ISLAMIC CONCEPT OF MANDATORY EDUCATION AND FARMERS EARNING IN RURAL PUNJAB, PAKISTAN

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Abstract

Economic growth is multifaceted and can be measured through numerous methods. Due to its varying measuring techniques, various sectors like service sector, manufacturing sector and agriculture played diverse roles in economic growth and development. However, among these roles, the role of agriculture is perhaps more vital as it gives support to both service and manufacturing sectors. The advancement in agriculture results in agricultural growth which contributes significantly in the economic growth of countries like Pakistan where the major population percentage is directly or indirectly linked with agriculture sector. For agriculture growth farmers knowledge and productivity skills are mandatory. The knowledge of farmers includes formal education, social networking and Islamic obligatory education which may affect the micro or macro factors of production. Macro factors of production constitutes the farmers total earning and total productivity while the micro factors of production depend on the personal features, characteristics, education, and skills of the farmers. The underlying study considers the microeconomic determinants of farmers' land size, gender, magnitude of livestock, experience and total years of education including the formal, religious and mother's education. All these microeconomic determinants have been measured through primary data by developing a questionnaire for farmers. The questionnaire has been developed to measure the earnings and microeconomic features of production related to farmers' personal characteristics. The data has been collected from tehsil Arifwala, district Pakpattan, Punjab Pakistan.

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A total of 295 sample size has included for final analysis. The proposed model was estimated through correlation and regression by using the ordinary least square method (OLS). The results of the study revealed that land size, magnitude of livestock, farmers' experience and education including formal, religious and mother's education had substantial and positive association with farmers' earnings. Whereas, gender found to be insignificant with agriculture earnings and growth. The study highlighted the distinctive microeconomic factors of agriculture production which can significantly contribute in the agriculture growth and ultimately boost up the overall economy. Policy makers must consider the importance of farmers' overall education whenever devising policies for agriculture sector.

Therefore, study suggested improvement and acceleration in female education/ Mother's education, livestock, obligatory education of farmers, training of farmers to attain expertise in farming and increase in size agricultural land through land reform programs as strategy to enhance farmers earning in developing economies like Pakistan.

Keywords: Mother's Education, Livestock, Education, Size of Land, Farmers Earning

JEL Classification: I12, L22, A2, Q15, Q12

1. Introduction

Earning of individuals in any sector can be affected by number of factors such as obligatory education proposed by Islam, skills, training, working environment and family support. Farmers have crucial and significant role in agricultural sector to produce crops, livestock and raw material for industrial goods (Diao, X., et. al. 2010). Farmers contribute in self-sufficiency of food (Fresco, L. O., and Poppe, K. J. 2016), in earning of foreign exchange (Raza, J., and Siddiqui, W. 2014), in economic growth and development of a society (Awokuse, T. O. 2009). It is important to explore factors affecting farmers earning to enhance agricultural productivity and to improve their socioeconomic status. Efficient earning from any source encourages employee and worker to work with more concentration (Nickell, S., et. al, 2005). Different researchers have done efforts in this regard like Rashid and Sheikh (Rashid, S., and Sheikh, A. T. 2015), have concluded positive connection of fertile land, number of canal and ground water irrigation, lack of soil erosion, location of plot at head and middle of watercourse and access to electricity with earning of farmers. However, water logging, salinity and distance to nearest city are negatively related. According to Ghafoor et. al, 2010, farmer's own agricultural land, family size, education of

farmers and agricultural expenditure affect income of small farmers positively. In Bhutan, it is explored that socio-economic development, good governance in the country, suitable environmental condition, roads for access to farms and market, research and extension services, export, improved organized marketing system and availability of seasonal loans to farmers are necessary factors for agriculture development and farmers earning (Tobgay, S. 2005).

Respectively, education and earning are associated with each other. Education plays a vital role in the earning of individual in agriculture as well as in other occupations. In many nations, the studies on education and earning explore that an average high educated people have more return than less educated. Educated individual can perform more tasks and can easily adopt the new technologies and skills. More education is related to more earning, more respect and more dignity in the society (Su, et. al, 2013). It is established that the nation's educated workers have great potential to catch up technologies rapidly. This is proven in Japan and other developed countries (Andaleeb, S. S. 2002). Alike, quality of land, size of land, use of fertilizers are helpful to increase agriculture production (Tripathi, A., and Prasad, A. R. 2010). Normally, agricultural productivity is remained low in developing countries mainly due to slow rate of technological innovation, less adoption of advanced farming methods, problems with quality, quantity and untimely input supply, low investment in construction of infrastructure, market problems, livestock diseases and low availability of credit to farmers (Gollin, D. et. al, 2011). In addition, political instability, corruption in political and institutional wings and terrorism also has some adverse impacts on agricultural productivity. Use of improved seed, number of tractors, tube-wells, water availability to farmers for agricultural land plays positive and significant role for agricultural output (Naqvi, S. A. A., & Ashfaq, M. 2014). Distance from market, cost of transportation, and farmer's access to market and to market information are also important determinants of small farmer's income (Ahmed et. al, 2016).

Farmers earning can also be affected from some other microeconomic factors such as working hours, mother's education, household size and gender, size of land, livestock and experience of farmers (Mincer, J. 1975; Randolph, T. et. al, 2007; Mehdikarimi, S., Norris, S., & Stalzer, C. 2015; Havari, E., and Savegnago, M. 2016; Aikaeli, J. 2010; Hassan, M. A. 2015; Duffy, M. 2009). Empirical exploration of mentioned factors has limited literature. Farmers have generally been eager to try new hybrids, new chemicals, new tillage practices, new feeding

regimes and new equipment, but new ways of doing business have met with more resistance, possibly because they change relationships and frequently substitute interdependence for independence in the decision-making process for prosperous life (SARITHA, A. 2011). Assessment of determinants of farmers earning is very important due these factors. Because for efficient earnings, farmers have to be more knowledgeable, more empowered and more interlinked with society than they were before.

Tehsil Arifwal of district Pakpattan is a bridge between south Punjab and central Punjab. Farmer of central Punjab is consider more efficient and productive as compare to farmer of south Punjab. This study uses data of tehsil Arifwala (because this farmer has both characteristic of south Punjab and central Punjab) to investigate the microeconomics factors contributing toward farmer earnings that itself is new contribution in literature. Previously determinants of farmer earing of Punjab and developing countries are investigated. The rationale of this research is to help government to formulate suitable agriculture pricing and input subsidies policies for farmer in the light of microeconomic determinants of farmer earnings.

For empirical analysis descriptive statistics and regression technique have applied to explore determinants of farmers earning. This study used Ordinary Least Square (OLS) method due to quantitative dependent variable.

2. Review of Relevant Literature

In literature, determinants of farmer's earning have been discussed by using time series, cross sectional as well as panel data. Some researchers found a positive and significant relationship between farm size and livestock earning (Kumar, A et. al, 2007), while others showed; livestock holding has positive association with income of farmers. Farmers derive income from livestock not only in the form of milk and meat but also in the form of organic fertilizer (Herrero, M, et. al, 2013). Education and earning are associated with each other. Education plays a vital role in the earning of individual in agriculture as well as in other sectors (Mincer, J. 1975; Chani et al., 2012; Chani et al., 2014). In many nations, the studies on education and earning explored that educated people have more income than less educated persons. Because, the educated individual can perform more tasks and can easily adopt the new technologies and skills (Caperton, I. H. 2012). It was analyzed positive association among household's income and education attainment at micro

level study in Pakistan. But still this issue is needed to be presented more at micro level to suggest solid policy framework in the future (Chaudhry, et. al, 2010).

Hudson and Sessions (2009.), investigated the impact of parental education on the shape of an individual's experience-earnings profile. The results showed that parental education affect the ability of respondent to change labor market experience into earning. Through results it was also found that the individuals whose father and mother both have fifteen years of education and sixteen years' experience, these individual's wages were 52 percent higher than those individuals whose parents both have only 5-10 years of education. Similarly, Lemieux (Lemieux, T. 2001), estimated the casual effect of education on earning in Canada. This attempt was measured by using Ordinary least square (OLS) technique. Data was taken from the public use files of statistical agencies like statistic Canada. This study was made by using independent variables like year of labor market experience, gender, material status and geographical location. It was concluded that an extra year of education increased 10% earning. Results also found that education not only benefited the individual but also Government and society. Mahmudul et. al, 2003, examined the relationship of farmer's education with income in Bangladesh. The data was collected from the farmers of Gazipur district that was close near to the Dhaka, the capital of the Bangladesh. For data collection farmers were interviewed randomly. It had been seen the effect Farm size, Number of family earners, Family size, Farming experience that was years of rice cultivation, Extension services and education years of farmers on income of the farmers. For this purpose the ordinary least squares (OLS) was used to measure agriculture income and total income. The empirical results showed that Education had negative impact on agriculture income but for non-agriculture income, Education had positive effect. It means that education had raised the total income of the farmers. Else this the Extension services had also increased the income of farmers.

Some other factors have also been explored by different researchers for agricultural performance. Hussain (2014), employed a regression analysis on technical efficiency with variables as land tenure type, access to institutions, and size of farm and usage of input. He used country level data of center West Brazil. It was concluded non-linear relationship between efficiency and size of farm with first decreasing then increasing production with size. There were found that access to advanced input, institutions and easy access to credit are the necessary determinants of distinguish in technical efficiency among the farms. Safa[31], had explored a research about socioeconomic factors that affected the income of small farmers in Yemen. In

Yemen an agro forestry land use system was practiced by the small farmers that were associated with low income and productivity. For the sample size of 150 small farmers were selected by simple random sampling. Ordinary least square (OLS) and weighted least square (WLS) were applied for the estimation of results. Findings showed that income of small farmers were influenced by education, livestock holding, area of land and family size. After the findings of results, government was suggested to provide financial and technical support to small farmers, so that they may increase income. McCulloch et al 2005, utilized cross section data in order to determine whether productivity growth in agriculture, productivity development in non-agriculture activities or rural to urban migration was most successful for rural poverty reduction in Indonesia from 1993 to 2002. They found that rural to urban migration seems not an important way to get rid of poverty. This leads him to found that changes in agricultural prices, productivity and earning still play a critical poverty for poverty reduction. Mittal et al 2010, used the Cobb-Douglas production function to find the sources of agricultural growth in India. They used time series data from India and explored that Indian agriculture is characterized increasing returns to scale. They found that land size and quality, labor and use of fertilizers have positive and significant effect. On the other side farmer age showed significant negative effect on the agricultural production.

In developed countries, there is ongoing debate on farm size and productivity and found inverse relationship between them. For this it is argued that small farms use resources more efficiently as family labor exists and they do work with high capability to monitor their production activities. This type relationship is measured by Sial et al (2012). They evaluated inverse farm size-productivity hypothesis of 302 farmers by random sampling from six districts of central Punjab, Pakistan. This study was designed to see the output level of small and large farms based on their productivity and resources availability. For this purpose, simple regression is performed on small and large farms for four main crops. Resultantly, this study approved the negative relationship between farm size and productivity in the sample area. A study was examined by the Birthal et al (2014), about farm household's access to different income generations activities and it was also seen impact of these activities on income distribution. For this study household level data was used from the survey conducted by the National Sample Survey Organization. Results concluded that a family engaged to farm sector, earns close to half of their income from the family that is engaged with non-farm activities. The main cause of low income from the farming side was due to small land holding, surplus labor force and low agricultural productivity. Non-farm sources

showed positive relation with total income. So, for the policy recommendation, it was suggested that non-farm sector can serve as potential entry number for land constrained family to raise their income level.

Muthamia et al (2015), explored the determinants of earning from tea export in Kenya. The main purpose of this study was to see "how the changes of tea export earning affect the profit of firm in this sector and after this how it affect the farmer's earning. They used Tea export earning as dependent variable and real exchange rate, foreign income and inflation as independent variables. To increase accuracy of this attempt, they also used unit prices of tea, agriculture value added and export of goods and services as control variables. Many regression techniques as unit root test, co integration, and error correction model were used to test the research hypothesis. Findings showed that foreign income has indirect relationship with the tea export earning, but they are significant expect inflation. Iqbal et al (2015), determined the off farm activities among cotton farmers in Punjab, Pakistan. The study was conducted because off-farm activities among rural farmers have become imperative part of income strategies in developing countries. Multistage cluster sampling technique was adopted to collect date of 180 cotton farmers. By using independent variables like education, household size, farm size, distance from city, dummy variable for access to road, household workers, farming experience and dependency ratio, it was concluded through binary logistic model that the farmers having access to road were significant with different business activities. Else this, experienced farmers were more likelihood for labor activities. At the end educated farmers and the farmers having large family size were tended to greater probability for services type off-farm activities. Reviewed literature declared the importance of some micro factors for farmers earning and suggested empirical exploration in this regard.

3. Data and Methodology

Data:

This study is based on primary data in Tehsil Arifwala District Pakpattan in Punjab province of Pakistan for estimation of determinant of farmer's earning. The sample of 295 farmers was selected using web[1] based sample size calculator provided by Australian Bureau of Statistics using

[1] https://www.abs.gov.au/websitedbs/D3310114.nsf/home/Sample+Size+Calculator

95% confidence level and 0.05709 level of significance. Data was collected from 295 respondents through simple random sampling. Information was gathered from 27 villages, in which eight villages were from Arifwala to Sahiwal road, six villages were from Arifwala to Pakpattan road, five villages were from Arifwala to Bahawalnagar road, four villages were from Arifwala to Burewala road and four villages were from Arifwala to Thrikhni road. Farmers earning from farming and farm related activities as livestock, rent from land and agricultural asset were considered. A questionnaire schedule is an inquiry form, comprising of a number of pertinent questions with space for entering information asked. In this study questionnaire schedule was designed related to farmer's earning questions. Medium of questionnaire was English language but questions were asked in local language of the respondent. There were 255 villages and 30 Union councils in Tehsil Arifwala.

Methodology:

This study uses following variables and check their impact on farmer's earning. General functional form of the model is represented as:

$$FE = f(SCHL, MRED, SZLD, LVST, EXP, GEN) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Specific model for estimation:

$$FE_i = \beta_0 + \beta_1 SCHL_i + \beta_2 MRED_i + \beta_3 SZLD_i + \beta_4 LVST_i + \beta_5 EXP_i + \beta_6 GEN_i + \mu_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The study uses Cross-Sectional Least Square method for empirical analysis.

Description and construction of variables

Variable	***Description***
FE	*Total farmer earning is sum of his total earning from four sources: 1). Land Cultivation; 2). Livestock; 3). Laborer in Farm and 4). Agri Assets Returns*
SCHL	*Farmer Education in years*
MRED	*Farmer's mother education in years*
SZLD	*Size of land is measure in acres*
EXP	*Experience is measured as number of years work as farmer*
LVST	*Dummy variable is used; 1 if former have livestock, 0 if he does not possess*
GEN	*Dummy variable is used; 1 if former is Male, 0 if she is Female*

Theoretically linkages of independent variables with farmers earning have been observed from literature. A farmer who has longer education is less likely to become full time farmer. He may be part time farmer or quit from farming. This will become cause of less or no earning from farming. But there may also be a chance to have high potential to earn more from farming. If a farmer have high agricultural education, then it is likely to become full time farmer with high earning (Osmani and Hossain, 2015). Mothers education may promote intergenerational transmission of education from mothers to offspring especially in daughters, educated parents produce better environment for their children, which create cognitive skills to their children and so, help them to earn more (Havari and Savegnago, 2016). In case of size of land, one can get economize of size which leads to lower costs of production by increasing output. This concept means that as the size of land increases the average cost of per unit of production decreases which may encourage farmers' earning (Duffy, 2009). Livestock possessions enhance farmers income, as it provide food in the form of milk, egg and meat, generate income from the sale and purchase of animal, livestock waste is important factor for enhancing soil fertility, in some areas it has been

used dung as a fuel, animal produce power by providing power for transportations and farm equipment, animals can be transformed into cash by selling them so it is instrument of liquidity and alternative form of insurance, livestock asset can be sold at the time of crises. Mincer (1975) concluded that as experience of individual increase income of individual also increase which leads to rise in opportunity costs but increase earning at a diminishing rate over in old age .Gender is an important factor for farmer earning. Gender is also an important factor for earning, as male have an advantage on female in market. Females are less paid than males (Osmani and Hossain, 2015). So, Schooling years, mothers' education, size of land, livestock, agricultural experience of the farmer and gender of the farmer can be affected farmers earning at micro level. Present study has investigated the impact of schooling years, mothers' education, size of land, livestock, experience of farmer and gender of farmer on farmers earning.

4. Empirical Findings and Discussion

Descriptive statistic of the variable and data is reported in Table 1.

Table1. Descriptive Statistics

Descriptive Statistics						
	Complete schooling (years)	**Spouse education (years)**	**Experience (years)**	**Total earning of the farmer (PKR)**	**Size of land (Acres)**	**Age (years)**
Mean	8.59	5.93	19.8	33955.98	6.27	45.31
Std. Deviation	4.348	4.92	10.83	19945.319	6.561	11.614
Minimum	0	0	2	3667	0	19
Maximum	16	16	50	96493	48	80

Frequency Statistics				
	Live stock	**Educated**	**Married**	**Male**
Not Have/No	57 (19.3%)	35 (11.9%)	27 (9.2%)	11 (3.7%)
Have/Yes	238 (80.7%)	260 (88.1%)	268 (90.8%)	284 (96.3%
Total	295 (100%)	295 (100%)	295 (100%)	295 (100%)

Source: Author calculation

Table 1 consists of two portion. Firstly, statistical information of quantitative variables are given in form of mean, standard deviation, minimum and maximum values of six variables such

as schooling, spouse education, experience, farmer earnings size of land and farmer age. Secondly, summarize frequency is reported of four dummy variables; livestock (1 if farmer possess livestock, 0 otherwise), education status (1 if farmer is literate, 0 otherwise), marital status (1 if farmer is married, 0 otherwise) and gender (1 if farmer is Male, 0 otherwise).

Table 2: Correlation Matrix

Pearson Correlation	Earning of the farmer	Schooling Years	Mother education	Size of land	Experience
Earning of the farmer	1.000				
Schooling years	.539	1.000			
Mother education	.589	.491	1.000		
Size of land	.410	.270	.334	1.000	
Experience	.079	-.119	.008	.040	1.000

Source: Author's Calculation

Table 2 of correlation matrix shows that all independent variables have positive and high degree correlation with farmers earning. Farmer earning is seemed to be highly positive correlated with farmer education, mother education and size of the land; while correlation coefficients of experience is positive but with significantly lower values. This indicates that farmer earning is highly correlated with education and land holding than all other variables.

Estimates of Regression

Farmers earning is taken as dependent variable and schooling years, Mother Education, Size of land, Livestock, Experience and Gender has been taken as independent variables. Empirical results are given below.

Table 3: Regression Estimates (Farmer earnings as Dependent variable)

Independent Variable	Coefficient	t-statistics	Prob.
(Constant)	-797.602	-.168	.867
Schooling years	1437.760	6.409	.000
Mother education	2161.234	7.322	.000
Size of land	627.093	4.582	.000
Livestock	7373.364	3.470	.001
Experience	147.489	1.840	.067

Gender	4716.951	1.037	.301

Source: Author's Calculation

Table 3 reveals OLS estimators and their significance. Empirical findings shows only gender is statistically insignificant whereas all other determinants are statistically significant with positive impact on farmer earnings. Moreover, farmer experience is showing minor impact on farmer earning with 90% level of confidence while livestock is seemed to be major factors contributing in farmer income at 99% level of confidence. Farmer education, mother education and land size also have positive significant impact on farmer earnings. Economics theory says education have positive impact on earning as well as assets also contribute in earnings. Livestock variable used as intercept dummy variable in this regression. The results reveal that having livestock positively contribute in farmer's autonomous income i.e. farmer having live stock may have Rs. 7373.364 more autonomous income than farmer with livestock. This result is statistically significant based on t-statistic and its corresponding p-value. In agriculture livestock and cultivatable land are capital of farmer that is as capital increases farmer income will also increase positively. These results are consistent with economics theory and existence literature Singh et al (2014). Theatrically experience also has positive impact on earning but in this case, study shows farmer experience do not really matters in Arifwala because method of cultivation are typical and not very advance that may not help to boast farmer income significantly.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.708[a]	.501	.491	14236.572	.501	48.176	6	288	.000	2.040

a. Predictors: (Constant), Gender, Mother education, Livestock, Experience, Size of land, Schooling years

b. Dependent Variable: Earning of the farmer

Table 5: ANOVA

Model	Sum of squares	DF	Mean of square	F	Sig.
Regression	58585996979.185	6	9764332829.864	48.176	.000[b]
Residual	58371837545.649	288	202679991.478		
Total	116957834524.834	294			

Source: Author's Calculation

Summary of the coefficient of multiple (R) measure the degree of linear association between dependent variable and all independent variable jointly. In this study R^2 shows that there is high explanatory power of our independent variables as schooling years, mother education, and size of land, livestock, experience and gender jointly. Practically R has little importance in case of multiple linear regression model. The more meaningful quantity is R^2. The co-efficient of determination (R^2) is an important measure of goodness of fit of a regression line. Estimates of one tailed ANOVA have been reported in table 5 that postulate three types of variations in dependent variable such as, due to regression (ESS), due to residuals (RSS) and total (TSS) with corresponding degrees of freedom.

5. Conclusion

Exploration of microeconomic determinants of farmers earning is rarely studied. Present study focused on schooling years of farmers, education of farmers' mother, size of land, number of livestock, and experience of farmer in this regard. Mother's education, degree of livestock, farmer's education, and agricultural experience of farmers and size of land had significant and positive association with the earning of farmers. On the other hand, farmer's gender had insignificant and positive effect on the earning. Expansion and improvement in education of farmers may improve farmers earning especially in rural areas of developing countries like Pakistan. There is needed to increase educational institutions specifically in rural areas to increase education of farmers and women. Women have major contribution for capital formation by contributing in household decision making through education. Enlargement and escalation in female education/ Mother's education, livestock, farmers' education, experience of farmers, size of agricultural land by reducing inequality in agricultural land suggested as strategy to enhancement of farmers earning.

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