluralistic network. Neither governmental nor non-governmental service providers can alone comply all extension responsibilities in an effective manner. Rather, the efficiency and effectiveness of all institutional components of the extension system depend strongly on professional interactions and powerful work linkages among them which should be increasingly encouraged. Hence, developing the operational participation of multiple extension providers in program planning activities is a crucial element in a balanced pluralistic extension system. However results show, public extension has a central position in the extension program planning's networks. Such a centralized position of the public sector is not suitable for extension system and even could put the program planning's network at the risk of sudden collapse. It can be concluded, there is not an appropriate linkage among multiple extension actors. So that many of the identified extension providers are not strongly associated with the others and have a little, if any, information sharing in extension program planning processes. Accordingly, an integrated institutional platform must be developed to coordinate program planning activities among multiple extension actors and via providing relevant incentives, peripheral actors should be attracted and actively involved in related processes. Undoubtedly, appropriate policy environment, financial support from government and cross-sectorial coordination will accelerate the establishment of a harmonic extension program planning's network. In this regards, more studies and specifically a contextualized institutional mapping are recommended to determine the capabilities of each extension provider and proportionate responsibilities to undertake in a pluralistic extension program planning's network.

#### REFERENCES

- [1] K.Davis, and W. Heemskerck, "Investment in extension and advisory services as part of agricultural innovation systems", in *agricultural innovation systems: an investment sourcebook*, Washington, DC: The World Bank, 2012, pp. 179-193.
- [2] D. J. Spielman, K. Davis, M. Negash, and G. Ayele., "Rural Innovation Systems and Networks: Findings from a Study of Ethiopian Smallholders", *Agriculture and Human Values*, 28(2), 2011, pp. 195–212.
- [3] D. J. Spielman, K. Davis, M. Negash, and G. Ayele.,(2010, June). Rural innovation systems and networks: findings from a study of Ethiopian smallholders, *Agriculture and Human Values*, [Science+Business Media]. Available: <https://www.researchgate.net>

- [4] L. A. Schwartz, *The role of the private sector in agricultural extension: economic analysis and case studies*, Ithaca: Cornell University, 1994.
- [5] W. Rivera, and G. Alex, *Decentralized systems: Case studies of international initiatives*, Washington, DC: The World Bank, 2004.
- [6] E. L. Okorley, D. Gray and J. Reid, "Towards a cross-sector pluralistic agricultural extension system in a decentralized policy context: a Ghanaian case study", *Journal of sustainable development in Africa*, vol. 12, No.4, 2010.
- [7] E. L. Molua, "The economics of tropical agroforestry systems: The case of agroforestry farms in Cameroon", *Forest Policy and Economics*, 7(2), 2005, pp. 199-211.
- [8] B. E., Swanson. (2011, Aug 26). Changing extension paradigms within a rapidly changing global economy, [On line]. Available: <http://www.meas-extension.org>.
- [9] P.C. Ajieh, A.E. Agwu, and A.C. Anyanwu, "Constraints to Privatization and Commercialization of Agricultural services as perceived by extension professionals and farmers", *African journal of agricultural research*, 3(5), 2008, pp. 343-347.
- [10] H.R. Gemo, J. B. Stevens, and P. Chilonda, "The role of a pluralistic extension system in enhancing agriculture productivity in Mozambique", *South African Journal of Agricultural Extension*, 41(1), 2013, pp.59-75.
- [11] A.D. Kidd, J.P.A. Lamers, P.P. Ficarelli, and V. Hofmann, "Privatising agricultural extension: caveat emptor", *Journal of Rural Studies*, Vol. 16, 2000, pp.95-102.
- [12] C. C., Garforth, et al., "Farmer experience of pluralistic agricultural extension, Malawi", *Journal of agricultural education and extension*, Vol. 19 (2), 2013, pp.147-166.
- [13] GFRAS, "Building Knowledge Systems in Agriculture: Five Key Areas for Mobilising the Potential of Extension and Advisory Services", Switzerland, Position Paper, June 2012.
- [14] D. R. Camille and H. Creech, "An experiment with social network analysis: assessing the scope and scale of IISD's relationships on Internet governance to test the usefulness of social network analysis for network evaluation". The International Institute for Sustainable Development (IISD), 2008.
- [15] I. Christoplos, "Mobilizing the potential of rural and agricultural extension", Rome: FAO, 2010.
- [16] K. M. Singh, B.E. Swanson, and M.S. Meena. (2013, August). Reforming India's Pluralistic Extension System: Some Policy Issues. *SSRN Electronic Journal*. Available: <http://ssrn.com/abstract>
- [17] H. Asadihkoob, and M. S. Ebrahimi, "Farmer's Attitude to Agricultural and Rural Development in South west Iran", *Journal of applied environmental and biological sciences*, 5(8s), 2015, pp. 86-90.
- [18] A. W. Van den Ban, and R. K. Samanta, *Changing roles of agricultural extension in Asian Nations*, Delhi: B.R. Publishing, 2006.
- [19] S. M. Hosseini, and A. Rezaei, "Developing an Information System for Sustainable Natural Resource Management in Alborz Watershed, Northern Iran", *Systemic Practice and Action Research*, vol. 26, Issue 2, 2013, pp. 131-152.
- [20] O. Bodin, and B. I. Crona, "The role of social networks in natural resource governance: what relational patterns make a difference?" *Journal of Global environmental change*, vol. 19, 2009, pp. 366 -374.

#### AUTHORS' PROFILE



##### Seyed Mahmood Hosseini

Professor of Agricultural Extension & Education, Department of Agricultural Extension & Education, College of Agriculture & Natural Resources, University of Tehran, Iran.

Email: [hseimim@ut.ac.ir](mailto:hseimim@ut.ac.ir)



**Erfan Alimirzaei**

PhD. student of Agricultural Extension, Department of Agricultural Extension & Education, College of Agriculture & Natural Resources, University of Tehran, Iran.

Email: [e.alimirzaei@gmail.com](mailto:e.alimirzaei@gmail.com)



**Yoysef Hejazi**

Professor of Agricultural Extension & Education, Department of Agricultural Extension & Education, College of Agriculture & Natural Resources, University of Tehran, Iran.

Email: [yhejazi@ut.ac.ir](mailto:yhejazi@ut.ac.ir)



**Hamid Movahed Mohammadi**

Professor of Agricultural Extension & Education, Department of Agricultural Extension & Education, College of Agriculture & Natural Resources, University of Tehran, Iran.

Email: [hmovahed@ut.ac.ir](mailto:hmovahed@ut.ac.ir)