

Adjusting indigenous knowledge and new technologies in cotton cultivation in the city Garmsar

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Abstract: This study has been developed to adjust indigenous knowledge and new technologies in cotton cultivation in Garmsar. Adjustment is to adapt a person, object or society with an ultimate goal to be done in different economical, social and cultural dimensions. Unadjustment of both indigenous and new knowledge is one of the big problems causing no acceptance of proper technologies in indigenous societies as well as neglecting indigenous values in a scientific community. Qualitative and quantitative findings represent low adjustment in indigenous knowledge of cotton farmers which are the main holders of this knowledge with new technologies in cotton planting. Decision sharing, receiving benefits, and income level are all important in increasing the adjustment of indigenous knowledge and new technologies. This study indicates that political problems such as allocating the price, educational problems and lack of new technologies have been considered as serious barriers to the adjustment for thirty years. It also implies that the more interaction between experts and farmers, the higher score can be allocated to adjustment of indigenous knowledge and new technologies. This study is a survey that uses descriptive and inferential statistics to evaluate the variable relations and impacts. A validity assessed questionnaire has been used to gather data and SPSS win 18 has been used to analyze gathered data. The population included 92 people which were chosen randomly.

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Introduction

Adjustment is applied to a process on which social relations are coordinated and from which, some lives benefit (Akbari, 1379). In this study, adjustment is considered as an adapting factor between different characteristics of indigenous knowledge and new technologies. In an overall view, adjustment means incorporation, adaptation, and compatibility, and is in four major fields' economical, sociocultural, individual and psychological aspects. Indigenous knowledge is a part of every country's national property which consists its local beliefs, values and knowledge. It has been the result of trial and error in natural environment for ages and is still passing orally from generation to generation (Emadi, 1378). Technology which, in this study is synonymous to a new knowledge is a manmade product, based on knowledge, research and development and economically, it is considered a product having specific characteristics such as a life cycle. Being planted in different parts of the country, cotton is considered as one of the strategic products and one of the most highly-used natural fibers of the world.

It is a dicot angiosperm of the species Malvaceae and genus *Gossypium*. How it grows, depends on environmental atmospheric situations. Having pharmaceutical, industrial and nutritional importance, cotton has been long researched on. Current estimate for Garmsar production is about 12 thousand tons annually. 6 factories are run with this amount. Refining cotton bolls will result in cottonseeds

and spun yarns which is the initial substance for loom, textile and spinning industries.

Using mechanized seed- planters for planting cotton seeds in Garmsar seems a fast and easy way, however, in formers point of view, it is not proper because the amount of seeds is used here is twice as much. Meanwhile, the common technology is not appropriate for ploughing the fields. The amount of delinting seeds (not fluffy) used here is less than fluffy ones and it can even be lessened to half. Normally, in cotton plantations where the average fluffy seeds used by an in-line planter are about 40 kg/h, it can be reduced to 20 kg/h using delinting seeds. When using pneumatic machines, this amount can be reduced to 8 - 12 kg. Almost more than half of the cotton producers in this city, are still working traditionally. Last year, more than half of the farmers ploughed their field along with their products; thus, this year, arable lands have decreased.

This study is to find whether adjusting indigenous knowledge and new technologies are able to increase productivity both quantitatively and qualitatively? It seems if available technologies adjust with farmers' traditional procedures, we will have a normal result.

Comparing with other world's ancient cultures, formal and academic research on indigenous knowledge in our country is somehow new. To be novice in this research field, lets us learn from others' failure and success. Indigenous knowledge has been

noticed by anthropologists and environmentalists for about two decades. Native people remind their indigenous knowledge as a romantic experience. Nowadays it has been proved that agricultural modernization and mechanization do not necessarily increase productivity. On the other hand, if traditional and indigenous methods are used consciously, productivity and efficiency will increase steadily. It is basically believed that technology is one of the important factors for change. However, there is a mutual relationship between technological changes and social changes. Technology not only causes changes but also is a channel to society's changes. Sometimes, it acts as a pressure factor in society's development. However, it has a noticeable role in global changes (Tavakkoli, 1379). Understanding indigenous and technological knowledge of users, paying attention to available regional ecosystems which are compatible with them, error tracking through information and understanding aforementioned issues, learning from farmers and villagers have been know as, and finding solutions through their experiences as well as adjusting with them as the starting point of production and technology transition, participation of farmers in problem solving, and conveying technology to the specified farmers are necessary. As a result, one of the biggest problems is that people and experts are getting far from each others; thus, it is necessary to adjust villagers' knowledge and skills with those of experts. Adjusting indigenous knowledge and new technologies through incorporation, combining observations, and regional native experiences can be somehow useful in solving problems. These two knowledge are complementary and can achieve success and progress together so that neither of them can do so by itself.

Studying indigenous literature and adjusting it with new knowledge and rural constant development literature has manifested that indigenous knowledge is complementary and functional to new knowledge. That is, effort in trying to gather them, is not only a merely academic and anthropologic activity but clearly it has also been started to solve the problems being caused by unadjustment of indigenous knowledge and new technologies. Thus, to solve the rural extension problems of a country, it is essential to search scientifically and evaluate indigenous knowledge and skills of people. Next, adjusting this knowledge with new technologies will be useful and efficient in planning economical, social, and cultural activities. Thus, evaluating the adjusting of these two knowledge in constant rural extension indicates that they are both capable of preserving natural resources and eliminating poverty in villages. However, it has some constrains against issues related with regional rural growth. So,

using any solutions consisting both indigeneous and new knowledge will have a noticeable role in removing the constrains (Adib & Roosta, 1390). MacLin, 1994, in a research named "Evaluating Cultural Adjustment In Host Society" worked on effective cultural factors such as differences in language, etc. found that cultural factors influence adjustment.

Izadpanah, 1375, worked on "The Role of Agricultural extensional Activities In Planting Water-required- Wheat From Gonbad And Gorgan's Farmers' Point Of View" and found that there is a meaningful relationship among agricultural extension activities, preparing the land, disinfecting seeds, using **sarak** fertilizer, and decreasing waste while harvesting by combine. There has also been a correlation between individual training, display programs and visiting cotton plantations and their efficiency (Izadpanah, 1375).

Tabatabayifar, 1381, in a research titled "Identifying agricultural extension and educational requirements of cotton farmers in Garmsar in 79-80" found a positive and meaningful relationship between independent variables like education level, the area under cotton cultivation, using agricultural extension and educational programs and variables like the amount of educational requirements. He also identified a negative but meaningful relationship between independent variables like age, participation in educational classes, the number of visit from cotton fields, the number of contacting with extentionist and using educational journals and variables like the amount of educational requirements.

Efforts to increase farmers' (here cotton farmers) adjustment level should have a high priority over other issues. The government should find different ways to adjust and improve the traditional atmosphere of the society through his certain and constant techniques. Note that the whole process should be done in a way that farmers themselves show tendency to training constantly and incentively. In addition, agricultural extension as a connecting link between indigenous knowledge and new technologies should move faster and more efficient than farmers to be a more useful guide for farmers

In this study the aim is to study the adjustment of indigenous knowledge and new techno paper and finding effective ways to improve them. This study also tends to help agricultural society as well as those who decide on educational and agricultural programs. The general aim of this study is to identify effective factors on adjustment of cotton farmers and new technologies. Considering the initial aims, this study is functional and descriptive. A descriptive research, describes what it is. The current research is as follows:

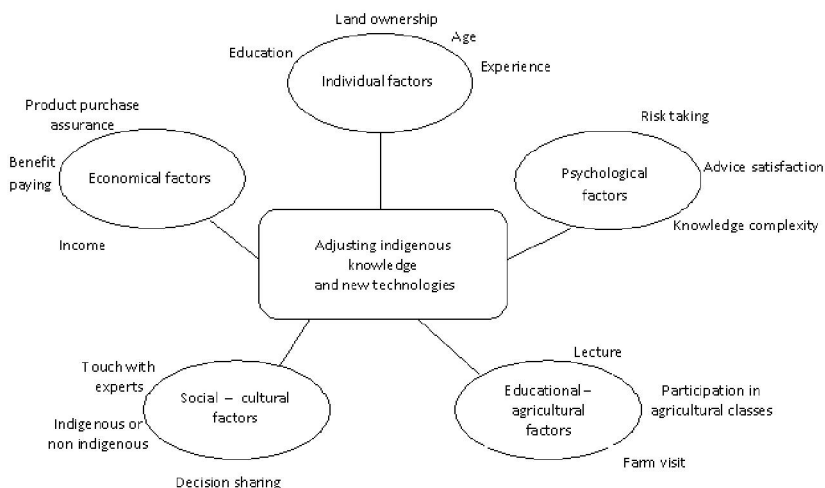


Diagram A: research model According to this diagram, the effect of five independent variables has been studied on this adjusting.

Methodology

Considering the research nature, structure and variable ranges, we used a questionnaire consisting two parts: qualitative and quantitative. The questionnaire involved 92 items; 9 for individual characteristics, 31 for knowledge of cotton farmers, 15 for educational and agricultural attributes, 21 for psychological characteristics, and the rest evaluated socio-economic characteristics. The Validity of coefficient through Cronbach's alpha for each of the mentioned variables are 0.920, 0.775, 0.863, 0.745, and 0.824 respectively. The total alpha coefficient was about 0.814. To do data analysis and to reach the research aim, 2 descriptive and inferential methods were used. Descriptive statistics were used to produce frequency distribution table to describe the current situation. Then in descriptive method, Spearman was used and data were analyzed through SPSS statistical software. After hypothesizing, the adjustment of each of the five factors was examined and a factorial analysis was done to identify the factors constraining the adjustment of indigenous knowledge and new technologies. The index produced through Bartlett and KMO testing was 0.874. Thus, it was possible to comparatively examine the adjustment obstacles; the most important factors found as obstacles, are presented in a table To achieve more information and knowledge and considering inaccessibility to them through questionnaire, an explorative study was done.

In this study, according to initial study and identifying experts in Garmsar, the data were gathered through interview and conversation with 20 cotton farmers. Table presented, show the results of these interviews. According to general census done in 1380 in Garmsar, 4 regions and 5 out of 145 villages consisted

inhabitants. There were about 35000 people living in these villages, out of which, 2100 people planted cotton every year. In this research, 91 cotton farmers were chosen as the study population to fill in the required questionnaires. Calculation sample size was also done through Cochran formula. Here, the intended populations were farmers who planted cotton on at least a half- hectare land.

Research findings

According to the information gathered about age, education and job experience of cotton farmers, it was cleared that 61% of the populations are low-educated, about 70 years old, and have 20-40- year experience of cultivation. In fact the whole indigenous population of this region consists of old; low-mid educated, and highly experienced people. Farming is the first and main job of 80% of this population and the rest 20% farm as their second or side job. Statistics have revealed that about 1.1% say that farming cotton doesn't have any income; 23.9% say that the income is low; about 50% say that the income is average and the rest 18% believe it is reasonable.

People who worked on renting lands were asked if they were willing to use new technologies provided that the land was given to them. 68.5% said yes and reasoned that the whole benefits would belong to them and considered new technologies faster. The rest said no and considered the traditional method still better than the new ones. Some of them, also, rejected for their age, expensive tools and technologies. Thus, it is inferred that no having land doesn't justify the unadjustment with new technologies. A question on knowing different seeds showed that 66.3% of the populations just know 2 kinds of cotton seed: Cotton

Vash and Ghooze which are the American ones; 24% know delinting seeds in addition to preceding seeds and just 9.8% could name the seeds; meanwhile, only one farmer mentioned the colored types of cotton. It implies that farmers have little knowledge about available seeds in bazaar and are not free to choose different seeds since there is no service.

About their knowledge toward different use of the plant cotton, it was shown that they believe every part of this plant except the flower is used. However, they are ranked from the most important to the least: cotton fiber, leaves, stem, root, and seed. About different methods on seed preparation for cultivation, it is inferred that new methods are not used in these plantations yet, and farmers prefer to use traditional methods for different reason like expensiveness of delinting seeds and void seeds. About knowing new and mechanized methods of cotton, it is implied that farmers are still using the methods they used 30 years ago for they neither are familiar with new ones nor had any opportunity to learn them.

The average seeds used in this region is 53.86 kg/h which represents farmers' knowledge level is too low or they have been trained badly or they haven't been trained at all. About the knowledge of seed disinfection, 57.6% of participants didn't know any special method against diseases and pests. In Garmsar, the average seed used is about 40 to 60 kg which is twice or three times as standard. This is while, cotton cultivation is done in lines; thus, 20-30 k/h seeds should be used. Out of 92 participants, 4 used fallow lands, 28 used winter water ice, ...used pesticide poisons, 26 used fall ploughing (plowing), and only a few, used methods like burning lint and parasite insects. Resistant types and cultivation time were not mentioned at all. Aforementioned methods are the most functional traditional ones while methods like parasite insects and resistant types such as transgenic cotton, pot cultivation, and intercropping have not been mentioned at all. So, knowing new technologies would be considered low.

Out of 92 participants, 16.3% used no method to reclaim their land. 27.2% used fertilizer, 33.7% used recultivation, 16.3% used participant plants and only 6.6% used excavation to reclaim hard lands. On how to manage drought and water crises in hot seasons, 13% of participants declared they didn't use any special method; 21.7% said they used Koozkar method (that is, they block 2 rows (Keil) out of three to save water); 21.7% considered fill and drop method as the first and last appropriate method; 17.4% said they divided the land into some parts and the parts, then they irrigated the parts which had more products; and finally 28.1% said that they let the land be thirsty or they used weeds in rows (Keil) to stop water steaming. None of them referred to drip irrigation

which indicates one of the problems in agricultural extension in Garmsar.

On knowing resistant and new types like transgenic cotton, 100% of participants said they hadn't heard it yet. However, after knowing about the resistant seed of this type, 58.7% were ready to volunteer to cultivate it in Garmsar empirically; 30.4% said, they would cultivate it just in case they see the result, , and only 10.9% disagreed to cultivate it. On mechanized cotton harvesting, 91.3% believed that new tools and devices had not been modernized for thirty years and 8.7% said they used tools and devices. On contacting with experts, 22.8% said they didn't have any contact, 37% said they contacted very little, 26.1% declared an average contact and 14.1% referred to high contact with experts. 57.6% of farmers said their cotton plantations had not been visited by experts and 30.4% referred to a few visits by experts. On different ways of receiving information like "agricultural extensionist", "radio and TV", "journals", "neighbors and relatives" and "local experts", they seemed willing to get information from experts. Thus, we can conclude that local experts are considered the most desirable and effective way in adjusting indigenous knowledge with new technologies. On effectiveness of experts' advices and recommendations, most of the answered had been "low" which represents experts' quantitative trainings have been low and somehow infeasible.

According to the research findings, authorities' levels of attention to the training of cotton farmers have been shown in table The most frequency, 76.1%, is about the answer "low" or "not". It implies that the authorities don't pay attention to farmers' training. It is while the need for training cotton farmers toward "appropriate seed selection", "plow", "using pesticides", "irrigation", "fertilizing", and "harvesting" is high and about 71.5%. The reasons for not participating in agricultural extension classes are: "lack of class holding from center", "information are repetitive", "experts don't leave their desks", "low cotton farmers are not paid attention", "trainings are not done in time", and "trainings are not as effective as they should". Some questions were asked to identify why farmers didn't go to educational-agricultural extension centers and the results according to the most frequency are: 30.4% nonnative experts, 31.5% bad and inappropriate recommendations to farmers, 21.7% lack of the experts' presence in their offices, and 16.3% inappropriate reaction toward customers. Findings of the research on age, experience, information transition through speech, visit form experimental farms, indigenouness of experts, product purchase assurance, ownership, education level, knowledge complexity, farmers' contact with experts, decision

sharing, benefit conferment, income were examined with adjustment of indigenous knowledge with new

technologies and the result are shown in the following table.

Table1: Correlation Coefficient

Variable	Correlation Coefficient	Meaning
Age of cotton farmers	K2 Pearson	0.058
Experience in cotton cultivation	K2 Pearson	0.108
Land ownership	K2 Pearson, Cramer	0.017
Farmers' level of education	γ K2 Pearson	0.015
Information transition through speech	K2 Pearson	0.773
Visit form experimental farms	K2 logarithm	0.550
Level of satisfaction toward recommendations	K2 Pearson γ	0.004
Risk taking level	K2 Pearson	0.800
Knowledge complexity	K2 Pearson	0.011
Farmers' contact with experts	K2 Pearson	0.00
Decision sharing	K2 Pearson	0.011
The difference of indigenoussness and not indigenoussness of experts	Cramer	0.233
Benefit conferment	Spearman	0.014
Income	Spearman	0.033
Product purchase assurance	K2 Pearson	0.550

The level of the signification of the variables are shown.

According to the above table, there is no meaningful relationship between adjustment of indigenous knowledge and new technologies and variables as age, experience, information transition

through speech, visiting experimental farms, indigenoussness of experts, product purchase assurance. Meaningful relation of other variables with adjustment of indigenous knowledge and new technologies is 0.5% and rejects the hypothesis of zero.

Table2: arranging the variables of the research

Items	Mean	Standard deviation	Coefficient variations	Rank
Lack of government support toward low cotton farmers	6.66	0.96	0.144	1
Inappropriateness of technologies with regional situations	5.96	1.01	0.169	2
Inappropriateness of technologies with regional situations	5.96	1.01	0.169	3
Experts' weak empirical knowledge	6.41	1.09	0.170	4
Experts' weak empirical knowledge	6.41	1.09	0.170	5
Not in time trainings	5.88	1.03	0.175	6
Lack of in time accessibility to technologies	7.21	1.28	0.178	7
Avoiding participating farmers in new production designs	5.39	1.02	0.189	8
Local expert doesn't accept technologies	6.32	1.36	0.215	9
Not showing new technologies' functions to farmers	6.38	1.41	0.221	10
Technology complexities	7.00	1.55	0.222	11
Infeasible recommendations	6.34	1.42	0.224	12
Lack of farmers' ability to learn due to high age	6.31	1.47	0.233	13
Government assurance in purchasing products produced by new technologies	6.31	1.47	0.233	14
Price inconstancy (importing cotton while harvesting internal cotton)	5.69	1.45	0.255	15
Farmers' individual concerns	5.69	1.45	0.255	16
Lack of extensionists' attention toward farmers' training needs	6.00	1.54	0.256	17
Expensiveness of new technologies	7.45	1.96	0.263	18
Reluctancy toward using new technologies	7.44	1.97	0.263	19
Lack of long term loans and appropriate benefits	5.29	2.01	0.380	20
Lack of continuous contact between farmers and agricultural extionsists	3.63	1.63	0.485	21

In this table, the variables of the research have been arranged according to its importance.

Explorative study findings

Table3: Summary and results of the study

N	Findings	F
1	Cotton cultivation in Garmsar dates back to 80 years ago but no one really knows who cultivated for the first time.	20
2	The first cotton type produced was Ghoze which is not cultivated anymore.	20
3	We learned to cultivate through our fathers and brothers then we gained experience.	20
4	We started working on farm since we were children.	20
5	The first thing we learned was shoveling.	19

6	We worked on renting farms those days and it sufficed our living, however nowadays it is the opposite.	20
7	Just a few experts tend to train us. Training was too much better before the revolution. Experts were knowledgeable but nowadays they don't show up.	20
8	Educational classes are rarely held and farmers don't participate due to inappropriate informing.	20
9	Some years ago, cotton was worth cultivating but nowadays farmers prefer to cultivate alfalfa. It is about 3-3.5 ton per hectare.	16
10	Our seeds are really expensive because centers do not distribute any seeds.	20
11	Nobody has visited our farms so far. However, we know what they want to say.	20
12	No new thing is trained to us.	20
13	No new tools have been introduced. We will welcome new tools even if they are expensive. It is about 30 years that we are using our old tools.	20
14	Centers have sold harvesting machines which harvested 90k per Keil.	20
15	We don't know transgenic cotton seed but if it is useful we are willing to use them.	20
16	We are ready to consult experts but they don't leave their desks.	20
17	Our cultivation is often a little early or late. Because we don't have enough water to irrigate.	20
18	We remove fluffs traditionally. Centers don't give us bare seeds.	20
19	We don't know any other was but to sell cotton Vash, sometimes we let our cattle browse in the farm in order both to use their fertilizer and earn money.	20
20	We used to plant sunflowers, beans, beet, sesame, tomatoes and egg plants around our farms.	19
21	Nobody has shown us a way aside from using fertilizer and poison.	20
22	It's better to see the result of new technologies then we use it. Because if it is not good, the farmers would suffer.	20
23	Our satisfaction is not of importance. If so, they wouldn't import cotton in or harvest time.	20
24	We want government to guarantee our products. The price is not good at all. We suffer the loss and the dealers benefit.	20
25	If we are supposed to use the new technologies, we should be trained thoroughly how to use them.	20
26	We need loans, we want them to do their commitments and pay attention to small farms as well.	20

This table shows that all the indigenous information of the cotton planters have led to this explorative study.

Discussion and Conclusion

There is no meaningful relation between the age of cotton farmers and level of adjustment of indigenous knowledge and new technologies. This is also true about the farmers' experience. On the other hand, by increase in age and experience of farmers, no change happens in their adjustment. This research is not along with the research Faraji et al. (1385), Maleksaeedi et al (1389), and Sharma et al (2002) did on "Farmers' attributes and acceptance of corn kernel".

There is a meaningful relation between recommendation satisfaction and adjustment of indigenous knowledge and new technologies. According to theoretical framework of the research, Merser, 1999, has stated that satisfaction indices can play an effective role in satisfying farmers. Descriptive findings show that more than 67.3% of farmers were not satisfied with advice and recommendation they received.

There is a meaningful relation between benefit conferment and adjustment of indigenous knowledge and new technologies. The results of this research are along with the studies of Rasoulzade

Tabatabaee et al. (1387), Diala (1994), and Khaledi et al. (1389).

There is no meaningful relation between product purchase assurance and adjustment of indigenous knowledge and new technologies. This finding differs from what Merser found in 1999; however, this finding corresponds with Lahestanizade's researches.

Suggestions

1. Considering the fact that half of the farmers are low or uneducated, although, findings showed no relation between education and adjustment, complexity of technology effects unadjustment. So it is inferred that making people literate, can remove complexity of technologies. Thus, literacy centers should be prepared for illiterate farmers.
2. It seems logical that the government gives long-term loans to farmers who don't have land or farmers with small lands to enlarge their land into vast plantations. In this way, new technologies can appear more effective.
3. According to descriptive and analytical statistics findings about educational expansion classes, it seems that farmers are not in an appropriate educational situations, thus, agricultural department should act as quickly as possible.
4. Since farmers' knowledge of cotton doesn't differ what they hear from experts, it is recommended that authorities do something to increase their experts' agricultural knowledge.
5. It is suggested that experts avoid recommending something that are not sure of their functions. Because age, ownership, and mental situations of farmers are so that if they suffer loss, it would result in a permanent and deep unadjustment.
6. The findings show that farmers' knowledge of killing pets, cultivation, and harvest pessimistically goes back to 70 and

optimistically 30 years ago. There has been no promotion so far.

7. To associate and cooperate more with villagers, experts are needed to leave their desks and empathize with them. Thus, experts are better to be indigenous to understand the population culturally and morally.
8. Farmers are willing to consult with technology producers and new design executers. They want to share these designs beside the executers in order to gain their benefits. This cooperation will lead to a link the traditional knowledge to the new one. More importantly, farmers would try their best to broadcast these technologies.
9. It is required that agricultural experts and extensionists, make the designs as comprehensible as possible. According to the research, the most reliable communicative channel is local experts and the most desirable educational tool is photos and slides.
10. According to the research there is no experimental farm which is better to be built. One of the biggest problems is inappropriateness of technologies with the region conditions. So, before demonstrating the new technologies it is better to use them in an experimental farm to assure their effect.
11. According to ranking socio-cultural problems, it is better to prepare programs in which technologies are as farmers' need, not so unreachable that using them results in planting Korpe, or decreasing the quality of cotton while harvesting. Lack of continuous communication between farmers and experts is one of the problems which results in psychological problems. Most of the farmers who don't take risk, would be left alone in a period of time. They state that they are reluctant to toward adjustment because they don't see any cooperation between experts and themselves.
12. In order to increase farmers' productivities, the government should support small-land farmers (they don't feel they are forgotten), assure purchasing products produced by new technologies (reward them in return for using new technologies), balance the prices (stop importing cotton while harvesting our cotton),

decrease the number of dealers. Consequently, cotton factories would change according to the new technologies.

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