

## The Role of Agriculture in Iran's Economic Development

Ahmad Reza Khorami and Dr. Saeed Pierof

Academic of Science of Tajikistan, Tajikistan

**Abstract:** The agricultural sector as one of the most important sectors in the process of development has always had a special status in world economy. However, relative decrease of the share of agriculture over the recent decades often leads one to believe that agriculture can be ignored in favor of those sectors which have a faster progress, whereas, on the contrary, in order to accelerate favorable economic transition agriculture must be encouraged. Therefore, this research seeks to study the role and effect of the agricultural sector in comparison to other sectors such as industry, services, mining and commerce on variables such as GDP, the remnant of bank facilities and credit organizations, total petroleum exports in Iran during the past 15 years. Research methodology is applied and of descriptive-correlational type. Data collection tool is previous documents and evidence. Data analysis method is step-by-step regression. The results of the research indicate that in the first, second and third regression models agriculture respectively has the third, first and second status in regard to level of effectiveness.

**Keywords:** Agricultural sector, economic development, industrial sector, services sector, step-by-step regression

### INTRODUCTION

Economic development has always been accompanied with economy's transition from dominant share of agriculture to dominant share of industry and services. The relative share of agricultural sector should be decreased as soon as possible. The rate of this transition is based on the rate of agricultural growth, the faster the agricultural growth, the faster will its relative importance in economy decrease. Relative decrease of agriculture's share often makes us imagine that we can ignore agricultural growth in the benefit of those parts with faster growth (Erh-cheng, 1988; Shakeri, 2004). On the contrary, in order to accelerate desirable economic transition agricultural growth should be encouraged. Accelerating agricultural growth requires a plan in which government has determined strategies and, more importantly, some achievable priorities. These priorities define the direction of growth, modify the trend of activities and facilitate commercialization of agriculture and also adoption of an outward-oriented direction in non-agricultural rural sector in the long term (Chenery, 1952; Domar, 1947).

In the process of development, although the nature of main functional factors in agricultural growth will remain stable, but combination of goods undergoes radical change and if agricultural sector cannot move forward simultaneously with demand rate, prices will increase and the consumption market will tend to import these goods or substitute them with other goods (Baseri and Jahangard, 2007). With reduced prices of transportation and increased capacity of maintaining agricultural products due to technological revolutions,

world is rapidly moving towards globalization and commercial growth. The most important consequence of the above-mentioned process on agricultural sector is that the effects of technological revolutions will be quickly promoted. When due to technological advances, some countries reduce production costs of the agricultural sector, in countries that do not invest on the agricultural sector; agriculture is gradually drawn back and turns into a deteriorating sector (Zanjani, 2001).

**Problem statement:** Over the recent decades, numerous debates regarding the status of agricultural sector in the areas of economy, development, planning, micro and macro issues in economy and international commerce have been raised by economists and policymakers. In regard to historical precedence, industrial means of production have not been invented after agricultural methods of production and human societies have been experienced agricultural production without industry involvement for centuries. Following the middle ages and occurrence of intellectual revolution in the west and granting science a pivotal role, technical and industrial advances were developed within the agricultural production system, that is, scientific and industrial advances were first designed and implemented in order to overcome natural obstacles and limitations and delaying the law of diminishing returns. Later, industry, as a separate sector, was in proper, dynamic and logical interaction with agricultural sector and these two developed and evolved as two sectors which complemented and reinforced one another (Gilanpour, 2002). Therefore, Ricardo, famous classical economist, claimed that agricultural growth

helps increase the overall economic efficiency and basically, the limitations of agriculture determine the boundaries of the growth of this sector and the necessity of creating capital for economic development. The agricultural sector can make it possible to provide food supplies and raw material for other growing sectors, provide an investible surplus product, create demand for industrial products in rural sections through cash sales of products to cities and supply the currency needed by new industries through exporting agricultural products.

Development economists have emphasized that if there has to be a structural revolution in products and workforce in the long run, successful agricultural development policies must be adopted in order to fulfill that objective. However, adopting these successful policies which develop the agricultural sector does not mean expanding the non-agricultural sector to the extent that agriculture would be restricted. Teachings of the past also indicate that unidirectional tendencies towards city are to the disadvantage of the village. The agricultural sector is not solely a means of industrial development, but rather its position and nature is higher than being merely a means. In many countries, the most suitable ground for rapid economic growth is agricultural development. Its first strategies and requirements include supply and food safety, promoting hygiene and technical and professional training, better transportation facilities and sufficient credit for production goals. Therefore, regarding the role of agricultural sector in the process of development of countries, it can be concluded that the agricultural sector is a suitable source for industrial development and reflection of industrial development in rural sectors can turn into a dynamic trend of progressive interaction between the two sectors of agriculture and industry. A study of the process of economic revolution of various countries in the world shows that the role and significance of agriculture in economic development in these countries and also in different modes of economic development is not the same. Since almost no social or historical phenomenon can be seriously studied without taking a general context into consideration, it is necessary that the role of the agricultural sector in economic development be studied within an overall context which may be generalized to most world countries; however, a study of the significance of the agricultural sector in economic progress and development and its role in each of the economic sectors must be adapted to regional and geographical characteristics and features. The agricultural sector and the opportunities ahead of ...

Agriculture is the prerequisite of the country's economic development and also can serve as the largest and most reliable director of the social structure of the country. Agriculture in Iran is both prerequisite of economic development and also can be the greatest and most reliable director of the social structure of the country. Unfortunately, due to some reasons the

capabilities of this sector have not been utilized yet. Agriculture is the basis of our economy and in case it is activated, it can lead to a great and auspicious revolution in the social system of the country and be the origin of significant development in the country's socio-economic relations. In regard to employment, producing agricultural and livestock products, supplying the country's needed food, less dependence on foreign currency, etc., the agricultural sector is of particular significance in comparison with other economic sectors. In spite of all the efforts made by the government to support and direct this sector, it is still faced with numerous problems which shows that governmental support and direction has failed to play an effective role as is worthy of this sector (Nowrouzi, 1994).

**Significance of the research:** Agriculture is an important sector in the economic development and poverty alleviation drive of many countries. The role agriculture has played in the industrial growth and development of most of the industrialized countries in the world cannot be over emphasized. The importance of this sector is more pronounced in the developing countries including Iran where it is the main thrust of national survival, employment and food (Muhammad-Lawal *et al.*, 2009). Agriculture in Iran is the way of life of the rural people. Despite its declining importance as a contributor to the Gross Domestic Product (GDP), agriculture still represents an important input to the national economy and to rural livelihoods in Iran (Stads *et al.*, 2008).

Agriculture is the largest part of Iran's economy, which has a large share of non-petroleum exports. It is also responsible for the employment of a large portion of the population of the country. Thus, growth of this sector to a large extent determines the economic growth. Studies in developed countries show that along with growth and development, the share of the agricultural sector in employment and gross domestic product has decreased and in the process of development, industry has played a leading role and the role of agriculture has been reduced. This phenomenon has directed many developing countries including Iran to accept and implement negative policies against agriculture and emphasize the involvement of investible resources of the country in industry and the public sector. However, regarding the prominence of the agricultural sector in poor and developing countries, at least during the initial stages of growth and development, the required capital for industry must be provided by the agricultural sector just like developed countries. Along with expansion of urbanization, the importance of the agricultural sector increases, because with economic development and increase in income, the demand for protein also increases. If society cannot meet this demand, then it will be compelled to allocate the scarce domestic currency to import of agricultural products. Besides supplying food stuff, by increasing

the supply of raw industrial materials, the agricultural sector can help light industries (such as textile, wool weaving industry, carpet weaving and production of sugar) develop and prosper in developing countries and increase of production and supply of these materials reduces production cost of these industries and then there will be no need to import raw material for such industries and in case of mass production, the surplus can be exported. Therefore, this research seeks to study the relationships between and the effects of various agricultural sectors and examine the impact of the growth of agriculture on various parts of industry, services, employment, gross domestic product and other non-agricultural sectors (HadjiRahimi and Torkamani, 2003).

In order to deal with this issue, the following questions were designed:

#### **Research questions:**

- Do changes in the agricultural production sector affect economic sectors (gross domestic production, employment, industry, services, export, food industry)?
- Does agriculture have a positive effect on other economic sectors such as services, industry, export, etc.?

#### **Research hypotheses:**

- Agricultural development has positive effects on various economic sectors and this leads to improvement of national economy (general hypothesis)
- Agricultural development has had positive effects on national gross production
- Agricultural development has had positive effects on production of food stuff
- Agricultural development has had positive effects on employment
- Agricultural development has had positive effects on industry and services

### **LITERATURE REVIEW**

#### **Different theories and viewpoints regarding the status of the agricultural sector in the process of development:**

- **Viewpoints of western development economists regarding the agricultural sector (1950- 1969):** During the 1950s, most development economists in the west did not consider the agricultural sector among significant factors contributing to economic growth. Development economics between 1950 and 1960 was greatly influenced by Arthur Lewis's study entitled Economic Development with Unlimited Supplies of "Labor" which was published in 1954. Lewis believed that there is no

need for the capital sector to be the same as the industrial sector. The non-capital sector may also include the handicrafts. Many development economists reached the conclusion that since economic development in the long term leads to revolution in the economic structure, it is advisable that transition of resources (especially surplus labor force) from agriculture to industry be subject to a short term economic development strategy (Lewis, 1954).

The second turning point affecting development economists' viewpoint regarding the agricultural sector was publication of Albert Hirschman's important book entitled *The Strategy of Economic Development*. Hirschman argued that, compared with investment in agriculture, investment in industry leads to a faster and more inclusive economic growth. In an article entitled *The Role of Agriculture in Economic Development* (1961) inspired by Lewis's model, Johnston and Mellor stressed the significance of agriculture as the driving force of economic growth. They argued that agriculture makes five significant contributions to transition of developing countries' economic structure; providing labor force, capital, currency and food stuff for the developing industrial sector and creating a suitable market for the manufactured industrial products. Classic works of new economists in the area of agriculture during the 1960s not only stressed the interaction between agriculture and industry and the potentially significant role of agriculture in economic development but also made it clear that if this potential is to be utilized understanding the process of agricultural development will be highly important. Some of the experiences in agricultural development during the 1950s and 1960s emphasize the need for a better understanding of the process of agricultural development (Hirschman, 1958).

- **Period of growth with equity since 1970 (expansion of development goals):** In 1970, the predominant development economics trend in the west gradually paid more attention to employment and distribution of real income in its general sense. Economists, political leaders in developing countries and leaders of major contributing organizations in the early 1970s argued that instead of waiting for the average revenue per capita to increase in order to solve the problems of poverty and malnutrition, we must pay more attention to employment, income distribution and basic needs such as food and housing. Change in the direction of development economy in the early 1970s predicted a very important role for agriculture in development plans. Soon after it was revealed that if agriculture is to play a more important role in development plans policymakers can use the simple two-part models of 1950s and 1960s. In response to some of the unpleasant aspects of the

Green Revolution and agricultural growth plans in the 1960s, many of the governments in developing countries approved of and supported integrated rural development plans and basic necessities in the early 1970s.

- **Development issues in the 1980s:** Reforming macro-economy, food safety, creating income and sustainable agriculture are among the main changes in development economics in the 1980s. This decade witnessed major changes in development economics in the form of a tendency towards economic growth, modification of policies and market liberalization. In the mid-1980s, policymakers in many countries expressed their serious concern regarding the problem of supplying food. Lack of food safety is related to a country's short term inability to supply sufficient food due to temporary shortage in production or real revenue, a typical example of which is famine. At the global level, 1980s has also been shocked by greenhouse effect, global warming along with an increase in carbon dioxide and other gases in the atmosphere as well as concerns regarding acid rains, pesticide residues, destruction of the environment and the burning of forests. The results of development studies and experiences over the past four decades indicates that in order to achieve agricultural growth in the large scale and rural development the following issues must be emphasized: reinforcement of institutional infrastructures for yeoman farmers (in respect to research, training and promotion), supervision, analysis of policies and education, renewed stress on analysis of development economics issues in the broader context of macro-economy, reassessment of the role of global commerce and allocation of agriculture in global food economy which is continuously moving towards interdependence (Najafi and Kourkinejad, 2008).

**Summation of various viewpoints on the status of the agricultural sector in the process of development:** In a statistical study of the relationship between agriculture and overall economic growth in today's less developed countries, the World Bank has reached the following conclusions: continuous importance of agriculture in the economy of developing countries is reflected in the simultaneous growth of agriculture and economy. During the 1970s, Iran was a leading state among 23 countries which had a gross domestic product of over 20%. Agricultural development along with the growth of gross domestic product indicates that factors which affect agricultural performance may be somehow linked to general socio-economic policies.

**The role of the agricultural sector:** In the process of development, agriculture should produce surplus food and create more revenue for the villagers so that urban

production markets may expand and at the same time, resources for expanding urban productions may be provided. We argue that "unbalanced growth" as simultaneous efforts for agricultural and industrial development is necessary. We recognize that capacity of an undeveloped country for undertaking everything simultaneously is extremely limited. Others, especially Nichols (1963), Schultz (1953) and Jorgenson (1961) emphasized the interdependence of a country's agriculture and industry. Myint (1957) put his figure on the odd incongruence between "closed economy" model which is latent in the domestic interdependence and the fifth role, that is, currency revenue earning, which means the country is doing international business. Reynolds stressed a significant, yet often ignored, distinction between static and dynamic viewpoint on transfer of resources. In most development models, new industry is the sharp edge of economic development, whereas agriculture reserves the resources which can be used for supplying food, employment and financial aspects of development of urban activities. It has been argued that this issue is both a logical necessity and is also confirmed by historical experience- as proved by the case of Japan (Gardner and Rausser, 2002).

**Various models of agricultural development:** The literature of agricultural development can be determined by the following models:

- **Boundary model:** This model was used for developing fertile land and preserving soil productivity and transforming rocky and poor land into cultivable land.
- **Protection model:** This model emphasized development of a combination of centralized cultivation systems, production and use of organic fertilizers and forming capital in the form of drainage, irrigation and other physical facilities for more effective improvement of water and soil resources.
- **Urban/industrial effect model:** This model seeks to explain underlying geographical differences of agricultural and workforce efficiency systems in a society which is being industrialized.
- **Promotion model:** Promoting better agricultural methods, even in pre-modernist societies, has been one of the main sources of efficiency.
- **High-efficiency input model:** This model sought to transform traditional agriculture into a productive source of economic development in poor countries.
- **Induced innovation model:** Technical changes in the process of development are considered as intrinsic factors. This agricultural development model shows how economic conditions induce development and acceptance of a series of effective technologies in a certain society (Ruttan, 1985).

**The role of agriculture in developing GDP:** The share of agriculture in employment, gross domestic product and export and its changes during Iran's economic development reflects the degree of dependence of country's economy on agriculture and the current condition of the agricultural sector. Almost 50 years ago when the oil sector had not developed considerably and oil revenue was not the same as today, Iran was considered an agricultural country and its economy was largely dependent on this sector. A large portion of the active force was employed in the agricultural sector and its share in gross domestic product was more than other sectors. In addition to supplying the demand of the urban areas for food and agricultural products, the national treasury also earned some currency through export of agricultural products and since commercial balance of the agricultural sector was positive, in this way this sector had a role in economic development. Growth of the industries and services sectors especially construction sector during development programs and increased transactions, to the detriment of the agricultural sector, led to a gap between urban and rural income and escape of the work force from villages. Economic growth caused gradual changes in the structure of production and employment which somehow occurs during economic development of most countries. Over the post-revolution years, the services sector had the highest share of gross domestic product until 1995. It is noteworthy that increase in the ratio of the share of the agricultural sector was higher than increase in the ratio of the industries and services sectors.

#### **Employment:**

**Employment strategy:** Agriculture is essentially suitable for reducing poverty. Therefore, it is important to mobilize resources for implementing it. This strategy increases supply of inexpensive food and demand for work force. These two factors are necessary for eradicating poverty through growth. Wherever poverty is rampant, adopting this development strategy should be a first priority for eradicating poverty. In longer periods, the new agriculture and employment-based strategy causes the problem of regional inequalities. Simply due to random-technical advances, agriculture will grow faster in one area compared with other areas. The role of government in the agriculture and employment-based strategy is vital, because the agricultural sector is a small-scale sector. The public sector must make much investment in support of this sector. Government constantly needs to find ways of transferring these activities to the private sector. Activities such as marketing should be conducted by this sector. Since agricultural development spreads to wider areas, infrastructural requirements will be far-reaching. And since the process of rural reconstruction means small and medium-scale industrial development

and enhancing consumption patterns, rural communication and power supply are very significant (Amini, 2002; Esfandiari, 2009).

**Food supply:** What does developing food strategy mean to a country? How should it do it? What should its objectives be? There is no definite answer to these questions. Each question should be answered according to the conditions of each country and time requirements. Besides, each question should be answered analytically. An analytic viewpoint allows for distinguishing a series of answers to real construction bricks of food policy of a country as the first step in ultimate design and implementation of these construction bricks from the actual process of recognizing these questions. These questions originate from the need of the domestic food strategy to respond to four basic objectives including:

- Efficient growth in the agricultural and food sectors
- A more proper distribution of income, mostly through creating proper and efficient employment
- Creating a satisfactory nutrition for the public through providing the minimum level of basic needs
- Providing sufficient food safety under the circumstances of insignificant harvest-natural disasters or insecure supply of food in the world

These 4 basic objectives represent the objectives that most of the policymakers in poor and rich countries have in mind for the agricultural and food sectors. Employment growth, minimum standard of living and security against famine or severe shortage of food constitute the main accomplishments of a successful and ideal food strategy—even if all the objectives are not achieved simultaneously through each of a set of policies. Although development plans may regard all 4 major objectives as equal in significance, the real budget, prices and commercial policies for the agricultural and food sectors reflects something else (Moazen, 2002).

**Developing exports and commerce:** Rural exports development increases economic development of underdeveloped countries either directly through “escape for surplus” mechanism or indirectly through development of domestic economic organizations, especially in relation to the traditional sector of their economies. These indirect consequences will be significant so long as these countries deal with a deep “dichotomy” between modern and traditional sectors and a large portion of their resources in the traditional sector is still involved in subsistence production. The reason for emphasis on supply in order to meet the demand for wage goods which has been due to

employment boom in domestic product and aimed at increasing the production of food is that employment and agriculture-based development strategy requires free sales system and the employment aspect of this strategy requires that capital be easily divided among the forces in manufacturing sector. In a closed economy it is not really possible to restrict increasing work force relationships. Job creation aspect of this strategy requires that capital be easily distributed among rapidly growing work force. Obviously, rapid growth of imports should coincide with rapid growth of exports and goods and services should be exported with high employment content. This is clearly consistent with standard business theory. Rapid growth of domestic markets for functional industrial products also reduces production costs and leads to suitable foreign competition. Currency rate which has not been estimated low helps price agricultural products perfectly and encourages limitation of the use of inputs which are produced with high investment, because these inputs are imported and cost more. It also creates higher motivation for exporting work intensive goods and will help overcome various institutional obstacles facing exports, which certainly exist in developing countries. This currency policy is in contrast to currency rate policy which is consistent with capital intensive approaches. If employment increases more than the capacity of domestic food production, we should take advantage of the opportunity and import food products so that employment growth may be supported (Khaledi and Rahimzadeh, 2008).

**Developing industry and services:** In case efficiency of agricultural products is more than other activities, reduction of the share of the agricultural sector in production and employment indicates critical condition of economic development. In other words, if due to favorable prospect of export of agricultural products, work force efficiency in the agricultural sector is high, then people's remaining in the agricultural sector may be more helpful to economic development than their transference to the non-agricultural sector. But if growth of agricultural production is less than the growth of employment and population growth, it will be problematic, which shows the necessity of integrating the agricultural and industrial sectors. Agriculture creates demand for the products of light and heavy industries and supplies industrial raw material and work force for industrial development. One of the appropriate indexes for examining the performance of macroeconomic policies and their effect on economic sectors and even macrostructures in a long-term period is changes in the added value of economic sectors, because changes in the added value of economic sectors during a long-term period in the economy of these developing countries has led to changes in the structure of economic sectors in GDP so that from 160 to 1998, the mean growth rate of the added value of the

agricultural sector in most of these countries has been lower than their mean GNP growth rate. However, these changes have been in contrast to the industrial sector. Therefore, structural changes in the agricultural and industrial sectors indicate a technological revolution in the production process of these two sectors and the industrial sector has had a major role in this revolution. In order to supply raw material for producing agricultural products and delivering the goods produced in the agricultural sector to the consumers, communication networks are required. Transportation and communication as one of the branches of economy play a significant role in the agriculture of a region. Most farmers have to adjust their farming and management of their works with the transportation volume and limitations. Developing the transportation network leads to fundamental changes in economic activities and eventually regional specialization. The more advanced the transportation economy, the higher the economic efficiency of various sectors especially the agricultural sector will be. In order for the elements of agricultural development to play their role properly, other factors are needed which include roads, transportation system, power, telecommunications, etc. To achieve agricultural development, apart from the above-mentioned factors, we need agricultural infrastructure services that include a collection of services and educational institutions which are provided by government and governmental and private organizations. These services are among the necessities of modern agricultural operation. Framework of agricultural infrastructure services includes marketing facilities, transportation costs, access to roads, price incentives of credit organizations, federations, political policies and reclamation of arid lands. These are factors which in most cases help improve the condition of farms and in some ways affect the agricultural operation and economic activities of the farm (Gandhi, 1990, 1996).

**Previous researches:** Devadoss and Willian (1990) studied relationship between agricultural and public economics. He studied the effect of money Policies on the agricultural sector in the United States of America during the period 1950-82 which results indicated, expansionary monetary policy cause to increase export, prices and incomes of agricultural sector and retraction monetary policies has a negative effect on the economy. One of investment is one of the effective factors in the growth of agricultural sector. Chenery (1952) and QuickList (1954) studied theoretical framework used for investigating investment which is based on flexible acceleration models. Jorgenson (1971-1963) founded neoclassical models of analyzing investment behavior based on this flexible acceleration theory. Fisher and Vag (1974) used these models for Australia agriculture, Heubulk and Blans, Asala and Chambers used these models for USA agriculture.

Steven (1999) developed a four parts numerical simulation model for Ethiopia's economy to assess the

impact of agricultural growth on growth in other economic sectors. Considered Sectors in his model are agriculture, services, traditional industry and modern industry. Steven (1999) calculated coefficients of macroeconomic growth by income shocks on agriculture, services, industry, traditional and modern industry by estimating model. His results showed that agricultural has the largest growth rate after service sector (Pirasteh, 2003).

## METHODOLOGY

With regard to objective, this research is applied and in respect to data it is quantitative and regarding data collection method, it is descriptive and of survey-longitudinal type and since it seeks to find the relationships between the variables, it is also correlational. The data of this research were collected using documentation data collection method. These data have been extracted from Islamic Republic of Iran Central Bank, the National Treasury, Privatization Organization, Islamic Republic of Iran Customs Tax Affairs and Statistics Center. Data analysis in socio-economic researches is conducted at the two levels of data description and analysis. In the data description phase, the population under study has been described based on the intended variables and a picture of the current condition is provided. And in the data analysis phase, the relationships between the variables are examined or dependent variables are described by using independent variables. The data description phase comprises of one-dimensional tables. One-dimensional tables present variables of the share of agricultural added value from gross domestic product, remained facilities of banks and credit organizations to the governmental sector, the share of agriculture from non-petroleum exports, the share of agriculture from employment and food safety. In the first phase, all the post-revolution variables were consecutively studied and in the second phase, mean of the share of agriculture in comparison to other sectors in the post-revolution years was studied. For data analysis, linear regression with enter and stepwise multiple methods were used. Regression analysis enables the researcher to predict changes of dependent variables based on independent variables and determine the share of each independent variable from explaining the dependent variables. Enter multiple regression analysis is a method in which all the independent variables are entered simultaneously and the effects of all independent variables on the dependent variable are studied and stepwise method is a method in which the most powerful variables are one by one inserted into the equation and this continues until significance test error reaches 5% (Wright, 1921). In the inferential section,

Table 1: The share of agricultural added value from gross domestic product (billion rials/percent)

The share of agricultural added value in production	Year
29926	68
33227	69
35094	70
38704	71
39077	72
39902	73
41381	74
42742	75
43162	76
47722	77
44238	78
45774	79
44738	80
50805	81
53320	82
53488	83
58389	84
61134	85
65062	86

Table 2: Mean share of each of the sectors from gross domestic product from 1989 to 2007 (billion rials/percent)

(%)	Frequency	Gross domestic product
19/3	54114/9841	Added value of industries and mines group
14/7	41263/2529	Added value of the agriculture sector
14/7	41319/0811	Added value of oil and gas sector
51/2	143566/7714	Added value of the services sector
100/0	277577/92	Total gross domestic product

by using regression the role of agriculture along with other economic sectors in economic development of the country after the revolution was studied.

## DATA ANALYSIS AND RESULTS

**Descriptive statistics:** According to Table 1 for frequency distribution of gross domestic product and added value, agricultural added value from gross domestic product has had a growing trend since 1989. In 1998, this growth has had a higher rate. However, after 1998 this growth has diminished and then again after 2002, it has had an upward trend.

According to Table 2 representing the share of sectors from gross domestic product, the largest share of gross domestic product from 1998 to 2007, that is, 51.6% belongs to the services sector. Next is the added value of the industries and mines group (19.3) and agriculture with a share of 14.7% has the third rank among other sectors. However, the added value of oil and gas sector with a share of 14.7% is equal to the role of agriculture.

According to Table 3 representing frequency distribution of the share of agriculture from remained facilities of banks and credit organizations to non-governmental sector, from 1989 to 1996, agriculture has not had a considerable change but since 1996, its development process has had a considerable growth and the rate of these changes has remarkably increased since 2002.

According to table of frequency distribution of mean remained facilities in each of the sectors from

Table 3: The share of agriculture from remained facilities of banks and credit organizations to non-governmental sector (billion rials/percent)

Remained facilities of banks and credit organizations to non-governmental sector	Year
1691	68
2134	69
2949	70
3657	71
4863	72
6042	73
7286	74
9587	75
12066	76
15157	77
22622	78
28705	79
37468	80
50243	81
62975	82
82764	83
112204	84
160192	85
202033	86

Table 4: Mean of remained facilities in each of the sectors from 1989 to 2007 (billion rials/percent)

(%)	Frequency	Remained facilities of banks and credit organizations to non-governmental sector in various sectors
27/4	74449/1474	Domestic commerce, services, etc. sector
16/0	43402/0368	Agriculture sector
29/2	79327/6526	Industries and mines sector
23/8	64727/8368	Construction and housing sector
3/6	9717/9364	Export sector
100/0	267532/8474	Total of remained facilities of banks and credit organizations to non-governmental sector

Table 5: The share of agriculture from non-petroleum exports (million dollars/percent)

The share of agriculture from non-petroleum exports	Year
898	68
1037	69
1934	70
2002	71
2510	72
3281	73
1885	74
1646	75
1237	76
1416	77
1479	78
1467	79
1605	80
1548	81

1989 to 2007 (Table 4), the industries and mines sector with a share of 29.2% has the highest share in the remained facilities of the banks. Next are the commerce and construction sectors which respectively have shares of 27.4 and 23.8% and occupy the second and third ranks. Agriculture with the share of 16% has the fourth rank and the export sector receives only 3.6% of the remained bank facilities.

According to Table 5 representing frequency distribution based on the share of agriculture from non-petroleum exports, the share of agriculture from non-petroleum exports from 1989 to 1994 has been ascending and in 1994 this trend has reached its highest

Table 6: Mean share of each of the sectors from the total non-petroleum exports from 1989 to 2002 (million dollars/percent)

(%)	Frequency	Non-petroleum exports in various sectors
72/9	1543/2265	Agriculture
1/7	36/7082	Mining
25/3	536/1878	Industry
100/0	2115/3580	Total non-petroleum exports

Table 7: The share of agriculture from employment (person)

The share of agriculture from employment	Year
3201000	78
3282000	79
3366000	80
3453000	81
3545000	82
3641000	83
3741000	84
3846000	85
3955000	86
4071000	87

Table 8: Mean share of each of the sectors from employment from 1999 to 2009

(%)	Frequency	Sector
26/9	3689715/9060	Agriculture
/7	99379/0485	Petroleum
14/8	2033687/0921	Industry
10/6	1453652/1977	Construction
47/0	6460804/5566	Services
100/0	13737238/8008	Total employment

Table 9: Food products by agriculture from 1981 to 1996 (million calorie)

Frequency	Year
36053255	60
37630310	61
34258320	62
36093000	63
39384050	64
42592390	65
42697540	66
40812460	67
45655180	68
51007840	69
57274090	70
59087840	71
59967860	72
61264410	73
58294594	74
46825719	75

amount. But since 1994, this trend has extremely decreased and has had a downward trend since around 1999 it has not had a considerable growth.

According to Table 6, from 1989 to 2002, agriculture with the share of 72.9% has had the highest share of non-petroleum exports. Next is industry with the share of 25.3% which has the second rank in non-petroleum exports and the share of mining from non-petroleum exports is only 1.7%.

According to Table 7 based on frequency distribution of the share of agriculture from employment, from 1999 to 2009 employment in the agricultural sector has had an upward trend and from 3201000 persons has increased to 4192000 persons.

According to frequency distribution Table 8 based on mean share of each of the sectors, from 1999 to 2009

Table 10: Regression model of gross domestic product

Model	Coefficients			
	B	S.E.	Standardized coefficients Beta	t
1. (constant)	7401.884	4614.389		1.604
Added value of the services sector	1.881	0.027	0.998	70.172
2. (constant)	-34730.000	7637.627		-4.547
Added value of the services sector	1.780	0.023	0.945	76.884
Added value of petroleum and gas sector	1.386	0.235	0.072	5.889
3. (constant)	-2391.940	6093.027		-0.393
Added value of the services sector	1.323	0.067	0.702	19.628
Added value of petroleum and gas sector	1.234	0.121	0.064	10.168
Added value of mining and industry group	0.722	0.105	0.250	6.874
4. (constant)	3173.791	2461.658		1.289
Added value of the services sector	0.994	0.045	0.528	22.277
Added value of petroleum and gas sector	0.944	0.057	0.049	16.614
Added value of mining and industry group	1.009	0.048	0.327	19.775
Added value of the agricultural sector		0.110	0.111	9.158

Dependent variable: Gross Domestic Product (GDP)

Table 11: Regression model of remained facilities of banks and credit organizations to non-governmental sector

Model	Coefficients			
	B	S.E.	Standardized coefficients Beta	t
1. (constant)	-52800.700	11268.420		-4.686
Agricultural sector	6.920	0.121	0.999	57.227
2. (constant)	-14100.800	9178.564		-1.536
Agricultural sector	5.017	0.362	0.724	13.849
Domestic commercial sector	0.784	0.147	0.278	5.325
Services and others				
3. (constant)	470.760	1985.842		0.237
Agricultural sector	2.670	0.172	0.385	15.484
Domestic commercial sector	0.947	0.030	0.336	31.798
Services and others	1.017	0.069	0.283	14.814
Mining and industry sector				

Dependent variable: Remnant of facilities of banks and credit organizations to the non-governmental sector

the highest share from employment, that is, 47% belongs to the services sector. Next is agriculture with the share of 26.9%. Industry with the share of 14.8% has the third rank and construction with the share of 10.6% has the fourth rank and petroleum has the share of only 0.7% from employment in the country.

According to frequency distribution Table 9 based on food products by agriculture from 1981 to 1996, agricultural products have had an unbalanced trend from 1981 to 1988, that is, during these years it has been decreasing or increasing. But since 1988, there is an upward trend; until 1995 and 1996 when again this index has a downward trend.

**Inferential statistics:** Considering the value of t and its level of significance, all the sectors with 99% certainty play a significant role in gross domestic product (Table 10). The respective regression equation can be written as follows:

$$Y = .528X_1 + .049X_2 + .327X_3 + .111X_4$$

Considering the value of t and its level of significance, with 99% certainty, agriculture, commerce

and services and also industries and mines have a significant role in remained bank facilities (Table 11). The respective regression equation can be written as follows:

$$y1 = .385X_1 + .336X_2 + .283X_3$$

Considering the value of t and its level of significance, all the sectors with 99% certainty play a significant role in non-petroleum exports (Table 12). The respective regression equation can be written as follows:

$$Y1 = .73X_1 + .579X_2 + .039X_3$$

According to the Table 13, regression coefficient equals 0.945 and coefficient of determination equals 0.894. This value shows that 89.4% of changes in calorie consumption are explained by agricultural products. And considering beta coefficient which is 0.945, for each change in the unit of agricultural standard deviation, there will be 0.945 changes in food safety standard deviation. And the respective regression equation can be written as follows:

Table 12: Regression model of total non-petroleum exports

Model	Coefficients			
	B	S.E.	Unstandardized coefficients	Standardized coefficients
		Beta	t	
1. (constant)	1593.186	363.906		4.378
Industry	1.120	0.277	0.819	4.936
2. (constant)	13.182	36.912		0.357
Industry	1.029	0.014	0.752	71.330
Agriculture	0.999	0.018	0.577	54.720
3. (constant)	-1.233	14.057		-0.088
Industry	0.998	0.007	0.730	150.389
Agriculture	1.002	0.007	0.579	145.051
Mining	1.015	0.124	0.039	8.189

Dependent variable: Total non-petroleum exports

Table 13: Regression model of food safety

Model	Coefficients			
	B	S.E.	Unstandardized coefficients	Standardized coefficients
		Beta	t	
1. (constant)	6065388	4952553		1.225
Agricultural products	1.126	0.104	0.945	10.849

Dependent variable: Calorie consumption

$$Y_1 = .945X_1$$

## CONCLUSION AND RECOMMENDATIONS

The agricultural sector as one of the important sectors in development process has always had a unique place in world economy, especially after the oil shocks in the 1970s which led to economic depression in the west. The agricultural sector and agricultural products as one of the significant factors in economic development were paid attention to, in a way that during the 1980s the relationship between the developmental role of agriculture and economic growth were taken into consideration by many economic analysts. Since Iran has the geographical potential as well as wide climatic variety, the agricultural sector can play a determinant and significant role in economic development. The results of this research also confirm this issue. Nowadays the effect and significance of agriculture in the economy of the country is known to everybody and the needs of various economic sectors is a fact that if it is ignored it will do much harm to the process of development of the country. Accepting the importance of the agricultural sector in the current and future economy of the country and the urgent need for its resulting currency incomes and using the products of this sector for domestic consumption make it necessary to pay attention to the agricultural sector and fulfilling sustainable development depends on production and utilization of resources in coordination with other factors such as technology, human resources, financial resources. In a country like Iran with an average income, the share of agriculture is rapidly decreasing. But agriculture maintains its significance in the rate and pattern of economic growth. Agriculture is in

possession of 10 to 20% of the total volume of economy and as the largest sector plays a significant role in the overall growth rate of economy. In addition to accelerating economic transition, agriculture contributes to health and transmittal of urbanization pattern. This is the same trend that occurred during the transition period in Taiwan, Japan and Europe. With reduction of the relative importance of agriculture in gross domestic product, potential growth rate of agriculture increases. The reason is that when prosperous population is rapidly urbanized, it allocates a larger share of its income to purchasing high value agricultural goods. Therefore, domestic demand for purchasing livestock and husbandry products grows with the rate of approximately 6 to 7%. Around 1.5% of this rate is due to population growth and 4 to 5% due to annual income growth which occurs at a price extension of 1 to 2%. With rapid growth of the husbandry sector, this sector gains economic capabilities for competing in international markets and also through expansion of exports accelerates agricultural development. Therefore, sectors producing high value agricultural products may have an annual growth of 7 to 8% and this rate equals the growth rate of the industrial subsector. When the share of high value products from agricultural gross domestic product reaches over 5%, the overall growth rate of agriculture is stabilized at the level of 4 to 5%. Agriculture is as effective in the growth of gross domestic product and modification of urbanization pattern as it is in increasing employment and decreasing poverty. Increase in farmers' income leads to demand growth and creates a multiple effect and also employment growth rate and poverty reduction depend on agricultural income. By studying the theoretical and practical aspects of the status of the

agricultural sector in various phases of economic development of the country, it was revealed that the agricultural sector due to its importance in gross domestic product, employment, food safety and political independence of the country must never be ignored and any economic reformation plan will be ineffective without paying attention to and putting stress on this sector. In fact, in order to fulfill the objectives of economic growth and development of the country, the context for domestic development should be prepared and by emphasizing rural development the position of the agricultural sector in this context should be determined. It is only through such fundamental measures that the optimal position and dynamic and effective interaction among the industrial, agricultural and services sectors is determined and fulfilled. The process of investment in the agricultural sector is generally unsuitable. Support for this sector is not favorable in comparison with advanced countries and some of the developing countries. Population growth, the need of various economic sectors for the products of the agricultural sector, creating jobs and the possibility of earning currency revenue on the one hand and considerable capacity for increasing agricultural products due to variety of climatic conditions, access to sea, fertile lands, pastures, forests and the work force ready for activity on the other hand, makes it necessary to pay more attention to the agricultural sector in Iran. In general, this research indicates that agriculture has a low share of gross domestic product and employment, which decreases the modulus of elasticity of gross domestic product in comparison with investment. It seems that one of the reasons is low share of investment in the agricultural sector in comparison with other sectors.

#### **Recommendations:**

- Providing necessary strategies for absorbing capital in the agricultural sector
- Using tax exemptions for encouraging producers in this sector (in the form of subsidies)
- Inexpensive bank facilities along with accurate supervision by respective experts
- Providing technical and scientific consultation to traditional and industrial producers
- Developing agricultural and industrial complexes for absorbing young productive force and enhancing the quality of agricultural products by using mechanization
- Expanding conversion industries for agricultural products and internal and external marketing of the products can be effective strategies for developing the agricultural sector and optimal use of the existing potentials in this sector
- Expanding the activities of rural industries and creating side jobs in the agricultural sector by the

private sector by using encouragements and providing facilities of the governmental sector

- Providing gratuitous facilities and aids in order to increase the efficiency of using water through covering streams and constructing reservoir pools and also using new technologies such as pressure irrigation
- Acquiring and providing correct information about marketing of agricultural products (internal and external) by the respective governmental organizations which can lead to increase of producers' income through increasing the received share from the end customers' price
- **Increasing investment:** Right now considerable investment in the form of subsidiaries is made in this sector but a comprehensive domestic food safety plan requires more investment. However, part of the required expenses can be provided through modifying current plans. A remarkable instance is targeting subsidiaries and participative facilities. What is certain is that real needs will be revealed through planning and comprehensive analyses.
- Finally, it is necessary that economic policies in the agricultural sector of the country adopt balanced strategies including logical support of development of (strategic) food production and other economic methods including reduction of production costs, improving production quality, maintaining international standards, updating technology in producing agricultural products and additional industries.

#### **REFERENCES**

- Amini, A., 2000. Survey of chronological statistic series of employment in Iran's economy from 1966 to 1996. *J. Plann. Budget*, 5th year, No. 3, Tehran.
- Baseri, B. and E. Jahangard, 2007. Study and analysis of employment capacity of Iran's agricultural sector. *Quart. Agric. Develop. Econ.*, No. 59, Ministry of Agriculture, Tehran.
- Chenery, H.B., 1952. Overcapacity and the acceleration principle. *Econometrica*, 20: 1-28.
- Devadoss, S.M. and H. Willian, 1990. Impacts of US monetary policies on the farm sector. *Appl. Econ.* London, 22: 1451-1471.
- Domar, E.D., 1947. Expansion and employment. *Am. Econ. Rev.*, 1: 145-160.
- Erh-Cheng, H., 1988. The contribution of agriculture to economic growth: Some empirical evidence. *World Dev.*, 16: 1329-1339.
- Esfandiari, A.A., 2009. A study of employment in economic sectors in Iran with concentration on agricultural sector. *Quart. Agric. Dev. Econ.*, No. 67, Ministry of Agriculture, Tehran.

- Gandhi, V.P. 1990. Investment behavior in developing countries: The case of agriculture in India. *Food Res. Inst. Stud.*, 22: 85-106.
- Gandhi, V.P., 1996. Investment behavior in Indian agriculture. *Indian J. Agric. Econ.*, 51: 542-557.
- Gardner, B.L. and G.C. Rausser, 2002. *Handbook of Agricultural Economics/2, A, Agriculture and its External Linkages*. Elsevier, Amsterdam.
- Gilanpour, O., 2002. Supporting Agricultural Sector. Institute of Agricultural Economic Research and Planning, Ministry of Agriculture, Tehran.
- Hadjirahimi, M. and J. Torkamani, 2003. A Study of the Role of Agricultural Sector in Economic Growth. *Quart. Agric. Dev. Econ.*, No. 42, 43. Ministry of Agriculture, Tehran.
- Hirschman, A., 1958. *The Strategy of Economic Development*. Yale University Press, New Haven.
- Jorgenson, D.W., 1961. The development of a dual economy. *Econ. J.*, 71: 309-334.
- Jorgenson, D.W., 1971. Econometric studies of investment behavior: A survey study. *J. Econ. Lit.*, 9: 214-220.
- Khaledi, K. and A. Rahimzadeh, 2008. Strengths, weaknesses, opportunities and threats facing Iran's agricultural exports. *Quart. Agric. Dev. Econ.*, No. 62, Ministry of Agriculture, Tehran.
- Lewis, W.A., 1954. Economic development with unlimited supplies of labor. *Manch. Sch. Econ. Soc.*, 22: 139-191.
- Moazen, A., 2002. Increase in production of wheat and food security. *Asia Newspaper*.
- Muhammad-Lawal, A., O.A. Omotesho and A. Falola, 2009. Technical efficiency of youth participation in agriculture: A case study of the youth in agriculture programme in Ondo state, south western Nigeria. *Niger. J. Agri. Food Environ.*, 5(1): 20-26.
- Myint, H., 1975. Agriculture and Economic Development in the Open Economy. In: Reynolds, L.G. (Ed.), *Agriculture in Development Theory*. Yale University Press, New Haven, CT.
- Najafi, B. and J. Kourkinejad, 2008. A study of the interaction between important economic sectors in Iran with concentration on the role of agriculture. *Quart. Agric. Dev. Econ.*, No. 63, Ministry of Agriculture, Tehran.
- Nichols, W.H., 1963. An 'agricultural surplus' as a factor in economic development. *J. Polit. Econ.*, 71: 1-29.
- Nowrouzi, F., 1994. Production and supply of food in Iran. *Quart. Agric. Dev. Econ.*, No. 33, Ministry of Agriculture, Tehran.
- Pirasteh, 2003. Share of agricultural sector in productivity and economic growth in Iran's economy. Proceeding of the 6th Conference of Iran Agricultural Economics.
- Ruttan, V.W., 1985. *Technical and Institutional Change in Agricultural Development: Two Lectures*. Economic Development Center, Department of Agricultural and Applied Economics, University of Minnesota, Sanford.
- Schultz, T.W., 1953. *The Economic Organization of Agriculture*. McGraw-Hill, New York.
- Shakeri, A., 2004. The status of agricultural sector in the process of economic development of Iran. *Quart. Agric. Dev. Econ.*, No. 48, Ministry of Agriculture, Tehran.
- Stads, G.J., M.H. Roozitalab, N.M. Beintema and M. Aghajani, 2008. Agricultural research in Iran policy, investments and institutional profile: International food policy research institute agricultural extension. Education and Research Organization, ASTI Country Report.
- Steven, A.B., 1999. Agriculture and economic growth in Ethiopia: Growth multipliers from a four-sector simulation model. *Agric. Econ.*, 20(3): 241-252.
- Wright, S., 1921. Correlation and causation. *J. Agric. Res.*, 20: 557-585.
- Zanjani, H., 2001. Demographic revolution and its problematic consequences. *J. Iran. Soc. Assoc.*, 5: 34-56.