Regression analysis of factors influencing the efficiency of model farmers From the views of farmers in Garmsar

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Abstract: The current research analyzes the Factors influencing the efficiency of model farmers to achieve the intended promotional targets from the views of the farmers in the Garmsar District. The engagement of model farmers in the process of promotional activities can strengthen the local and participatory leadership of the villagers in the local decision making process. This research is of applied type and uses the descriptive correlative method. The statistical group studied consisted of 13000 farmers from the District of Garmsar, who are somehow in relation with the model farmers. The number of model farmers for the beneficiary groups studied was determined to be 210 persons on the basis of the Cochran formula and the necessary calculations of 30 farmers in the Province of Tehran, leading to 202 questionnaires valid for analysis. The data required from the statistical group were collected by questionnaire and the SPSS 16 software application was used to analyze the data. The first variable entered in the equation was the reflection of agricultural problems to authorities by role models. The results of calculations show that in the beneficiaries' opinion the mentioned variable has the greatest role in the effectiveness of the role models. Scientific and practical skills and experience in the relevant work and profession (second level), enjoying respect and credibility among the farmers and the honest and caring trustees of the people (third level), having self confidence and high moral and ethical values (fourth level) and the capacity of transferring information to farmers (fifth level) had the highest role in the effectiveness of the role models. [Davood Samari, Mohammad Sadegh Sabouri**. Regression analysis of factors influencing the efficiency of model farmers From the views of farmers in Garmsar**. *Life Sci J* 2013;10(2s):304-311](ISSN:1097-8135). http://www.lifesciencesite.com. *52*

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Introduction

Among the common practices in the global promotional system to attract the participation of local manpower is the engagement of outstanding farmers in advancing the promotional activities. This action is known under various titles such as contact farmers, elucidating individuals, pioneering farmers, promotional aids, key farmers, etc at different countries. The selection of model farmers with the introduction of top producers in different fields and through provision of support and incentives tries to establish a fair competition among producers and to increase motivations to participate in promotional activities with the ultimate aim of increasing production. As an appropriate model the model farmers are always followed by villagers, who refer to them at times of technical difficulties, readily accepting their advices. Finally as a trainer in an unofficial environment, they also encourage innovations that have desirable social values. Moreover, the engagement of role models in the promotional activities can be of interest from the aspects of local leadership and participation in the decision making process. The role models in a society are living symbols of the perceptions, existence and performance, who can become the focus of interest and a role model through their impact on their community and who can act in such a way to make others follow suit. To achieve this status, the individual must not only be above others from the technical as well as level of understanding and acceptance of new methods and innovations, but requires other outstanding characteristics such as popularity and social acceptance, enjoying a sound reputation among people and having the necessary faculty for social activities and interactions with peers. They must be leaders in the own professions and have a high quality performance. They are expected to facilitate the promotion of technical innovations and transformation of their knowledge and information to other farmers. In fact by playing the role of voluntary and unofficial promoters, these outstanding farmers pave the way for promotional activities (Special Bulletin of the Agricultural Jihad Week, 2002).From an idealistic point of view, the model farmers have a capacity to undertake a broad spectrum of promotional activities from the transfer of technology to development of human resources and attracting local public participation. However, the question that preoccupies an inquisitive mind is that in principle, what kind of promotional activities would the model farmers in each country, region or

locality be capable of undertaking? In other terms what would be the promotional performance (s) of a rural example under special conditions, what factors influence such activities, have the model farmers the necessary and sufficient impact during the promotional activities, and what backgrounds, conditions and facilities are needed for efficient undertaking of promotional activities by the model farmers.Given the fact that for years the model farmers have been selected and introduced in the different specialized fields of agriculture and natural resources of Iran as a promotional agent with the objective of undertaking the different promotional functions, this research tries to address the above questions as they relate to the selected agricultural and natural resources model farmers. The outstanding farmers and other leading farmers can participate in different ways in the promotional functions and broaden the scope of access of the promotion staff to the different rural and tribal communities. These farmers can be the best assistants for the promotional agents in all the different fields and at all stages of their functions and can be an efficient actors in advancing the training and promotional activities (Special Bulletin of the Agricultural Jihad Week, 2002).The idea of engaging model farmers was approved and stressed by the World Bank as well (2007).According to Arabzadeh Moghadam (2001), an important issue in the rural development and promotion is to focus on technical leaders to boost their capacities and potentials and to enhance their technical knowledge, as this group has always been an effective agent in training other villagers. Since the model farmers have the adequate understanding of the cultural and economical and social conditions of their local community, have a close contact with the people, are trusted and have an interaction with the local societies, they can play a significant role as facilitators of the socio-economic and managers of the group activities. The facilitators are among model farmers in this role, who lead operations and train others to increase their participation in works. The other function of the facilitator is to act as change agent (Moghadassi Farimani, 2002).The individuals selected in the plan for model farmers in the agriculture and natural resources sector are also among the local technical leaders. This plan was implemented by each of the relevant departments in the ex-Ministry of Agriculture in the year 1984 and the ex-Ministry of Construction Jihad in the year 1988, and it continued on in the year 2000 when the two ministries and subsequently their plan's executive bureaus merged (Special Bulletin of the Agricultural Jihad Week, 2003).The effectiveness of the plan's objectives or in other terms studying the actualization level of the plan's objectives at execution time is among the main goals of these studies. The results can be instrumental in adjusting the objectives and the general frame of the plan, and by identifying its strengths and weaknesses at design and execution stages, they can assist the policy makers and planners to decide about the continuation, amendment or the stoppage of the plan.The records of related researches with the existing limitations are: Mohamed's research (2004) titled a review of the effectiveness of training – promotional courses for the volunteers of Karaj Construction Mobilization proved the significant and positive relationship between the variables of the trainers' capacities in establishing a link between the course material and the practical conditions, the relation between the course materials with the field of education, attractiveness, diversity and the clarity of the materials, awareness of objectives before training, awareness of objectives after training, interest in work after training, the impact of training materials, the course's facilities and the satisfaction level, the applicability of the materials and the proficiency of the trainers.In a study to evaluate the H-4 Youth Club in Texas, the impacts of training courses were defined on the basis of the level of intended knowledge and information gained by trainees and the general satisfaction of the participants. The level of individual satisfaction in this research was determined on the basis of his/her evaluation of the different parts of the programs, which constituted the criteria to assess the effectiveness (Howard et al, 2001).In Hosseini and Rivera's opinion (Hosseini & Rivera, 2001) the indicators for effectiveness during the study of the food management training program's impacts, included the level of satisfaction of the program's participants. The results of this research showed that the larger the individual's farm the greater would the program acceptance be. Furthermore, there was a significant relation between perception and the size of the farm. In a study to assess the level of farmers' knowledge and awareness of the integrated pest management, the significant relation was found between the level of participation in training courses and the level of knowledge and awareness (Erbaugh et al, 2001).

Material and Methods

From the objective point of view, the current study is an applied research since its results can be used by promotion planners and stakeholders. This is a quantitative study and from a methodological point of view it is a type of a comparative study or population study, which processes the performances of the agricultural and natural resources role models some years after their selection.The independent variables in this research include structures that are either related to the effectiveness or impact of them.

Table 1. The distribution of abundance of individual characteristics of the agricultural role models

Individual details	Category	Abundance (persons)	Ratio	Ratio aggregate
Age	20 – 30	36	17.3	17.3
n=202	31- 40	86	42.7	60
Youngest = 21 & eldest = 72	41 – 50	46	23	83
Average 41.3 error margin = 11.73	Over 51	34	17	100
Record of agricultural activities:	1 – 10	39	19.2	15.3
n=202	11-20	51	25.3	35.6
Least = 2 & most = 60	21-30	62	30.7	50.9
Error margin = 12.2 average = 22.3	Over 31	49	24.3	78
	Illiterate	36	17.8	
	Reading & writing	41	20.3	
	Elementary	32	15.8	
Education	Middle school	20	9.9	
n= 202	High school	28	13.9	
	Associate degree	21	10.4	
	Bachelors degree	22	10.9	
	Masters and PH.D	2	1	

Table 2. The opinions of beneficiaries about the impacts of relation with role models on the performance of beneficiaries

Performances	**The level of impact of relations with role models on the performance of farmers**									
	Very low		**Low**		**Medium**		**High**		**Very high**	
	Abundance	Ratio	Abundance	Ratio	Abundance	Ratio	Abundance	Ratio	Abundance	Ratio
Increased production	19	9.4	28	13.9	91	45	46	22.8	18	8.9
Increased product quality	20	10.5	37	18.3	85	42.1	35	17.3	25	12.4
Improved product marketing	34	16.8	51	25.2	81	40.1	24	11.9	12	5.9
Increased revenues	21	10.5	33	16.3	100	49.5	41	20.3	7	3.5
Reduced production costs	20	9.9	35	17.3	96	47.5	38	18.8	13	6.4
Efficient use of resources	21	10.5	33	16.3	51	25.2	84	41.6	13	6.4

Table 3. The distribution of abundance of individual characteristics of the agricultural role models

Prioritizing the economic, social, cultural and individual qualifications of a model	Average	Standard Error	C.v	priority
Productivity and efficient use of facilities	3.74	0.89	0.238	1
Innovation and creativity	3.69	0.93	0.252	2
Compliance with principles and application of expert recommendations	3.61	0.98	0.271	3
Perseverance and having a sense of cooperation with other farmers	3.65	1.02	0.279	4
Scientific and practical skill and experience in the relevant profession	3.54	1.11	0.314	5
Having a high level of scientific and general information	3.6	1.18	0.328	6
Strong public relation and capacity to transfer information to farmers and to reflect problems to authorities	3.39	1.3	0.383	7
Strong and job creating management	3.3	1.35	0.409	8
Benefitting from government support	3.27	1.34	0.410	9
Having self confidence and outstanding ethical and spiritual values	3.19	1.37	0.429	10
Compliance with the principles of mechanized farming and application of improved seeds	3.2	1.39	0.434	11
Interested in rural work and life, and being proud of farming	3.06	1.4	0.457	12
Enjoying respect and trust of farmers, being the trustee and confident of people	2.96	1.43	0.483	13
Economical disposition and undertaking tasks in an economical way	2.88	1.44	0.5	14
Possessing financial resources and agricultural machines and equipment	2.45	1.48	0.604	15
Minimum use of pesticides and fertilizers and preference for organic farming	2.39	1.52	0.636	16

These are: individual details (age, educational background, etc), economical details (revenue, the surface area of the production unit, etc), relationships (contact with experts, number of training courses taken), the media usage level (radio, television, magazines, newspapers, brochures, promoters, expert and internet), and activity as promotion assistant and the level of acquaintance and relation with research centers. The relevant variables in this research are the effectiveness of the role models in undertaking promotional activities to determine the deviation of the studied society as well as the ideal accuracy. Initially 30 role models were selected at random and pre-tested. The dependant variable was applied to obtain the ideal deviation, which was equal to 0.37. The probable desired accuracy was taken to be equal to 0.05.In this way, after applying the known parameters in the Cochran equation, the sample volume was calculated for 195 persons, who were then increased to 210 for greater accuracy. Questionnaires were used to collect the data required for the research. To determine the validity and apply the necessary corrections, the questionnaires were presented to experts, and the final questionnaires were prepared on the basis of their comments.To calculate the reliability factor of the measurement tools of the project, the Cronbakh Alfa was used by completion of 30 questionnaires (a=0.95). Moreover the abundance, concentration and dispersion tables were used to describe the research findings and at the stage of analysis, the Spearman correlation factors were applied to clarify the relations between independent and allied variables. The above actions were undertaken using the SPSS win 16 software application.

Clarification of Finding and Conclusion

Among variables affecting the effectiveness of the training activities is the individual's age, as it can have an impact according to working experience, capability to participate in training courses and the type and procedure of planning the training programs. In this study, the average age of the individuals was taken to be 40 with an error margin of 11.67 for age parameter. The youngest person studied was 21 and the oldest individual was 71 years of age. As can be observed, the largest age abundance belongs to individuals of 31 to 40 years of age, composing 42.7% of the individuals. The 41-50 years age group comes next, composing 23% of the statistical society. The largest abundance as far as the agricultural record is concerned, related to 21 – 30 years category (62 persons, 30.7%). Therefore the experience level of farmers is such as to have a suitable competence of the agricultural environment and they are fully aware of all aspects of the works.

The scope of education of those questioned included illiterates to maximum of Masters Degree (and professional doctorate). Most of the interviewees (41 persons, 20.3%) could read and write. 17.8% were illiterates, 15.8% had an elementary education, while those with education levels of middle school, high school, associate degree, bachelors and masters (PhD) degrees composed respectively 9.9%, 13.9 %, 10.4 %, 10.9 % and 1% respectively. The overall education level of the interviewees was not ideal and under such conditions, information dissemination must be undertaken with appropriate methods. As shown in the table 2 in the opinion of most beneficiaries, relation with role models had medium effect on increasing production (91 persons, 45%), increasing the quality of product (85 persons, 42.1%), improved marketing (81 persons, 40.1%), increased revenues (100 persons, 49.5%) and decreasing the costs of production (96 persons, 47.5%), while it had a high impact on efficient use of the production resources (84 persons, 41.6%). In replying the question on the qualifications of a beneficiary to become eligible for model, the following answers were provided according to priorities: According to the table 3 the beneficiaries believe that productivity and efficient use of facilities, innovation and creativity, complying with scientific principles and applying expert opinions, perseverance and having a sense of cooperation with other farmers, scientific and practical skills and experience in the relevant profession, having a high scientific and general information, having a strong public relation and capability to transfer information to farmers and reflecting problems to authorities, having self confidence and outstanding ethical and spiritual values, compliance with the principles of mechanized farming and application of improved seeds, interest in rural work and life and taking pride in farming, enjoying the respect and trust of farmers, being the trustee and confident of people, economical disposition and economical undertaking of works, possessing financial resources and agricultural machines and equipment and minimum use of pesticides and fertilizers and preference for organic farming are among the major economic, social, cultural and individual qualifications of a model. The regression coefficient of R=0.724 and the determination coefficient of R2 = 0.601 and the adjusted determination coefficient of R2 AD = 0.548 were calculated (P=0.000 and F= 41.725). Therefore, based on the determination factor it can be claimed that the economic, social, cultural and individual qualifications of role models explains 60.1% of the deviation in the dependent variable. Initially, the first variable used in the equation was the reflection of the

farmers' problems to the official by the role models. The calculation results showed that the mentioned variable had the highest importance from the point of view of beneficiaries on the effectiveness of role models. Scientific and practical skills and experience in the relevant profession (second step), enjoying the respect and trust of farmers, being the trustee and confident of people (third step), possessing self confidence and high ethical and spiritual values (fourth step) and capacity of transferring information to farmers (fifth step) had respectively the highest role in the effectiveness of role models.

Given the coefficients in the above table, the standardized equation would be:

$Y= 0.631 X1 + 0.421 X2 + 0.327 X3 + 0.289 X4 + 0.255 X5$

Result and Discussion

The results of the Spearman correlation test on the variables of innovation and creativity, capacity to transfer information to farmers, interest in farming and rural life and their effectiveness in the promotional activities show a significant relation, as confirmed by the studies of Karbalaee Harifte (2002), Shahbazi (2002), Cason &Roling (1999) and Ajayi (2001).The Spearman correlation test showed that the variables of productivity and efficient use of facilities by role models, perseverance and having a sense of cooperation with other farmers, scientific and practical skill and experience in the relevant profession, reflecting the farmers' problems to authorities and possessing self confidence and high ethical and spiritual values have a significant relation with the variable of the role models' efficiency, which are somehow consistent with the findings of, Howard (2001) and Sabouri et al (2008). According to the step wised regression analysis the reflection of farmers' problems to relevant authorities is the main demand of farmers from the models. This is consistent with the findings of Sabouri et al (2008), Yaghoubi Nejad (2005), Karbalaee Harifte (2002), Snapp, Blackie and Donovan (2003) and Anderson (2008).Scientific and practical skill and experience in the relevant profession is among the main reasons announced by farmers for the efficiency of the model, and this confirms with the findings of Van Den Ben and Hawkins (2006), Ommani and Chizari (2005) and Anderson and Feder (2004). According to the step wised regression analysis the reflection of farmers' problems to relevant authorities is the main demand of farmers from the models. This is consistent with the findings of Sabouri et al (2008), Yaghoubi Nejad (2005), Karbalaee Harifte (2002), Shariati et al (2004) Snapp et al(2003) and Anderson (2008). Scientific and practical skill and experience in the relevant profession is among the main reasons announced by farmers for the efficiency of the model, and this confirms with the findings of Van Den Ban and Hawkins (2006), Ommani and Chizari (2005) and Anderson and Feder (2002). Enjoying the respect and trust of farmers, being the trustee and confident of people are counted as the primary and necessary requisites of promoters and agents of change, as stressed by farmers in this research. This corresponds to the results of studies undertaken by Shahbazi (2002), Van Den Ban and Hawkins (2006), Ommani and Chizari (2005) and Anderson (2008). Possessing self confidence and high ethical and spiritual values are among the important characteristics of the promoters and agents of change, as stressed by farmers in this research. This is consistent with the findings of Kizilaslan (2006) and Anderson (2008). Capacity to transfer information to farmers and establishing contact are among the principle qualifications of agents of change as stressed by farmers in this research. This corresponds with the findings of Abdol Maleki(2007) and Snapp, Blackie and Donovan (2003).

Conclusion

1. Based on the findings of the research and the information collected during field studies, the followings are presented as recommendations:
2. Reflecting the farmers' problems to authorities is the most important requirement of role models in the opinion of farmers. Therefore, it is recommended that the models take the necessary trainings in the techniques of diagnosis and correct reflection of problems.
3. Scientific and practical skill and experience in the relevant profession is among the most important requirement of role models in the opinion of farmers. Accordingly, only those models who possess such a quality must be selected. Obviously it would be better to select this group from among the quick accepting group.

To facilitate the establishment of relations between outstanding producers and the research centers and stations, it is recommended that the outstanding producers be introduced to the regional and national research centers and stations, and necessary measures be taken to insure their constant contact and cooperation in joint research programs at farms and production units.

4. The outstanding farmers need complementary methods such as competitions and other motivations, which need to be designed and planned to ensure the full realization of the intended objectives.

Table 4. Correlation test among the independent variables of the research on the role models and their impacts on promotional activities

Variable 1	Variable 2	Correlation factor (r)	Significance level (P)
Productivity and efficient use of facilities	Effectiveness of role models in promotional works	0.291	0.003
Innovation and creativity	"	0.143	0.039
Compliance with principles and application of expert recommendations	"	0.088	0.098
Perseverance and having a sense of cooperation with other farmers	"	0.296	0.000
Scientific and practical skill and experience in the relevant profession	"	0.362	0.000
Having a high level of scientific and general information	"	0.062	0.241
Capacity to transfer information to farmers	"	0.177	0.041
Capacity to reflect problems to authorities	"	0.398	0.000
Strong and job creating management	"	0.048	0.264
Benefitting from government support	"	-0.99	0.213
Having self confidence and outstanding ethical and spiritual values	"	0.286	0.001
Compliance with the principles of mechanized farming and application of improved seeds	"	-0.119	0.148
Interested in rural work and life	"	0.168	0.042
Enjoying respect and trust of farmers, being the trustee and confident of people	"	0.176	0.042

Table 5. Correlation Regression analysis of the independent variables from the point of view of beneficiaries and the efficiency of role models

Variable	B	Standard error	Beta	T	Sig
Constant	1.680	0.33	-	-	0.000
Reflecting farmers' problems to authorities (X1)	0.69	0.06	0.631	8.439	0.000
Scientific and practical skills and experience in th`e relevant profession(X2)	0.472	0.066	0.421	6.128	0.000
Enjoying the respect and trust of farmers, being the trustee and confident of people (X3)	0.384	0.099	0.327	4.998	0.001
Possessing self confidence and high ethical and spiritual values (X4)	0.312	0.109	0.289	4.001	0.003
Capacity of transferring information to farmers (X5)	0.266	0.136	0.255	3.202	0.008

5. Given the results of this research on the impact of models and other producers on increased efficiency and quality of products of others, it is recommended that each year and following the selection of models, the outstanding producers be introduced by different means to the rural community and regional producers, and while learning about capacities and the outstanding and innovative qualifications of the models, people are encouraged to establish contact with them. This could also lead to the establishment of a fair competition among producers to gain the title of the outstanding producer in subsequent years.
6. Given the continued contact between outstanding producers and others, and their awareness of professional problems, it is recommended during meetings, and individual contacts between authorities, experts and promoters and the producers, the issues and problems of the regional producers are addressed and solutions proposed for their resolution. This is also important, since reflecting the people's problems to relevant authorities strengthens their social status among people.
7. It is further recommended that through a proper organizational arrangement, the capacities of the outstanding farmers and producers be used for compilation of regional and national plans and policies and the execution of the programs in a better organized manner.

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References

1. Abdol Maleki, M.2007. Review of the impact of short term training courses for rangers in Toysarkan District, MSC thesis in the field of agricultural promotion and training, Tarbiat Moddaress University, Tehran.
2. Special Bulletin of the Agricultural Jihad Week.2002.Introducing and honoring the national outstanding farmers. Tehran: Agricultural Jihad Public Relation.
3. Ajayi, M.2001.Evaluation of the effectiveness of extension teaching methods used by agricultural trainees for field days. Journal of Extension Systems .17-27.
4. Anderson, J.R. & Feder, G.2002.Agricultural extension: Good intensions and hard realities. The World Bank Research observer, 19, 1, 42-60. Retrieved 18th, December 2005 from; http://wbro.oxfordjournals.org/cgi/reprint/19/1/41.
5. Anderson, J. R.2008.Agricultural Advisory Services. Background paper for World Bank Development Report .2008. Agriculture for Development. Washington DC: The World Bank.
6. Arabzadeh, M.2001.Selection of model farmers, a new approach to transfer technical innovations. Jihad Periodical, 190 – 191.
7. Cason and Roling, R.1999.The extension paraprofessional model: relationship of program effectiveness with paraprofessional teaching style and personality profile.
8. Erbaugh, J; Donnermeyer, J. and Kibwika, P.2001.Evaluating Farmers Knowledge and awareness of integrated pest management (IPM). Assessment of the IPM collaborative research support project in Uganda. AIAEE 40.
9. Hosseini, J and River, W.2001.Effectiveness of Maryland Nutrient Management Program in reducing crop nutrient use by livestock farmers in Maryland. Journal of Extension Systems, 17.
10. Howard, J. et Al.2001. Developing a program evaluation instrument for Texas 4-H: A work in progress. Journal of Extension [online], 39, available on http//:joe.org/joe/2001august/iw4.htm1.
11. Karbalaee Harifte, H.2002.The method and criteria for selection of outstanding wheat farmers from the view of agricultural promoters, MSC thesis, Tarbiat Moddaress University, Tehran.
12. Kizilaslan, N.2006.Agricultural information systems: A national case study. Agricultural information systems. This journal is available on www.emeraldinsight.com/0024-2535.
13. Moghaddasi Farimani, Sh. 2002. Reviewing the promotional performance of outstanding rangers in Central Zagross. Tehran, Bureau for Studies and Integration of plans.
14. Mohamed, R.2004. Reviewing the impact of the training – promotional plans provided to the Construction Mobilization Volunteers in Karaj. MSC thesis in the field of agricultural promotion and training, Science and Research Unit, Tehran.
15. Ommani, A. R & Chizari, M.2005. An educational needs assessment of low input sustainable agriculture (LISA) practices for wheat farmer in Khuzestan province, Iran. Proceeding of the 21st Annual Association of International Agricultural and Extension Education Conference. San Antonio, Texas, USA. Available on the [online] http://www.aiaee.org/2005/posters/p028.pdf.
16. Sabouri, S., Malek Mohammadi.I, Chizari, M &Hosseini, S.M.2008.Correlating the views of researchers in the field of agricultural knowledge and information on the role of

promotion in development of agriculture. Unpublished PHD thesis, Tehran: University of Science and Research.
17. Shahbazi, A.2002. Rural Development and Promotion, Tehran: Tehran University Press
18. Shariati, M. R; Motevali. H, Hosseinei, S.M.2004.Study of NGOs' role in protection, restoration and development of natural resources (case study with an emphasis on NGO), Forests and Pastures periodical .63, Tehran.
19. Snapp, S.S.; Blackie, M.J. & Donovan, B. C.2003. Realigning research and extension to focus on farmers' constraints and opportunities. Available on www.elsevier.com/locate/foodpol
20. World Bank .2007. Enhancing agricultural innovation: How to go beyond the strengthening of research systems. World Bank, Washington D.C.
21. The Coordination and Integration group of the promotional programs of the Ministry of Agricultural Jihad .2002.the General plan of the comprehensive system of the Iranian Agricultural Training and Promotional plan. Tehran, Ministry of Agricultural Jihad, Department of Promotion and Operation System.
22. Van Den Ban, A and Hawkins, H.2006. Agricultural promotion (translated by Mohsen Tabraee and Zamanipour). Mashhad, Ferdowsi University.
23. Yaghoubi Nejad, M.2005.Evaluating eh impacts of promotional methods. Symposium on Evaluation of the Study, Promotional and Training plans, Site of the Department of Agricultural Promotion and Training, Ministry of Agricultural Jihad, Tehran.

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