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Feasibility study of establishment of process and supplementary industries of agriculture sector in East Kakavand rural district, Delfan town

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A B S T R A C T

Development and establishment of process and supplementary industries of agricultural products is one of the most advantageous relationships between the two sectors of agriculture and industry which has a major role in reducing corruption and waste of agricultural products in addition to reducing regional inequality. This research has been conducted to study the feasibility of establishment of process and supplementary industries of agriculture sector in the form of a field research, as a cross-sectional case study relying on the previous studies. In the library method, documents, reports, yearbooks, and other resources have been used, and in the field method, regarding the large number of villages in the rural district, 27 villages were chosen, and the obtained data were processed using SPSS software. In order to prepare the tables and charts, Excel was used, and for the purpose of preparing the maps, GIS environment was utilized. L.Q. index (local coefficient), one-sample t-test, and Pearson correlation were used for studying and analyzing the components affecting the establishment of process and supplementary industries. Measuring the quality and level of correlation between the variables were done by regression method. The results of the research showed that regarding the production of products such as wheat, barley, chickpea, and sugar beet, East Kakavand rural district has a comparative advantage of higher than one, and it has had a better performance compared to the city and the province. Therefore, this rural district has the capacity of investment and development regarding the production of the above mentioned products. In this regard, the industries suggested for this rural district include warehouse and silo, sugar factory, forage packing, beans packing, production of flour, bran, and animal concentrates, paper and carton industry, etc. According to the findings of this research, development of process industries has been able to predict the variable of employment rate. In other words, the standardized coefficient of Beta indicates that for one unit of change in process industry, a 22% change is expected in employment rate.

K e y w o r d s: *Feasibility study, process and supplementary industries, agriculture sector, East Kakavand rural district, Delfan town*

Introduction

Agricultural development, as the main focus of development of the country, has a special role, and agriculture-related industries are considered as the necessary condition for development of this sector. In addition, due to world requirements, attending regional and international markets, and joining world trade organization (WTO), clarification of the role of process and supplementary industries in agriculture sector seems increasingly necessary (Nouri, Nilipoor Tabatabaei, 2007:161). Case studies on the consequences of establishment of industry in rural districts indicate the fact that employment in non-agriculture sector can be considered an appropriate strategy for rural employment. In the meantime, rural industries are more useful than other agricultural activities for employment and increasing the incomes of the villagers. -Regarding the importance of this issue, a look at the statistics shows a lot of facts. Every year, 85 million tons of different agricultural products are produced in the country, 8.17% of which is lost as waste. If we consider the average value of every kilogram of agricultural products equal to 100 Tomans, every year the country's economy loses a sum of two trillion and 34 billion Tomans as a result of agricultural product wastes. Through developing process and supplementary industries, and building new warehouses and cold storages, it is possible to prevent the waste of agricultural products (Iranian Food Industry News Network, 2010).

Michael Todaro is also strongly in favor of the development of industries in third world countries. In his idea, income and price elasticity of demand for industrial products are more than for agricultural products. Therefore, there is a need to an industry which can strengthen the connection between the two sectors of agriculture and industry (Michael Todaro, 1998: 384). The theory of industrialization of rural areas, as a catalyst for sustainable employment and the last solution for the poverty in rural areas, is now considered a potential factor for the problem of unemployment and a quencher for deprived rural areas (Samal, 2007: 57). This view is based on the belief that industrialization of the villages and development of non-agricultural activities are important factors for improving the welfare and supplying the essential goods and services for poor rural families (Lidholm, 2004:48). It is predicted that in the year 2030, the world population will be equal to 8/11 billion people, 60% of which will live in urban areas and 40% will live in rural areas. In other words, in the next thirty years, there will still be about 3/22 billion people in rural areas, which shows a little increase in comparison with 2000 (53% of the world population, about 3/21 billion people) (Pourahmad, 2002:28).

The population of most of the developing countries grows rapidly. However, creation of new job opportunities is not consistent with the population growth (Taherkhani, 2000:53). In this regard, one of the strategies followed in rural areas of the developing countries which has had positive results, is industrialization of the villages. Rural industries are referred to as industries which are defined in the form of small process industries fitting the rural areas of the country, and their establishment location is rural regions such as the district centers, rural districts, and subsidiary villages (Hosseini, 2002:23). According to this, rural industrialization is a process which has provided tools for diversification of the rural economy, and it is also a strategy which has decreased rural poverty, from the viewpoint of the rural and national economy (Li, 2001:3), the development of industries makes a balanced development between urban and rural households,

agriculture and industry sectors, regional economy, and urban and industrial decentralization possible (Choi, 2001:1).

Therefore, it seems necessary to develop and expand non-agricultural jobs and income-generating activities, especially rural industries and developing low level centers (DHV consultant engineers, 2006:5-6). The challenge of employment and the issue of unemployment is not only one of the main current social problems of the country, but due to the population growth over the past two decades, it can be considered as the main social challenge over the future decades. The immediate consequences of this crisis are increased poverty and other social harms such as theft, depravity, addiction, etc. which threaten social stability and cohesion. Although different solutions have been suggested for confronting unemployment and developing job opportunities in rural areas, the most appropriate and practical way of developing employment opportunities in short time and a successful strategy for taking advantage of unused opportunities is the agriculture sector (Zahedi Mazandarani, 2004: 41-51). Therefore, the main priority which is proposed in renewing the economic structure of rural communities through adapting the new strategy of rural development is a suitable combination of agricultural and non-agricultural activities, especially process and supplementary industries of agriculture sector (Chandra, 2001:1-3). With this approach, according to the theory of mutual union which emphasizes on simultaneous growth of agriculture and non-agriculture sectors, development of sustainable and productive employment is predicted (Sama, 1997:458). The facts in our country indicate the limitation of agricultural factors including soil and water, high rate of population growth, seasonal and permanent unemployment in

villages, and all of these factors have led to excessive emigration of villagers to the cities. Establishment of rural industries as a productive economic sector is one of the main issues and an essential step for adjusting the difference of income between urban and rural areas which is considered as one of the most effective factors for decreasing the immigration, according to the experts (Rezaei, 2007:179).

Research background

So far, several suggestions and viewpoints have been proposed regarding the establishment of industries and also rural industries, among which we can mention the models of Alfred Weber, August Loosh, Palander, Smith, Green Hot, Walter Isard, Rostron, Rousto, Rener, Cristaler, Tonen, and Leonardo (Kalantari, 2001: 175-179).

Also, the theories of local organization and theoretical basics of locating the industries and development of industrial complexes such as industrial zone, industrial region, industrial pole, and industrial park are considered as the theories of local organization and theoretical basics of locating the industries (Papli Yazdi, 2003: 177).

In the following, there is a review of the researches conducted in this field:

In an article titled "contrastive comparison of the production factors in large scale and small scale industries" Nebyouni et al. (2008) concluded that the capacity of small scale industries for creating job is more than that of the large scale industries, and also, due to lack of investment in the country, it seems logical to emphasize on small scale industries in order to create jobs and added value. Therefore, it seems necessary for the Iranian programmers and policy makers to pay more attention to small scale industries.

In a research titled "feasibility study of establishment of process and supplementary industries for economic development in rural areas", Moradi et al. (2013) suggested that process and supplementary industries of agricultural products can be an appropriate approach for preventing wastes and increasing the added value of agricultural products, and through creating jobs, it leads to increased income of low income rural groups and decreased emigration from villages to cities.

Kermanshahi and Koolivand (2014) investigated the effect of feasibility of establishment of process industries on sustainable rural development, and suggested that process and supplementary industries of agricultural products can be an appropriate approach for preventing wastes and increasing the added value of agricultural products.

Rezaei Jafar (2005), in his research project titled "Feasibility study of establishment of process and supplementary industries of livestock products in Ilam province", believes that the establishment of process industries can play a major role in decreasing deprivation, unemployment, immigration, and increasing the development and employment.

In an article titled "consequences of developing agricultural products processing industries and milk industries in rural development of Amol central district", Langerodi and Ardashiri (2006) concluded that the agriculture sector, as the main economic activity of the region, is faced with major problems (lack of proper marketing, high amount of wastes, low price of the products, and low amount of production), and most of these problems will be solved through development of agricultural products processing industries. In addition, part of the economic and social problems of the region such as lack of enough employment opportunities, limitation of agricultural land per capita, low incomes, etc. will be improved by development of agricultural products processing industries.

In a research titled "locating the process and supplementary industries of the agriculture sector in the rural district of Khan Mirza", Ghanbari, Mohammadi, Miranaraki (2017) suggested that based on the findings of the research, components such as population, area under cultivation, average production, type of communication path, infrastructure services, and topographic condition are considered as the most important factors for locating the industries.

Dehbashi Hamid (2014), in his master's thesis titled "Feasibility study of establishment of process industries in Kohgiluyeh and Boyer-Ahmad province", stated that the natural, economic, and social characteristics of the province for establishment of process industries, deals with the identifying the capacities and potentials of the region, improving the

People's participation culture, strengthening the infrastructures, and fund-raising, and he believes that process industries in the province provide the opportunity for decreasing unemployment, immigration, and moving towards a dynamic economy.

In 2005, Liberson et al. (Bangladesh) proposed some approaches for developing process industries and devoted more attention to agricultural products processing industries, research supports, and access to the market as the factors of development of these industries. Jinchang, Zoy, and Lin (2008), in their article, investigated the issue of evaluating and choosing the supplier using RST algorithm and Vikor model. In Thailand, Watanabe et al. (2009) in a relevant article concluded that the process industries

help to reducing poverty in two ways including the employing poor farmers in factories.

Therefore, in this regard, the following questions are raised:

1. Regarding the potentials of the studied rural district such as high quality lands and the area under cultivation, is it possible to establish process and supplementary industries in this rural district?

2. Will the establishment of process industries in this rural district lead to employment and rural development?

Theoretical basis

Despite all the technological developments, the most developed industrial countries not only consider the development of agriculture sector as the complement of industry sector, but they evaluate the importance of food production linked to national security. In our country, in addition to the fact that industrial development does not have any relationship with its common procedure across the world, its relation with the agriculture sector is also neglected. Wide range of facilities in Iran, variety of climatic conditions, and the possibility of production of all kinds of products of temperate, semi-tropical and tropical, and high quality of the products have made Iran one of the top five countries of the world which is the major producer of 20 agricultural products, while not all facilities (cultivable lands and extractable water) are used. Regarding the high amount (about 30%) of agricultural product wastes and the importance of process industries in lowering wastes and creating added value, foreign exchange earnings, and employment, it is especially important to review the status of these industries and propose methods for successful attendance in international markets (Kermanshahi et al., 2014:7).

Process and supplementary industries of agriculture sector are referred to as industries dealing with processing herbal and animal products such as agricultural, garden, fish, livestock and poultry, forest and pasture products. According to this definition, processing includes physical, chemical and organoleptic changes, maintenance, packing and distribution. In this way, it is possible to increase the durability of the products, improve their supply and consumption, and enhance the economic value of the products through this kind of industries. Another definition of the process industries is as the following: industries which convert the agricultural and livestock products into semi-finished goods and materials or ready to use products are called process industries. Process-supplementary industry is considered as one of the most important branches of agriculture. Undoubtedly, development of process industries is one of the most advantageous relationships between the sectors of industry and agriculture. These industries lower the level of permanent and seasonal unemployment in rural areas. Also, they provide the opportunity for development of agriculture sector, and it will lead to increasing products, efficiency, creating job opportunities, supplying essential needs, linking with other economic sectors, and decreasing regional inequalities. Therefore, such industries can be a prerequisite for industrialization strategy and provide the food security in the country. This issue was considered in different developmental plans and also in the fifth plan, development of new capacities for processing 25 million tons of agricultural products is predicted. Due to the use of agricultural products as raw material, process industries can be considered as a factor of better use of these products. Many agricultural products have different production and

consumption times. Their production and harvest is usually done in a specified and short time, but they are consumed in a longer period of time. Through maintaining the products, process industries can change them in a manner that it is possible to consume them over the year (Rezaei, 2010: 113). Development and expansion of process industries have economic effects such as creation of added value, employment, foreign exchange earnings, and also more use of agricultural products, and therefore, preventing the waste of products. The expansion of process industries creates added value in these sectors from two aspects: A)the added value created in the sector is spent on increasing the added values in the sector itself; B)due to its relationship with other sectors, it created added value in those sectors. Since process industries use agricultural products as the raw material, development and expansion of the mentioned industries leads to increased production or increased use of the products and indirectly creates added value (Kermanshahi and Mohammadi, 2011: 7).

Among the main problems about agriculture, we can mention high amounts of wastes which comprises about 35 to 40 percent of 130 million tons of the total agricultural products. Consuming fresh products (selling raw products) is one of the consumption methods of agricultural products which cannot be completely removed from. In order to decrease the amount of wastes and increase the added value and quality, we should turn towards sorting and packing. One of the approaches for creating added value in agriculture sector and promoting the economic level of the producers is establishment of processing industries. In all stages of production, distribution, and consumption, there is come waste. In the production stages (cultivating to harvesting),

waste is caused by lack of optimized and on time use of the inputs such as fertilizer, seed, human force, etc. In the distribution stage, waste is related to the process of marketing and market supplying. Regarding the seasonal supply and permanent demand of the agricultural products, marketing and distribution channel requires a specific condition. The consumption waste depends on the culture of the consumer and type of consumption. Promoting the technology and improving the quality of packing of food products can play an important role in creation of added value. Because paying attention to factors such as light, heat, anti-corrosive and antibacterial additives help the marketer to sell the product at a desirable price. On time sale leads to decreased inventory in warehouse, cold storage and farm, and in result, the amount of wastes is minimized. In Iran, the sectors which need an increased capacity include potato (processed and packed), onion (processed and packed), tomato (processed), vegetable, and greenhouse products (processed and packed), fruit (processed and packed), nut fruits (processed and packed), pistachio, date, saffron (processed and packed), citrus (processed and packed), new products of dairy industries, egg (processed and packed), honey (processed and packed), fishery products (processed and packed), industrial livestock slaughter (processed and packed), segmentation, packing, and freezing res meat, chicken and meat products.

Due to continuous relationship between agriculture sector and the existing facilities and capacities in production areas such as the villages, where the main activity of the villagers, the strategy of developing and expanding the industries of processing agricultural products has an effective role in rural development through better marketing of agricultural products, creating jobs, decreasing

wastes, and increasing the incomes. Processing the food products leads to a better distribution of income and welfare, and therefore establishment of social justice. So, development of agricultural process industries is one of the subcategories of agriculture priorities.

Methodology

This research has been conducted by descriptive-analytical (statistical and descriptive analysis) methods in terms of purpose and research methodology. The population of this research includes all the villages of East Kakavand rural district including 98 villages (71 residential villages and 27 non-residential villages) with a population of over 8741 people and 1715 households (2006). Due to the multiplicity and dispersion of the villages and also the existing limitations, in this research, only villages having more than 20 households were chosen among which 27 villages with populations of more than 5972 people and 1234 households were selected.

Table1: Population and sample of the research

Number (people)	Description
1234	Population (N)
271	Sample (n)
300	Increased sample

Source: Calculations by the author, 2015

Among the 27 villages and the population of 5972 people in 2006, 271 household heads were chosen as the statistical sample using Cochran's formula. In order to achieve more accuracy, this number was increased to 300 household heads. Therefore, using Cochran sampling method, a questionnaire was designed and made available to the statistical sample.

$$N = \frac{\frac{(t)^2 \times p \times q}{d^2}}{1 + \frac{1}{N}\left(\frac{(t)^2 \times p \times q}{d^2} - 1\right)}$$

It is the value which is obtained from the normal curve according to the percentage of accuracy probability, and since the considered accuracy percentage is 95, the t value is 1/96.

p= is the probability of existence of an attribute in the population and its value is 0/7.

q= is the probability of absence of attribute and its value is 0/3.

d= is the probability of error and regarding the 95% accuracy, its value is 0/05.

N= is the population including 1715 household heads.

$$n = \frac{\frac{(1/96)^2 \times (0/7) \times (0/3)}{(0/05)^2}}{1 + \left[\frac{1}{1715}\left(\frac{(1/96)^2 \times (0/7) \times (0/3)}{(0/05)^2} - 1\right)\right]} = \frac{322/7}{1/19} = 271/17$$

After determining the sample size using Cochran's formula, sample size of each village has been determined using the probabilistic classification sampling method as described in table 2 and according to the household head of every place.

After evaluating the sample size of every village, the questionnaires were randomly distributed among the rural household heads. Therefore, the sample size of the total population was calculated using Cochran's formula, and the size of every place was specified using probabilistic classification method, and then, the questionnaires were randomly distributed among the sample (Hafezniya, 2006).

Table 2: Population and size of the probabilistic classified sample in residential areas of East Kakavand rural district

| No	Village	Number of households	Total population	Number of samples
1	Haft Cheshmeh/district center	100	417	29
2	Posht Tang Darozaneh	46	234	12
3	Ghazi Khani	71	341	17
4	Zardeh Savar	75	326	18
5	Chafteh Dare Sofla	36	194	9
6	Nosrat Abad	47	251	11
7	Zargaran	46	194	11
8	Hezarkhani	149	791	36
9	Golestaneh	91	490	22
10	Miyan Chagha	50	248	11
11	Chahar Afshar Sofla	37	164	9
12	Gashvar Ali Abad	52	273	12
13	Golgin	20	84	5
14	Male Kabud Oliya	48	212	11
15	Chaman Buleh	77	341	19
16	Paein Abad Oliya/Chal zard	22	115	5
17	Kaveh Oliya/Deh sefid	34	172	8
18	Daramro/Daramrud	31	139	8
19	Mehrabad Tude rud	26	113	6
20	Jafar abad Oliya	22	90	5
21	Veno/Jafarabad	21	84	4
22	Divand	25	117	6
23	Parcheh Balut	26	133	6
24	Hossein abad Oliya	28	160	7
25	Gale veys	22	100	5
26	Cheshmeh Haji mohammad	21	87	4
27	Miyan Tang Sofla	21	102	4
Total	27 villages	1234	5972	300

Source: Calculations by the author, 2015

Regarding the first research hypothesis about the potentials of agriculture sector of the rural district in this research, using the index of local coefficient (L.Q.), comparative advantage of the rural district over the reference area (the province and the city) has been measured and the basic and main products of the rural district which have the potential for investment and process industry have been specified.

Regarding the other hypothesis, on the nature of the data and research purposes, Pearson correlation coefficient was used, in order to measure the relationship between the variables, regression method was used, and in order to illustrate and analyze the data, 28 questionnaires were filled by the villagers of East Kakavand rural district. In this stage, in order to make sure of reliability of the questionnaire, the order of the questionnaire was finalized and its completion operation was started across Kakavand rural district. Feasibility study and establishment of process and supplementary industries require the recognition of the capacities and time-place limitations and paying attention to climatic and topographic features of the region. On the basis of the studies conducted and domestic and foreign successful experiences, we can design the models using SPSS software, prepare the graphs using Excel, and prepare the maps using GIS. Since the methods of factor analysis and Cronbach's alpha were respectively used to determine the

reliability and validity, the outputs of these two methods showed that all the questions of the questionnaire met the required limits and none of the questions of the questionnaire were removed. The output of Cronbach's alpha showed that the questionnaire had the required (0.785) reliability. Then, in order to ensure, Cronbach's alpha was used that the output (0.785) proved the reliability of the questionnaire since it was higher than the required minimum for confirmation of reliability (0.7) and drew the conceptual model of the research. In the conceptual model of this research, there are some effective key parameters among which, we can mention economic, social and environmental dimensions. Other factors expressed in the above mentioned conceptual mode include the existence of agricultural potentials of the studied area such as performance level, area under cultivation, and water needs of the products.
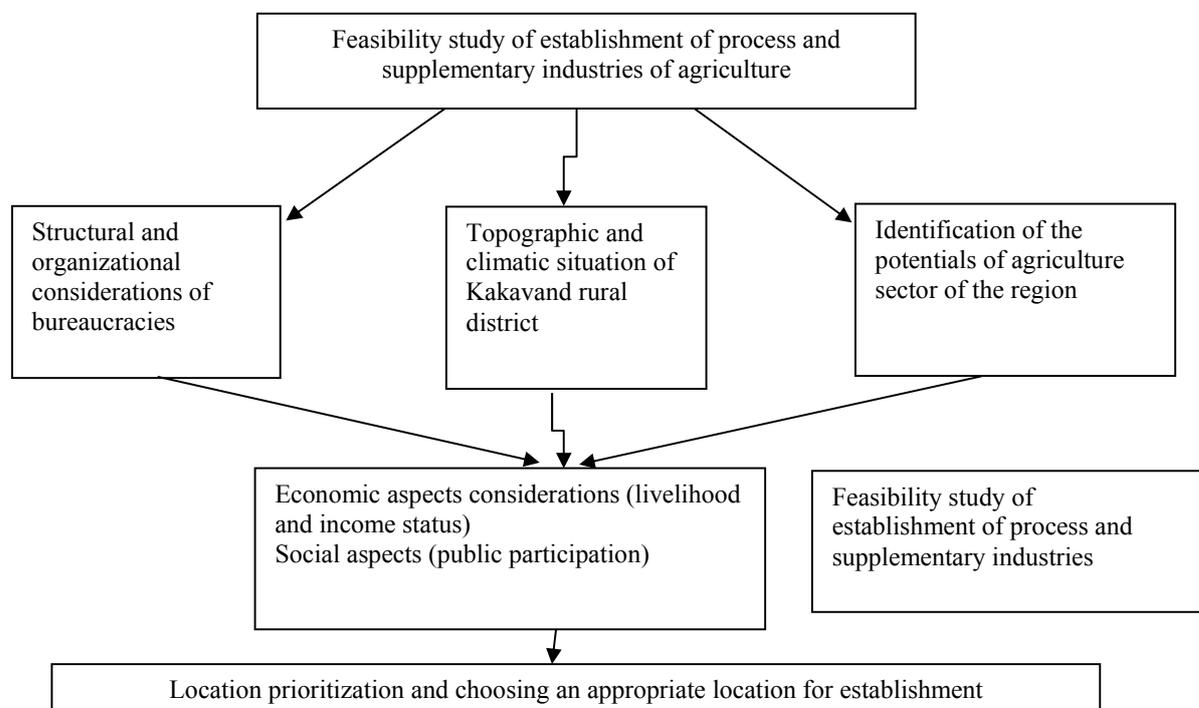
Introducing the study area

The city of Delfan is located at the geographical latitude of 34:4 of northern latitude and the geographical longitude of 47:58 of the eastern longitude (Bakhtiyari, 1998:83). From north and northwest, Delfan is bound to Kermanshah province, from the northeast, it is bound to Hamadan province, and from the south, it is bound to Khorramabad city. From the north, this city is bound to Hersin and Kermanshah with the distances of 50 and 95 kilometers. From the northeast, it is bound to Nahavand with a distance of 60 kilometers, and from the south, it is bound to Khorramabad with a distance of 85 kilometers.

In terms of political divisions, this city has one town, two districts, ten rural districts, and 520 residential villages (Figure 1).

Firure 1: The situation of East Kakavand rural district in Kakavand district
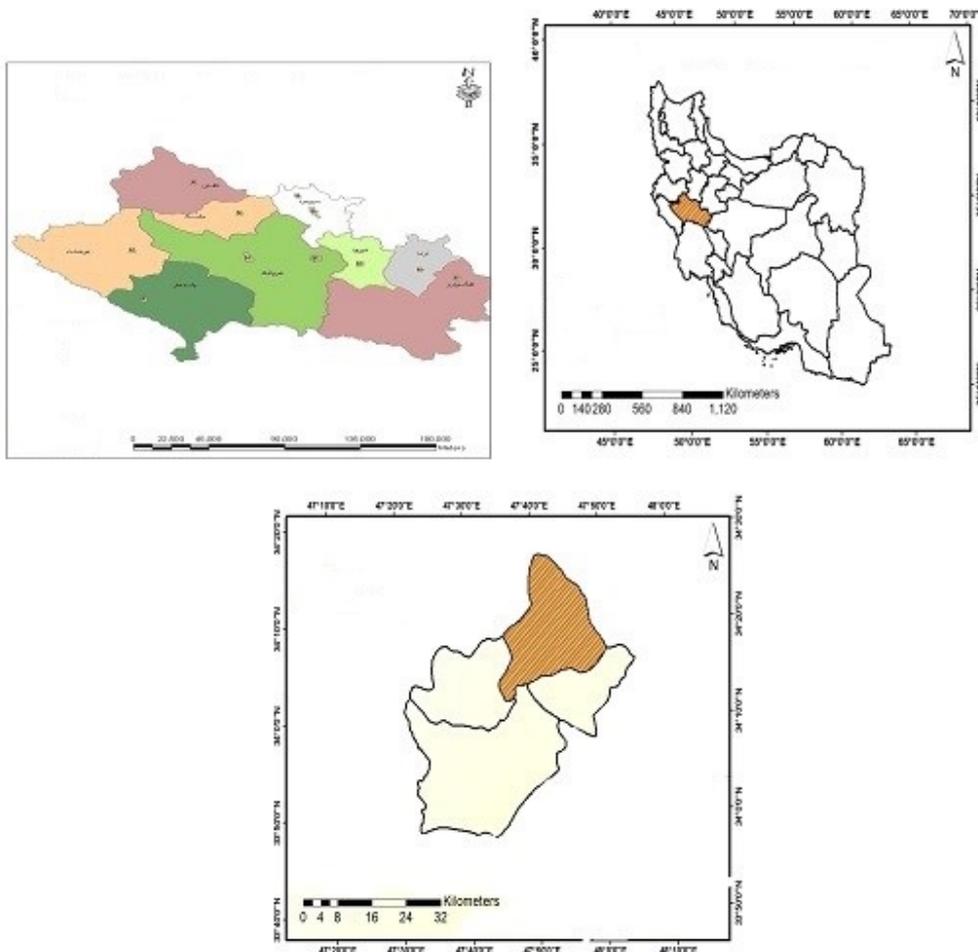

Analysis of the findings

In this research, the age groups have been divided into 5 categories and the frequency and frequency percentage of each group have been separately presented in the table. In the age group of table 3, distribution of the respondents according to age groups of older than 18 with 30 people and the age group of older than 60 with 30 people respectively

constitute the highest (35 percent) and the lowest

Figure 2: The graph of respondents according to age groups
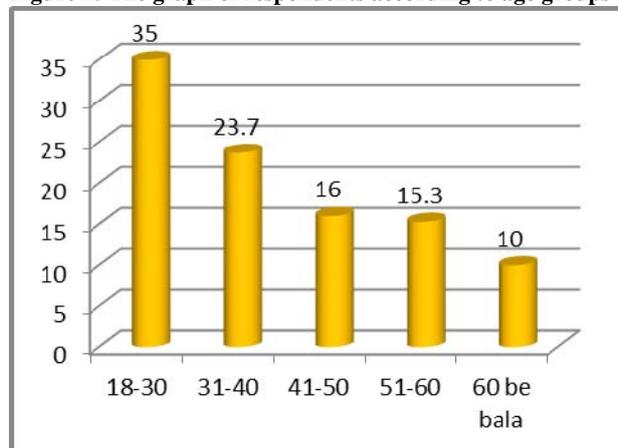
In terms of gender, 92.7 percent (278 people) of the respondents were men and only 7.3 percent (22 people) of the respondents were women. Among all of the respondents (300 people), 233 people (77.7 percent) of them were married and 67 people (23.3 percent) were single. In terms of education level, the respondents were divided into 6 categories that illiterate persons with 104 people (34.7 percent) had the highest frequency, and the lowest frequency was related to the groups of persons with educations of Bachelor's degree and higher with 16 people (22.7 percent of the frequency). The group of middle school degree and the group of diploma degree have the frequencies of 13.3 and 18 percent respectively. Among the respondents, 69 percent (207 people) were employed and 31 percent (93 people) declared themselves unemployed. A rate of 31 percent unemployment is an almost high rate and indicates the lack of employment opportunities in East Kakavand rural district. The biggest income group earned between 300 to 400 thousands Tomans, and this group includes 31.3 percent (94 people). The smallest income group earned more than 400 thousands Tomans which comprises only 7.7 percent of the respondents. The highest population of the

frequency.

Age groups	frequency	Frequency percentage
18-30	105	35
31-40	71	23/7
41-50	48	16
51-60	46	15/3
Older than 60	30	10
Total	300	100

Source: Research findings 2015

respondents, 105 people (35 percent), are employees of agricultural sectors, this means that most of the residents of this rural district are farmers, and the potentials of this region are focused on agriculture, and the experts and programmers should consider this sector and provide the opportunity for increased employment in this sector through establishing process industries. In other words, they should activate these potential capacities of the region. Gardening and animal husbandry jobs with a frequency of 33 percent had the lowest population among the respondents.

Analysis of the data in line with hypothesis 1

Regarding the potential of agriculture sector, in East Kakavand rural district, the establishment of process industries seems possible.

Evaluation of the agriculture sector potentials in the rural district and L.Q model:

Paying attention to the agriculture sector potentials in East Kakavand rural district the area under cultivation and production of crops is among the main issues relevant to job creation in the rural district which should be considered by rural

programmers. Regarding the studies on crops of the rural district, and calculation of local coefficient of these products in the area under cultivation and the amount of production of crops such as barley, wheat, chickpea, and sugar beet have a local coefficient of more than one (Tables 9 and 10) and the local coefficient of more than one indicates that these products are exportable and surplus in the region. Due to lack of facilities for packing, processing and converting for long term maintenance, exporting these products out of the rural district decreases the value of the products, and they have not been so successful in marketing. Due to abundant production of agricultural products in the rural district and lack of processing factories, every year hundreds of tons of crop production of the rural district is exported to other regions for processing. If there are supplementary industries in agriculture sector of the region, the products will not fall in price at the time of harvesting. Selling the raw products is the most important challenge of the rural district, so that many farmers are waiting for process industries and they have complaints about lack of process industries in this rural district.

Table 3: The yearly performance share and area under cultivation of East Kakavand rural district from the province and the city

Production of agricultural products		Area under cultivation		Index
As compared with the city	As compared with the province	As compared with the city	As compared with the province	
16	1/842	16/25	2/826	The share of East Kakavand rural district

Source: Calculations by the author, 2015

The statistics of Table 4 suggests the important role of agriculture sector of the rural district in area under cultivation and the production of crops compared with the province and the city

Table 5: Local coefficient of main products of East Kakavand rural district compared with the province

Rate	L.Q of more than 1	L.Q of the rural district products compared with the province		Product name
		In production	In the area under cultivation	
٢	Has	2.261	1.455	wheat
۴	Has	1.861	0.886	barley
١	Has	2.974	1.63	chickpea
۵	Does not have	0.582	0.205	alfalfa
۶	Does not have	0.454	0.515	lentil
٣	Has	2.226	0.857	sugar beet

Source: Calculations by the author, 2015

Table 6: Local coefficient of main products of East Kakavand rural district compared with the city

rate	L.Q of more than 1	In production	In the area under cultivation	Product name
		L.Q of the rural district products compared with the city		
2	Has	1.667	1.089	wheat
3	Has	1.95	1.88	barley
1	Has	1.02	0.727	chickpea
5	Does not have	0.205	0.205	alfalfa
6	Does not have	0.515	0.92	lentil
4	Has	1.168	0.666	Sugar beet

Source: Calculations by the author, 2015

In this research, to determine basic activities of agriculture sector (crop) in East Kakavand rural district, local coefficient (L.Q.) method was used. This method is used for identifying the basic sector in different regions and has a special emphasis on separation of basic and non-basic activities, and it is one of the major theories of the growth of basic economy. Moreover, it is a method for analyzing and studying the inter regional and district relationships, and it is often used for measuring the relationships of import and export in different regions and areas (Masoumi Ashkvari, 2006:104). Local coefficient or L.Q. model is obtained through the following equation:

$$L.Q_{ij} = \frac{\dfrac{e_{ij}}{\sum e_j}}{\dfrac{E_{ic}}{\sum E_C}}$$

$L.Q_{ij}$=local coefficient of activity i in region j

e_{ij}= production in sector i in the rural district

$\sum e_j$= total amount of production in the rural district

E_{ic}= production in sector i over the province

$\sum E_c$= total production of the province

If:

1< L.Q., the region is the exporter of goods and services

1=L.Q., the region is self-sufficient

1>L.Q., the region is the importer of goods and services

As presented in Tables 5 and 6, the production of chickpea in East Kakavand rural district with a L.Q. of 2.974 has the highest local coefficient compared to the whole province, and the production of wheat (2.261), sugar beet (2.226), and barley (1.861) are in next ranks. It should be mentioned that while products such as sugar beet and barley which have an L.Q. of lower than one in terms of the area under cultivation, and production amount, have a comparative advantage over that of the province, and

this indicates the high amount of production of these products and their superiority compared to the province, so, the rural programmers and agriculture experts should pay more attention to these products in order to increase the area under cultivation.

In comparison with Delfan, products such as barley with an L.Q. of 1.95, wheat with an L.Q. of 1.66, sugar beet with an L.Q of 1.168, and chickpea with an L.Q. of 1.06, respectively have the highest local coefficient compared with the city.

Regarding the performance and capacity of the rural district in production of some products and influence of agricultural economy in the region, there is a need and possibility of establishment of process industries. The proposed industries for this rural district include warehouse and silo, sugar factory, forage packing, production of flour, bran and livestock concentrate, paper, carton production industries, etc.

Table 7: Products with high L.Q. in the rural district and the related industries

Product	Industries related to the product
Wheat	Production of flour and bran, livestock and poultry food, forage packing, warehouse and silo, producing paper and carton with the remains of straw
Barley	Production of livestock concentrate, bran and meal, livestock food, forage packing
Chickpea	Packing chickpea and making it exportable, warehouse and silo
Sugar beet	Sugar factory, sugar beet pulp

Source: Calculation by the author, 2015

One-sample t-test in line with hypothesis 1 (evaluation of agricultural potentials of East Kakavand rural district)

One of the parametric tests is one-sample T test. This test is used to evaluate the equality or inequality of the average sample with the average population when the standard deviation of the population is unknown, or when we have the average quantitative variable of a sample, and we want to compare it with a hypothetical number (Afshani, 2009: 100). The formation of the hypotheses is as the following:

H0= East Kakavand rural district does not have the required potential for establishment of process industries.

H1= East Kakavand rural has the required potential for establishment of process industries.

Table 8: One- Somple Test

				average of one-sample test	One-Sample Statistics
	N	Mean	Std. Deviation		Std. Error Mean
Agricultural potentials of every region	300	29.2967	4.85323		.28020

				One-Sample Test		
				Test Value = 24		
					95% Confidence Interval of the Difference	
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
JP	18.903	299	.000	5.29667	4.7453	5.8481

Source: Calculations by the author, 2015

The findings of the above table indicate that the mean of the studied sample is 29.29 which is more than the mean of the test (24), and this difference with the amount of T=18.90 and Sig=0.00 at confidence level of 99 percent is significant. Therefore, it can be stated that the studied sample has a potential of higher than mean level, meaning that it has a high potential for establishment of industries, and the H0 hypothesis is rejected so the H1 hypothesis is accepted.

Analysis of the data in line with the second hypothesis

There is a positive and significant relationship between the establishment of agricultural process industries and increased employment in East Kakavand rural district. As seen in the following table, the F value is 15.222 and the significance level is Sig=000. Since the significance level is less than 0.05, the model is significant

Table 9: Regression coefficients of employment index

	Analysis values					
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.883	1	114.883	15.222	.000[a]
	Residual	2248.997	298	7.547		
	Total	2363.880	299			

a. Predictors: (Constant)

Establishment of industries
b. Dependent Variable

Creation of job

Source: Calculations by the author, 2015

Table 10: Regression coefficients of employment index & Model

		Regression coefficients of employment index				
	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	Constant	1.015	.258		11.936	.000
	Establishment of industries	.025	.069	.220	3.902	.000
	a. Dependent Variable job					

Source: Calculations by the author, 2015

The above table which is titled Coefficients, reports the value of Beta or Betas. Beta is the standard coefficient. The more the amount of Beta and T, the less the amount of significance level (Sig), and this indicates that the independent variable (predictive) strongly affects the dependant variable. According to the findings of the above table, it means that the process industry has been able to predict the variable of the amount of employment. The standardized Beta coefficient shows that for every unit of change in process industry, a 22 percent change is created in employment.

Conclusion

 Regarding the studies on crop products of the rural district, calculation of the local coefficient of these products in the area under cultivation, and the comparison of the production with the province and the city, products such as wheat, barley, chickpea, and sugar beet have a local coefficient of more than one, meaning that these products have had a better performance compared to the province and the city, and a local coefficient of more than one indicates that these products are exportable and surplus in the Region, so that many agriculture experts agree on the establishment of these

Industries, and many farmers have complaints about lack of these industries.

Therefore, regarding these capacities and high performance of the rural district in production of some products and influence of agricultural economy on the region, there is a need to establish process and supplementary industries. The proposed industries for this rural district include warehouse and silo, sugar factory, forage packing, beans packing, production of flour, bran and livestock concentrate, paper, carton production industries, etc.

So, our first hypothesis which emphasized on the potential of crop products of the rural district for the establishment of industries is confirmed. The findings indicate that the mean of the studied sample is equal to 29.29 which is higher than the mean of the test (24), and this difference with the values of T=18.90 and Sig=0.000 at confidence level of 90% is significant. Therefore, it can be stated that the studied sample has a potential of higher than the mean level, meaning that it has a high potential for establishment of industries. Additionally, it can be stated that there is a relationship between the potentials of the region

and establishment of process industries (R=0.60) that with the value of Sig=0.00 at confidence level of 0.99, the relationship is significant. Therefore, it can be statically stated that there is a positive and significant relationship between the potentials of the region and establishment of process industries. Regarding the procedure of this research and its results, the following suggestions can be considered:

Since the study rural district has potential capacities for agriculture, in order to activate these potentials, recognition, planning and investing in this sector is recommended. So, proper use of potentials and comparative advantages of the region is necessary for balanced, comprehensive development and flourish of the villages.

1- For proper use of the potentials and comparative advantages of the studied rural district, construction of warehouse and silo, packing the beans and forage, and producing sugar, livestock food, etc. in the studied rural district is suggested.

2- Investing on creation of appropriate warehouses and marketable facilities for grading and packing.

3- Reducing the mediators and shortening the path between the producers and consumers.

4- Encouraging the people and motivating them for investing on agriculture related industries.

5- Systematizing the irrigation and using drop irrigation regarding the wide water resources available.

6- Coordinating the handicrafts with the demand patterns and standardizing them.

7- Supporting and encouraging the investment of private sector for establishment of rural industry units in rural districts.

8- Encouraging industrial investment in undeveloped areas in order to actualize the balanced and comprehensive development.

9- Training efficient and skillful human force in line with training the employees of industrial units.

10- Encouraging and supporting rural entrepreneurs.

11- Emphasizing on environmental protection in development and expansion of infrastructures and establishment of process industry units.

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