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ACCESS TO OUTPUT MARKET BY SMALL FARMERS: THE CASE OF PUNJAB, PAKISTAN

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ABSTRACT

Transport infrastructure in Pakistan is still a problem for rural people to access output markets. This study aims to identify the ways to improve access of small farming households to output markets. To achieve this aim, specific objectives are: to find out the determinants of small farmers' access to output markets; and to assess impact of these factors on farmers' income. For this purpose, primary data from 576 households were collected from twelve districts of the Punjab province. To achieve the first objective, logistic regression was used as the dependent variable is a binary variable. For second objective, the dependent variable was in a continuous variable which guided towards the application of a OLS model. The results of the study revealed that the education, cost of transportation, distance from farm to market and access to market information were the factors which determined the accessibility of farmer to output market. A significant impact of these factors was found on the income of small farmers. The study suggests that the transportation facilities, market infrastructure and flow of market information should be improved.

Keywords: Farm households, Agriculture markets, Market information, Access to market, Transport, Transportation cost, Extension services.

INTRODUCTION

Most of the poor population of the world depends on agriculture in one or the other way especially small farmers. To promote rural development and poverty reduction focus should not only be on improving production capacity of the farmers but also on enhancing their market access (Jayne *et al.,* 2010). Marketing plays a major role in income generation that helps reducing poverty and improves living standard of small farmers (Cai *et al.,* 2012). Small farmers are facing many problems including poor infrastructure and high transaction costs that reduce the chances of getting high incentives for market participation (Barret, 2008: Key *et al.,* 2000). This is true for both input and output markets (Fischer and Qaim, 2012). Poor access to markets is a major reason (Machete, 2004).

In developing countries, small farmers are facing many problems to access markets. This includes capability to acquire basic farm services and farm inputs and the ability to supply farm products to markets (Tilburg and Schalkwyk, 2012). The timely availability of inputs and their good management results in high production but poor access to output markets creates problems for farmers which reduces their profits (Sendal, 2007). Small farmers often lack resources and access to infrastructure, especially roads (Jacoby, 2000) and market infrastructure (Senyolo *et al.,* 2009) to sell their produce in time at different markets. This results in reducing their income which reduces their living standards (Heinmen, 2002) and causes food insecurity (Bashir *et al.,* 2012). Small farming households usually protect their food security through their own production. To meet their ends, they sell their surplus produce and sometimes assets like animals, vehicles (motor bike, bicycle, etc.), jewellery, etc. (Ahmed *et al*., 2015). A strong economy ensures established markets, both input and output markets, to the farmers helping them overcome the vicious circle of 'grow-eat-grow' that will eventually help the economy to become stronger in international trade (IFAD, 2013). Pakistan's economy is primarily based on agriculture sector which accounts for about 20.9 percent of the GDP (GOP, 2015). In rural areas, the main activity of the people is farming and related activities. Since 2000, on an average, this sector has grown at about 4.5 percent annually. Despite this decent growth, agricultural sector could not help reduce rural poverty. The access to market by small farmers could be one of the reasons. Pakistan has a total road structure of about 263942 kilometers of which 185063 kilometers are good quality roads (GOP, 2015). From every five villages in Pakistan, 15 percent population still has no access to roads. Beside

this, in three of every ten villages there is a lack of motorized access to markets (Essakali, 2005). The access to markets, both input and output, needs to improve through technology, land holding, assets, level of education, policies and endowment (Amrouk *et al.*, 2013; and Arias *et al.*, 2013); accessibility of physical and institutional infrastructure i.e. road, electricity, communication, markets and rules of law etc.; and policies that effect prices and trade incentives. It has been noted that the supply response by small farmers is considerably improved by reducing the constraints faced by them as compared to provide them trade related incentives (Barrett, 2010).

Small farmers are the majority of world's poor (Nagayets, 2005) and represents half of the population of the world that are undernourished (Hazell *et al*., 2007). Enhancing the livelihood is very important to alleviate poverty and food insecurity. Other income sources like labour are important for small farmers and poorest (Mueller and Chan, 2015). Access to output market remain crucial.

Despite heavy investments in research and development for agricultural sector, the benefits seems not translated into improved livelihood of small farmers (Ntale, 2013). The focus of researcher remained on the access to input markets and related issues, the access to output market remained an under researched area (IFAD, 2003). This study aims to identify the ways to improve access of small farming households to output markets. To achieve this aim, specific objectives are to:

1. find out the determinants of small farmers' access to output markets
2. assess the impact of these factors on farmers' income.

METHODOLOGY

Study area and data collection: Primary data were collected from the Punjab, Pakistan as it is the most populous province of the country providing shelter to more than 54.16% of the total population (GOP, 2015); and contribute about 57% to the national agricultural GDP (GOP, 2011). Following Bashir *et al.,* 2012, one third (12) of the total districts (36) of Punjab were considered to be a good representative sample. At each step, different sampling techniques were used. To select the districts, a stratified sampling technique was used because the province has 5 agro-climatic zones (Pinckney, 1989). These zones were categorized on the basis of cropping pattern. Zone 1 is wheat-rice zone having ten districts, Zone 2 is wheat-cotton zone having nine districts. Zone 3 is mixed zone comprised on seven district. Zone 4 and 5 are arid and low intensity zones respectively and comprised of four and six districts respectively. The strata were not identical in terms of district numbers, so a proportionate sample was drawn using the formula:

$$n_i = n(N_i/N)$$

Where i = 1-5 strata,
n_i = No. of districts in ith stratum,
n = Total number of selected districts (12),
N_i = Total number of districts in ith stratum,
N = Total number of districts (36).

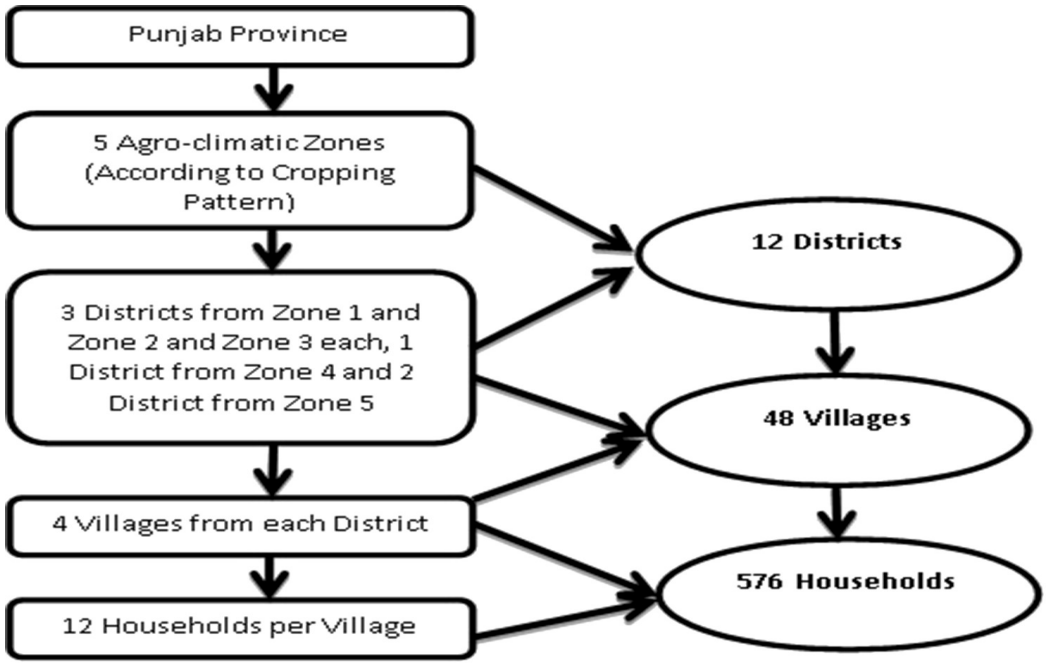

Figure 1. Schematic flow of work

According to the proportionate sampling procedure three districts each from Zones 1, 2, and 3, one district form Zone 4, and two districts from Zone 5 were selected. Districts were selected on the basis of high yields of major crops (Wheat, Rice, Sugarcane, Cotton and Maize)[1] in respective strata. The selected districts were: Mandi Bahaudin, Kasur and Nankana Sahib from Zone 1, Sahiwal, Rahim Yar Khan and Pakpatan from Zone 2, Sargodha, Faisalabad and Toba Tek Singh from Zone 3, Jehlum from Zone 4 and Rajan Pur and Muzzafar Garh from Zone 5. Due to high homogeneity in village characteristics, only four villages from each district were randomly selected and from each village, twelve households were selected, randomly. The total sample size was 576 households. A comprehensive questionnaire was designed and data were collected after pre-testing and fulfilling all the requirements of human ethics.

Data Analysis: To address the first objective, data were analysed using a logistic regression model following the work of Awoyinka *et al.* (2003). The logistic regression directly estimates the probability of an event occurring for more than one independent variable (Hailu and Nigatu, 2007). The general form of the model is given below:

$$logit(y_t) = \beta_0 + \beta_t x_t \varepsilon_t \quad (1)$$

For the current study the model can be expressed as;

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \varepsilon_i \quad (2)$$

Where:

Y_i is the probability of the i^{th} household to have access to output market. The output markets of Tehsil and Districts were considered, only (1 for access to these market and 0 otherwise).

β_0 is the constant term,

$\beta_{(1\text{-}6)}$ are the coefficients of independent variables.

X_1 is household head's education level (1 for literate and 0 otherwise).

X_2 is the distance to output market (Km).

X_3 is the cost of transportation (PKR).

X_4 is the influence of extension workers (1 for positive influence and 0 otherwise)

X_5 is the influence of cooperative societies (1 for positive influence and 0 otherwise).

X_6 is access to market information (1 for access to information and 0 otherwise).

ε_i is the error term

[1] Crops Area and Production (By Districts) 1981-82 to 2008-09, Vol. 1 Food and Cash Crops, Federal Bureau of Statistics (Economic Wing), Government of Pakistan

The cost of transportation is different from the distance to markets because:

1. The mode of transportation (Truck, Van, Trolley etc.) and the variation in fuel prices impact the cost of transportation (Senyolo *et al.,* 2009; Russel *et al.* 2014).
2. The bad condition of the roads may also increase the cost of transportation (Taiwo and Kumi, 2013).
3. Most farmers sell their produce at farm gates due to higher transportation costs (Akangbe *et al.* 2013).

Furthermore, the decision to include the influence of extension workers (X_4) variable in model due to the intuition developed by Osmani and Hossain (2015) as a representative of the market participation.

To address the second objective, multiple linear regression analysis was used following Adejobi *et al.* (2006). Equation 3 explains the model for the study in hand:

$$HI_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \varepsilon_i \quad (3)$$

Where:

HI_i is the monthly farm income of the ith household (PKR).

X_1 is household head's education level (1 for literate and 0 otherwise).

X_2 is the distance to output market (Km).

X_3 is the cost of transportation (PKR).

X_4 is the influence of extension workers (1 for positive influence and 0 otherwise)

X_5 is access to market information (1 for access to information and 0 otherwise).

and ε_i = Error term

RESULTS AND DISCUSSION

Descriptive Statistics: The results are comprised of summary description of household characteristics, results of binary logistic model and results of multiple linear regression model. The detailed summary descriptive statistics are present in Table 1.

Factors effecting households' access to output market: This section elucidates the results of binary logistic regression and explains the determinants of farming households' access to output market in the Punjab province. The results are presented in Table 2. The results show that the model predicts with high accuracy in terms of predictive efficiency i.e. about 91.3 percent. The model's goodness of fit of the logistic regression model can be tested by Hosmer and Lemeshow (H-L) test and pseudo R^2s (Peng *et al.*, 2002). The value of (H-L) test is 8.433 (8 df) which is statistically non-significant (P>0.05) implying that the model is a good fit. On the other hand, the value of pseudo R^2s i.e. Cox and Snell R^2

and Negelkerke R^2 are 0.286 and 0.537, respectively indicating a reasonable model fit. However, the values of Pseudo R^2 cannot be tested in an inferential framework and are regarded as poor measures of model fit. (Hosmer and Lemeshow, 2000; Menard, 2000)

Table 1. Summary description of rural farming household characteristics

Characteristics	Dominant indicator
Household Head's gender	About 98% respondents are male
Household head's age	Farmers under study had average age of 47 years
Education level of household head	About 64% household head are literate
Household size	Farmers had a household size of between 6 to 8
Farm Size	Average farm size had 6 acres
Monthly income of household	Farmers have average monthly income of Rs. 41716
Distance to output market	Average distance from farm to output market is about 13.7 Km
Influence of extension workers	Extension workers have positive influence on 62% farmers
Influence of cooperative societies	80% farmers have negatively influenced by cooperative societies
Access to market information	About 73% farmers have access to market information
Medium of sales of farm produce	38% of the farmers sold their produce at the farm gate

Table 2. Results of binary logistic regression

Variables	Coefficients	Standard Error	Exp (B)
Education	0.628***	0.340	1.874
Distance to output market (Km)	- 0.190*	0.033	0.827
Cost of transportation (PKR)	-0.000123*	0.000021	1.000
Influence of extension workers (Dummy)	0.040	0.352	1.040
Influence of Cooperative Societies (Dummy)	- 0.294	0.482	0.745
Access to Market Information (Dummy)	1.446*	0.377	4.248
Constant	5.500*	0.701	244.732
Model Prediction Success (MPS)		91.3%	
Log-likelihood ratio		243.771	
H-L model (df = 8) Significance test results		8.433 (p-value = 0.392)	
Cox & Snell R^2		0.286	
Negelkerke R^2		0.537	

Note: *, **, *** represent significant at 1%, 5% and 10% respectively

Out of six independent variables, four are statistically significant. The results of significant variables are explained here. Access to market means farmers have an easy approach to tehsil and district markets and sell their produce there. Education has a positive impact on farming households' access to output market. This implies that the chances of understanding the market importance as well as is functionalities are higher in farmers with literacy level that induces higher rate of market access. The associated odds-ratio of the coefficient indicates that the chances of literate farmers to access output market are about 1.9 times higher than that of the illiterate farmers. Mukwevho and Anim (2014) also reported similar result that education may enhance market access. Distance from farm to output market has a negative impact on farmers' decision to access the output market implying that long distance from farm to market leads to reduction in the probabilities of market access by small farmers. The associated odds-ratio explains that an increase of one kilometer in the distance from farm to market results in 0.8 times less chances to the access to output markets. These results are in line with the results of Hlongwane *et al.* (2014) according to their results, one kilo meter increase in the distance travelled to market caused 0.775 reduction in market participation in South Africa.

Access to market information has a positive relationship with market access. Farmers having market information have a higher probability of market access by 4.3 times than those of who have no or little access to market information. This implies that that better access of farmers to market information can enhance the probabilities of farmers' access to markets. Onoja *et al*. (2014) also showed similar results in Nigerian small-scale fishery sector. A study carried out by Apind *et al.* (2015) also showed that market information had positive impact on market access and participation. Cost of transportation had a negative impact on access to output

markets by small farmers. High transportation cost leads to farmer's reluctance to market participation. These results are in line with the findings of Agbola *et al.* (2010).

Relationship between farm income and market related factors: The causal relationship between farm income and market related factors were estimated using linear multiple regression analysis. The results are presented in Table 3. The values of R^2 and F statistics show that the model is a good fit.

Table 3.Results of multiple regression

Variables	Unstandardized Coefficients (B)	t-value	Sig.
Constant	-79824.60*	-4.157	0.000
Education (Dummy)	14261.69**	1.810	0.071
Distance to output market (Km)	-9867.80*	17.999	0.000
Cost of transportation (PKR)	- 10.207*	1.713	0.026
Influence of extension workers (Dummy)	22609.87*	1.565	0.018
Access to market Information (Dummy)	349.50***	2.025	0.081
F-statistics	67.396 (p-value = 0.000)		
R^2	0.672		

Note: *, **, *** represent significant at 1%, 5% and 10% respectively

All of the five variables are statistically significant (education, distance to output markets, cost of transportation and access to market information). The coefficient of literacy (education) explains that an educated farmer can earn about Rs. 14261 extra as compared to an un-educated farmer. This is because of the fact that education provides more knowledge about agricultural practices as well as about the importance of their products and their markets.

Distance from farm to output market had a negative relationship with farm income. When distance from farm to market increases by 1 kilometer, farm income decreases by Rs. 9868. This is because of the facts that most of the farm produce is perishable and small farming households' lack the storage facilities and poor transport system. These results are in line with the results of Adejobi *et al.*, (2006) who reported that distance to market has negative effect on farm income. Furthermore, it was found that an increase of Rs. 1 in the cost of transportation reduces farmers' income by Rs. 10. Taiwo and Kumi, (2013) described in their study that cost of transportation had negative effect on farm income.

Extension workers play a major role in enhancing the incomes of farmers, as they provide valuable suggestions and information about new technologies to the farmers. A positive influence of extension officers was observed on farmers' income. As the help from extension workers is increased, the income of small farmers may increase by about Rs. 22600. Xuan *et al.* (2014) described that extension services has positive impact on tea farmer's income. Farmers' having access to extension services earn about 30 percent more than the farmers that have no access to these services. Similar result also reported by Owens *et al.* (2001) that farmers who receive the extension services have 15 percent more crop production. Agricultural market information is also a major component in enhancing income of the farmers. The results show that increasing access to market information cause about Rs. 1549 increase in income. Agbola *et al.* (2010) also stated that access to market information had positive impact on farmers' income.

Conclusion: This study explored various factors that affect farming households' access to output market within Punjab province and analyzed their impact on their incomes. The study inferred that the market accessibility is threatened due to long distances from farm to market, high transportation cost and lack of market information. Furthermore, these variables along with other market related variables tend to increase transaction costs for small farming households which then have an inverse impact on their farm incomes. To improve the living standard and welfare of small farming households in general and in the study area in particular, the focus should be on improving and enhancing the scope of extension services from production side to marketing side. Furthermore, it is suggested that the transportation costs should be reduced for small scale farming households.

REFERENCES

Adejobi, A., P. Amaza, and G. Ayoola (2006). Enhancing the access of rural households to output markets for increased form income. Poster paper prepared for presentation at the International Association of Agricultural Economics Conference, Gold Coast, Australia. August 12-18, 2006

Agbola, P.O., A. Thomas, and D.A. Babalola (2010). Determinants of farmers' access to output markets and the effects on income; A case study

of Ikenne local government area, Nigeria. Acta Satech 3: 33-39.

Ahmed, U.I., L. Ying, and M.K. Bashir (2015). Food insecurity and coping strategies by micro growers in Punjab, Pakistan. J. Environ. Agri. Sci. 3: 31-34

Akangbe, J.A., O.O. Dloruntoba, B. Achem, and S.E. Komolafe (2013). An appraisal of transportation facilities effects on agricultural development in Moro Local Government Area, Kwara State, Nigeria. Ethiopian J. Environ. Stud. Mgt. 6(2): 191-200.

Amrouk, E.M., N. Poole, N. Mudungwe, and E. Muzvondiwa (2013). The impact of commodity development projects on smallholders' market access in developing countries. FAO Commodity and Trade Policy Research Working Paper No. 35, Food and Agriculture Organization of the United Nations (FAO), Rome

Apind, B.O., J.K. Lagat, H.K. Bett, and J.K. Kirui (2015). Determinants of small-holder farmers' extent of market participation: Case of rice marketing in Ahero irrigation scheme, Kenya. J. Eco. Sust. Dev. 6(2): 154-160.

Arias, P., D. Hallam, E. Krivonos, and J. Morrison (2013). Smallholder integration in changing food markets. Food and Agriculture Organization of the United Nations (FAO), Rome

Awoyinka, Y.A., O.A. Awoniyi, F.R. Sodique, A.A.A. Adesope, and F.C. Idumah (2003). Access to credit and income of Floriculture business in Oyo State Nigeria. Publication at the Department of Agricultural and Management Science, Tai Solarin University of Education, Ogun State Nigeria

Barrett, C.B. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. Food Policy, 33(4): 299–317.

Barrett, C.B. (2010). Smallholder market participation: Concepts and evidence from Eastern and Southern Africa. In Sarris and Morrison (eds) Food Security in Africa. Market and Trade Policy for Staple Foods in Eastern and Southern Africa. FAO and Edward Elgar.

Bashir, M.K., S. Schilizzi, and R. Pandit (2012), Food security and its determinants at the crossroads in Punjab, Pakistan, Working Paper 1206, School of Agricultural and Resource Economics, University of Western Australia, Crawley, Australia, June, 2012.

Cai, G., Y. Dai, and S. Zhou (2012). Exclusive channels and revenue sharing in a complementary goods market. Mark. Sci. 31: 172-187.

Essakali, M.D. (2005). Rural access and mobility in Pakistan: A policy note. The World Bank, Washington, D.C., Transport Note No. TRN-28, December, 2005

Fischer, E., and M. Qaim (2012). Linking smallholders to marker: Determinants and impacts of farmer collective action in Kenya. World Dev. 40(6): 1255-1268.

Government of Pakistan (2010). Pakistan Economic survey 2009-10. Economic Advisor's Wing, Finance Division, Islamabad, Pakistan.

Government of Pakistan (2011). Pakistan Economic survey 2010-11. Economic Advisor's Wing, Finance Division, Islamabad, Pakistan.

Government of Pakistan (2015). Pakistan Economic survey 2014-15. Economic Advisor's Wing, Finance Division, Islamabad, Pakistan.

Hailu, A., and R. Nigatu (2007). Correlates of household food security in densely populated areas of Southern Ethiopia: Does the household structure matter? Stud. Home Comm. Sci.1: 85-91

Hazell, P., C. Poulton, S. Wiggins, and A. Dorward (2007). The Future of Small Farms for Poverty Reduction and Growth. Washington, DC: International Food Policy Research Institute.

Heinmen, P.A. (2002). Relationship making in the new economy. J. Relationship Mark. 1: 5-61

Hlongwane, J.J., L.J. Ledwaba, and A. Belete (2014). Analyzing the factors affecting the market participation of maize farmers: a case study of small scale farmers in greater Giyani Local Municipality of the Mopani District, Limpopo Province. Afr. J. Agri. Res. 9: 895-899

Hosmer, D.W. and S. Lemeshow (2000). Applied logistic regression. John Wiley and Sons, New York, USA

IFAD (2003). Promoting market access for the rural poor in order to achieve the Millennium Development Goals. Roundtable Discussion Paper for the 25th Anniversary Session of IFAD's Governing Council. International Fund for Agricultural Development. Rome, Italy.

IFAD (2013). Market orientation and household food security. International Fund for Agricultural Development, Rome, Italy. Available: www.ifad.org/hfs/thematic/rural/rural_4.htm. Accessed 12 September 2014

Jacoby, H.G. (2000). Access to markets and the benefit of rural roads. The Eco. J. 110 (July): 713-737

Jayne, T.S., D. Mather, and E. Mghenyi (2010). Principal challenges confronting smallholder agriculture in sub-Saharan Africa. World Dev. 38(10): 1384–1398.

Key, N., E. Sadoulet, and A.D. Janvry (2000). Transactions costs and agricultural household

supply response. Am. J. Agri. Econ., 82(2): 245–259.

Machete, C.L. (2004). Agricultural poverty in South Africa: Can agriculture reduce poverty? Paper Presented at the Overcoming Underdevelopment Conference. Pretoria, SA, 28-29 October.

Menard, S. (2000). Coefficients of determination for multiple logistic regression analysis. Am. Stat. 54: 17-24

Mueller, B. and M.K. Chan (2015). Wage Labor, Agriculture-Based Economies, and Pathways out of Poverty: Taking Stock of the Evidence. USAID. LEO Report No. 15. Available at: https://www.microlinks.org/sites/default/files/resource/files/Report_No__15_-_Labor_Stocktaking_Report_final.pdf

Mukwevho, R., and F.D.K. Anim (2014). Factors affecting small scale farmers in accessing markets: A case study of cabbage producers in the Vhembe District, Limpopo Province of South Africa. J. Hum. Ecol. 48(2): 219-225

Nagayets, O. (2005). Small Farms: current status and key trends. In: The future of small farms: proceedings of a research workshop, Wye, UK June 26-29, IFPRI. Available at: www.ifpri.org/publication/futuresmall-farms

Ntale, J.F. (2013). Determinants of commercial mixed farming on small farms in Kenya. European J. Buss. Mangt. 5(22): 47-55

Onoja, A.O., B.B. Usoroh, D.T. Adieme and N.J. Deedam (2014). Determinants of market participation in Nigerian small-scale fishery sector: Evidence from Niger delta region. Consilience. J. of Sust. Dev. 9: 69 – 84

Osmani, A.G., and E. Hossain (2015). Market participation decision of smallholder farmers and its determinants in Bangladesh. Econ. Agri. 62(1): 163-179.

Owens, T., J. Hoddinott and B. Kinsey (2001). The impact of agricultural extension on farm production in resettlement areas of Zimbabwe. Working paper No. WPS/2001-6, Orebro University, Sweden. Available: www.oru.se/PageFiles/13614/Impact%20of%20Extension.pdf. Accessed 24 November 2014.

Peng, C.Y., T.S. So, F.K. Stage and E.P.S. John (2002). The use and interpretation of logistic regression in higher education J.: 1988-1999. Res. High. Edu. 43: 259-293

Pinckney, T.C. (1989).The demand for public storage of wheat in Pakistan. International Food Policy Research Institute (IFPRI), Research Report No. 77, December, 1989

Russel, D., J.J. Coyle, K. Ruamsook, and E.A. Thomchick (2014). The real impact of high transportation cost. CSCMP's Supply Chain Quarterly (Logistics), 1. http://www.supplychainquarterly.com/topics/Logistics/20140311-the-real-impact-of-high-transportation-costs/ (Accessed on October 30, 2015)

Sendal, A. (2007). Commercializing small-scale vegetables production in Limpopo Province. Draft Report, 5 November 2007. Polokwane, South Africa: Limpopo Department of Agriculture.

Senyolo, G.M., P. Chaminuka, M.N. Makhura, and A. Belete (2009). Patterns of access and utilization of output markets by emerging farmers in South Africa: Factor analysis approach. Afr. J. Agri. Res. 4(3): 208-214.

Taiwo, A., and F. Kumi (2013). An appraisal of road condition effect on rural transportation in Sekyere Central District of the Ashanti region of Ghana. J. trans. Tech. 3(4): DOI:10.4236/jtts.2013.34028

Tilburg A.V. and H.D.V. Schalkwyk. 2012. Strategies to improve smallholders' market access. Book chapter from Unlocking markets to smallholders: Lessons from South Africa. Mansholt Publication Series, 10. Wageningen Academic Publishers. Netherlands.

Xuan, L.D., H.K.T. Thu and S. Bauer (2014). Impact of access to agricultural extension services on tea households' income in the Northern Region of Vietnam. Paper presented at Tropentag, Prague, Czech Republic, September 17-19, 2014. Available: www.tropentag.de/2014/abstracts/links/Do_Xuan_iWwITQrH.pdf. Accessed 24 November, 2014.