J. Agr. Sci. Tech. (2012) Vol. 14: 1-10

Can Agriculture Be Considered a Key Sector for Economic Development in an Oil Producing Country? The Case of Iran

H. Salami[1*], H. Sadat Barikani[1], and M. S. Noori Naeini[1]

ABSTRACT

In the light of the 2008 World Development Report, this paper revisits the impact of agriculture on overall economic growth, in the case of an oil producing country, using indices of intersectoral linkages. To this end, four input-output tables of Iran's economy are utilized. The results support the importance of the agricultural sector in stimulating the economic growth of Iran, but also show that the manufacturing sector has a higher potential to increase domestic production through its intersectoral linkage effects. Consequently, the results provide a caveat to the recommended general policy of the World Bank that the agricultural sector can be considered a key sector for the economic development in developing countries, at least in an oil producing country like Iran.

Keywords: Agriculture, Economic development, Forward and backward linkages, Input-output, Iran.

INTRODUCTION

After more than two decades of general neglect of agriculture as a source of balanced socio-economic growth, there is increasing recognition of the importance of this sector in development. For example, the International Bank for Reconstruction and Development (the World Bank) published its 2008 World Development Report on agriculture: "Agriculture for Development". This publication and its message in support of agriculture as a key sector to economic growth have been welcomed by a wide range of audiences, from politicians to academics.

Views of agriculture's role in development have evolved over time. The role of agriculture was seen by early development economists such as Rosenstein-Rodan (1943), Lewis (1954), Hirschman (1958), Jorgenson (1961), Fei and Ranis (1961) as subsidiary to the main strategy of growth, i.e., accelerating industrialization. Many of these economists considered agriculture as a source of inexpensive and abundant labor, financial surplus, and transferable raw materials to other sectors of the economy without any negative effect on agricultural production and productivity. Thus, they assumed an important, though passive role for agriculture in the overall development context. Hirschman (1958) in particular, ignored agriculture as a source of growth on the basis of the observed weak forward and backward linkages with other sectors. In contrast, Johnston and Mellor (1961) identified some active roles that agriculture plays throughout the development path and asserted that successful industrialization experiences are usually preceded by periods of dynamic agricultural growth. Kuznets (1968) also, referred to the role of agriculture by expressing that in a successful

[1] Department of Agricultural Economics, Faculty of Economics and Agricultural Development, College of Agriculture and Natural Resources, University of Tehran, Karaj, Islamic Republic of Iran.
[*] Corresponding author, e-mail: hsalami@ut.ac.ir

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

development strategy, technological progress must support both industrialization and agricultural productivity. Yet, as Sarris (2001) pointed out, development thinking and practice in the 1960s and 1970s with emphasis on import substitution and industrialization tended to ignore agriculture as a leading sector.

On the relationship between agricultural and overall growth, Stern (1996) has provided a good summary of the empirical evidence supporting a close positive correlations between agricultural and overall growth for the years before 1980. Based on this summary, little or no correlation was observed afterwards. The associations highlighted by Stern suggest some complementarity between agricultural and non-agricultural growth. This view diverged from earlier beliefs. According to Kuznets (1968), the revolution in agricultural productivity is a crucial base of modern economic growth. Kalecki (1960, 1971) asserted the idea that balanced growth in both wage goods (mainly agriculture) and capital goods forms the basis of sustainable long run growth. According to Kalecki, since agriculture is the main sector producing food in developing economies, agricultural development is essential for a successful industrialization strategy for these countries.

In the late 1970s and early 1980s the role of agriculture as a leading sector was re-emphasized in the development literature by authors such as Mellor (1976) and Adelman (1984). These authors emphasized the importance of agricultural growth in generating demand for locally produced non-tradable products, and thereby stimulating overall production and growth. In addition, based on the Hayami and Ruttan (1971) assertion that traditional agriculture could be transformed rapidly into a modern sector through the adoption of science-based technology, Hsieh and Sadoulet (2007), emphasized the role of agriculture in stimulating competitive exports of industrial products. Hsieh and Sadoulet argued that technological change and productivity growth in agriculture contribute to industrial exports by holding down food prices and thereby affecting urban wage costs.

According to Byerlee *et al*. (2009) during the 1990s, the development community explicitly accepted poverty reduction as the major objective of development programs and a growing literature started to demonstrate the links between agriculture and poverty reduction (Timmer, 2002; Thirtle *et al.,* 2003; and Christiaensen and Demeny, 2007). In addition, since the 1992 Earth Summit in Rio, a central role of agriculture for meeting the environmental agenda has been recognized. This broader role was appreciated in the eight Millennium Development Goals agreed to in 2000 by United Nations member states particularly for reducing poverty and hunger, fostering gender equality, and sustainable management of the environment. In addition, agriculture's role in economic growth remains critical to achieving all these goals.

Recently, Anríquez and Stamoulis (2007) provided evidence that other industries are not inherently superior to agriculture in the development process, as claimed by the structuralists and others as referred to above. They indicated that the other industries do not manifest a long-term productivity growth rate higher than agriculture. Furthermore, a claimed low backward linkage for agriculture has not been backed by enough evidence. More importantly, the World Bank, after more than two decades of the world's neglect of agriculture as a source of balanced socio-economic growth, has published its 2008 World Development Report on agriculture: "Agriculture for Development". The main message of this publication is that agriculture is the key sector in economic growth, at least for some set of countries at a relatively early stage of development.

This report considers different roles for agriculture in three different groups of countries namely; agricultural-based, transforming and urbanized countries. For the agricultural-based countries, agriculture

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

is regarded as a basis for economic development. The role of agriculture is taken to be decreasing disparities between urban and rural regions for the second group. For urbanized countries, agriculture is primarily a provider of environmental services.

The question that this paper tries to address is: can agriculture be a leading sector for economic growth in an oil producing country that is nevertheless strongly agricultural, such as Iran with a 10.7 percent share in GDP and 20.9 percent in overall employment? This is a case that does not fit nearly into the World Bank's classification system. Answering this question is important as Iran remains largely an agricultural-based country. In addition, in the first two Socio-economic Development Plans after the Revolution in 1979, the agricultural sector was considered to be the leading (key) sector for economic growth.

To answer this question, the paper employs an empirical approach based on linkage analysis. The paper applies this analysis to data on the Iranian economy since 1973, a period in which the country has experienced a substantial increase in the world nominal price for oil.

Conceptual Framework

The analysis of strengths of backward and forward linkages allows the identification of the key sectors in an economy. As defined by Hirschman (1958), the production backward linkages are the links in production that one sector has with other sectors in an economy as a purchaser of inputs. Forward linkages of a sector refer to the connections that the sector has with the rest of the economy as supplier of the inputs.

In the case of agriculture, the main backward linkages are with the animal feed sector, fertilizers production, machinery manufacturing, and with the financial and non-financial services sectors including banks, transport, machinery repair, commerce, etc. On the other side, the forward linkages of agriculture are mainly in the food processing industries, as well as in the restaurant and hotel sector, public schooling, etc. As the agricultural sector becomes more developed, it requires more financial services, machinery and other purchased inputs. This results in an increase in its backward linkages with the other sectors, which in turn results in an expansionary effect on the rest of the economy. Similarly, growth may drive further development of food processing industries and hotel and restaurant services, thereby expanding the forward linkages of the agriculture sector. Accordingly, the expansion of the agricultural sector induces the expansion of the former sectors and generates a multiplier effect based on the forward linkages of the agricultural sector with the rest of the economy.

The linkages between sectors in an economy are recorded in the input-output matrix, which shows how the total output of each sector is distributed between final consumption (households and government) and intermediate uses. The input-output matrix shows how each sector sells inputs to all the other sectors of the economy. Using information in the input-output table, Rasmussen (1956) defined the following "power of dispersion index" as a measure of the backward linkage (BL) effect. This describes the relative extent to which an increase in final demand for the products of sector j is dispersed throughout the rest of the economy:

$$BL_j = \frac{\frac{1}{n}\sum_{i=1}^{n} r_{ij}}{\frac{1}{n^2}\sum_{i=1}^{n}\sum_{j=1}^{n} r_{ij}} \qquad (1)$$

where n is the number of sectors (industries) and $\Sigma\, r_{ij}$ in the numerator is the sum of the column elements in the well known Leontief inverse (multiplier) matrix defined as r associated with the input-output table, where r_{ij} is the element of i^{th} row and j^{th} column of "Leontief inverse" matrix, and $\Sigma\Sigma rij$ is the sum over all the elements of the Leontief inverse. The numerator in Equation

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

(1) denotes the average increase in output of a sector induced by a unit increase of the final demand for products of sector *j*.

Based on Equation (1) a value greater than one for BL_j implies that sector *j* has above-average backward linkage effects in the economy, whereas a value less than one for BL_j means that the sector *j* has below-average backward linkage effects. Thus, a linkage value above one for a given sector indicates that this sector will hand over a relatively large share of the increase of final demand for its products to other sectors in the economy.

Rasmussen (1958) also defined the index of the 'sensitivity of dispersion" as a measure of forward linkage (FL) indicated by Equation (2):

$$FL_i = \frac{\frac{1}{n}\sum_{j=1}^{n} r_{ij}}{\frac{1}{n^2}\sum_{i=1}^{n}\sum_{j=1}^{n} r_{ij}} \qquad (2)$$

The denominator of the above equation has the same definition as in Equation (1), however, the Σr_{ij} term in the numerator is the sum of the row elements of the Leontief inverse. The FL_i, index is interpreted as the increase in output of sector *i* needed to cope with a unit increase in the final demand for the product of each of the sectors. In other word, this index expresses the increase in the production of sector *i*, driven by a unit increase in the final demand for all sectors in the economy.

The above indices have the drawback that they do not reveal how evenly any sector draws on all other sectors and all sectors draw on any one sector. According to Rasmussen (1956), a sector can have relatively high values of backward and forward linkages and yet be related only to a small proportion of the other sectors in the economy. To account for this drawback, the author suggested the following measures of standard deviation coefficients also called "variation index":

$$CV^b = \frac{\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(r_{ij} - (\frac{1}{n})\sum_{i=1}^{n} r_{ij})^2}}{\frac{1}{n}\sum_{i=1}^{n} r_{ij}} \qquad (3)$$

$$CV^f = \frac{\sqrt{\frac{1}{n-1}\sum_{j=1}^{n}(r_{ij} - (\frac{1}{n})\sum_{j=1}^{n} r_{ij})^2}}{\frac{1}{n}\sum_{j=1}^{n} r_{ij}} \qquad (4)$$

In the above equation, r_{ij} has its previous definition. In Equations (3) and (4), CV^b and CV^f are, respectively, the variation index for the backward linkage associated with sector i, and the variation index for the corresponding forward linkage. Thus, CV^b index reflects the extent to which any sector draws evenly on all other sectors, and CV^f indicates the extent to which all sectors draw evenly on any one sector. The small values of these indices are indication of more evenly spread of backward and forward linkages.

Many economists including Ghosh (1958), Augustinovics (1970), and Jones (1976), questioned the Rasmussen's dispersion index of forward linkage and its variation index derived from the matrix of Leontief inverse by arguing that, while sectors are of different sizes, there is not much economic sense in exploring what happens to a sector if all sectors, are to expand their output by an identical unit increase. Then, they proposed to utilize the "output-inverse" matrix denoted by Equation (5) in the calculation of the Rasmussen's dispersion index of forward linkage and its variation index.

$$W = (I - Z)^{-1} \qquad (5)$$

where Z is the output coefficient matrix and is derived from:

$$Z_{ij} = \frac{x_{ij}}{x_i} \text{ and } x_{ij} = Z_{ij} x_i \qquad (6)$$

and x_i is the total demand or total output of row *i*.

Denoting w_{ij} as the element of i^{th} row and j^{th} column of "output-inverse" matrix (W), the index of forward linkage and its

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

variation index based on the above matrix are defined as follows:

$$FL_i^p = \frac{\frac{1}{n}\sum_{j=1}^{n} w_{ij}}{\frac{1}{n^2}\sum_{i=1}^{n}\sum_{i=1}^{n} w_{ij}} \quad (7)$$

$$CV^p = \frac{\sqrt{\frac{1}{n-1}\sum_{j=1}^{n}(w_{ij} - (\frac{1}{n})\sum_{j=1}^{n} w_{ij})^2}}{\frac{1}{n}\sum_{j=1}^{n} w_{ij}} \quad (8)$$

In the above equations, the element of the output inverse, w_{ij}, shows the increase in output of the j^{th} sector required to use the increased output brought about by a unit of primary input into the i^{th} sector. Therefore, the i^{th} row sum of W is the increase in total output of the economy required to utilize the increased output from an initial unit of primary input into sector i. Accordingly, the output inverse gives the impact on user sectors.

Using Rasmussen (1956) definition of sectoral linkages, a sector is classified as a key sector if $BL_j > 1$ and $FL_i > 1$, as a forward linkage oriented sector if $BL_j < 1$ and $FL_i > 1$ and as a backward linkage oriented sector if $BL_j > 1$ and $FL_i < 1$. However, according to Diamond (1974), the key sectors are those with high linkage indices and low variation index. Thus, by taking the difference between BL_j and CV^b, for backward linkage and FL_i and CV^f, or FL^p and CV^p for forward linkage the ultimate key sectors are obtained in such a way that sectors with high "linkage indices" and low "variation indices" come first. In this case, it is not necessary that the key sectors take values of (BL_j-CV^b) or (FL_i-CV^f) greater than 1. Since, BLj has to be subtracted by CV^b, the value of (BL_j-CV^b) declines. The same applies to values of (FL_i-CV^f). In the present study, these definitions are the basis for specifying the key or leading sectors in the economy and, thus examining whether the agricultural sector can play a role as a leading sector in the Iranian economy.

To specify the key sectors and analyze the changes in the role of agriculture over the past 28 years, this paper makes use of four input-output tables developed for Iran's economy by the Statistical Center of Iran. These cover the years 1973, 1986, 1991 and 2001. The original detailed input-output tables are aggregated into five sectors including agriculture, manufacturing, food processing, services, and oil. The aggregated input-output table (Table 1) for the latest year, the 2001, is reported here.

To measure backward linkage effects, Rasmussen's dispersion and variation indices were computed based on the Leontief inverse matrix. For identification of the forward linkage effects, the concept of "output-inverse" developed by Jones, has also been applied. To find the key sectors based on the Diamond (1974) suggestion, the standard deviation coefficients (variation indices) of the forward and backward indices have been subtracted from these indices. The sectors are then ranked for identification of the key sectors. To analyze the changes in the role of agriculture over the past 28 years, the indices were calculated for all four input-output tables.

Table 1. Input-output table (2001, in Billion Rials*).

	Agriculture	Food processing	Manufacturing	Services	Oil and gas	Aggregate demand
Agriculture	14059559	45931903	3102115	1834329	846	125058407
Food processing	39996	15607	13244524	2210953	68434	82859381
Manufacturing	6337726	7424193	49945656	6078447	7810	219879100
Services	7982703	2946808	817356666	61930997	856299	609954627
Oil and gas	18866453	11199785	35774525	18165809	2987963	118806932
Aggregate supply	125058407	82859381	219879100	609954627	118806932	

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

RESULTS

Results of the backward linkage indices and their Variation Indices are reported in Table 2. Tables 3 and 4 show the results of forward linkage indices based on the Leontief inverse and output inverse indices, respectively, for the period of study.

Results from Table 2 indicate that key sectors in terms of backward linkages are food processing, manufacturing, and agriculture sectors (but not for all the years). The results have not changed much over 28 years, suggesting the continuing importance of these three sectors in the Iranian economy. The rankings, derived from taking the difference between the backward dispersion index and its standard deviation coefficient, generally confirm the previous results regarding the nature and strength of sectoral backward linkages. The food processing industry leads, followed by the manufacturing and agricultural sectors, though agriculture is ranked higher based on the 2001 input-output table, the most recent available. An interesting result is that the oil sector in Iran cannot be considered as a leading (key) sector in this country and its position has not changed over the period of study.

The forward linkage index of identifying key sectors based on the output inverse matrix (Table 3), ranks the manufacturing sector the highest, followed by agriculture. The position of manufacturing is improving while the position of agriculture is worsening over the period of study. Based on the information provided by the 2001 input-output table, the agricultural sector can no longer be considered as a key sector as the value of the forward index has fallen below one in this year. The role of the service sector in the overall growth of the economy is improving as the value of the forward index has risen to 1.2 in 2001. Thus, the service sector appeared to be a forward linkage oriented key sector in the economy of Iran. The food processing industry is no longer a key sector from this point of view. In fact, this sector is considered to be a backward linkage oriented sector in Iran. The manufacturing sector with the values of forward and backward indices greater than one throughout the study years is the only key sector in the Iranian economy. Of course, the agricultural sector has been a key sector for some years, though it appeared to be a backward linkage oriented sector in recent years. Results of the forward linkage index based on the Leontief inverse (Table 4) confirm the results derived from output inverse matrix (Table 3). However, results based on the Diamond methodology for assessing forward linkages rank the sectors differently. Based on this index, agriculture is ranked the highest for the years before 2001, followed by the manufacturing sector and the service sector. The latter sector has become the most important key sector since 2001. The composition of goods produced in the manufacturing sector has changed over time to encompass more petrochemical products and machinery. Changes in the types of manufactured goods might be responsible for such favorable improvements in the position of the manufacturing sector in Iran.

CONCLUSIONS

Using the available input-output tables for the period 1973-2001, we derived measures of production linkages to analyze the role of agricultural sector in Iran as an oil producing country. The finding that the agriculture backward linkage is large - although not larger than that of the manufacturing sector - supports the view that agricultural growth contributes considerably to overall economic growth in Iran through demand linkages. In addition, the fact that the agricultural sector is ranked first for the earlier years and at the worst, the second sector in the latest year based on the Diamond methodology for identifying forward linkages, suggests that the effects of this sector are more evenly dispersed through the Iranian economy.

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

Table 2. Backward linkage indices (1973-2001).

	Agriculture				Food Processing				Manufacturing				Services				Oil and Gas			
Year	BL	CV	BL-CV	Rank	BL	CV	BL-CV	Rank	BL	CV	BL-CV	Rank	BL	CV	BL-CV	Rank	BL	CV	BL-CV	Rank
1973	1.07	0.54	0.53	3	1.24	0.46	0.78	1	1.09	0.53	0.56	2	0.87	0.46	0.41	4	0.73	0.44	0.29	5
1986	0.99	0.57	0.42	3	1.36	0.48	0.88	1	1.09	0.66	0.43	2	0.84	0.46	0.38	4	0.71	0.43	0.28	5
1991	0.94	0.57	0.37	4	1.40	0.5	0.90	1	1.14	0.68	0.46	2	0.87	0.46	0.41	3	0.65	0.43	0.22	5
2001	1.12	0.48	0.64	2	1.44	0.43	1.01	1	1.13	0.70	0.43	3	0.74	0.5	0.24	4	0.57	0.44	0.13	5

BL= Backward linkage, CV= Coefficient of variation stands for standard deviation.

Table 3. Forward linkage indices based on the output inverse (1973-2001).

	Agriculture				Food processing				Manufacturing				Services				Oil and gas			
Year	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank
1973	1.3	0.53	0.77	1	0.91	0.49	0.42	4	1.1	0.53	0.57	2	0.91	0.44	0.47	3	0.78	0.43	0.35	5
1986	1.29	0.58	0.71	1	0.81	0.5	0.31	5	1.23	0.61	0.62	2	0.82	0.42	0.4	3	0.83	0.45	0.38	4
1991	1.42	0.6	0.82	1	0.8	0.49	0.31	5	1.25	0.65	0.6	2	0.78	0.44	0.34	3	0.76	0.44	0.32	4
2001	0.94	0.47	0.47	3	0.86	0.51	0.35	5	1.32	0.68	0.64	2	1.20	0.43	0.77	1	0.79	0.43	0.36	4

Table 4. Forward linkage indices based on the Leontief inverse (1973-2001).

	Agriculture				Food Processing				Manufacturing				Services				Oil and Gas			
Year	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank	FL	CV	FL-CV	Rank
1973	1.26	0.53	0.73	1	0.86	0.48	0.38	4	1.11	0.54	0.57	2	0.98	0.45	0.53	3	0.79	0.44	0.35	5
1986	1.29	0.55	0.74	1	0.76	0.49	0.27	4	1.33	0.64	0.69	2	0.99	0.47	0.52	3	0.63	0.41	0.22	5
1991	1.43	0.53	0.90	1	0.72	0.48	0.24	4	1.28	0.67	0.61	2	0.94	0.47	0.47	3	0.63	0.42	0.21	5
2001	0.96	0.46	0.50	2	0.64	0.47	0.17	4	1.20	0.7	0.50	2	1.60	0.46	1.14	1	0.60	0.42	0.18	5

Thus, the agricultural sector can play an important role in stimulating the overall economic growth in Iran. However, although the results support the importance of the agricultural sector in stimulating the economic growth of Iran through both the backward and forward linkage effects, they also show that the manufacturing sector has higher potential to increase domestic production through intersectoral linkage effects. Over the period 1973-2001, the relative role of the manufacturing sector in boosting Iran's economy has also increased. The forward linkage index of the manufacturing sector has increased from 1.11 to 1.20 (Table 4), while that of the agricultural sector has dropped from 1.26 to 0.96. In addition, the values of the backward linkage index of the manufacturing sector are higher than those of the agricultural sector throughout the 28 year period of study. Consequently, the results do not support the recommended general policy of the World Bank, that the agricultural sector can be considered a key sector for the economic development, at least, in an oil exporting country like Iran. However, even in this case, the role of agriculture shall not be underestimated in the process of economic development, as it ranks the first and at worst the second key sector in the context of the Diamond methodology for identifying the forward linkage. Particularly, it should be noted that the linkage analysis used in this study does not take into account the implication of investment in different sectors in reducing poverty, fostering gender equality, and sustainable management of the environment. As already mentioned, several studies have indicated that the agricultural sector plays a central role in promoting the above aspects of economic development, and this might be true in the case of Iran.

It is important to note the implications of the analysis for the oil sector. While this sector is a very important sector in providing foreign exchange required for development in Iran, it cannot be considered as a key sector by any means in the context of the Iranian economy. Consequently, even in such an oil producing country, the role of agriculture shall not be underestimated.

REFERENCES

1. Adelman, I. 1984. Beyond Export-led Growth, *World Dev.,* **12**: 937-49.
2. Augustinovics, M. 1970. Methods of International and Intertemporal Comparison of Structure. In: "*Contributions to Input-Output Analysis",* (Eds.): Carter, A. P. and Brody, A.. Amsterdam, North-Holland, PP.249-269.
3. Anríquez, G. and Stamoulis, K. 2007. Rural Development and Poverty Reduction: Is Agriculture Still the Key?: ESA Working Paper No. 07-02. Agricultural Development Economics Division, The Food and Agriculture Organization of the United Nations.
4. Byerlee, D., de Janvry, A. and Sadoulet, E. 2009. Agriculture for Development: Toward a New Paradigm. *Annual Rev. Res. Econ.*, **1**: 15-35**.**
5. Christiaensen, L. and Demery, L. 2007. Down to Earth: Agriculture and Poverty Reduction in Africa, Directions in Development. The World Bank, Washington, DC.
6. Diamond, J. 1974. The Analysis of Structural Constraints in Developing Economics: A Case Study. *Oxford B. Econ. Stat.,* **36:** 95-108.
7. Fei, J. C. and Ranis, G. 1961. A Theory of Economic Development. *Am. Econ. Rev.,* **51**: 533-65.
8. Hirschman, A. O. 1958. *The Strategy of Economic Development*. Yale University Press, New Haven, Connecticut,
9. Hsieh, C. and Sadoulet, E. 2007. *Agriculture and Development*. Background Note for the World Development Report 2008, The World Bank, Washington, DC.
10. Hayami, Y., and Ruttan, V. 1971. *Agricultural Development: An International Perspective*. Johns Hopkins University Press, Baltimore, Maryland.
11. Johnston, B. F. and Mellor, J. W. 1961. The Role of Agriculture in Economic Development. *Am. Econ. Rev.,* **51**: 66-93.
12. Jorgenson , D. G. 1961. The Development of a Dual Economy. *Econ. J.,* **71**: 309-334.

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

13. Jones, L. P. 1976. The Measurement of Hirschmanian Linkages. *Q. J. Econ.,* **90**: 323-333.
14. Ghosh, A. 1958. Input-Output Approach to an Allocative System. *Economica*, **5**: 58-64.
15. Kalecki, M. 1960. Unemployment in Underdeveloped Countries. *Indian J. L. Econ.,* **3**: 59-61; reprinted in Kalecki M. (1976) Essays on Developing Countries, Sussex, UK, Harvester Press.
16. Kuznets, S. 1968. Toward a Theory of Economic Growth with Reflections on the Economic Growth of Nations. Norton, New York.
17. Lewis, W. A. 1954. Economic Development with Unlimited Supplies of Labour. *Manch. Sch. Econ. Soc.,* **22**: 139-181.
18. Mellor, J. W. 1976. The New Economics of Growth: A Strategy for India and the Developing World. Cornell University Press, Ithaca, New York.
19. Rasmussen, P. N. 1956. *Studies in Inter-sectoral Relations*. Amsterdam, North-Holland.
20. Rosenstein-Rodan, P. N. 1943. Problems of Industrialization of Eastern and South-eastern Europe. *Econ. J.,* **53**: 202-211.
21. Sarris, A. H. 2001. The Role of Agriculture in Economic Development and Poverty Reduction: An Empirical and Conceptual Foundation. Paper Prepared for the Rural Development Department of the World Bank, University of Athens, Greece.
22. Stern, N. 1996. Growth Theories, Old and New, and the Role of Agriculture in Economic Development: Economic and Development Paper 136. Food and Agriculture Organization of the United Nations, Rome, Italy.
23. Thirtle, C., Lin, L. and Piesse, J. 2003. The Impact of Research-led Agriculture Productivity Growth on Poverty Reduction in Africa, Asia, and Latin America. *World Dev.,* **31(12):**1959-75
24. Timmer, C. P. 2002. Agriculture and Economic Development. In: "*Handbook of Agricultural Economics"*, (Eds.): Gardner, B. and Rausser, G.. Elsevier Science B.V., Amsterdam, **2**: 1487-1546.
25. *Statistical Center of Iran.*1973, 1986, 1991 and 2001 Input-output Tables, Tehran, Iran.World Bank. (2008) World development report 2008: Agriculture for development. The World Bank, Washington, DC.

آیا کشاورزی می تواند به عنوان یک بخش کلیدی در توسعه اقتصادی در کشور صادر کننده نفت مورد توجه باشد؟ مورد کشور ایران

ح. سلامی، ح. سادات باریکانی، و م. س. نوری نائینی

چکیده

در سایه گزارش ۲۰۰۸ بانک جهانی، این مقاله اثر بخش کشاورزی در رشد اقتصاد ایران را به عنوان یک کشور صادر کننده نفت، با بهره گیری از شاخص های ارتباطات بین بخشی در اقتصاد، مورد بازنگری دوباره قرار داده است. برای دستیابی به این هدف از جداول داده-ستانده ایران منتشر شده توسط مرکز آمار ایران استفاده شده است. نتایج در حالی که حکایت از اهمیت بخش کشاورزی در تحریک رشد اقتصادی در کشور دارد، لیکن نشان می دهد که بخش صنعت دارای پتانسیل بیشتری برای ترغیب تولید در سایر بخش های اقتصادی به دلیل اثرات ناشی از ارتباطات متقابل این بخش با سایر بخش ها می باشد. این نتیجه بیانگر آن است

[DOR: 20.1001.1.16807073.2012.14.1.11.1]

که توصیه بانک جهانی مبنی بر قرار گرفتن بخش کشاورزی به عنوان یک بخش کلیدی در توسعه کشور های درحال توسعه نمی تواند لااقل برای کشورهای صادر کننده نفت مانند ایران صادق باشد.

[DOR: 20.1001.1.16807073.2012.14.1.11.1]