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Extension-Education Methods to Facilitate Learning in Sustainable Agriculture

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ABSTRACT

A study was carried out to analysis the situation of sustainable agricultural extension–education methods in Iran. A sample of 87 respondents was selected through simple random sampling. The instrument used to achieve objectives of the study was a questionnaire by reliability 0.92. Findings revealed that Iran's sustainable agricultural extension–education methods are not favorable and the extension system does not pay enough attention to them. These conditions necessitate rethinking of extension–education methods to accomplish sustainable agriculture. Based on the findings, Iranian agricultural extension specialists believe that extension system currently have to address On–farm experimentations, Providing feedback from farm management activities, Problem solving methods and Group extension methods and networking to exchange and sharing information to achieve sustainable agriculture practices at very high level.

Key Words: Extension-education method; Sustainable agriculture; Facilitation of learning

INTRODUCTION

The conditions for sustainable agriculture are created in the socio-political sphere, through policy, institutional and behavioral change and this sphere is called the ecological knowledge system. Currently learning and facilitation of learning are vital components of the ecological knowledge system, which have to consider in the in-depth rethinking of extension systems because extension roles have shifted from advisory activity to facilitation of learning. In new paradigm, extension can be seen as a social mechanism for facilitating social learning of appropriate responses to changing circumstances. This perspective implies that the transformation of agriculture is an active social reconstruction of what our natural resources mean to our survival and how to use them to support our continuing livelihood. Transformation cannot be accomplished only based on positivist science, elite expertise and on transfer of technology to farmers (Roling & Wagemakers, 1998). Within this new paradigm, sustainable agriculture cannot accomplished by only using conventional extension methods; rather it requires a new kind of learning process-facilitation of learning (Allahyari & Chizari, 2006 & 07). Within the new paradigm of extension, farmers should have more control over the information that they need or want and over how it is delivered. Extension should be demand–pull rather than science–push (Marsh & Pannell, 1999).

In agricultural extension systems to support sustainability, participatory and group learning and networking for sharing and exchange of information are the most important changes relevant to extension–education methods, because participation is an important factor in agricultural sustainability (Grudens-Schuck, 2000). If we want to achieve sustainable agriculture, we should ensure that real participation is occurring and that interactive participation works where people participate in joint analysis, leading to action plans and forming/strengthening local groups or institutions. The learning methods used seek multiple perspectives and groups determine how available resources are used. Farrington (1994) believes that increased farmer participation in advisory programs and extension services, decentralizing from activities and facilitating to apply local groups and NGOs are the most approaches for extension in future.

Using social/participatory learning is one of the most important characteristic of extension–education methods to support sustainability. Kroma (2003) stated that social learning has been described as a process by which a community of interest or group of individuals learns how to engage in sharing and reflecting on knowledge gained either through experience or action to enhance innovative capacities. According to Wals (2007) social learning is the collective action and reflection that occurs among different individuals and groups as they work to improve the management of human and environmental interrelations. A critical aspect of the joint learning process then is the

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opportunity it creates for farmers and change/extension agents to reflect on new ideas and experiences and on how such new insight can inform and guide subsequent action. Such a process also reflects a view of extension agents, not merely as service providers, but as facilitators, linking farmers to networks of knowledge and resources that support productive activities. An important value of a social learning approach is that extension professionals are themselves enabled to learn their way through on how to work with farmers in a participatory, rather than didactic, top–down way, while creating the social networks for facilitating exchange of knowledge between farmers as well as between researchers and farmers. In community-based approaches, by applying and developing farmer knowledge's, educating observation skills and using adult education methods to collaborative decision–making, extension changes toward facilitation (Roling, 1994).

The most characteristics of learning process toward sustainable agriculture are utilizing indicators to visualize environmental problems, using record keeping to make economic results transparent, regular field observation and measurement as the basis for decision-making, inference from observations based on social 'theoretical' knowledge, change of information and experience among co-learners and use of scientific principles (Somers, 1998). We must use visualize methods including result and method demonstration (Mirani *et al.*, 2002), field trip and mass media production. There is considerable potential in adapting the use of mass media and information technology (IT) to support participatory extension (World Bank, 2006), channeling feedback from rural communities to researchers and extension workers, as well as providing information to farmers. Farmer participation in designing and implementing mass media programs improves program quality and enhances the learning process (Antholt & Zjip, 1995).

In order to support sustainable agriculture, extension approaches should use collaborative problem–solving as the dominant mode of influence on clients' behavior, work increasingly to influence and facilitate planning, decisions and take action at group and community levels (Garforth & Lawrence, 1997; Roling & Pretty, 1997; Moyo & Hagmann, 2000; Braun *et al.*, 2000; Cho & Boland, 2004). One of the key elements in this type of facilitation is that it fosters discovery learning (Pretty, 1995; Roling & Pretty, 1997; Braun et *al.*, 2000; Probst & Hagmann, 2005). This approach is not to answer farmers' questions on the basis of one's expertise, but to use questions as opportunities for discovery and working out answers oneself. In this approach, there is a curriculum for learning, very definitely, but farmers are not told what happens or what to do. The essence is that they discover things for themselves and what they do with it is their own responsibility (Roling & Jiggins, 1998).

Feedback is important for the drawing up of a learning agenda and for forming conclusions about important issues and can be organized in various ways (Roling & Pretty, 1997; Leeuwis, 2000; Killough, 2005).

The purpose of this study was to analysis the situation of sustainable agricultural extension–education methods in Iran specifically to describe the current situation of extension-education methods to accomplish sustainable agriculture and identify the most appropriate extension–education methods to accomplish sustainable agriculture as perceived by extensionists.

MATERIAL AND METHODS

The study employed a descriptive survey designed to accomplish the objectives. The target population was faculty members, extension managers in provinces and extension specialists of deputy of agricultural extension and farming system in the Ministry of Agriculture (*Jihad-e-Keshavarzi*) (N=170). A random sample of these (n=87) was selected. A mailed questionnaire was used to collect the data. Questions were generated from the literature review. The survey was divided into three sections to gather data on personal characteristics of extension specialists, the degree of current attention of extension system on sustainable agriculture extension-education methods from extension specialists' perspective and necessity of attention on extension-education methods to accomplish sustainable agriculture in Iran's agricultural extension system from extension specialists' perspective. Responses for 2nd section were categorized using a Likert-type scale from point 1 to 3 representing low, medium and much attention, respectively. Responses for 3rd section were categorized using a Likert-type scale from point 1 to 5 with very low, low, medium, much and very much categories. Content and face validity were established by a panel of experts from faculty members. Questionnaire reliability was estimated by calculating Cronbach's alpha. Reliability of the overall instrument was estimated at 0.91. Results were analyzed using the statistical package for the social sciences (SPSS 14.0). Frequencies, percentages, means and standard deviations were calculated.

RESULS AND DISCUSSION

The first objective was to analysis the current situation of supporting sustainable agricultural extension-education methods. Data (Table I) shows the opinions of Iranian agricultural extension specialists regarding the current conditions of extension-education methods to accomplish sustainable agriculture. The three–point scale was interpreted as 1–1.49=low stress, 1.5–2.49=medium stress and 2.5–3 high stress (Agbaje *et al*., 2001). None of the 10 statements about extension–education methods had means considered as high attention, three had medium attention rating and seven had low attention rating. In any statement regarding extension education methods, at least 49.4% of respondents believed that the degree of current attention of

Table I. Frequency, percent, mean and standard deviations for opinions of Iranian agricultural extension professionals regarding the current conditions of extension-education methods to accomplish sustainable agriculture

Rank	Sustainable agricultural extension–education methods	F[a]	%[b]	M[c]	S.D[d]	Rmk[e]
1	On–farm experimentations	39	49.4	1.56	0.59	M
2	Group extension methods and networking to exchange and sharing information	47	59.5	1.52	0.69	M
3	Using new communication and information methods	44	55.7	1.51	0.62	M
4	Providing feedback from farm management activities	44	55.7	1.49	0.60	L
5	Participatory learning	47	59.5	1.45	0.43	L
6	Using indicators to make environmental problems visible	51	64.6	1.40	0.59	L
7	Regular field observation and measurement as the basis for decision-making	53	67.1	1.37	0.56	L
8	Problem solving methods	56	70.9	1.33	0.55	L
9	Demand–driven extension methods	55	69.6	1.32	0.55	L
10	Experiential and discovery learning	60	75.9	1.24	0.46	L

N=79, a=number of responses to low attention, b=percent, c=mean, d=standard deviation, e=remark, L: low attention, M: medium attention and H: high attention; Scale: 1=low attention, 2=medium attention and 3=much attention

Table II. Frequency, percent, mean, and standard deviations for opinions of Iranian agricultural extension specialists regarding the necessity of attention on each of extension - education methods to accomplish sustainable agriculture

Rank	Sustainable agricultural extension–education methods	F[a]	%[b]	M[c]	S.D[d]	Rmk[e]	χ^2
1	On–farm experimentations	74	93.7	4.54	0.62	VH	6.2*
2	Providing feedback from farm management activities	76	96.0	4.53	0.57	VH	5.6*
3	Group extension methods and networking to exchange and sharing information	76	96.3	4.51	0.57	VH	3.83
4	Problem solving methods	73	92.4	4.51	0.71	VH	3.66
5	Using indicators to make environmental problems visible	73	92.4	4.49	0.66	H	2.3
6	Using new communication and information	73	92.4	4.47	0.64	H	4.6
7	Regular field observation and measurement as the basis for decision-making	71	89.9	4.41	0.73	H	4.3
8	Experiential and discovery learning methods	68	86.1	4.41	0.71	H	6.8*
9	Demand–driven extension methods	69	87.3	4.36	0.65	H	0.86
10	Participatory learning methods	66	83.3	4.34	0.60	H	2.7

N=79, a=number of responses to high and very high attention, b=percent, c=mean, d=standard deviation, e=remark, VL: very low attention, L: low attention, M: medium attention, H: high attention and VH: very high attention; Scale: 1=very low attention, 2=low attention, 3=medium attention, 4=much attention and 5=very much attention; *$p \leq 0.05$

Iran's extension system was at low attention level. Findings revealed that Iranian agricultural extension specialists believed that amongst sustainable agricultural extension–education methods, respectively On–farm experimentations (M=1.56, SD= 0.59), Group extension methods and networking to exchange and sharing information (M=1.52, SD=0.69) and Using new communication and information methods (M=1.51, SD=0.62), currently have the best situation. Respondents (49.4%) believe that currently the extension system is emphasizing upon On-farm experimentations with a medium level, 59.5% emphasizing upon Group extension methods, networking to exchange and sharing information with medium level. Iranian agricultural extension specialists believe that Experiential and discovery learning (M=1.24), Demand–driven extension methods (M=1.32) and Problem solving methods (M=1.33) receive the least emphasis from the extension system (Table I).

The second objective was to identify appropriate extension–education methods to accomplish sustainable agriculture in Iran. Data in Table II reports the frequency, percent, mean and standard deviations for each 10 statements regarding supporting extension–education methods for sustainable agriculture from Iranian extension professionals' perspective. The five-point scale was interpreted as 1–1.49=very low attention, 1.5–2.49=low attention, 2.5–3.49=medium attention, 3.5–4.49=high attention and 4.5–5=very high attention (Agbaje *et al.*, 2001). Extension specialists believe that to accomplish sustainability extension system should be addressed to the all types of extension education methods.

Respondents represented that On–farm experimentations (M=4.54, SD=0.62), Providing feedback from farm management activities (M=4.53, SD=0.57) and Group extension methods and networking to exchange and sharing information (M=4.51, SD=0.57) were the most important extension–education methods toward sustainable agriculture. Respondents believe that extension system to achieve sustainable agriculture should be focused on these methods. A high level (93.7%) of respondents reported that there should be emphasis On-farm experimentations, albeit that the extension system, currently, is emphasizing On-farm experimentations thereabout at medium level.

In addition, 57% of respondents believe that there should be emphasis on Providing feedback from farm management activities, thereabout at very high level. Other extension–education methods to support sustainable agriculture are Group extension methods and networking to exchange and share information, Problem solving methods, Using new communication and information, Using

indicators to make environmental problems visible, Regular field observation and measurement as the basis for decision-making, Experiential and discovery learning methods, Demand–driven extension methods and Participatory learning methods. The relative low standard deviations for these responses indicate a relatively high level of agreement among the respondents (Table II).

For testing differences among respondents group, Kruskal–Wallis test was employed. The results showed that there are no significant differences among the age, level of education and years of experience of agricultural extension specialists and their opinions regarding the necessity of attention on each extension education methods for sustainable agriculture. The findings show that the means of extension specialists' opinions regarding the necessity of attention on each extension education methods differed significantly when examined by their organizational position for the methods: Providing feedback from farm management activities (χ^2=6.5, p≤0.05), Experiential and discovery learning methods (χ^2 =6.8, p≤0.05) and On–farm experimentations (χ^2=6.2, p≤0.05). Extension specialists who worked as faculty members were significantly more likely to agree with these methods.

CONCLUSION

Iran's sustainable agricultural extension–education methods are not favorable and the extension system does not pay enough attention to them. Iran's extension system only gives attention to On–farm experimentations, Group extension methods and networking to exchange and sharing information and New communication and information methods thereabout at medium level. The study shows that to accomplish sustainability in agriculture, we must give attention to diversify extension–education methods. Based on the findings, in most of the above mention methods, farmers' participation is key element for the success of extension activities and they are favor for the achievement of sustainability.

REFERENCES

Agbaje, K.A.A., R.A. Martin and D.L. Williams, 2001. Impact of sustainable agriculture on secondary school agricultural education teachers and programs in the north central region. *J. Agric. Educ*., 42: 38–45

Allahyari, M.S. and M. Chizari, 2007. Analysis of extension-education methods of environmentally sound agriculture in Iran. In: *Proc. 4th World Environmental Education Congress, 2-6 July 2007*. Durban, South Africa

Allahyari, M.S. and M. Chizari, 2006. Facilitating learning to combat desertification. In: *Proc. Int. Symp. On Dry Land Ecology and Human Security, 4-7 December 2006*, Dubai, United Arab Emirates. [Online]. Available at: http://www.isdehs.com/html/2006_262.html

Antholt, C. and W. Zjip, 1995. *Participation in Agricultural Extension, Social Development Notes, Environmentally and Socially Sustainable Development Network*. No 11. Available at: http://siteresources.worldbank.org

Braun, A.R., G. Thiele and M. Fernandez, 2000. *Farmer Field Schools and Local Agricultural Research Committees: Complementary Platforms for Integrated Decision Making in Sustainable Agriculture*. Agriculture Research and Extension, Network Paper No 105, London

Cho, K.M. and H. Boland, 2004. Education and extension for multi–functional agriculture: extension concepts for sustainable agricultural development in Myanmar. In: *Proc. 20th Annual Conf. AIAEE*. Dublin, Ireland

Farrington, J., 1994. *Public Sector Agricultural Extension: is There Life After Structural Adjustment*? Natural resource perspectives, [Online], No 2, available from: http://www.odi.org.uk/nrp/odi-agri2.html

Garforth, C. and A. Lawrence, 1997. *Supporting Sustainable Agriculture Through Extension in Asia*. Natural Resource Perspectives, No 21, London: Available at: http://www.odi.org.uk/resources/specialist/natural-resource-perspectives/21-sustainable-agriculture-extension-asia.pdf

Grudens-Schuck, N., 2000. Extension and grassroots educators' approaches to participatory education: interrelationships among training, world view, and institutional support. In: *Proc. Adult Education Research Conference, Vancouver, British Columbia, June 1–4, 2000*. Available at: http://www.edst.educ.ubc.ca/aerc/2000/grudensschuckn1-web.htm

Killough, S., 2005. Participatory approaches to agricultural researches and extension. *In*: Gonsalves, J. *et al.* (eds.), *Participatory Research and Development for Sustainable Agriculture and Natural Resource Management*, pp: 23–32. Philippines, Intentional Potato Center – user's perspectives with agriculture research and development

Kroma, M., 2003. Participation and social learning: supporting farmer innovation in central Ghana. *J. Int. Agric. Extension Educ.*, 10: 43–9

Leeuwis, C., 2000. Learning to be sustainable. Does the Dutch agrarian knowledge market fail? *J. Agric. Educ. Extension*, 7: 79–92

Marsh, S. and D. Pannell, 1999. *Agricultural Extension–A Decade of Change*. Canberra, Rural Industries research and Development Corporation. Available at: www.rirdc.gov.au/pub/shortreps/sr66.html

Mirani, Z.D., M.A. Narejo and F.C. Oad, 2002. Sustainable agriculture endeavors: perceptions of farmers and extension agents. *J. Appl. Sci*., 2: 27–8

Moyo, E. and J. Hagmann, 2000. Facilitating competence development to put learning process approaches into practice in rural extension. *In*: *Human Resources in Agriculture and Rural Development, 1999*. Rome, FAO. Available at: http://www.picoteam.org/ publications/pdf

Pretty, J.N., 1995. Participatory learning for sustainable agriculture. *World Develop.*, 23: 1247–1263

Probst, K. and J. Hagmann, 2005. Protypical approaches to innovation development. *In*: Gonsalves, J. *et al*. (eds.), *Participatory Research and Development for Sustainable Agriculture and Natural Resource Management*, pp: 16–23. Philippines Intentional Potato Center – user's perspectives with agriculture research and development

Somers, N., 1998. Learning about sustainable agriculture. In: Roling, N.G. and M.A.E. Wagemaker (eds.), *The Case of Dutch Arable Farmers, in Facilitating Sustainable Agriculture*, pp: 125–134. Cambridge, Cambridge University

Roling, N.G. and J. Jiggins, 1998. The ecological knowledge system. *In*: Roling, N.G. and M.A.E. Wagemaker (eds.), *Facilitating Sustainable Agriculture*, pp: 283–312. Cambridge, Cambridge University press

Roling, N.G. and J.N. Pretty, 1997. Extension's role in sustainable agricultural development, In: Swanson, B.E., R.P Bentz and A.J. Sofranko (eds.), *Improving Agricultural Extension: A Reference Manual*. Rome FAO

Roling, N.G. and M.A.E. Wagemakers, 1998. *Facilitating Sustainable Agriculture, Participatory Learning and Adaptive Management in Times of Environmental Uncertainty*, pp: 1-22. Cambridge, Cambridge University Press

Roling, N.G., 1994. Facilitating sustainable agriculture: turning policy models upside down. *In*: Scoones, I. and J. Thompson (eds.), *Beyond Farmer First, Rural People's Knowledge, Agricultural Research and Extension Practices*, pp: 467–473. Intermediate Technology Publications, London

Wals, A.E.J., 2007. Learning in a changing world and changing in a learning world: reflexively fumbling toward sustainability. *Southern African J. Enviro. Educ.*, 24: 35–45

World Bank, 2006. *Agriculture Investment Source Book*. Washington, D.C, World Bank. Available at: www.worldbank.org/agsourcebook

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