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Determining the Socio-Economic Importance of Saffron as an Alternative Product to Opium Production in Afghanistan

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Abstract

The objective of this work is to determine the socio-economic importance of saffron production as an alternative to opium production in Afghanistan, and to determine if saffron production could influence farmers' incomes. The primary data for the survey was obtained via direct interviews with farmers of 4 saffron leader districts in Herat, where 95% Saffron production was noted during 2016-2017. Factor analysis was used to determine the factors that influence saffron producers. Cluster analysis was used further, to separate farmer income groups. According to the first cluster, the most important factors affecting agricultural production were: negative climatic conditions while market instability was the second factor. Saffron producers' annual average yield is 6.6 kg/ha in results that showed that if opium production is permitted, saffron farmers would produce opium due to the high revenue associated with opium production in Afghanistan.

Keywords: agricultural policy, cluster analysis, factor analysis, risk analysis.
JEL Classifications: C10, Q17, Q18

1. Introduction

The agriculture sector holds an important place in the economies of undeveloped and developing countries. In these countries, agriculture has an important place both in terms of employment and contribution to the gross domestic product.

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In recent years, with the increasing use of medicinal, aromatic and endemic plants in the pharmaceutical, cosmetic and food industries, these group of plants have begun to gain importance as alternative products in agricultural, industrial and economic importance (Temel, Tinmaz, Öztürk, & Gündüz, 2018).

As of 2001, Afghanistan has entered a new phase after the US' declaration of war on the Taliban regime in the country. Since 2002, the Ministry of Counter Narcotics of Afghanistan (MCN) has been established with the support of the United States. Different policies such as Alternative Livelihoods, CARD-F projects, Food Zones, and Good Performance appraisal programs based on drug termination in the country have started to be implemented in Afghanistan with the Ministry of Counter Narcotics, the Ministry of Agriculture and the Ministry of Rural Affairs (Ministry of Counter Narcotics, 2012).

There have been many studies against the restriction of opium production (Mcdonald & Mansfield, 2001; Jalali, Oakley, & Hunter, 2006; Felabab-Brown, 2015). Hancock (2012) investigated the underlying causes of terrorism in the region and found that there was a relationship between the production level of the opium and terrorism. Favre (2005) have suggested that, it is important to provide an alternative source of income for the farmers if the production of the opium is restricted or completely abolished, as opium production is the most important source of income for the people living in the rural areas.

Again, (Glaze, 2007; Mercille, 2011; Hancock, 2012) have proven that policies against opium production have failed. They emphasize that the America did not want to end the production of opium completely. (Favre, 2005; Jalali et al., 2006; Chouvy, 2008) emphasized the creation of alternative economies for the termination of opium production in Afghanistan.

Among 34 provinces of Afghanistan, saffron production policy is completely applied in 32 provinces. Despite the production of saffron in 32 provinces, it is still scarcely produced. In Afghanistan, it is aimed to reach the production of 15,000 kg of saffron annually. Currently, a kilo of dried saffron is sold for 1200-2000 dollars in the field, and for 2000-3000 dollars in the market

abroad (MAIL, 2016). 6 kg of saffron is obtained from per hectare averagely, therefore it is an expensive plant (Cinar & Onder, 2019). At the same time, the saffron of Afghanistan was chosen as the best quality saffron by the International Taste and Quality Institute in Brussels for 4 years, successively (ITI, 2017).

Especially in the western part of Afghanistan, the most suitable places for saffron farming have been identified. Herat province in this region has become a saffron production center in Afghanistan with a production share of 98% (ITI, 2017). The main goal of the study was to reveal socio-economic structures of farmers who produce saffron in Afghanistan as an alternative to opium, to identify problems in the sector, and to make suggestions to policy makers to increase the production of saffron, which provides an important income throughout the country.

2. Material and Method

Primary and secondary data were used as material in the study. In Herat province, which accounts for 95% of saffron production in Afghanistan, face to face interview method has been used. The farmers living in the 4 districts that actively produce saffron constitutes the context of the study.

The secondary data used in the research were used to predict the model and reveal the structure of the industry. Journals, internet resources, books, programs, publications of Afghanistan Ministry of Agriculture, Livestock and Irrigation, Central Statistics Organization of Afghanistan (CSO) Herat Directorate of Agriculture, NGOs, Food and Agriculture Organization (FAO) along with national and international studies and resources have been used for the purpose of the research.

"Proportional Sampling" method was used in the study to reach the aims of the study in the best way (Turanli & Guris, 2010). According to the Herat Agriculture and Livestock Directorate, the total number of farmers producing saffron is 8602, in 2015. According to the number of samples (90% confidence interval and 8% deviation), 149 people were identified. The distribution of the number of the surveys was determined as 57 people in Pashtun Zarghun, 50 in Ghurian, 21 in Zinda Jan, and 21 in Karuh districts,

considering the number of farmers producing saffron in districts. These 4 districts of Herat constitute 87% of the saffron-producing farmers in the country.

3. Result and Discussion

Iran, disputed Indian occupied Kashmir, Greece, Morocco, Spain and Italy are among the major countries/regions famous for saffron production. Especially known as the homeland of saffron, Iran has the largest saffron production areas in the world, and is the global leader in saffron production.

According to data provided by Food and Agriculture Organization (2014), Iran is producing 239 tons of saffron and constitutes 93.7% of world saffron production and according to Khanali, Farahani, Shojaei, and Elhami, (2017) plays important role in Iran agriculture. Greece is ranked number second with 5.7 tones, and Morocco and India are ranked as the third with 2.3 tones (Ministry of Counter Narcotics, 2012).

3.1. Descriptive Analysis

According to the survey results, given in Table 1, conducted with 149 saffron producers in the Herat province of Afghanistan, it is seen that the surveyed farmers have a minimum age of 20 and a maximum age of 70 and the average age level is 45.

The civil war that has continued in Afghanistan for 40 years is the most important reason behind the low education level of people such that 69% of the total adult population is not illiterate (Reynolds, 2009). This includes large majority of people that do not allow women education and this is common in rural areas.

In the western regions where the survey is conducted, this ratio is slightly higher. For this reason, farmers are more likely to make use of their own experiences during farming.

Table 1: Socio-Demographic Characteristics

Variables	Min.	Max.	Avg.	Std. Dev.
Age (year)	20	70	44.47	11.32
Education (Year)	0	16	6.23	5.45
Number of Individuals (Person)	4	20	9.92	2.99
Experience (Year)	2	60	18.58	12.68
Number of individuals working in agriculture (Person)	1	7	1.72	1.01
Saffron production experience (Year)	2	12	6.19	2.34
Revenue (US$ Year^{-1})	735.3	22058.8	7946.1	4287.76
Land assets (ha)	0	10	1.03	1.18
Non-agricultural Income (US$ Year^{-1})	0	2941.2	703.3	820.9
Bank loans	0	1	0.13	0.34

One of the most important problems of the saffron industry is the high input price. Especially during the first year, the cost of corms planting and ground preparation and the high price of corms used for planting (Nabizadah, 2010). Table 2 gives the minimum, maximum and average costs per hectare of saffron production.

In the first year, corms cost minimum US$ 1294- US$2574 with average of US$ 1822 per hectare. Since saffron is a perennial plant, the labor costs for each year vary from the 2nd year and onward period are at the minimum with US$ 29.4 to a maximum of US$ 294 and US$ 140 on average. In addition, fertilizer costs are minimum US$ 22 and maximum of US$ 220.6, as animal manure is expensive in some regions, and the average fertilizer cost is US$ 93.85. However, the average cost of pesticides + herbicides and other costs was determined as US$ 22.89 and US$ 134, respectively.

Table 2: Saffron Production Costs

Variables	Min.	Max.	Avg.
First year cormscost (US$ ha^{-1})	1294.1	2573.5	1822.15
Labor cost (US$ ha^{-1})	29.4	294.1	139.96
Fertilizer costs (US$ ha^{-1})	22.1	220.6	93.85
Agricultural drug expenditure (US$ ha^{-1})	0.00	73.50	22.89
Other costs (US$ ha^{-1})	0.00	514.7	134.02
Total costs (US$ ha^{-1})	**1411.8**	**3132.4**	**2212.88**

When Table 3 is analyzed, that shows the satisfaction level with the production enhancing policies for saffron production implemented by the state or the NGOs operating in the field of agriculture, it is seen that generally farmers are not satisfied with the state policies in terms of education on saffron planting and

harvesting, chemical fertilizer incentive, saffron corms incentive, bank loan for saffron plantation, and help in marketing saffron.

Table 3: Satisfaction with Politics Applied by the State or NGOs in Saffron Cultivation

Policies	Average*
Education on saffron planting and harvesting	2.99
Chemical fertilizer incentive	1.58
Saffron corms incentive	1.73
Bank loan for saffron plantation	1.29
Help in marketing saffron	2.72

* 1 = not satisfied at all, 2 = not satisfied, 3 = neutral, 4 = satisfied, 5 = very satisfied

The yield per hectare of saffron for 6-year period is given in Table 4. According to the data acquired from the survey, in general, 0.38 kg of dried saffron is harvested per hectare on average during first year of saffron production. However, beginning with the second year, the dried saffron production starts to increase to a minimum of 1 kg / ha and a maximum of 5 kg ha^{-1} and an average of 2.97 kg ha^{-1}. Likewise, the harvest is 9.85 kg on average and can reach up to a maximum 12 kg per hectare during the 3rd year.

Moreover, the saffron yield tends to decline from the 4th year onwards, with average of 6.28 kg dried saffron per hectare. In general, in the beginning of the 5th year, the production period of saffron ends when the farmers uproot the saffron corms to plant them at another place. Meanwhile, some farmers continue harvesting for dried saffron production and harvest an average of 2.3 kg of saffron per hectare. Due to the fall in the harvest, there is no farmer maintaining production after the 6th year. When looking at saffron sales, a market regulated for farmers is non-existent in Afghanistan. Hence, products of the farmers are sold in international markets by mediators, who purchase saffron for US$958.6/kg in general.

Table 4: 6-Year Saffron Production Yield per Hectare

Variables	Min.	Max.	Avg.
Saffron production in the 1st year (kg ha^{-1})	0	2	0.38
Saffron production in the second year (kg ha^{-1})	1	5	2.97
Saffron production in the 3rd year (kg ha^{-1})	0	12	9.85
Saffron production in the 4th year (kg ha^{-1})	0	10	6.28
Saffron production in the 5th year (kg ha^{-1})	0	8	2.35
Saffron production in the 6th year (kg ha^{-1})	0	0	0.00

The average of the factors to extend saffron production according to the farmers is given and sorted descending (Table 5).

Table 5: The Distribution of the Effective Factors in Saffron Production

Variables	Average*	Std. Dev.
Profitability is higher than other products.	4.84	0.44
Saffron has a low need for water.	4.82	0.40
Suitable for the existing conditions of your village.	4.81	0.45
The soil of Herat is suitable for Saffron.	4.80	0.44
I will keep working in agriculture in the future.	4.80	0.62
I want to increase the saffron plantation in the upcoming years.	4.79	0.62
Saffron production is carried out mostly by women.	4.77	0.47
Saffron is resistant against cold and heat.	4.70	0.58
We can harvest more in small fields.	4.16	0.88
Marketing and sale of saffron is quite easy.	3.85	0.93
Market conditions of saffron is suitable for you.	3.85	0.78
Saffron sales price is always changing.	3.62	1.03
We can store the saffron until the price is high.	3.62	1.07
There is enough work force in your family for the saffron production.	3.32	0.98
Saffron needs less workforce.	3.19	0.99
Planting and harvesting saffron is easy.	3.18	1.30
Saffron is suitable for retail.	3.04	1.18
There is enough initial advertising for saffron.	2.72	1.03
Saffron requires less fertilizer and pesticides.	2.66	1.02
You have enough capital and land for saffron plantation.	2.48	1.12
The government and NGOs are helping with the production of Saffron.	2.21	0.95
Modern machinery is needed for planting and harvesting saffron.	2.13	0.88
You take advantage of state incentives in saffron plantation.	1.87	0.95
Saffron corms are cheap in Herat.	1.36	0.62

*1: Not important 2: A little important, 3: Moderately important, 4: Quite important 5-Very important

According to data obtained; variables such as farmers to keep working in agriculture in the future as saffron is more profitable than other products and to maintain saffron production in the following years and the increase of plantation fields, the impact of the appropriate geographic and natural conditions of Herat,

especially the low water need of saffron and Herat's suitable air and soil conditions for states saffron production and the recruitment of women in saffron production have an average of 4; that shows plantation is advantageous. But the limited input factors, the high price of saffron corms especially during recent years, and the farmers that are not happy with the policies of the state and the NGOs for saffron plantation have the lowest share. In a study of Hamzei and Bozarjmehri (2015), on the factors affecting the development of saffron plantation in Nishapur, Iran; they found that saffron plantations are significantly affected by geographic conditions, presentation techniques e.g. pocketing during marketing input and management, respectively.

3.2. Factor Analysis

Risk factors that affect the vegetative production in Afghanistan are grouped under 28 titles, considering the conditions of the region. 3 methods are used to understand whether the data set is in accordance with the factor analysis. These are the creation of the correlation matrix, Bartlett's test and the Kaiser-Meyer-Olkin (KMO) tests. In this context, Kaiser-Meyer-Olkin (KMO) and Bartlett's test are carried out in the study to determine the appropriateness of the data to factor analysis. As KMO test is 0.712 > 0.70, data sets have been found to be suitable for the factor analysis. Bartlett test have been found significant and Cronbach's alpha coefficient is calculated as 0.813.

When the Table 6 is examined, where the rotation matrix is given, the risk sources affecting agricultural production, that were collected under 28 titles considering the conditions of the country in the research area, have been collected under 9 titles as a result of factor analysis. Factor 1, 2,3,4,5,6,7,8,9, had variance of 17.63%; 7.91%; 6.85%; 6.77%; 6.28%; 6.23%, 5.53%; 5.27% and 4.68% in the same order. These 9 factors account for 67.15% of the total variance (Table 6). According to the rotation matrix obtained from factor analyses, these factors are named as: Factor 1, "work force, theft, and natural conditions"; Factor 2, "Business conditions"; Factor 3, "Unstable politics"; Factor 4, "adverse climatic conditions"; Factor 5, "lack of knowledge"; Factor 6, "the size of the enterprise"; Factor 7, "finance problem"; Factor 8, "market

instability" and Factor 9, "product conservation and the health of the manager".

Table 6: Risk Sources Rotation Matrix k

	1	2	3	4	5	6	7	8	9
Work force, theft, and natural conditions									
Lack of business building	**.831**	.052	-.010	-.087	-.119	.071	.045	.130	-.164
High foreign work force wages	**.828**	.137	.073	.047	.135	-.011	.082	.040	.123
Global warming	**.747**	.247	-.157	-.073	-.151	-.112	.095	-.155	.146
Losses resulting from theft	**.714**	.145	-.035	-.189	.012	-.078	.089	-.151	.034
Lack of family labor	**.651**	-.174	.017	.051	.331	.114	.149	.060	.047
Losses caused by diseases	**.581**	.293	-.048	-.157	.167	.193	.300	-.164	-.162
Change in rainfall	**.565**	.288	-.114	.407	-.197	.052	.121	-.351	.051
Insufficiency of tools and machinery	**.537**	-.118	.287	-.179	-.397	.058	-.037	.138	-.274
Lack of contract production	**.496**	.090	.111	-.190	-.027	.217	.108	.312	.314
Operational conditions									
Infrastructure deficiencies	.134	**.738**	.223	-.078	.014	.209	.061	.103	-.056
Changes in the yield	.016	**.625**	.014	.223	-.091	-.275	-.109	.270	-.264
Changes in input prices	.482	**.616**	-.048	-.202	-.042	.082	.069	.085	.172
Natural disasters	.146	**.577**	.334	.000	.196	.121	.197	-.085	.039
Unstable policies									
Changes in government policies	.080	.119	**.800**	.053	.052	.166	-.082	-.066	-.101
Changes in agricultural policies	-.110	.173	**.789**	.079	.112	.040	-.023	.027	-.042
Adverse climatic conditions									
Rough winter	-.139	-.086	.117	**.761**	.175	.014	.187	.222	.134
Less rainfall in winter	-.200	-.026	.029	**.618**	.043	.113	-.085	-.017	-.065
Lack of knowledge									
Lack of technical information and advisor	-.054	.005	.140	.054	**.809**	.105	-.090	.014	-.176
Lack of marketing opportunities	.305	.061	.179	.427	**.579**	-.069	.008	-.087	-.022
Business size									
Lack of business land	.235	.001	.077	.181	-.223	**.717**	-.004	.059	-.039
Nonexistence of business accounting records	-.320	.157	.054	.320	.309	**.652**	.023	-.127	-.089
Changes in land rental prices	.079	.144	.202	-.195	.255	**.614**	-.115	.138	.079
Financing problem									
High interest on agricultural loans	.157	.203	-.022	.146	-.049	-.022	**.780**	.129	-.062
Lack of bank loans for producer	.200	-.053	-.046	-.077	-.037	-.046	**.759**	-.160	.027

Market instability									
The product price fluctuation	.027	.214	-.096	.086	-.082	.083	-.087	**.788**	-.048
The economic situation of the country	.410	.109	-.435	-.191	-.184	.102	-.239	**-.497**	.059
Product storage and management health									
Product losses resulting from storage	.120	-.018	-.098	.086	-.107	-.081	-.055	-.010	**.828**
Health problems of the manager	.144	.194	.145	.283	.121	-.272	-.012	.171	**-.399**
Eigen Value	20.41	11.91	6.72	6.30	5.05	4.73	4.41	3.93	3.68
Description Variance	17.63	7.91	6.85	6.77	6.28	6.23	5.53	5.27	4.68
Bartlett's Test	X^2= 1564.100, p = 0.000								
Kaiser-Meyer-Olkin	0.712								
Cronbach's alpha					0.813				

Methods implemented to partially eliminate or to reduce the effect of risk factors in agricultural production are called risk strategies (Tümer, Birinci, & Aksoy, 2010; Öztürk, 2013). In the study, strategies determined by the farmers against the risk sources affecting the agricultural production in the research area are collected under 14 titles, taking the regional conditions into consideration.

In the study; KMO test is 0.609 > 0.60 and it is determined suitable for data set factor analyses. Bartlett test is meaningful and Cronbach's alpha coefficient is calculated as 0.651 (Table 7).

When Table 7 is examined, where the number of factors depending on eigenvalues statistics and variants are given, considering the conditions of the region and the opinions of farmers, the measures taken against the risks that affect agricultural production, that were collected under 14 titles, are collected under 5 titles as a result of factor analysis. Factors 1, 2, 3, 4,5 have share of 14.34%, 12.62%, 11.62%, 10.53% and 9.84% of total variant, respectively. These factors have been found to explain 58.95% of the total variance as a result of analysis. According to the Rotation Matrix of Risk Strategies; Factor 1 is named as "product varieties and non-agricultural investments, Factor 2 as "Modern agriculture", Factor 3 as "business management", Factor 4 as "Organized work" and Factor 5 as "Risk management."

Table 7: Risk Strategies Rotation Matrix

	1	2	3	4	5
Product varieties non-agricultural investment					
Non-operational investment	**0.751**	-0.124	-0.096	-0.066	-0.038
Working in non-agricultural field	**0.747**	0.086	-0.018	-0.035	-0.081
Cultivating products besides saffron	**0.666**	-0.056	0.263	0.306	0.016
Modern agriculture					
Keeping accounting records	-0.151	**0.736**	0.298	0.055	-0.082
Cooperating with agricultural organizations	-0.021	**0.636**	-0.164	-0.008	-0.139
Being informed about the market	0.068	**0.564**	-0.153	0.193	0.420
Selling saffron by processing	0.420	**0.511**	0.471	0.121	0.096
Business management					
Making product sales in different periods	0.205	0.183	**0.698**	-0.055	0.172
Using the inputs in optimum	0.228	0.171	**-0.622**	-0.035	0.221
Organized labor					
Contract production	0.264	-0.153	-0.028	**0.731**	0.141
Pest and disease control	-0.141	0.186	0.105	**0.668**	-0.148
Cooperative membership	-0.024	0.274	-0.444	**0.553**	0.079
Risk management					
Planning the expenditures	-0.224	0.021	-0.228	0.117	**0.721**
The introduction of the agriculture insurance system in Afghanistan	0.053	-0.138	0.230	-0.127	**0.714**
Eigen Value	16.29	13.84	11.75	9.39	7.69
Description Variance	14.34	12.62	11.62	10.53	9.84
Bartlett's Test	X^2= 295.881 p = 0.000				
Kaiser-Meyer-Olkin	0.609				
Cronbach's alpha			0.651		

3.3. Cluster Analysis

In Herat, the survey area, 28 risk sources that affect agricultural production are reduced to 9 factors with factor analysis. These factors are analyzed as 2 clusters according to K-means clustering method. According to risk sources, farmers in the cluster 1 consist 2.63%, farmers in the cluster 2 consist 97.37% of total producers (Table 8).

According to K-means clustering method, while adverse climatic conditions is the most important factor in the 1st cluster, instability of the market is the second most important factor regarding the most important factor clusters in agricultural production in chart 4.21. In the second cluster, the most important factor is determined as adverse climatic conditions.

Table 8: Risk Factors Cluster Analysis Results

Risk sources	Clusters	
	1	**2**
Work force, theft, and natural conditions (Fac1_1)	-0.3346	0.0904
Business conditions (Fac2_1)	0.3093	-0.0084
Unstable policies (Fac3_1)	0.2471	-0.0067
Adverse climatic conditions (Fac4_1)	**-3.4037**	**0.0920**
Lack of knowledge (Fac5_1)	-0.6872	0.0186
Business size (Fac6_1)	0.9533	-0.0258
Financing problem (Fac7_1)	-0.5051	0.0136
Market instability (Fac8_1)	-2.3549	0.0636
Product storage and management health (Fac9_1)	-0.6896	0.0186
Number of observations	**4**	**148**
The total mass ratio (%)	**2.63**	**97.37**

According to K-means clustering method, while adverse climatic conditions is the most important factor in the 1st cluster, instability of the market is the second most important factor regarding the most important factor clusters in agricultural production in chart 4.21. In the second cluster, the most important factor is determined as adverse climatic conditions.

14 strategies against the risk sources affecting agricultural production in Herat, the study area, are reduced to 5 factors with factor analysis. These factors are analyzed as 2 clusters according to K-means clustering method. According to risk sources, farmers in the cluster 1 consist 78.3%, farmers in the cluster 2 consist 21.7% of total producers (Table 9). According to K-means clustering method, "business management" is determined as the most important in Clusters 1 and 2 regarding the most important factors in agricultural production in Table 9.

Table 9: Risk Strategies Clustering Analysis

Risk strategies	Clusters	
	1	**2**
Product varieties non-agricultural investment (Fac1_1)	0.0696	-0.2510
Modern agriculture (Fac2_1)	0.0750	-0.2705
Business management (Fac3_1)	**0.3284**	**-1.1844**
Organized labor (Fac4_1)	0.0512	-0.1845
Risk Management (Fac5_1)	0.2390	-0.8617
Number of observations	**119**	**33**
The total mass ratio (%)	**78.3**	**21.7**

4. Conclusion

It is generally known that Afghanistan is one of the countries with the lowest literacy rates in the world. 69% of the total adult

population is not literate, and this is especially common in rural areas (Reynolds, 2009). In the same way Wodka (2012) suggests that literacy rate of women is lower than men in Afghanistan and women's education should be increased equally for the termination of illegal production, such as opium. This rate is lower in western regions where the survey is carried out. This situation affects the people of this country negatively. Particularly the agricultural activities of farmers are affected adversely by this situation. "The Role of Women in Saffron Production" in this study reveals that 72% of women working in saffron production are illiterate.

The most important problem of the saffron sector is the high input costs. Especially in recent years, the tripled corms prices and the prohibition of corms export by Iran, has resulted in many problems for farmers. To solve this, the support of the state to farmers and reducing input prices play an important role in developing the saffron plantation.

In Herat, the research area, clustering is made on sources of risk that affect agricultural production and two cluster analyses are formed. 1. While the most important factor is adverse climatic conditions in the cluster 1, this factor is followed by instability on the market. The most important factor in cluster 2 is determined as adverse climatic conditions. In the same way, the strategy against risk sources affecting the agricultural production in this region is analyzed in 2 clusters with factor analysis. According to the results, in the first and second clusters, the most important factor is determined as Business management.

Increasing the economic prosperity of the country is a way of increasing agricultural income, and the other one is the suspension of civil war within the country and ensuring stability. Foreign investors would invest in the country when it is stabilized. Banks founded by the state are needed to meet financial needs of farmers with low interest to develop saffron sector. Similar results are found in the studies held by (Macdonald & Mansfield, 2001; Wodka, 2012).

As a result, saffron is one of the alternative products to opium in Afghanistan. Other alternative products that are suitable for the ecologic structure of the region and have high added-value

should be examined by taking geographical and climatic conditions of the region into consideration and farmers should be introduced to these products. By the way saffron or alternate plant crops fetch lower price compared to opium. There is lawlessness in the area that inhibits state activities in the area to control opium production. Also the officials of Agricultural department have no power to check or control opium production. The officials have power to suggest only, but there is wide scale corruption among the state officials who ignore opium production. Also opium producing mafia is more powerful compared to the state in these areas It seems extremely difficult to extend the production of other products without completely eliminating illegal opium production.

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