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Farmers' Perceptions of Agricultural Land Values in Rural Pakistan

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I. INTRODUCTION

Pakistan's agriculture sector is crucial because it is responsible for providing food, shelter, and clothing to a massive population of 180 million people which is growing at a rate of 2 percent per annum. Land is a valuable asset and a symbol of prestige for the rural population in Pakistan. According to the recent Pakistan Economic Survey of 2013-14, the agriculture sector contributes around 21 percent to GDP and provides employment for around 45 percent of the work force, who are primarily based in rural areas. The total geographic area of Pakistan is approximately 79.6 million hectares. Around 27.7 percent of Pakistan's land is currently under cultivation and the cultivatable waste lands offer good possibilities for crop production. The total cropped area of Pakistan increased from 21.82 million hectares in 1990-91 to 22.72 million hectares in 2010-11 [Agricultural Statistics of Pakistan (2010-11)] and the total population of Pakistan increased from 118 million to 175 million during the same time period. Similarly the tenancy status of land management and land ownership pattern has changed over time. For example, large landowners are shifting their preferences from managing their land on their own towards leasing or sharecropping the land to be managed by others [Agricultural Census (2010)].

Land is a difficult resource to exchange because of certain constraints such as the fact that land is immobile and there may be significant differences in the quality of land. Additionally, appropriate institutions may not exist which allow for costless exchange of land. Land is a finite resource and ideally the market with demand and supply forces should be able to determine the equilibrium price. However, this is not the case in Pakistan where land markets mostly don't exist at a formal level and the value of land is being priced arbitrarily and without any scientific backing. In some cases the price of land is being influenced by large landowners. Furthermore, in Pakistan, there is no appropriate or historical collection of data on land buying/selling and land revenue

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(provincial revenue departments are supposed to maintain records of land ownership, however, this data is usually not publicly available). For example, there is no nationally representative survey on household land purchases and only the recently released Pakistan Agriculture Census of 2010 included some data on change in land ownership patterns.

Lack of a formal land market and sufficient data means it is difficult to identify the determinants of value for land in Pakistan. However, the productivity of land can be/is a close proxy for the value of land, because the utility (and value) of any asset depends on how much income or returns that asset provides. Since the productivity of land can be determined and computed fairly accurately, this study uses the productivity of land in various regions as a substitute for farmers' perceptions of the utility of land in Pakistan.

In Pakistan, rural land in the agriculture sector is important because most of Pakistan's land can be classified as rural and is based in the agriculture sector. Since Pakistan is a developing country, the Government is trying to implement policies which promote development and reduce poverty. This can be done by promoting investment and policies which increase the productivity of land, particularly in rural areas. The same polices and investments which increase agriculture productivity indirectly also increase agricultural land prices (Gardner et al 1979).Previous literature has shown that land ownership and the productivity level of agricultural land are very closely related to poverty and development [Deininger (2004) and Hirshima (2008)]. Finding out what factors affect land values in rural Pakistan could help the Government of Pakistan decide what to invest in to promote development of rural land. Similarly, proper investment into rural areas can turn them into centers of commerce which will boost productivity and economic growth. In the long run, this will improve competition in the area.

According to the Food and Agriculture Organisation (2003), price of land is one of the tools which can be used to manage land resources. Price of land itself is important because it reflects the level of government reforms which are used to support agricultural production. However, studying land itself is difficult because land value has different definitions and land markets in Pakistan do not exist at a formal level. In order to resolve the problem of the definition of land value, we will be using the perceived value of the land by the farmers who manage the land.

Previously, many studies revealed that there is a positive impact of attributes/ characteristics of land on the value of agricultural land [Vasquez, *et al.* (2002), Guiling, *et al.* (2009), Cavailhès and Wavresky (2003), Peterson (1984, 1986)]. However, no such study exists for Pakistan. Specifically, this research study will look at the relationship between physical and economic characteristics and whether they are correlated with property values in rural Pakistan. Due to a lack of suitable and reliable data, we used perceived value of land per acre as our dependent variable. Specifically, we asked the farmers managing the land what is their perceived value of the land they are managing. The rest of the paper is organized in the following manner; section II gives a literature review on the subject, section III describes the methodology used and Section IV gives data on the sample. Section V describes the model we will be using to examine the relationship and Section VI provides results. Specifically we will be using a hedonic regression model based on the approach originally presented by Bover and Velilla (2002). Section VII is a conclusion along with brief policy recommendations.

II. LITERATURE REVIEW

As mentioned above, land is an important social and financial asset, yet there is a high level of inequality of land ownership in Pakistan. For example, the Household Income and Expenditure Survey of 2001-2002 stated that 43.13 percent of households in Pakistan were in rural areas. Out of the rural households 24.02 percent were landless, 42.27 percent owned less than 5 acres, 22.40 percent owned 5 to fewer than 12.5 acres, and 11.31 percent owned 12.5 acres or above. According to Qureshi and Qureshi (2004), the Gini coefficient for land ownership in Pakistan significantly increased from 0.66 in 1972 to 0.75 in 2000. Highest increase in inequality of land ownership is seen in the province of Punjab from 0.63 to 0.71 and KPK (NWFP at the time) from 0.68 to 0.86. Gini Coefficient is almost the same for Sindh 0.69 to 0.67 and Balochistan 0.69 to 0.68. Similarly, Mumtaz and Noshirwani (2006) performed a mapping exercise in 3 provinces (Punjab, Sindh, and KPK) and found that 40 percent of rural land is owned by 2.5 percent of households. They also found that women prioritized inheritance as an issue that bothered them. Women faced issues that they were manipulated out of their inheritance, had to forfeit their share in favour of brother or son, and were unable to pursue inheritance in court.

The Government of Pakistan has tried on three different occasions (1959, 1972, and 1979) to implement land reforms to solve problems with land usage and land development in Pakistan. PANOS (2011) stated that previous attempts at land redistribution have failed because of fragmentation which is hurting agriculture output. Ownership of land is rarely registered (despite law making land ownership registration mandatory) and is passed on through inheritance. An estimated 40 percent of cases brought before lower level civil courts and high courts are land related disputes [Aftab, *et al.* (2012)]. On August 10, 1989 the Supreme Court Shariat Appellate Bench declared that a maximum ceiling for land holding was illegal as per Islamic Law. Therefore, in recent decades, the focus had shifted from land redistribution towards improving records of land ownership.

Hirashima (2008) showed that the price of land in the province of Punjab in Pakistan and India was increasing at a faster rate than rent. The basic reason for this he argued is that the demand for land in Pakistan is price inelastic because of its importance to social status and the inheritance law. He argues that even though land is a factor of production just like labour and capital, land is significantly different because it is not man made and has limited scope of extension. These arguments appear to gloss over an important fact: the supply of land is fixed (at least in the short- and medium-term); therefore, any change in the demand curve will enhance land prices disproportionately—as movements along a (more or less) vertical supply curve.

It is far more common to find international literature examining factors affecting land prices. In this case, a far more widely used approach is done using hedonic modelling. The basis for a hedonic pricing model can be found in Rosen (1974) and this model can be used to estimate the impact of a range of characteristics such and economic, environmental, and location variables and how they affect the price of goods. In this case, the assumption is that consumers value the characteristic of goods or the services they produce rather than the goods themselves. However, no such study has been found examining land values in Pakistan.

For example Peterson (1984, 1986) used a hedonic regression model to analyse land prices in Africa and Europe. The author found that 70 percent of the variation in land prices was due to non-farm factors such as precipitation. Taylor and Brester (2005) look at the impact of a noncash income transfer program on agricultural land values. Specifically they use a hedonic regression model to look at the impact of a sugar program on agricultural land values in Montana. They find that noncash income transfers have a positive impact on land values. Similarly Roberts, *et al.* (2003) provide examples where government cash transfers or other government programs can have a positive impact on land prices. Bover and Velilla (2002) also use a hedonic price model to determine if quality indicators such as location and floor size affect land values of multi-unit housing in various cities in Spain. Results by city vary, however the hedonic regression results indicate that overall there is a positive relationship. Vural and Fidan (2009) provide further evidence while using a hedonic price model studying the effects of factors affecting land prices in Turkey. Results indicate a high correlation between type of organic matter in the area and land size. Saita (2003) uses a similar approach in examining factors affecting land values during auctions in Tokyo. The author's results contradict results mentioned earlier mainly because the housing market bubble in Tokyo had collapsed around the time. The author finds that land prices respond mostly to market conditions.

III. METHODOLOGY

The Pakistan Strategy Support Programme (PSSP) recently completed two related rounds (known as round 1.0 and round 1.5) of a rural household survey in 2012 in which 2,090 households from 19 districts across Pakistan were interviewed. These 19 districts included 12 from Punjab, 5 from Sindh and 2 from Khyber Pakhtunkhwa (KPK)[1]. Round 1.0 was a multi-topic survey which included questions from different economic areas and Round 1.5 was a survey specifically focused on agriculture. Therefore the sample of Round 1.5 only included households from Round 1.0 who were involved in farming (942 households). For a detailed description of the sample please refer to Table 4 in the Appendix section. This survey is known as the Rural Household Panel Survey (RHPS).

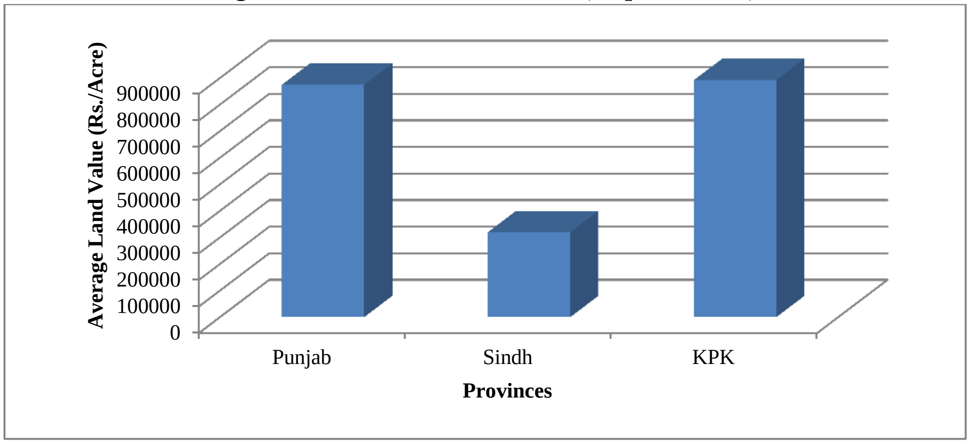
This paper will utilize the data from the PSSP's RHPS. Specifically the paper will use data relevant for land valuation from Round 1.0 by using community level data and data from Round 1.5 of the survey. Following the literature review, this study will try to fill in a gap in the current literature by examining what factors affect land prices in rural Pakistan. A selection of variables (physical and economic), which theoretically have an impact on land values, will act as independent variables. Specifically we will be using a hedonic regression model and two-stage least square model approach which has not been used previously for studying land prices in Pakistan. Section IV below provides sample characteristics and Section V will describe the model in more detail.

IV. SAMPLE CHARACTERISTICS

The sample we will be using has 942 households out of which 521 are in Punjab, 305 are in Sindh, and 116 are in KPK. Figure 1 below provides data on perceived value of land per acre in this sample. In this case the household was asked about the perceived value of the agricultural land(Rs /Acre) if it was sold today.

[1] *Note:* Balochistan was removed from the sample due to security reasons.

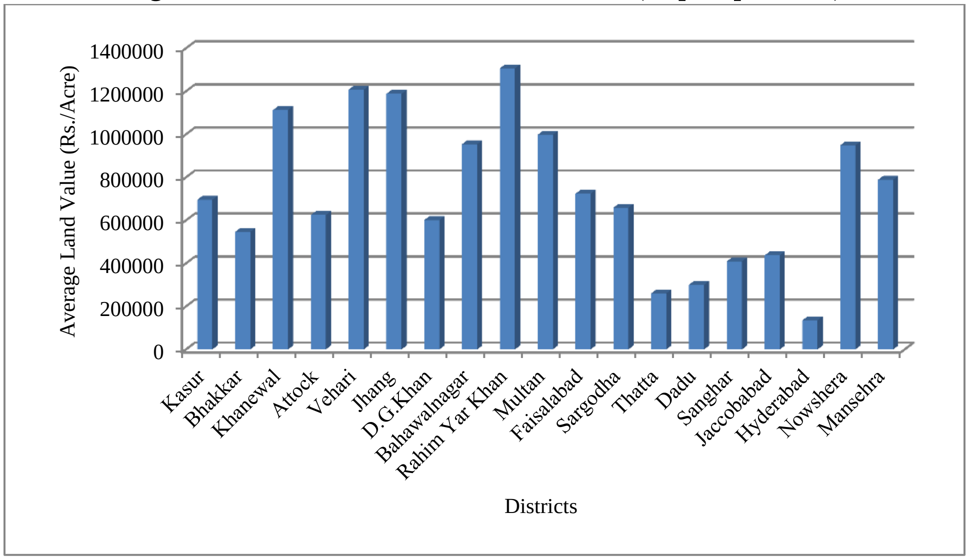
Fig. 1. Perceived Value of Land (Rupees / Acre)



The data indicates that the self-reported value of land per acre is highest in KPK at 892,115 Rs/acre. This is followed by Punjab with a perceived value of land at 874,439 Rs/acre. In Sindh the perceived value of land per acre is much lower at 319,650 Rs/acre. Lower perceived value in Sindh can largely be explained by physical characteristics such as a larger proportion of salinity and water logging issues. This is supported by Qureshi, *et al.* (2008) who found that there was a large occurrence of water logging and salinity in the Indus Basin specifically in the province of Sindh leading to problems in sustaining irrigating land and livelihoods of farmers. Another possible reason for lower perceived value of land is that the management of labour is not as efficient in Sindh compared to Punjab and KPK.

Figure 2 below disaggregates the data further into districts and provides the perceived value of land per acre by district.

Fig. 2. Perceived Value of Land Per District (Rupees per Acre)



The results indicate that in terms of perception, the most expensive land is in Rahim Yar Khan at 1,306,863 Rs/acre. The least expensive agricultural land is in the district of Hyderabad[2] at 135,583 Rs/acre.

Data on average land ownership per farmer from the RHPS proves that the distribution of land is highly unequal with a small amount of households owning a large proportion of the rural agricultural land. Using data from the sample, we were able to calculate Gini coefficients for land ownership by households and compare results with earlier findings from Qureshi, *et al.* (2004). Note that ownership is defined in terms of plots which are in the household's name which means that plots that were rented out or are being operated on sharecropping basis were attributed to the original owner.

Table 1

Gini Coefficient for Land Ownership in Pakistan from 1972 to 2012

	Qureshi, *et al.* 2004				PSSP 2012*
Province / National	1972	1980	1990	2000	2012
Pakistan	0.66	0.65	0.66	0.75	0.68
Punjab	0.63	0.62	0.62	0.71	0.61
KPK	0.68	0.69	0.65	0.86	0.60
Sindh	0.69	0.63	0.63	0.67	0.76
Balochistan	0.69	0.68	0.7	0.68	NA**

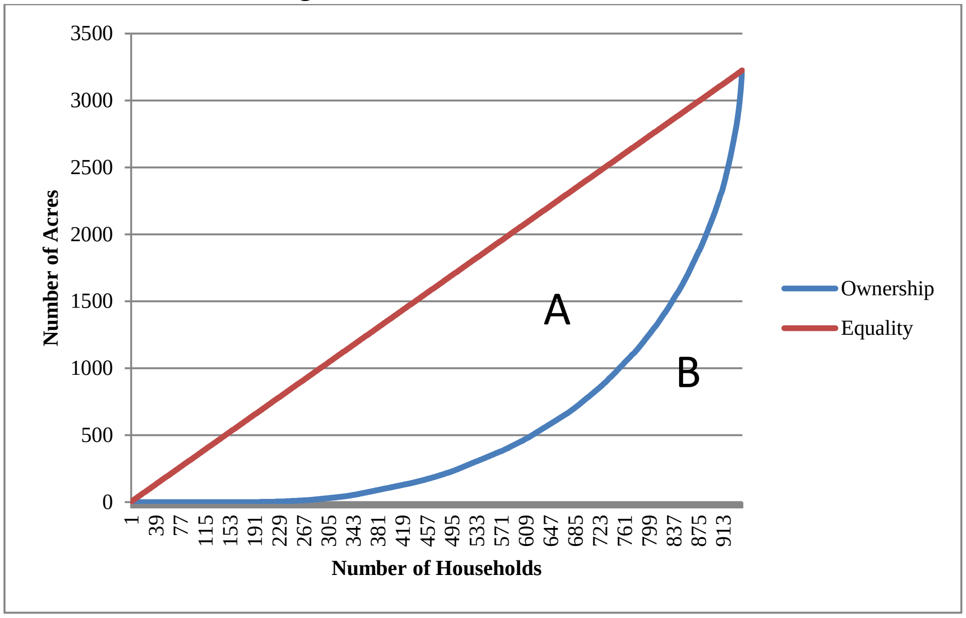
*Authors own calculation. **NA = Did not survey due to security reasons.

Qureshi, *et al.* (2004) showed that the Gini coefficient appeared to be rising in Pakistan overall from 1972 till the year 2000. A rising Gini coefficient implied that the inequality of land ownership appeared to be increasing during this time. Our calculation for the Gini coefficient is lower for Pakistan overall (0.59) and for each province. However this does not necessarily indicate that land ownership inequality is decreasing because both studies used separate data sources to calculate the Gini coefficient. Qureshi, *et al.* (2004) used data from the Agricultural Census Reports which had a larger sample size and covered a larger number of districts. We used data from the PSSP's Rural Household Panel Survey. The PSSP's Rural Household Panel Survey excluded a few districts from KPK for security reasons. Additionally our sample did not cover the province of Balochistan.

Figure 3 below gives a graphic representation of how the Gini Coefficient was calculated from our sample. The red line is the line of equality (each household owns the same amount of land) and the blue line is the actual land ownership pattern. The Gini coefficient is calculated as the area of "A" divided by the area of "A" plus "B" (Gini = A / (A+B)).

[2] Note that the sample for the PSSP Rural Household Panel Survey was creating using data from the most recently available Census of 1998. Since then the district of Hyderabad has been divided into 4 districts known as Hyderabad, Tando Muhammad Khan, Tando Allahyar, and Mitiari. Villages in the sample are located outside current day Hyderabad district.

Fig. 3. Gini Coefficient for Pakistan



V. MODEL

We will be using a hedonic regression model and two-stage least square model to analyse the mentioned relationship. The advantage of a hedonic regression model is that it divides the explanatory variables into constituent parts and allows for analysis of different attributes (example physical variables vs economic variables) on the dependent variable. We will be using cross sectional data for the Pakistan's Strategy Support Program's Rural Household Survey from the year 2012. Based on the approach by Bover and Velilla (2002), we used a model with a theoretical form provided below:

$$p_i = \alpha_0 + \delta_i X_i + \ldots + \delta_n X_n + \gamma_i Y_i + \ldots + \gamma_n Y_n + \varepsilon$$

Where $p_i$is the log of perceived value of land per acre and $X_i$to X_n are a set of dummy variables to calculate the effect of specific demographic or physical characteristics and $Y_i$to$Y_n$are the log of specific demographic, location, or development variables. This model can be considered as a log-log model for continuous variables and not for other types of variables (ex. dummy variables). The independent variables in the model can be categorized into four categories which are demographic variables, site characteristics, development variables, and location variables. The difference between site characteristics and location variables is that location variables are usually fixed for the entire village and surrounding area and cannot be changed. Site characteristics can differ between each plot. Development variables capture the socio-economic wellbeing of the residents of the mouza. The independent variables are grouped in these three categories mainly to separately identify variables that can be influenced or changed through policy or other actions (these are classified as developmental variables), from variables that represent some inherent characteristics of the area—e.g. geography, population etc. By focusing on variables that can be impacted through policy or managerial actions, the choice of policies or projects/programs can be made more focused, and the ones that contribute the most towards reducing poverty or enhancing productivity can be pursued.

There are four different versions of the model and the first two are standard hedonic regression models where one considers the impact of renting a plot and the other considers the actual value of rent per acre. The next two models used a two-staged least squares approach in order to counter potential issues with endogeniety in which we used proxies to capture the effect of a change in wealth or development in a village. Theoretically it is safe to assume that villages with a higher level of income are more likely to travel longer distances, and therefore these variables can be used as proxies for average agricultural income. Variables such as distance to nearest bank, city, and market are meant to capture the effect of a change in the level of income of a village.

Summary statistics for the variables used in the model are provided in the table below.

Table 2

Summary Statistics for Variables used in the Model (Dependent variable: Land value (Rs/acre))

Variables	Obs.	Mean	Std. Dev.	Min	Max
Land Value (Rs. / Acre)	1296	724023.9	634639	16000	5200000
Age of Respondent	1296	41.80324	13.71747	14	92
Value of Rent	1296	2688	8317.84	0.01	75000
Average Mauza Income	1296	168779.6	146951.9	0.01	917090
Ever Attended School	1296	0.5933642	0.4913954	0	1
Dummy for Ownership of Plot	1296	0.617284	0.486238	0	1
Dummy for Renting in Plot	1296	0.1296296	0.336025	0	1
Dummy for Flat Land	1296	0.7091049	0.4543505	0	1
Dummy for Fertile Land	1296	0.1589506	0.3657712	0	1
Dummy for Moderate Fertile Land	1296	0.7908951	0.4068265	0	1
Dummy for No soil erosion	1296	0.8333333	0.3728219	0	1
Dummy for Mild Soil Erosion	1296	0.1466049	0.3538482	0	1
Dummy for Salinity	1296	0.121142	0.3264182	0	1
Dummy for Waterlogging	1296	0.1535494	0.3606554	0	0
Number of Canal Irrigations	1296	10.02627	11.88117	0.01	77
Number of Ground Water Irrigations	1296	8.414097	10.91017	0.01	60
Dummy for Plot at Head	1296	0.087963	0.2833504	0	1
Dummy for Plot at Middle	1296	0.2214506	0.4153834	0	1
Dummy for Village Electrification	1296	0.9128086	0.2822242	0	1
Dummy for Internal Road	1296	0.2932099	0.4554096	0	1
Dummy for Cotton Grower	1296	0.0864968	0.142917	0	1
Dummy for Rice Grower	1296	0.1220263	0.194041	0	1
Dummy for Sugarcane Grower	1296	0.0306345	0.108021	0	1
Distance to Nearest City	1296	12.7284	7.644005	1	35
Distance to Nearest Tehsil Katcheri	1213	3.04642	0.5749389	0.7	4.32
Distance to Nearest Bank	1296	13.0463	8.247837	0	35
Distance to Nearest District Katchari	1296	42.77932	23.49335	10	115

VI. RESULTS

Table 3 below provides the results from the hedonic regression models described above.

Table 3

Results from all Models

Variables	Log-Log (Dummy for Rent in)	Log-Log (Value of Rent-in)	2SLS Model (Dummy for Rent in)	2SLS Model (Value of Rent in)
Constant	12.70***	12.69***	10.79***	10.82***
	(0.502)	(0.499)	(0.602)	(0.544)
Rent	–0.0262	–0.00104	0.112	0.0111
	(0.0789)	(0.00549)	(0.542)	(0.0377)
Average Mauza Income	0.0135	0.0136	0.113***	0.113***
	(0.0129)	(0.0129)	(0.0316)	(0.0317)
Ownership of Plot	0.00320	0.00921	0.0881	0.114
	(0.0619)	(0.0620)	(0.291)	(0.291)
Age of Respondent	–0.0541	–0.0541	–0.0322	–0.0329
	(0.0616)	(0.0616)	(0.0634)	(0.0635)
Ever Attended School	–0.0174	–0.0178	–0.0359	–0.0376
	(0.0460)	(0.0460)	(0.0513)	(0.0510)
Flat Land	–0.000108	–0.000369	–0.0328	–0.0344
	(0.0529)	(0.0529)	(0.0557)	(0.0556)
Fertile Land	0.323***	0.322***	0.237**	0.233*
	(0.114)	(0.114)	(0.120)	(0.121)
Moderately Fertile Land	0.133	0.133	0.0732	0.0699
	(0.0985)	(0.0985)	(0.104)	(0.104)
No Soil Erosion	0.589***	0.589***	0.685***	0.684***
	(0.147)	(0.147)	(0.146)	(0.146)
Mild Soil Erosion	0.480***	0.480***	0.522***	0.522***
	(0.148)	(0.148)	(0.148)	(0.148)
Waterlogging	–0.152*	–0.153*	–0.220**	–0.219**
	(0.0913)	(0.0913)	(0.0938)	(0.0939)
Salinity	–0.125	–0.125	–0.155*	–0.156*
	(0.0930)	(0.0930)	(0.0941)	(0.0943)
Number of Canal Irrigations	0.0397***	0.0396***	0.0369***	0.0368***
	(0.00975)	(0.00975)	(0.0103)	(0.0103)
Number of Ground Irrigations	0.0326***	0.0327***	0.0430***	0.0431***
	(0.00994)	(0.00994)	(0.0100)	(0.0100)
Plot Located at Head	0.363***	0.362***	0.254***	0.254***
	(0.0954)	(0.0954)	(0.0969)	(0.0969)
Plot Located at Middle	0.233***	0.233***	0.167**	0.166**
	(0.0641)	(0.0641)	(0.0681)	(0.0684)
Village Electrification	0.162	0.162	0.244**	0.243**
	(0.119)	(0.119)	(0.119)	(0.119)
Internal Developed Road	0.191***	0.191***	0.181**	0.184**
	(0.0651)	(0.0651)	(0.0776)	(0.0773)
Cotton Grower	0.359*	0.359*	0.115	0.115
	(0.212)	(0.212)	(0.221)	(0.221)
Rice Grower	–0.106	–0.107	0.234	0.232
	(0.243)	(0.243)	(0.250)	(0.250)
Sugarcane Grower	0.378*	0.375*	0.260	0.248
	(0.208)	(0.208)	(0.264)	(0.259)
Distance Nearest Weekly Market	0.00743	0.00752	–	–
	(0.0437)	(0.0437)		
Distance Nearest Bank	–0.00111	–0.00156	–	–
	(0.0395)	(0.0395)		
Distance Nearest City	–0.167***	–0.167***	–	–
	(0.0422)	(0.0422)		
Distance District Katcheri	–0.0327	–0.0323	–	–
	(0.0595)	(0.0595)		
Distance Tehsil Katcheri	–0.0171	–0.0163	–	–
	(0.0461)	(0.0462)		
District Dummies	Yes	Yes	Yes	Yes
	Test Statistics			
Observations	1120	1120	1120	1120
R-squared	0.514	0.514	0.478	0.478

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1.

The table above indicates that most of the site characteristics have a correlation with perceived plot value per acre. The site characteristics also have the expected sign; for example fertile land, no soil erosion, number of irrigations by canal and ground water, plot located at head and middle of water course all have a positive correlation with the dependent variables across most of the model versions. Similarly, waterlogging and salinity have a negative correlation on perceived value of land per acre although salinity is not statistically significant across all of the models. Four of the coefficients for development variables are correlated with the dependent variable. Access to electricity, internal road, cotton growers, and sugarcane growers are positively correlated with perceived land values across most of the model versions. Variables for access to electricity and cotton growers were chosen to act as a proxy for other variables which captured the effect of an increase in income or development of a village. Similarly dummies for cotton growers and sugarcane growers were chosen to capture the effect of an increase in prices of crops and choice of crop. Most of the physical variables were not correlated with the dependent variable with the exception of distance to nearest city. Demographic variables such as the age of the respondent or if the respondent has ever attended school do not appear to have any correlation with the dependent variable, however average mauza income does have a positive correlation with perceived land value in some of the model versions. Model results indicate that ownership status and renting of plots are not correlated with land value per acre.

Another way of looking at the results is by classifying the results that have a correlation with perceived land value at the 1 percent level. Three of these variables have an impact on soil fertility and erosion (quality of land) and four of these are related to water quality and access. This again shows the importance of access and maintenance of good quality land and water as well as the importance of physical characteristics such as waterlogging and salinity.

VII. CONCLUSION AND POLICY IMPLICATIONS

Our research study used a hedonic regression model and two-staged least square model to determine what demographic, site, development, or physical characteristics have a correlation with the perceived value per acre of agricultural land. Four different versions of the model were used to analyze the impact of rent vs. value of rent and to counter potential issues of endogeneity. Data for this study was obtained from the Pakistan Strategy Support Program’s Rural Household Panel Survey (RHPS) of 942 households across 19 districts and 3 provinces who are currently involved in agriculture. Overall, the results are consistent with international literature on the subject. Model results indicate that most of the site and physical characteristics are correlated with perceived land value and only a few of the development indicators and none of the demographic variables have a correlation with perceived land value. Specifically fertile land, lack of soil erosion, number of canal and ground water irrigations, location of plot at head and middle of watercourse, access to electricity, internal road, cotton grower, sugarcane grower, and average mauza income are positively correlated with perceived land value per acre. Waterlogging, salinity, and distance to nearest city are negatively correlated with perceived land value.

These results provide some important policy implications which the Government of Pakistan can consider. Overall, variables related to site characteristics such as soil erosion and the fertility level of the land have larger coefficients than development variables related to development of an internal road. This suggests that site characteristics have more of an impact than say geographic location or development variables. Therefore it can be argued that the Government should focus less on overall development projects and priority should be given to reducing salinity and educating farmers on best watering techniques etc.

It is worth noting that the Government of Pakistan has already announced a series of reforms to boost the economy and development. One of the main themes of the Vision 2025 of the Government and the Planning Commission include modernization of infrastructure and regional initiatives. Results from the model above suggest that the improvement of infrastructure and usage of regional initiatives could have the desired effect of increasing agriculture productivity through land development.

One of the limitations of the model used above is that we could only include characteristics which were measurable or observable (ex. access to road, access to water, soil quality etc.). Theoretically, there are other variables that could be correlated with perceived land value. For example, implementing institutional rules which improve good governance, land titling policies, inheritance policies, and promoting ownership of land by foreigners could all be positively correlated with land values. All of these factors could be used as mechanisms to achieve the desired objective to promote agriculture productivity and development in rural areas.

Lastly, considering the development needs of Pakistan, the area of land ownership and development of rural agricultural land cannot be ignored. Similarly, proper investment into rural areas can turn them into centers of commerce which will boost productivity and economic growth. In the long run, this will improve investment and competition in the area.

APPENDIX

Table 4

Description of Sample from Round 1.5 of PSSP Rural Household Survey

Province	District	Number of Households
Punjab	Attock	16
Punjab	Bahawalnagar	58
Punjab	Bhakkar	78
Punjab	DG Khan	42
Punjab	Faisalabad	43
Punjab	Jhang	55
Punjab	Kasur	39
Punjab	Khanewal	45
Punjab	Multan	22
Punjab	Rahim Yar Khan	42
Punjab	Sargodha	27
Punjab	Vehari	54
Sindh	Hyderabad	57
Sindh	Jacobabad	86
Sindh	Sanghar	26
Sindh	Thatta	86
Sindh	Dadu	50
KPK	Mansehra	45
KPK	Nowshera	71
Total		**942**

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