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# Factors Affecting the Value Added of Agriculture Sector in Selected Developing Countries Emphasising on Human Capital

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**Abstract:** The agriculture sector is one of the important economic sectors which is the provider of an important amount of production and food demands. This sector is of high importance because of having noticeable potentials of development such as millions of hectares of farmable lands, the possibility of using billions of cubic meters of water from surface and underground sources of water, the possibility of increasing the productivity of crops and gardening, and also considering its role in strategic purposes. For this purpose, the present study is trying to consider the effects of human development on the value added of the agriculture sector in selected developing countries in period of 2006 to 2014 using the panel-data method. The results of the studies show that human development has a positive and meaningful effect on the value added of the agriculture sector.

**Keywords:** Human Development, The Value Added of Agriculture Sector, Panel-Data.

## 1. Introduction

Human capital is one of those things discussed by economists. In studies and researches done about the factors creating growth, less than 50 percent of the growth is known to be caused by the primary factors of production (labor, capital and land) and the rest have been linked to unknown factors such as technology changes, increasing productivity and the remaining factor which is nowadays believed to be the role of human factor (Emadzadeh and Besktash, 2005).

The noticeable fact here is that nowadays in fact the injection of specific amounts of physical and material capital to the third world countries has not necessarily caused their development process to get quicker, but merely the countries that had a productive organization and at the same time, expert human capital, have been able to use and attract their material and physical capital decently and use them in their growth process (Moradi *et al.*, 2013).

Economic sectors must pay special attention to finding ways to improve using human capital and productivity in their own industries and have this as one of their priorities, because paying special attention to quality and productivity of the labor force, because of its beneficial effects and results, can help them achieve this purpose. So for achieving it, the first step is to start from investing in human capital (Okpala, 2007).

In this approach, the agriculture sector is considered as one of the important economic sectors which is the provider of an important amount of production and food demands. From perspective of having development potentials such as millions of hectares of farmable lands, possibility of using billions of cubic meters of water from surface and underground sources, the possibility of increasing the proceeds of agriculture products and considering the role of this sector in strategic purposes, this sector is of high importance. The most major activities of agriculture sector are made of crops and livestock (Esnaashari and Karbasi, 2009).

The agriculture sector can have a lot of effects on cooperations of other sectors, too. The share of agriculture sector in macro economic indexes such as gross domestic productions, the number of employees and non-oil exports is remarkable.

For this purpose, the present study tries to consider the effects of human development on the value added of the agriculture sector in selected developing countries in period of 2006 to 2014 using panel-data method.

## **2. Theoretical Basics and Previous Studies**

Agriculture as one of the oldest production activities is the most important economic activity of all countries in the world since the old times. Also nowadays the agriculture sector is the primary part of the national economy, so that their economic growth and development is in direct relation with their total agriculture sector development, in other words, agriculture development is discussed in national development framework of countries (Heydari *et al.*, 2015).

Unfortunately, many less-developed countries do not pay enough attention to agriculture sector in order to create quick economic growth, and are mostly tending to become industrial as soon as possible. The necessity of industrialization of basic sectors in these countries is understandable, but the fact that basic industry can not be developed without any foundation, is less paid attention in these countries (Warr, 2014).

In this situation, the important factor that can make big improvements in agriculture sector is human capital. The importance of human capital in agriculture sector is noticeable because so far, no production process has been made which does not need human labor, so no production is done without his cooperation. But the role of human factor during development and evolution of societies has been facing qualitative and quantitative changes of human labor in the production process. The role of human force has reached from physical work to its most advanced form (which means mankind mostly thinks and the machine works). Industrial development is based on two important capital sources which are physical capital and human capital.

Investment in human force and improving the quality of labor force is one of the fields and primary ways of increasing productivity, industry growth and ultimately speeding up the economic growth of the society. Considering economic studies, it can be said that human capital is totally an economic concept. In fact, the human's qualitative features are some kind of capital, because these features can increase productivity, production, income and welfare. Another definition of human capital is knowledge, skill, experience, capability and finally order and creativity which is acquired by education and is saved in different sectors in the labor force of the society and causes increase of productivity of the labor force which is created by increasing quality and effort (Nasiripour *et al.*, 2010).

The fact that high quality human force is considered as a capital for a workshop, has caused the developed countries to focus more on educating and training human force and relationships in the industrial production process. By experience, these countries have realized that increasing the productivity of a industries is more probable to happen by improving the quality of the labor force. Although by replacing modern machinery, changing and improving the production lines, applying modern inventory, etc. the productivity of different industries can be increased, but it should be considered that these factors also depend on capabilities and motivations of human force and it can be surely said that any machine has an ultimate defined capability and more can not be expected, but on the other hand, capabilities of human is infinite (Moshbeki *et al.*, 2010).

In recent decades, human resources have been considered as smart matter which plays an important role in the system with its skill and creativity. Efficient human force is one of the valued capitals of a country so that the capital of knowledge is much more important than the capital of production (Litman *et al.*, 2008).

Developing countries need human capital more than physical capital. According to statistics, human capital has the first rank of wealth creation in developing countries with 67 percent, while the share of physical resources is only 33 percent. It is capital that can be considered as the backup for major social movements in 21<sup>st</sup> century (Moradi *et al.*, 2013).

In the matter of human capital, one of the noticeable factors is the matter of human force education. Education plays the primary role in improving productivity of the labor force as the most obvious human investment. On one hand, education increases the productivity and abilities of the labor force and reveals their talents, and on the other hand it provides required field for using better and higher technology for the labor force. So, the society can achieve its purposes when it makes its way through human development. In fact, the foundation of human social life is made on education and we live as we are trained to, so with any definition of development, for achieving them, all of the effort is done by people who are supposed to make it happen. Since in the present world, the education sector is in charge of training human force in the

society, it is known as the most important factor of training human force (Emadzadeh and Besktash, 2005).

It is to be mentioned that international studies and experiences all emphasize on the fact that development of different economic sectors and the subject of stable and comprehensive development must pass the field of human force and the circumstance of success is stabilizing and continuing any kind of development and change, is investment in human development as its primary core.

Asumadu and Asantewaa (2017) studied the effect of energy, agriculture, macro economic indexes and human activities on environment pollution in Ghana using the SIMPLE pattern in period of 1971 to 2011. The results show that there is a linear relation between energy, agriculture, macro economic indexes and release of CO<sub>2</sub> gas.

Rockstrom *et al.* (2017) studied the effect of stable agriculture growth on human welfare. In this study, they defined a paradigm for increasing the amount of stability and turn it into an operational framework for agriculture development.

Eskandari and Zeraatkish (2016) studied the effect of value added and exports of fisheries sector on economic variables of agriculture sector in Iran using the VAR method in period of 1989 to 2013. The results show that the shock to the variable of growth of exports of fisheries sector on variable of value added of agriculture shows meaningful fluctuations. The effect of the shock to the variable of the growth of the value added of fisheries on the variable of growth of value added of agriculture has always been positive effect and the effect of this shock on the variable of growth of value of agriculture exports has been negative.

Alavi-rad (2014) studied the effect of energy consumption on value added of economic sectors of agriculture, industry and services in Iran in period of 1991 to 2010 using the FMOLS and DOLS. The results show that there is a long-term co-assembly relation between energy consumption and real gross domestic production without oil. The elasticity of real gross domestic production without oil compared to energy usage, resources of gross capital and employed human force according to theories and many studies are experienced and comparing these tensions in both methods of estimation show that long-term co-assembly relationship are too close to each other.

Rocco and Smith (2013) studied the relation between developing human force and education. The results show that education has a positive and meaningful effect on human force development.

Irfan *et al.* (2012) studied the relation between human capital and economic development in Pakistan using Autoregressive distributed lag method (ARDL) in period of 1972 to 2009. The results of the estimations show that there is a two-way relation between human capital and economic development in Pakistan in the studied period.

Olayemi (2012) has studied the relation between investing in human capital and total productivity in Nigeria in period of 1978 to 2008 using the Granger method. The results show that costs of education for the government has had a positive and meaningful effect on productivity but growth of physical capital has had negative effect on productivity.

Mohammadzadeh and Rahnemay (2012) studied the effect of the amount of capital of research and domestic development and foreign capital stock on value added in medium and major industries of Iran using panel-data method in period of 1993 to 2007. The results show that during the studied period, domestic capital stock, foreign capital stock and amount of domestic research and development capital has a positive and meaningful effect on value added in medium and major industries of Iran.

Amini and Ansari (2012) studied and analyzed the role of human capital and research and development in increasing total productivity of production factors in selected service sectors using panel data of 9 non-government service sub-categories in period of 1996 to 2007. The results of the estimation of the model using panel data show that there is a positive and meaningful relation between total productivity of production factors and variable of human capital.

### **3. Introducing Data and Estimation Model**

#### **3.1. Data and Research Model**

The statistical population of this study is 8 selected developing countries of Indonesia, Malaysia, Thailand, Iran, India, Pakistan, Belarus and Russia. The time period used is from 2006 to 2014. Time series data from these countries has been collected from WDI 2016. The model presented in this study is as follows:

$$L(AGRI_{it}) = \beta_0 + \beta_1 L(EDU_{it}) + \beta_2 L(HE_{it}) + \beta_3 L(DCP_{it}) + \beta_4 L(GFC_{it}) + \varepsilon_i$$

LAGRI<sub>it</sub> = logarithm of value added of the agricultural sector of the country i (In constant dollars, 2005)  
 LEDU<sub>it</sub> = Logarithm of government expenditure in the education sector for country i (as a percentage of GDP)  
 LHE<sub>it</sub> = Logarithm of health expenditures the country i (as a percentage of GDP)  
 LDCP<sub>it</sub> = Logarithm of domestic credits to the private sector i (as a percentage of GDP)  
 LGFC<sub>it</sub> = Legarithm gross fixed capital formation country I (In constant dollars, 2005)

### 3.2. Panel Data Method

The econometrical model used in this study is based on panel data method. In panel data model, the data are serial and sectional which means the data are calculated during time between the sections. According to econometrical principals, the mentioned model is estimated using the Ordinary Least Squares method (OLS) and the β ratios are acquired. This method provides more awareness information, more variation of changeability, Less collinearity between the variables and more freedom and performance rates, while the series of time have collinearity. In panel data, considering the fact that they are a combination of time and section series, the sectional dimension causes adding changeability or much variation having which we can do more reliable estimations (Ashrafzadeh and Mehrgan, 2010).

## 4. The Estimation Results

As seen in table 1 and according to possibility of the statistic of F test and Housman, the stable effects method is the most decent one for estimating the model.

**Table 1.** Results of F test and housman for model estimation

Test	F test	Housman test
Statistic	92.3574	55.1364
Prob	0.0000	0.0000

Source: Research findings

Based on this, the results of the estimation of the introduced model for defining the pattern of effect of human development on value added of agriculture sector using stable panel data effects method is shown in table 2.

**Table 2.** Results of estimation of effect of human development on value added of agriculture

Variables	Coefficient	T Statistic	Prob
LEDU	0.3153	9.2565	0.0000
LHE	0.2484	6.4045	0.0000
LDCP	0.0816	3.0288	0.0026
LGFC	0.5663	2.9394	0.0035
$R^2 = 0.7936$		$\bar{R}^2 = 0.7823$	D-W = 1.83

Source: Research findings

The results related to stable effects method show that raiois of the model’s variables have been statistically meaningful. Also all of the variables have the expected theoric mark. Education costs variable, health costs, domestic credits to the private sector and gross fixed capital have had positive effect on value added of agriculture sector during the studied period in selected developing countries. Elasticity of value added of agriculture sector compared to education costs is 0.31. This shows that with 1 percent increase of education expenditure, increases the value added of agriculture sector by 0.31 percent. Foundamental change of cultural beliefs, social, political and economic sectors in order to create and fit with new capacities and quantitative and qualitative improvement of human, educational and economic capacities, can happen with more human development which itself helps create a growing industry. This requires training efficient and expert human force. Correct education is in fact one of the primary and logical ways of directing the efforts of employees in every company and it causes using hidden talents, taking use of creativity and creation of flexibility of mind required in employees. The more decent and efficient the education is, the wider it is going to direct a specific society to purposes such as development, skill, change and improvement and these changes cause the employees of a company to be more successful doing their duties. Educating human force is a lucrative investment the output of which

has an effective role in flourishing and efficient development in any economic sector and also in improving the general culture of the society. Paying attention to education is one of the fundamental dimensions of human development because it is one of the inevitable choices of people, a choice which has no relation with their level of wealth or social rank. Learning is an inseparable part of human development. Educated human force has decent tools for fighting social deprivations and they can make decisions which can have positive effects on their lives and they will be able to exchange information with each other and by that, they can play a role in enriching knowledge and culture of the human society, increase production and creating value added in different economic sectors such as agriculture. So it can be concluded that paying attention to education of human force is important in order to achieve agriculture growth purposes.

As it is observed, with 1 percent increase of the value of health expenditures, the value added of agriculture sector increases 0.24 percent. Improvement and increasing the amount of value added of different economic sectors such as agriculture, etc. will be possible if the labor force is healthy mentally and physically. Healthcare expenditures will result increase of capital stock by improving health indexes and finally will result economic growth of the countries. Health can be considered as an important part of human capital and usually it is expected that healthy individuals who are employed with specific amounts of production factors have more efficiency in time unit compared to sick labor force. Healthy people are usually more motivated and hardworking to have more income. In spite of that, investment for increasing healthcare services can increase the efficiency of other investments in training healthy human force in fields such as general and professional education. Sanitation and health can affect growth and development of a country in different ways. The first factor which can be pointed out is better productivity of healthy labor force compared to others. Healthy labor force can use their physical abilities more and better than others and have more creative and capable minds. Beside this direct effect, improvement of health and sanitation in human force will result motivation for continuing education and gaining better skills. Because improving health and sanitation situation on one side will cause attraction of investment in education and educational opportunities and on other side, by increasing learning ability, it will make individuals more capable of learning and gaining social skills. So it can be concluded that healthy human force work more and better than others and have more capable and creative minds. Beside this direct effect, health also has some indirect effects on production. For instance, improving health in human force will result motivation for more education and learning better skills, because improving health situation will increase attraction of investment in education and educational opportunities which itself has positive effects in productivity of different economic sectors such as agriculture. So with increasing healthcare costs, we can see increase of value added of agriculture sector.

Elasticity of the value added of the agriculture sector compared to the domestic credits to the private sector is 0.08. This shows a positive and meaningful relation with the value added of agriculture sector, so that with 1 percent increase of provided facilities for the private sector, we see 0.08 percent increase in value added of agriculture sector. In total, facilities have a positive effect on the value added and investment in agriculture sector. Because of less development of financial markets in developing countries, the agriculture sector depends on facilities provided by banks in order to provide for their activities.

Elasticity of the value added of the agriculture sector compared to gross fixed capital formation is also said to be positive. This shows that there is a positive and meaningful between gross fixed capital formation and value added of agriculture sector, so that we can say with 1 percent increase of value added, stable physical capital increases 0.56 percent.

The estimated  $R^2$  by the model is 0.79. This shows high explanatory of independent variables and shows high percentage of the reliability of the results. There is also no autocorrelation in the estimated model and Durbin Watson 1.83 is confirmed it.

## **5. Conclusion**

The role of human force has reached its most advanced level from physical work (which means human mostly thinks and machine works). Developing different sectors is based on two important capital resources which are physical capital and human capital. The thing that has been most focused on in developed countries is human capital. Human resources have two primary roles in economic growth and development. The role of labor as an early factor of production and the role of human as a factor beyond labor and other production factors are the two roles in production and economic growth. Human capital includes factors such as education level, skill, profession, experience, health and sanitation of the labor

force. Education has always been considered a certain tool in improving the quality of functioning and solving problems of management and lack of it, is also one of fundamental problems of any organization.

For this purpose, equipping of human force of any organization and improving and using this force as effective as possible, education is without a doubt one of the most important and effective factors for improving the affairs of organizations. It is to be mentioned that education is a basic duty in an organization and is an ongoing and not-ending process. The workers in any level of organizational levels including simple or sophisticated jobs, manager or a subtype, need to learn and gain new knowledge and skills and must learn new ways to do best in their job, no matter what it is. Achieving the purposes of any organization depends on the ability of the workers in doing the delivered duties and adapting with the environment. Educating and improving human force causes the individuals to increase their productivity effectively and decently with their organizational and environmental changes and continue their activities.

Of course the concept of human capital is not only used for education, but it is also said to any activity that increases quantity and productivity of the labor force and results increase of next incomes. So the costs of healthcare is also considered investment in human capital. Since labor force with higher human capital has higher productivity and has a more effective role in efficient use of production factors, it is usual that with increase of human capital level, productivity of the labor force and capital increases which itself will also result more production and creating value added in different economic sectors such as agriculture.

For this purpose, the present study has considered the effects of human development on value added in agriculture sector of 8 selected developing countries in period of 2006 to 2014 using panel data method. The results showed that education expenditures, healthcare expenditures, domestic credits to the private sector and gross fixed capital formation have had positive effects on the value added of agriculture sector in studied countries. So that we can say with 1 percent increase of the mentioned variables, the value added of agriculture sector will increase 0.31, 0.24, 0.08 and 0.56 percent respectively.

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