



STUDY OF ROLE OF AGRICULTURAL EXTENSION IN THE DISSEMINATION OF SUSTAINABLE AGRICULTURAL DEVELOPMENT

¹Jadalla.A.E.Omar, ¹Abu Hassan Abu Bakar, ²Hasnah MD. Jais & ³Faisal Moftah Shalloof

¹School of Housing, Building & Planning, Universiti Sains Malaysia (USM), 11800 Penang, Malaysia

²School of Biological Sciences, Universiti Sains Malaysia (USM), 11800 Penang, Malaysia

³School of Agriculture Economics, University Omar Al-Mukhtar, Al-Beida Libya

ABSTRACT

Achievement of a well organized extension system for efficient and effective extension delivery in all aspects of sustainable agriculture and rural development to attain food security, poverty reduction, rural empowerment and environment management. In order to solve the Problems of rural development, Agricultural extension systems need to encourage the active participation of Farmers in planning, implementing, and monitoring Agricultural extension programs. To achieve this participation, extension organizations will need to formally decentralize and Pluralistically transfer the control of specific program planning and management functions to the system levels of local Agricultural extension and Private sector organizations and Farmers organizations and Education organizations where extension programs are actually implemented.

KEYWORDS: - Decentralization, Pluralism, Sustainable Agricultural Development.

INTRODUCTION

Sustainable agriculture, although a difficult term to define operationally, includes the practice of low input agricultural production technologies, which attempts to ensure the profitability of farms while preserving the environment. And from the market point of view, these products obtained are sold at profitable prices which would provide incentives for farmers to adopt the necessary methods (Niamh Dennehy *et al.*, 2000). In addition, the farmers also need to be convinced that achieving such production systems for future generations is as crucial as, it is necessary to find a way to prioritize different programs and goals and then allocate resources towards those goals (Kristi N. Hughes and Ledbetter, 2009). It Provide efficient and effective need-based extension services to all categories of farmers, to enable them to optimize their use of resources, in order to promote sustainable agricultural and socioeconomic development (Hoque and Usami, 2007). There are difficulties in the operation of public extension systems and in the typical bureaucratic political environment within which they are budgeted and managed. The inability to service faulty equipment or acquire new ones, delay in the payment of salaries and allowances, embargo on recruitment of new staff and trainings, and infrequent promotion exercise are other problems (Al Subaiee *et al.*, 2005). Extension personnel perceived lack of funds to conduct timely research, inadequate transportation, resources of farmers, cost of inputs, and availability of credit as major constraints in technology transfer, inadequate supply of inputs, and inadequate coordination with development departments, banks, cooperatives and

other organizations (Rama Radhakrishna and Yoder, 1996). The fiscal unsustainability is a generic problem that affects many large-scale public agricultural extension systems (Witt *et al.*, 2008). We define fiscal sustainability as the financial ability to maintain the extension effort at a level that can realistically be expected to attain significant coverage (directly or indirectly) of the farming population nationwide (Quizon *et al.*, 2001). Farmers were reluctant to take the “risk” of implementing new practices, technologies or skills; had small scattered plots of land, showed little interest in extension programs because they lack confidence in the extension officers, possessed insufficient capital for inputs and little opportunity to acquire bank loans (Diamond, 2000). Agricultural extension services is the bedrock of Agricultural development, however, the development of the sector cannot be achieved without an efficient and effective extension system. Thus, there is the need for a well articulated and comprehensive Agricultural Extension Policy, Which depends on Decentralization and Pluralism to development of Agricultural extension system (Koyenikan., 2008). Agricultural extension services system is composed of a large number of varying elements, but there are some commonly known services which are essential to Sustainable agricultural development in spite of their various organizational schemes and arrangements. They include (Figure 1): agricultural research, agricultural extension, agricultural education and farmer’s training centers, agricultural credit, marketing system for purchasing inputs and selling agricultural produce, transport facilities, (Weitz, 1971, World Bank 1990, Umali 1994).

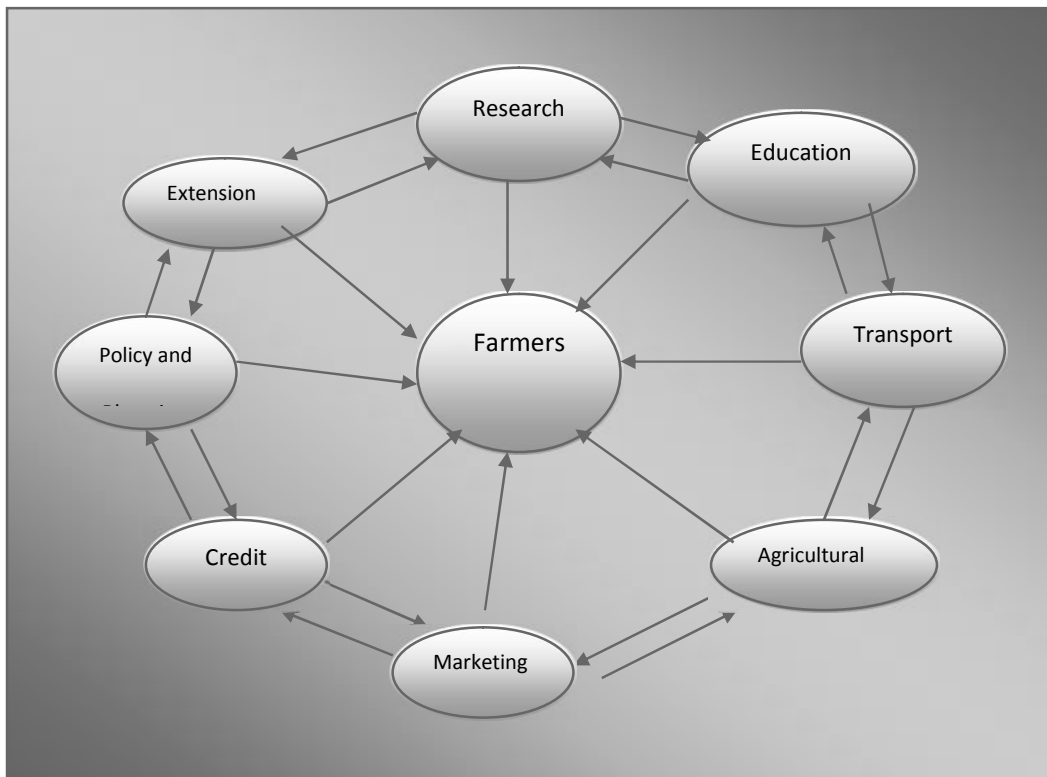


FIGURE 1: Elements that contribute in the dissemination of sustainable agricultural development.
Source, (Weitz, 1971, World Bank 1990, Umali 1994).

A review of research work study

Agricultural extension policy is a part of national development policy in general and of agricultural and rural development policy in particular. Hence, the problems of establishing or maintaining an effective agricultural extension service can be traced back to the lack of a realistic policy or an unstable policy framework for charting of the extension system (Swanson *et al.*, 1997). In developing national agricultural extension policies, representatives of all major groups of farmers should be directly involved and other relevant agricultural organizations, should have a comprehensive agricultural extension policy which provides for coordination with research and education. The most difficult and challenging policy issue facing extension today is to secure a stable source of funding (Swanson *et al.*, 1997). With the widespread trend to cut government budgets, therefore Policy makers should examine this issue carefully in deciding what level of public funding is necessary to support extension in relation to the needs of farmers in the country. Policies are predetermined guides to decision making; they establish boundaries or limits within which action may be taken. Many proposed instruments are not financially affordable within current budget allocations, even with greater efficiency in current spending, increasing the government budget allocations to agriculture will often be necessary (Farrington, 1995). Although it is hard to defend public funding of agricultural extension if the benefit is only for the farmers who use this service. There are many situations where the public at large also profits from the extension services, and this requires large increases in current budget allocations and

innovative public-private partnerships to make these investments (Van den Ban, 2000). In addition to creating a new management structure and hiring new employees, this new system had to arrange for new facilities such as offices, equipment, transportation, and a communications system (Burton E. Swanson and Rajalahti, 2010). Resources categorized into money, people, and time, have found a significant relationship between the resources and project implementation. They observed that having sufficient funding, appropriate people and enough time have had positive effects on a project's outcome (Chapman and Tripp, 2003). A search for alternative funding and delivering mechanisms is currently on and a decision on how to pursue these strategies (building political support for cost-sharing of agro technology transfer; establishment of farmers cooperative to serve as avenues for levy collection; enacting enabling legislation for cost-sharing; and increasing the number of extension staff or reducing the area of coverage per extension staff) would depend on the type and quality of services made available by various agencies at present (Chukwuone *et al.*, 2006). Subsidiary refers to the operational authority and responsibilities that are devolved to the lowest possible level of authority, consistent with organizational competencies and the efficient use of funds. Resources including funds, would be assigned to the grassroots level based on specific responsibilities, interested in and willing to shift the authority for providing extension services to farmers' associations, and moving towards shifting fiscal responsibility to districts and sub-counties while transferring the rights to farmer associations to contract-out to private entities for extension services (Rivera *et al.*,

2001). Agricultural extension can receive and expand project funds, enter into contracts and agreements and maintain revolving accounts that can be used to collect fees and thereby recovering operating costs (Van den Ban and Wageningen, 2003). The fees collected could be a potential source of funds for Agricultural extension to meet its declining operational funding (Van den Ban and Wageningen, 2003). Improving the competitiveness of farmers by financing agricultural extension may be a more effective and less costly way. However, people may realize what they have to pay in taxes to finance agricultural extension, but not what they would pay if import duties on food products were raised (Van den Ban, 2000). Fee-for-service Agricultural extension is provided for by Agricultural extension management (or another sector) and paid for by the farmers. Small groups of farmers usually contract the services. This arrangement allows farmers to “vote” on programs and program scale by paying for them (Davis, 2008). In addition to providing

feedback, fee-for-service also can provide additional sources of revenue to public extension, and private extension recognizes that public money can be used to fund private activities, and that public services may benefit from private (cost-recovery) revenues (Chapman and Tripp, 2003). Other measures include, increasing the number of extension staff or reducing the area of coverage by an extension agent and establishment of vibrant farmers cooperative to serve as avenue for collecting the charges from farmers (Chukwuone *et al.*, 2006). Therefore in order for cost-sharing to be effective, there should be enough information dissemination including radio advertisement and stakeholders’ in different parts of the country to sensitize the public especially farmers on cost sharing (Chukwuone *et al.*, 2006). The single most important feature of privatized extension systems is not a change in the source of funds but rather a change in the nature of incentives that drive information provision (Chapman and Tripp, 2003).

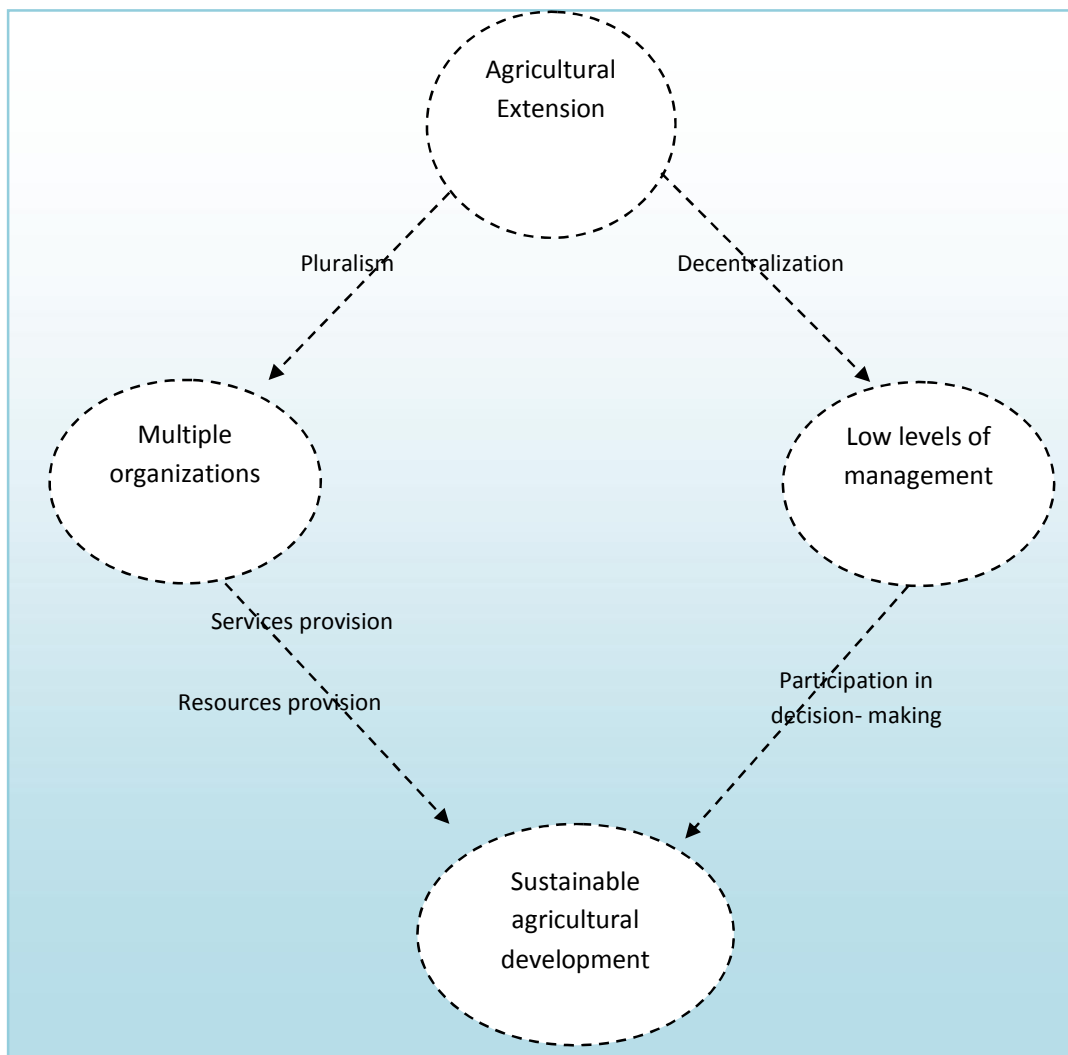


FIGURE 2: Different relationship to the agricultural extension for the dissemination of sustainable agricultural development.

Such changes certainly expand extension's ability to provide solutions to a wide range of complex problems while reducing costs and maintaining quality (Chapman

and Tripp, 2003). Sustainable agricultural development programs worldwide have recognized that local participation is the key to the sustainable transfer and long

term adoption of new technologies and approaches. Interactive participation is the approach that facilitates this kind of Sustainable agriculture programs (Toness, 2001). The main aim of the reorientation Agricultural extension programs was to encourage collaboration and integration by extension, research, tertiary institutions, participation of local stakeholders (different categories of farmers, plus representatives from private sector, rural banks, Agricultural organizations) and planning, and implementation of Sustainable agricultural development programs (Barrick *et al.*, 2009). In addition to participation of field staff in program planning, they are given responsibility for developing their own work plans and training programs and have representatives on the management of agricultural extension. Hence the field staff performance is expected to increase if they have program planning competency, program implementation competency and program evaluation competency (Tiraeyari *et al.*, 2010). Managers are related to policy formation in two ways. First, they play a crucial role in implementing organizational policies that have been established by higher management. Second, they create policies within their departments as guides for their own work groups (Swanson *et al.*, 1997). To achieve these linkages need to restructure with new expertise and skills and with a new set of decentralization procedures, which are less hierarchical and more flexible, to respond to the emerging needs of farmers at the local level and to improve the cooperation of cross of Pluralism extension approach among different government departments and other development agencies. (Figure 2)

Linking Decentralization of Agricultural Extension Systems to Sustainable agricultural development

Deconcentration is defined as the transfer of effective control by central Managements to regional and provincial Managements or other field level offices. In addition, this strategy may include the participatory involvement of farmers in the managerial processes for agricultural development (Rivera *et al.* 1997). District extension director received and followed instructions from the senior management of the agricultural extension with limited involvement of subordinate staff. The staff are involved in the development of the case organization's annual extension plan and each staff member is responsible in consultation with his supervisor, for the development of his own annual work plan and training program. Two field staff representatives are also included in a management team comprising the director and assistant, the supervisors and a support staff representative (Okorley *et al.*, 2009). Prior to decentralization, the management of the case organization was top-down - the decentralization is an example of promoting the participation of lower-levels of agricultural extension management in decision-making and budgeting. And extension, participatory and demand-led services are examples of the effort to integrate producers into agricultural processes (Niamh Dennehy *et al.*, 2000), as this allows much greater transparency of decision making because the field staff representatives are involved in the actual decision making (Okorley *et al.*, 2009). Decentralization also encourages more contact and open communication to build respect and trust among the

staff, gives a level of flexibility to field staff to design their location-specific extension activities with farmers. It encourages team work amongst the staff, and has opened itself up to increased scrutiny and input from farmers and other stakeholders through greater interaction with them (Okorley *et al.*, 2009). This is undertaken to improve the field staff's knowledge of farmer practices and the reasons behind these practices to foster this learning culture. The case organization provides a range of mechanisms through which staff can learn informally, such provides learning materials that the staff can access for self-directed learning (Okorley *et al.*, 2009). It creates an open environment in which staff feel comfortable in sharing information, as such this provides support to the field staff in decision-making, and encourages teamwork among the staff; and ensures that the staff are informed in a timely fashion about policies and other relevant issues (Okorley *et al.*, 2009). The needed reforms include decentralization of responsibility, delegation of authority to district managers and teams, autonomy in routine decision making, and a separate budget for operational expenditure. To adopt new technologies, solve problems, and increase income from agriculture, must have to reorganize its structure and functions by embracing wider expertise, decentralizing management, and nurturing a culture of organizational learning (van den Ban and Wageningen, 2003). It should take into consideration the diversity of organizations that are providing different extension services and the potential for improving the relationships among them. While extension managers and policy makers need to explore these options for providing better extension services to farmers to meet the emerging challenges (van den Ban and Wageningen, 2003). The technologies developed were often inappropriate for small-scale farmers, as the conditions on-farm, including the farmers' own management type and priorities, were not adequately considered (Davis, 2008). Understanding of human resource capacity building is a key factor of success for decentralized public agricultural extension and other institutions such as research institutes, universities and other government organizations to facilitate training. This proximity to major research institutions provides it with an advantage in relation to accessing expertise for training (Okorley *et al.*, 2009). The critical feature of field staff training at the case organization is the involvement of farmers in the training process, a practice they call "joint-training" exercise (Okorley *et al.*, 2009). Institutional reform has resulted in a variety of institutions being engaged in the transfer and exchange of agricultural information; as well as institutional reform through privatizing schemes such as contracting with the private sector and the establishment of partnerships in the provision of agricultural extension services (Kim *et al.*, 2009). There is no way the private sector organizations can effectively provide extension services without the assistance of the state and also from Agricultural development organizations, because they already have well-trained personnel and infrastructure in place. (Kristin Davis and Place, 2003). Extension and research staff will be accountable to farmer clients through the participation of farmer organizations and emerging agricultural structures in decision-making processes, and supported to

ensure that they have a say in formulating policies that affect them (Al-Rimawi and Al-Karablieh, 2002). Other intervention measures include providing effective information dissemination to farmers, improvement in technology delivery mechanisms and increasing outreach such as making technology component farmer specific. Others are decentralization of agricultural technology delivery institutions, enhancing farmer's managerial ability especially through farmers' organizations and educational institutions and reforming agricultural markets to stabilize income of farmers (Chukwuone *et al.*, 2006). Consequently, an increase in the quality and quantity of adult and continuing education programme is a priority and educational institutions are charged with the task of designing programme curricula to achieve these policy aims. Higher education today operates in a new era, an era that is much more conscious of the market place (Angstreich and Zinnah, 2007). Towards this end, it is necessary to review the potential of developing measures for the greater organizations when it comes to the agricultural extension organizations, design agricultural extension organizations in the regions centered on the key products, and various alternatives (Kim *et al.*, 2009).

The Move towards Pluralism for Sustainable agricultural development

Agricultural extension Managements can establish different collaborative working relationships with Agricultural Development organizations based on trust and mutual respect, to obtain access to resources for extension delivery Farmers and staff training. (Ernest *et al.*, 2010). The main challenge in installing a proper pluralistic agricultural extension mechanism is the effective coordination among various organizations, especially in matters of development when competent nonpublic institutions are present in the country (Rivera and Alex, 2004). The modality of using more than one organization, whether public or private, for delivering extension services is to help in achieving the desired goals (Rivera and Alex, 2004). In addition, agricultural research institutes, agricultural universities and farmers' associations, participate in the delivery of extension services. Here, agricultural extension refers to the cultivation of farmers' organizations that aim to increase agricultural productivity and to improve the everyday life of farmers. (Ban and Hawkins, 1988). The agricultural technology distribution is a model which shows the relationship among agricultural research, agricultural extension and farmers (Ban and Hawkins, 1988). Based on the agricultural technology distribution, agricultural extension process is a scientific knowledge the results of agricultural research to the techniques and transmits the techniques to the farmers to help them adopt the techniques and increase production by using them (Kim *et al.*, 2009). Agricultural research and technology identification are often relevant to all public and private extension service providers. Here, most extension services oversight is an inherent aspect of the public sector's responsibilities for policy formulation, and design of reforms to promote pluralistic extension institutional arrangements (Rivera and Alex, 2004). The obvious rationale is the pooling of all available resources in order

to alleviate pressure from low budgets and staff in the ministries of agriculture, as well as to let the farmers benefit from a variety of sources (Rivera and Alex, 2004). But pluralistic extension also requires of emphasizing multiple and diverse partnership between public and private sectors including partnership with farmer organizations and private venture companies to facilitate the common concepts, language, methods and skills needed to integrate the diversity that arises from institutional pluralism (Rivera and Alex, 2004). As farmer organizations mature, they may become increasingly oriented toward providing specific services for their members (Burton E. Swanson and Rajalahti, 2010). For example, farmers' associations have long played an important role in providing advice on production technologies, and putting pressure on research and extension organizations to work in a more demand-driven and client-oriented way (Van den Ban, 2000). The success of agricultural extension and development projects often depends on local participation, because this enable them to work as partners in planning and implementing agricultural and development programs. Extensionists should develop programs that facilitate the use of new technology to optimize this process and encourage farmers to use new technologies along with extension and other organizations (López and Bruening, 2002). Institutional reorientation can be achieved by strengthening farmers organizations to have a decisive role in determining extension agendas, programs, and services through contracting, decentralization, and support to local innovation (Rivera and Alex, 2004). The proposed organizational linkage structure is intended to promote cooperation and coordination among development organizations through involvement of the farmers, thereby providing a more structured and permanent basis for interaction between the organizations involved (Duvel, 1996). The organizational linkage must have maintained good collaboration among agricultural extension and farmers' organizations, and provide support in training the farmers and in the implementation of various agricultural projects (Kim *et al.*, 2009). This structure is not intended to be an alternative institutional framework for agricultural extension that focus on the implementation of development programs or projects; which usually consists of top management, middle management, support staff and field or site staff. It is visualized as a linkage structure or system with the purpose of linking development organizations with the community in an effective partnership (Duvel, 1996). Another trend is the formation of agricultural organizations (which are less bureaucratic, more flexible and with wider expertise) to implement special programs related to agricultural development (van den Ban and Wageningen, 2003). Farmer associations and producer co-operatives are also presently involved in agricultural extension services, because they are the most effective in reaching farmers producing these crops and commodities (van den Ban and Wageningen, 2003). Farmer organizations should therefore be a high priority for public sector extension, because farmers need a wide range of services related to technology (production and processing), quality, access to markets, price information, and business development, and improve the ability of

farmers to collectively find solutions to their problems (van den Ban and Wageningen, 2003). Economic and social issues require the allocation of appropriate resources for this work; this entails a commitment to develop proficiency local groups to participate in these processes (Niamh Dennehy *et al.*, 2000). Farmers belonging to farmers organizations are more aware of the constraints they were facing to improve their production than non-members. This may be due to the fact that most extension programmes were intended for farmers' organizations instead of individual farmers (Owona Ndongso *et al.*, 2010). The involvement of public organizations in institutional research and extension activities can lead these institutions to establish complementary relationships with such organizations as the Agricultural Research Institutes, the Ministry of Agriculture, and similar agricultural development organizations (Tefferu Betru and Hamdar, 1997). As the cost of research is high, the public system is more technically and logistically equipped to undertake research activities, and the firms have direct interest to cooperate with the public research in undertaking experimental works (Al-Rimawi and Al-Karablieh, 2002). The provision of extension assistance to farmers previously supported by participating organizations and the development of seed supply networks that are accessible and affordable to subsistence farmers represent two tangible areas where linkages between public and private extension activities could provide important benefits (Rodney Reynar *et al.*, 1996). Development programs worldwide have recognized that local participation is the key to sustainable transfer and long-term adoption of new technologies and approaches. Interactive participation is the approach that facilitates this kind of learning environment. Teaching has long been the normal mode of educational programs and institutions where agricultural extension skills work (Toness, 2001). The capacity building component was designed around three objectives: To develop competency-based curricula in participating universities that better match agricultural sector workforce needs. To develop new and updated courses, and improve instruction; and to develop internship programs to provide real-life experiences working with farmers, exporters and other agribusiness firms for college graduates (Barrick *et al.*, 2009). In order to move from a teaching paradigm towards a learning paradigm, highly participatory interactions and knowledge sharing among all sectors is critical for extension institutions both in applied extension programs and at teaching institutions. Emphasizing the strengths of both public and private extension initiatives may begin to fully address the needs of subsistence farmers (Toness, 2001). A case is made for the organizations involved to continue to cross the institutional divides so that the long-term sustainability and development of small-scale farming communities is ensured. Conventional station-based approaches to agricultural research, technology development, and extension have failed to achieve the expected results in the small-scale farming sector of the developing world (Davis, 2008).

Methodology

This paper is a review based on papers from Journals, Books, Conferences and Theses

Conclusion and future work study

Based on this review paper for several studies, the following conclusion was drawn and future work study are given, encourages more contact and open communication to build respect and trust among the staff, gives a level of flexibility to field staff to design their location-specific extension activities with farmers and effective coordination among various organizations. Further and concrete studies are needed because of complexity of the impact evaluation; it is necessary to combine studies using different perspectives in order to increase the scope and rigor of results. If studies are coordinated (e.g. Contribution of decentralization and the Pluralism of access to provides a framework for Agricultural extension staff to participate with farmers and other organizations in facilitating development planning and activity implementation For sustainable agricultural development).

REFERENCES

- Al-Rimawi, A. & Al-Karablieh, E. (2002) Agricultural Private Firms' Willingness to Cooperate with Public Research and Extension in Jordan. *Journal of International Agricultural and Extension Education*, 9, 5.
- Al Subaiee, S., Yoder, E. & Thomson, J. (2005) Extension agents' perceptions of sustainable agriculture in the Riyadh Region of Saudi Arabia. *Journal of International Agricultural and Extension Education*, 12, 5-14.
- Angstreich, M. & Zinnah, M. (2007) A meeting of the minds: farmer, extensionist, and researcher. *Journal of International Agricultural and Extension Education*, 14, 85-95.
- Ban, A. & Hawkins, H. (1988) Agricultural extension.
- Barrick, R., Samy, M., Gunderson, M. & Thoron, A. (2009) A Model for Developing a Well-Prepared Agricultural Workforce in an International Setting.
- Burton E. Swanson & Rajalahti, R. (2010) Strengthening Agricultural Extension and Advisory Systems: Procedures for Assessing, Transforming, and Evaluating Extension Systems.
- Chapman, R. & Tripp, R. (2003) Changing incentives for agricultural extension: A review of privatized extension in practice.
- Chukwuone, N., Agwu, A. & Ozor, N. (2006) Constraints and strategies toward effective cost-sharing of agricultural technology delivery in Nigeria: perception of farmers and agricultural extension personnel. *Journal of International Agricultural and Extension Education*, 13.
- Davis, K. (2008) Extension in sub-Saharan Africa: Overview and assessment of past and current models, and future prospects. *Journal of International Agricultural and Extension Education*, 15, 15-28.

- Diamond, J. E. (2000) Agricultural and Extension Education in Albania. *Journal of International Agricultural and Extension Education*, 7.
- Duvel, G. (1996) Institutional Linkages For Effective Coordination And Cooperation In Participative Rural Development. *Journal of International Agricultural and Extension Education*, 3, 76.
- Ernest L. Okorley, David Gray and Janet Reid (2010) Towards A Cross-Sector Pluralistic Agricultural Extension System in A Decentralized Policy Context: A Ghanaian Case Study. *Journal of Sustainable Development in Africa*, Volume 12, No.4, ISSN: 1520-5509
- Farrington, J. (1995) The changing public role in agricultural extension. *Food policy*, 20, 537-544.
- Hoque, M. & Usami, K. (2007) Effectiveness of agricultural extension training courses for block supervisors at the Department of Agricultural Extension (DAE) in Bangladesh. *Journal of International Agricultural and Extension Education*, 14, 51-59.
- Kim, J., Kong, M. & Ju, D. (2009) Challenges in Public Agricultural Extension of Korea. *Journal of International Agricultural and Extension Education*, 16.
- Koyenikan, M. J.(2008) Issues for Agricultural Extension Policy in Nigeria. *Journal of Agricultural Extension* Vol. 12
- Kristin Davis & Place, N. T. (2003) Non-governmental Organizations as an Important Actor in Agricultural Extension in a Semiarid East Africa. *Journal of International Agricultural and Extension Education*, 10.
- Kristi N. Hughes & Ledbetter, L. D. (2009) Creating an External Funding Strategy: How to Thrive. *Journal of Extension*, 47.
- López, J. & Bruening, T. (2002) Meeting Educational Needs of San Lázaro Farmers: Indigenous Knowledge Systems. *Journal of International Agricultural and Extension Education*, 9, 39.
- Niamh Dennehy, Dermot J. Ruane & Phelan, J. F. (2000) Supports and Funding for Community Development Projects in the Republic of Ireland. *Journal of International Agricultural and Extension Education*, 7, 83.
- Okorley, E., Gray, D. & Reid, J. (2009) Improving Agricultural Extension Human Resource Capacity in a Decentralized Policy Context: A Ghanaian Case Study. *Journal of International Agricultural and Extension Education*. 2, 38
- Owona Ndongo, P., Nyaka Ngobisa, A., Ehabe, E., Chambon, B. & Bruneau, J. (2010) Assessment of training needs of rubber farmers in the South-west region of Cameroon. 5, 2326-2331.
- Quizon, J., Feder, G. & Murgai, R. (2001) Fiscal sustainability of agricultural extension: The case of the farmer field school approach. *Journal of International Agricultural and Extension Education*, 8, 13-24.
- Rama Radhakrishna & Yoder, E. (1996) Constraints In Transfer Of Technology As Perceived By Extension Personnel. *Journal of International Agricultural and Extension Education*, 3, 76.
- Rivera, W. M., Elshafie, E. M. & Aboul - Seoud, K. H. (1997) The Public Sector Agricultural Extension System in Egypt: A Pluralistic Complex in Transition, Volume 4, Number 3. *Journal of International agricultural and Extension Education*, 4.56
- Rivera, W. & Alex, G. (2004) The continuing role of government in pluralistic extension systems. *Journal of International Agricultural and Extension Education*, 11, 41–52.
- Rivera, W., Qamar, M. & Van Crowder, L. (2001) Agricultural and rural extension worldwide: options for institutional reform in the developing countries. FAO About CAB Abstracts CAB Abstracts is a unique and informative resource covering everything from Agriculture to Entomology to Public Health.
- Rodney Reynar, Fred Musser & Bruening, T. (1996) The Potential For Linking Private And Public Extension Services In Bangladesh. *Journal of International Agricultural and Extension Education*, 3, 76.
- Swanson, B. E., Bentz, R. P. & Sofranko, A. J. (Eds.) (1997) Improving agricultural extension: A reference manual, Food and Agriculture Organization of the United Nations Rome.
- Teffera Betru & Hamdar, B. (1997) Strengthening The Linkages Between Research And Extension In Agricultural Higher Education Institutions In Developing Countries. *International Educational Development*, 17, 303-311.
- Tiraeyari, N., Idris, K., Hamzah, A. & Uli, J. (2010) Importance of Program Development Competencies for Agricultural Extension Agents' Performance in Process of Technology Transfer. *American Journal of Agricultural and Biological Sciences*, 5, 376-379.
- Toness, A. (2001) The potential of Participatory Rural Appraisal (PRA) approaches and methods for agricultural extension and development in 21st century. *Journal of International Agriculture and Extension Education*, 8, 25-37.
- Umali, D. L. and L. Schwartz (1994), "Public and Private Agricultural Extension: Beyond Traditional Frontiers." World Bank Discussion Paper No. 236. The World Bank: Washington, D. C.

Role of agricultural extension in the sustainable agricultural development

Van Den Ban, A. (2000) Different ways of financing agricultural extension. AgREN Network Paper, 106, 8-19.

Van Den Ban, A. & Wageningen, N. (2003) Funding and Delivering Agricultural Extension in India Rasheed Sulaiman V. *Journal of International Agricultural and Extension Education*, 10, 21.

Van Den Ban, A. (2000) Different ways of financing agricultural extension. AgREN Network Paper, 106, 8-19.

Weitz, R. (1971) *From Peasant to Farmer: A Revolutionary Strategy for Development*. (New York: Columbia State University Press).

Witt, R., Pems, D. & Waibel, H. (2008) The farmer field school Senegal: does training intensity affect the diffusion of information. *J. Int. Agriculture and Extension Education*, 15, 47-60.

World Bank (1990) *Agricultural Extension: The Next Step*. World Bank Policy Paper. The World Bank: Washington, D. C.