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Major Barriers to Application of Good Agricultural Practices (GAPs) Technologies in Sustainability of Livestock Units

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Abstract

The main purpose of this study was to investigate the major barriers to application of Good Agricultural Practices (GAPs) technologies in sustainability of livestock by ranchers of Meshkinshahr. A sample of 120 farmers was selected by using proportional random sampling method. Data were collected by means of a questionnaire. Validity of questionnaire was determined through Agricultural Jihad exports of Meshkinshahr County and some faculty members at University of Tehran, Department of Agricultural Management and Development. Cronbach's alpha was used to estimate the reliability. The reliability was found to be acceptable. The results of Factor Analysis showed that infrastructure barriers, informational- educational barriers, institutional-support barriers, personal barriers, economical barriers were the five barriers to application of Good Agricultural Practices (GAPs) technologies in livestock unites. These factors explained 67.23 percent of the total variance.

Keywords:
Good Agricultural Practices (GAPs), Barriers, Livestock systems, Sustainability, Safety food

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INTRODUCTION

There is growing demand for sustainable agricultural development in response to the environmental impacts of conventional agriculture (Rasul and Thapa, 2004). In recent years, maintaining the product, regarding environmental considerations coupled with reduce production costs, producing a healthy crop and empowerment of farmers, is caused extension of widespread sustainable agriculture. One of the major goals of sustainable agricultural systems is decreasing use of inputs in agriculture; Good Agricultural Practices (GAP) is one approach which deals with these issues. Good Agriculture Practices standard included human health and the environment, safety food and access to sustainable agricultural development, (achieve environmental, economic and social sustainability) which attention the sustainability of on-farm activities to certain safety and quality of food and non-food agricultural crops.

Good Agricultural Practices according to study done by Banzon *et al*. (2013) refer to approaches sustainability agriculture, safety and quality food and enables farmers to absorbent new market vantages by improving supply chain control, improving natural resource utilization, workers health, and working conditions, consumers and farmers families' health and creating new market opportunities for farmers in developing countries.

Livestock is source of income at least 20 million households who live in pastoral. As well as livestock provides the main income source at least 200 million small-holder farmers in Asia, Africa and Latin America (FAO, 1994). Livestock plays an important part in rural development in third world countries. This section is as producer of food, promoting of agricultural products level and providing of services and surplus economic goods and earn cash. Integrating livestock and agriculture make annual sustainable employment. As well as sale of livestock production provided necessary capital for the purchase of agricultural inputs and generally any kind of investment in the field. The animal is often considered as the main source of financing for agricultural households (Stainfeld and Mack, 1995) pay attention to there is the demand for healthy livestock and agriculture products in the world by consumers and buyers, Thus application of safety product regulations and international and national requirements is expanding to provide satisfactory of agricultural and livestock production consumers with production safety and healthy agricultural crops. one of this standards is Good Agricultural Practices (GAP) approach.

According to this definition, we can say that a healthy product or can be the result of application the guidelines and methods for organic production (agricultural biotechnology), which in this case is applied organic product. Or crops following the actions and practices of other methods of production can be obtained that contaminants and toxic ingredients in the product is Maximum Residue Limit (MRL). One of the guidelines of good agricultural practices that lead to GAP product (Koohsar, 2012).

GAPs for beef cattle farming are used to help farmers increasing their production of Livestock, with good quality, investment, safety production, the most using of existing resources, sustainable beef cattle production, and non polluted environment (NBACFS, 2005).

Now, the question this is: why despite the emphasis on healthy and organic produce, in practice, these methods are less used? It seems that due to the barriers and problems in the application of safe production technologies such as good agricultural practices. Undoubtedly, identifying of these challenges could facilitate adoption of good agricultural practices and provided development of successful GAP programs.

According the literatures of adoption technology lack of knowledge and awareness of stakeholders and producers is considered major constraint on application of good agricultural practices. (Banzon *et al*., 2013) with increasing of knowledge of GAP probably application GAP intensified in the food safety programs. It seems that agricultural extension facilitates enhancement of awareness and participation of farmers.

Finally, among the exits variables as documented in the literatures major constraints according to social, cultural and economic condition of application of technologies are presented in this research. In order to have a more

effective impact on promoting wide spread adoption of GAP technologies, that concentrating on barriers to adoption can be more effective.

Quality of below the standard of domestic beef due to the problem on the efficiency of production since beef cattle raising farmers lack knowledge and understanding on correct beef cattle raising. Extension of inadequate technology and poor efficiency in beef cattle – raising (Suppadit, 2003) are presented concentrating on barriers to application of good agricultural practices.

NuruIslam *et al.* (2012) stated that reasons for farmers being unable to adopt GAP standard included the lack or scarce access to credit for investment, lack of technical support. Therefore Malaysian GAP certification scheme require upgraded, extended and monitored to ensure the quality of the produce.

Razzaghi Borkhani *et al.*, (2010) in their studies concluded that barriers to adoption of IPM technologies included the infrastructure barriers, management barriers, economics-social barriers, institutional-support barriers and training-skills barriers.

Erbaugh *et al*., (2010) found that knowledge was the major factor in the adoption of IPM technologies.

Moradi and Omidi Najafabadi (2010) in their studies concluded that barriers to application of GlobalGAP standard included the institutional structural barriers, attitude and awareness barriers, researches barrier, economic barriers, marketing and trade barriers and private part and mass media barriers.

Swinnen and Maertens (2007) indicated that challenges of developing countries in adaption with food safety standards including financial, technical, structural constraints, lack of organization potential and ability to control and support of standards.

Kleinwechter and Grethe (2006) based on a theoretical framework of a adoption process (information stage, decision stage, implementation stage), of the Europe GAP standard by mango exporters in Piura, Peru, stated that the major constraints to adoption is lack of access to information on the standard GAP. And indicated that this problems relevance of the socioeconomic constraints. That the important public problem caused by the standard is the increasing costs. Other barriers are of little importance and practical conformation of the farm to the standard and constraints in understanding the regulations.

According to study done by Tawadchai *et al.*, (2006) In Thailand different levels of education may affect perceptions and learning ability on correct beef cattle – rising. Some practices need high level of knowledge such as disease healing and drug using. Result revealed that beef cattle raisers who had higher income had higher tendency to accept GAPs for beef cattle farming. This might be because they can afford to spend money on some expensive equipment or tools needed for a high standard of beef cattle farming. Thus, difference in family income may cause different capacities to buy expensive equipment and tools.

Rodriguez Baide (2005) in his studies concluded that major barriers in adoption of technologies were included the economics barriers , education and information barriers, constancy to change, application of technology, social challenges, infrastructural, landlessness and personal characteristics.

Hobbs (2003) indicated that the major disincentive for the adoption of Good Agriculture Practices (GAPs) were Economics, Institutional and Regulatory and Legal, Human Capital. Economic disincentive including: increase variable production costs (e.g. labor), reduce output/increase average costs, increase fixed production costs (e.g. equipment), asset specific investments. Institutional and Regulatory disincentive e.g. reliance on institutional infrastructure, lack of public institution for monitoring GAP. Human capital limitations included limits on the farmer's ability to apply the prescribed production and management protocols and maintain the appropriate level of documentation (literacy), limitation of labor, limitation of time management, inappropriate and poor public extension institution. Table 1 displays the summary of major barriers to application of GAP technologies.

Generally, according to the aforementioned introduction and according to the fact that it is important to find factors influence non-adoption technologies by farmers. Main purpose of this

Table 1: Summary of major barriers to application of GAP technologies.

Factors	Source
Infrastructure Barriers	Rodriguez Baid (2005), Hobbs (2003), Moradi and Omidi Najafabadi (2011), Razzaghi Borkhani *et al.*, (2010), Swinnen and Maertens (2007).
Awareness – Informational Bbarriers	Rodriguez Baide (2005), Drost (1996), Erbaugh *et al*. (2010), Karimi, (2009), Kleinwechter and Grethe (2006), Moradi and Omidi Najafabadi (2011), Nowak (1991), Razzaghi Borkhani *et al.*, (2010), Vanclay (1992).
Institutional-Support Barriers	Rodriguez Baide (2005), Hobbs (2003), Moradi and Omidi Najafabadi.(2011), Nowak (1991), Razzaghi Borkhani *et al.*(2010), Swinnen and Maertens (2007).
Personal Barriers	Rodriguez Baide (2005), Hobbs (2003), Karimi, (2009), Tawadchai *et al*., (2006), Vanclay (1992).
Economical Barriers	Rodriguez Baide (2005), Drost (1996), Hobbs (2003), Karimi, (2009), Moradi and Omidi Najafabadi. (2011), Nowak (1991), Razzaghi Borkhani *et al.*, (2010), Tawadchai *et al.*, (2006), Swinnen and Maertens (2007), Vanclay (1992).

study was to investigate the major barriers to application of Good Agricultural Practices (GAPs) technologies in sustainability of livestock systems by ranchers Meshkinshahr. The objectives of the study were:

- Identifying the demographic characteristics of respondents;
- Priority setting of respondents' view about barriers to Application of Good Agricultural Practices (GAPs) technologies of livestock unites;
- Factor analysis to indicate barriers to Application of Good Agricultural Practices (GAPs) technologies of livestock unites.

MATERIALS AND METHODS

Population and sample

This study was a descriptive-correlation research, carried out in Meshkinshahr County. The population of the study consisted of ranchers of traditional and industrial livestock systems. (N=366) in 2 district of (traditional livestock systems, N=360 and industrial livestock farms, N=6). By calculation Cochran's formula, a sample of 120 ranchers was selected by using proportional random sampling method. This formula is:

$$d = t\frac{s}{\sqrt{n}} \qquad n = \frac{N(t.s)^2}{Nd^2 + (t.s)^2}$$

In this formula, (n) is the number of sample, (N) is the number of population, (s) is standard deviation, and (t) is equal to 2. Table 2 displays the statistical population and sample size of this study.

Instrument

A questionnaire divided into three parts was used to collect data from the target group. Part one, asked farmers to specify their demographic and technical information such as age, educational level, and livestock experience, membership of in local associations (two groups: membership and non- membership) and total income.

Part two was assessed major barriers to application of GAP technologies of livestock unites using Likert-type scale (1="very low", 2= "low", 3= "intermediate", 4= "high" and 5= "very high").

Finally part three, assessed level application of Good Agricultural Practices (GAPs) technologies in livestock systems was measured in

Table 2: Statistical population and sample size of the study

County	District	No. of Ranchers per district	Sample size
Meshkinshahr	Traditional livestock farms	360	116
	Industrial livestock farms	6	4
	Total	366	120

Table 3: Demographic characteristics of respondents

Demographic Characteristics	Frequency	Percent	Mean	SD
Age (year)			53.35	12.67
< 31	6	5		
31-40	14	11.7		
41-50	28	23/3		
51-60	42	35		
> 60	30	25		
Educational level				
Illiterate	37	30.8		
Literate (not primary school)	51	42.5		
Primary school	15	12.5		
Secondary school	3	2.5		
High school	7	5.8		
Post high school	7	5.9		
Livestock experience			20.74	10.84
livestock Units ownership				
Personal	119	99.2		
rental	1	0.8		
Income from livestock (percent)			55.20	23.41

six parts including application of GAP practices for very high") installations and structures (seven statements), application of GAP practices for equipment and facilities (11 statements) application of GAP practices for health (17 statements), application of GAP practices for transportation (eight statements), application of GAP practices for nutrition) seven statements, application of GAP practices for recording events (8 statements), (accordance to studies done by (GlobLGAP, 2010 and Tawadchai *et al.*, 2006), All these parts were measured on a Likert-type scale ranged from 0 to 5 (0=No, 1=low, 2=intermediate and 3=high).

Validity and reliability

Validity of the instrument was obtained by Agricultural Jihad experts of Meshkinshahr County and the members of committee of thesis, Supervisor and advisers of thesis in Department of Agricultural Management and Development, University of Tehran. Reliability of the instrument was measured by calculating Cronbach's Alpha coefficient, a measure of internal consistency. The reliability for various parts was more than 0.7, which showed the acceptable level. Data were collected through face to face interviews with ranchers at their farms.

Data analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS). Descriptive and inferential statistics were used to analyze the collected data. Descriptive statistics included frequency, percentage, mean, and standard deviation and so forth and inferential statistics included factor analysis.

RESULTS AND DISCUSSION

Characteristics of the sample

According to the findings about 88.53% of respondents were men, and respondents were on average 53 years old. About 35 % of respondents were between the age of 51 and 60years. While, 5%, 11.70%, 23.30%, and 25% of respondents were <31, 31-40, 41-50, and >60 respectively. Most of the respondents were literate (69.20%) and 30.80% were illiterate. Respondents' experience in livestock activities was 20 years on average. Findings showed 99.02% respondents had personal ownership livestock unites. The average production of milk was 21.50 Liter daily. The average income of ranchers from livestock job was 58.20 percent of total income. According to the findings, anybody of the respondents in traditional livestock systems had access to internet and computer (Table3).

Priority Barriers to Application of Good Agricultural Practices (GAPs) for livestock

Table 4 shows that No guarantees prices for safety products has first priority of barriers to, because of having the highest extent of mean (M=2.275 Lack of veterinary clinics and early detection of diseases (M=2. 958), Delay in payment of compensation by insurance (M=2.866), Lack of support for organic milk producers (M=2.841), respectively have allocated priorities from second to fourth. In addition Low levels of literacy (M=1.808), The high age of most ranchers (M=2.808), The absence of avoiding laws excessive use of antibiotics and hormones in dairy farm (M=2.100) with the lowest extent of mean have allocated last priorities to themselves.

Factor Analysis

In order to indicate barriers to Application of Good Agricultural Practices (GAPs) by Ranchers factor analysis was conducted. To determine the appropriateness of data and measure the homogeneity of variables entered to the analysis, the Kaiser-Meyer-Olkin (KMO) and Bartlett' Test of Sphericity (BTS) were applied. KMO was 0.857 and BTS was 1125.557 ($p < 0.01$), indicating that the data were appropriate for factor analysis.

While performing the factor analysis, there are some decisions to be made: the method of factor extraction, the number of factors and the type of factor rotation. There are several factor extraction methods. The methods used for the final solution were chosen primarily on the interpretability of the resulting factors. In this study unweighted least squares factoring was used as the extraction method. Another decision to be made when conducting factor analysis is to determine the number of factors. One rule of thumb is to use

Table 4: Barriers to application of good agricultural practices (GAPs) for livestock.

Statement	Mean	SD	Priority
No guarantees prices for safety products	2.975	1.184	1
Lack of veterinary clinics and early detection of diseases	2.958	1.226	2
Delay in payment of compensation by insurance	2.866	1.076	3
Lack of support for organic milk producers	2.841	1.092	4
Lack of government support on livestock	2.808	1.937	5
Ranchers accustomed to the use of chemical drugs and method because of Immediate effects and lesser cost	2.766	0.993	6
Texture of old livestock buildings	2.750	1.317	7
Lack of access to extension-education services	2.741	0.957	8
Lack of access to safety and health food	2.741	1.111	9
Lack of familiarity with hygienic and health problem	2.708	1.032	10
The lack of Stalls health	2.666	1.079	11
Lack of sufficient knowledge about organic and safety production	2.600	1.110	12
Low risk of ranchers for application GAP	2.508	0.840	13
Lack of using efficient decontamination in livestock sites	2.466	1.003	14
Lack of equipments and facilities for using GAP technologies	2.383	0.842	15
Lack of access to affordable and quality vaccines	2.357	1.059	16
Lack of adequate information on GAP for livestock	2.225	0.911	17
The absence of avoiding laws excessive use of antibiotics and hormones in dairy farm	2.100	0.901	18
The high age of most ranchers	2.041	0.863	19
Low levels of literacy	1.808	1.055	20

Table 5: Eigen Values, variance percentage and The cumulative variance percentage of extracted determinants

Factors	Eigenvalue	% of variance	Cumulative % of variance
1	4.170	21.950	21.950
2	2.407	12.668	34.618
3	2.185	11.498	46.115
4	2.033	10.425	56.814
5	1.981	10.425	67.238

Table 6: Items Loaded In The Factors Using Varimax Rotated Factor Analysis

Factors	Variable	Factor loadings
Infrastructure	Lack of equipments and facilities for using GAP technologies	0.718
	The lack of Stalls health	0.535
	Lack of using efficient decontamination in livestock sites	0.737
	Lack of veterinary clinics and early detection of diseases	0.832
	Lack of access to safety and health food	0.833
	Texture of old livestock buildings	0.568
	Lack of access to affordable and quality vaccines	0.672
Informational – educational	Lack of adequate information on GAP for livestock	0.744
	Lack of sufficient knowledge and technique about organic and safety production	0.651
	Lack of familiarity with hygienic and health problem	0.579
	Low access or lack of access to extension-education services	0.6710
Institutional-support	Delay in payment of compensation by insurance	0.550
	Lack of support for organic milk and dairy production	0.593
	Lack of avoiding laws on excessive use of antibiotics and hormones in livestock farming systems	0.744
Personal	Low levels of literacy	0.889
	The high age of most ranchers	0.549
	Low risk of ranchers for application GAP	0.594
Economical	No guarantees prices for safety products	0.632
	Ranchers accustomed to the use of chemical drugs and method because of Immediate effects and lesser cost	0.867

an eigenvalue of one as the cut-off value. That is, all factors in a particular solution must have eigenvalues greater than one. Rotation is used to reorient the factor loadings so that the factors are more interpretable. The Varimax rotation option, which tries to minimize the number of variables that load highly on a factor, was used Eigen values; variance percentage and the cumulative variance percentage of extracted determinants are presented in Table 5.

Accordingly, five factors were extracted (Table 6). Factors were examined and given a descriptive title that represented the characteristics of the constructs. The first factor was infrastructure barriers which explained 21.950 percent of variance. Other factors were informational - educational barriers, institutional-support barriers, personal barriers and economical barriers which explained 12.668 11.498, 10.425 and 10.425 percent of the total variance respectively. These factors explained 67.238 percent of the total variance. The five factors that were extracted are as follows:

Factor 1: The first factor accounted for 21.950 percent of the total variance and 7 variables loading significantly. These variables were "lack of equipments and facilities for using GAP technologies", 'The lack of Stalls health", "lack of using efficient decontamination in livestock sites", "lack of veterinary clinics and early detection of diseases", "lack of access to safety and health food", "lexture of old livestock buildings" and "lack of access to affordable and quality vaccines". So, this factor was termed "infrastructure barriers".

Factor 2: The second factor accounted for 12.668 percent of the total variance and 4 variables loading significantly. These variables were "lack of adequate information on GAP for livestock", "lack of sufficient knowledge and technique about organic and safety production" , "lack of familiarity with hygienic and health problem" , "low access or Lack of access to extension-education services". So, this factor was termed "informational-educational barriers".

Factor 3: The third factor accounted for 11.498 percent of the total variance and 3 variables loading significantly. These variables were "delay in payment of compensation by insurance", "lack of support for organic milk and dairy production", and "lack of avoiding laws on excessive use of antibiotics and hormones in livestock farming systems" So, this factor was termed "institutional-support barriers".

Factor 4: The forth factor accounted for 10.425 percent of the total variance and 3 variables loading significantly. These variables were "the high age of most ranchers", "the high age

of most ranchers", and "low risk of ranchers for application GAP". So, this factor was termed "personal barriers".

Factor 5: The last factor accounted factor accounted for 10.425 percent of the total variance and 2 variables loading significantly. These variables were "no guarantees prices for safety products" and "ranchers accustomed to the use of chemical drugs and methods because of immediate effects and lesser cost". So, this factor was termed "economical barriers" (Table 6).

CONCLUSION AND RECOMMENDATION

The findings revealed that the major barriers to application of Good Agricultural Practices (GAPs) technologies in sustainability of livestock by of ranchers were infrastructure. Considering the percentage of variance explained by exploratory analysis factors "infrastructure barriers" with 21.950 percent of variance explained has the largest collection of major barriers to application of GAP technologies. In this context should be considered organization and integration of GAP of livestock programs in the region and infrastructure factors under supervision and manage of an organization (such as agricultural extension institution) and also to display FFS programs associated with early needs assessment of required infrastructure factors in the region for the implementation of GAP programs.

Information about being clear and explaining new technology causing more usable to farmers. Information reduces uncertainty and doubt about the application technology (Cawell *et al*., 2001) Providing more information about the technology reduces negative attitude towards technology adoption, correct combination of information is required for the effectiveness and efficiency to adoption technology (Bonabana-Wabbi, 2002).

Recommended to implementation and encourage farmers in the villages to participation in group activities and active membership and participation in such as village councils and cooperative associations. Farmers with more interaction between the institutions and social organizations get more knowledge and their attitude is more favorable to GAP and application the higher levels of technology.

Obviously, opinion leader's impact on farmers in technology adoption, attention trusted people and local leaders to adoption new technology is important as an effective strategy. Therefore, more attention to identify the real needs, to make tangible of non-tangible needs and prioritizing them by their producers. With facilitative agricultural extension and research agents and personnel under FFS programs. Most effective solution in this case targeted training of ranchers is in connection with the capabilities and benefits of GAP and is necessity the importance of its goals for the implementation of better safety production programs in the region (accordant to the result of Razzaghi Borkhani *et al.*, 2013) the important role of agricultural extension agents which can affect farmers' perceptions and behaviors to adopt and apply new technologies with use of extension-participatory methods such as farmer field schools is proper strategy for creating positive attitude of farmers towards new technologies.

Since one of the barriers to adoption and application of technologies, (according to study done by Razzaghi Borkhani *et al.*, 2011) is farmers' low risk orientation, it is recommended to provide incentives such as loans and facilities for farmers who have low income, purchasing guaranteed products, Fixed prices policies. This will increase application level among farmers. Besides more coordination between the public and the private sectors for application GAP standard and to give certification of safety production of livestock farming system. In extension GAP standard in Iran is important.

A important factor to ranchers consume to use chemical drugs and hormones, because of immediate effects and lesser cost is. Therefore requires changing farmer's perception. Hence, agricultural extension agent can affect farmers' perceptions and behaviors, in order to increasing usage and application GAP practices. Commuter of the Internet as sources of information cannot be used by ranchers. Therefore the necessary infrastructure provided education and information through mobile messaging and commuter for dairy farmers. In this context, educational - extension programs are used local knowledge and experience in order to production a healthy crop and GAP. Agricultural extension agents presented indigenous knowledge and combining it with modern knowledge and

technology transfer and information educational messages in minimum time for a family of ranchers.

Pay attention to major barriers to application of Good Agricultural Practices (GAPs) technologies among ranchers were informational-educational barriers. So for best application of GAP technology, it is recommended to establish extension workshops to increase farmers' knowledge toward GAP practices in livestock.

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