Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

Access to Market Information and Its Socio-Economic Impact on Peach Farmers in Rural Swat, Pakistan

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ABSTRACT
This study provides a sociological analysis of how access to market price information shapes the socio-economic condition of peach farmers in rural Swat, Pakistan. Using survey data from 364 randomly selected farmers in Tehsil Matta, the study focuses on the structural inequalities of accessing information, how they affect economic well-being and the power that is inherent in the local market systems. The results obtained show that there is a very concentrated information regime, 90 percent of the farmers rely specifically on commission agents to provide output price information, which instills a patron-client relationship that contributes to dependency. There is also a large information gap, with informed farmers getting a mean of PKR 401,970 per acre of farm profitability as compared to PKR 150,750 on the part of their uninformed counterparts ($p < 0.01$). Informed farmers also obtained much higher average price per-carton (PKR 458.14 compared to PKR 300.70). The analysis shows that structural constraints, such as universal inaccessibility to institutional credit (100% of respondents) and lack of satisfaction with public agricultural extension services (86.3%), are the main ones. The multivariate analysis confirms that the access to market information is the best predictor of economic outcome (= 0.286, $p <0.05$) as compared to the traditional assets such as land or orchard age. The research concludes that market information access is not just an intervention involving technical economies of change but a key instrument of raising social equity, lessening reliance on intermediary structures of power, and bettering rural livelihoods. The recommendations are dedicated to enhancing pluralistic, pro-poor information systems and reforming the rural financial institutions.

Key Words: Market Information, Peach Farmers, Rural Sociology, Socio-Economic Impact, Information Inequality, Agricultural Extension, Swat, Pakistan.

Introduction
Pakistan Agricultural development in rural areas is more of a social process rather than technical or economic. The core of this process is the circulation of knowledge and information, who can get it, who can influence it and how it can determine the life opportunities of a farming family. Although extensive literature has been devoted to the use of technology, its positive effect on productivity, and its integration with the market, little has been done to address social aspects of accessing, controlling, and using market information and their resulting effects on household welfare, social stratification, and

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www.thedssr.com

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

power relations, specifically in the case of the horticultural economy in Pakistan.

A sociological view of information is that information is not a neutral commodity. Its distribution is incorporated into the prevailing social structures, hierarchies and market relations (World Bank, 2007). Having access to timely and correct market price information may help to reduce uncertainty, improve bargaining power, and increase profitability. On the other hand, the absence of such information slows down the elimination of dependency, strengthens the pre-existing inequalities, and enables the intermediaries to gain a disproportionate amount of value out of the primary producers. In developing nations such as Pakistan where the agricultural sector is the largest contributor to the national Gross Domestic Product (GDP) 21% and provides a job to nearly half of the labor force (GOP, 2018), the study of these socio-informational processes is not a scholarly task, but an urgent necessity of poverty reduction, rural transformation, and social justice.

The Pakistani agribusiness is in a strange limbo. On the one hand, it is the most important source of foreign exchange revenues and the main source of livelihood of most rural population. Conversely, it is defined by poor productivity, divided landholdings, poor infrastructures, and overwhelming deficiency of access to modern information and communication technologies. Pakistan has an average of 8.33 tons of fruit per hectare, which is in contrast to 20-25 tons in developed countries (Memon et al., 2015). This productivity difference is not a matter of land quality or climate, it is a matter of knowledge, information, and institutional support-or the systematic absence of the same.

The Pakistani government had the British colonial government as the predecessor to its agricultural extension system. This system was developed as a conventional, top-down, hierarchical and technology-oriented model that aimed at passing pre-programmed packages of practices instead of addressing the contextually-diverse needs of farmers (Bajava et al., 2010). Different programs have been initiated to revive this system over the decades such as the Village Cooperative Movement, the Village Agricultural Industrial Development Program, the Basic Democracy System, the Integrated Rural Development Program, and the Training and Visit Program. All these programs were abandoned one after another without any serious consideration of their effects on the agricultural product, profitability of farmers, and, most crucially, empowerment of farmers and their social inclusion.

The result of such institutional failure is a deep information void in the countryside. The simple role of an extension agent to relay timely, applicable and actionable information (Okunade, 2007) has to a great extent been forsaken. The farmers that used to be supported by the government extension workers are now alone, they have to rely on the informal sources of information which are not always reliable and in many cases exploitative. This vacuum could not be empty; it has been occupied by non-governmental players whose interest may not always be in line with the farming households.

The recent cellular technology boom and high rate of mobile phone adoption in rural Pakistan may seem on the surface to provide a solution. Mobile phones have become more and more available, even to relatively poor farming communities. These technologies would in theory democratize market information, enabling farmers to research prices in various markets, to deal directly with buyers and avoid exploitative middlemen. Theoretically there are numerous sources of information: publications like Zarrat Nama (a monthly agricultural magazine), newsletters, booklets, documentaries, print media, mobile applications, television, radio, and the internet. Agricultural programs are aired on a regular basis by seven radio stations, such as Da Hawa Pa Chapu of Pakistan Broadcasting Corporation, Kerkela, FM Radio, Dava, Voice of America, and Karwanda (KP Bureau of

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

Agricultural Information, 2018).

Thing is, though, much more involved. It is not technology that breaks up social structures. Having a mobile phone does not necessarily equate to having access to helpful information about the market. The efficacy of these technologies is mediated by literacy levels, language barriers, social networks, trust, and the power of the existing intermediaries. Here, in the case of District Swat, as this paper will show, the commission agent is still the largest provider of price information - the very middleman the power of which lies in the preservation of information asymmetry. Irony is that without social and institutional change, technology may serve to strengthen and not break current hierarchies. Sociologically speaking, information is a kind of capital, a resource that can be amassed, traded and transformed into other types of capital (economic, social, and cultural). Joia (2000) defines information as a perceived message, which is represented as documents, visual representation or as audible messages. Timeliness and relevance are vital to its effectiveness. Samuel (2001) defines agricultural information to be information that is used to make decisions and allocate resources information that when accessed and acted upon empowers farmers to make informed decisions. These decisions, when summed up, decide productivity, profitability and eventually, the material conditions of the household life.

As farmers are informed on the prices of inputs, they will be able to make strategic purchases, which may include buying the inputs at a lower price (fertilizers, pesticides, and other important inputs) and lower the costs of production. They get to determine when, where and to whom they want to sell their produce when they have the price information (output price) and may be able to get better prices. This information is not just useful in a country, such as Pakistan, where most farmers are illiterate or having only basic formal education and experience rather isolated rural locations.

Lack of such information, however, has foreseeable and disastrous effects. Middlemen, contractors, brokers, wholesalers, and commission agents take a big portion of the profit which ought to accrue to the farmer. Such third parties have market information which the farmer does not have. They purchase cheaply (usually at the farm gate when there are limited options by the farmer) and sell at a higher price in distant markets. The farmer who has no information and no bargaining power attains a low value on his/her work and investment. This is especially acute on orchard based agriculture where an orchard once planted can be fruitful over many years, a significant long-term investment by the farming household.

There is a perfect and pressing situation to conduct this sociological inquiry in District Swat in Khyber Pakhtunkhwa Province. The area has the best climate and environment to grow orchards. Fruits and nuts of a great diversity are grown, among which are apple, peach, cherry, apricot, plum, walnut, pear, persimmon, almond and strawberry. Of these, apple, peach, apricot, plum, and persimmon are cultivated on a very large scale. Swat is justifiably called the "Fruit Basket of Khyber Pakhtunkhwa." The valley is also referred to as the Switzerland of the East thanks to its green vegetation, hills and picturesque beauty. These conditions of good climate, fresh water supplied by Swat River and alluvial soils make Swat fruits to have a unique taste which is known all over the country. Horticulture industry provides about a half of the overall Swat economy.

However, the seeming richness conceals underlying and chronic issues. According to the Khyber Pakhtunkhwa Bureau of Statistics, agricultural production in the province has decreased by 0.528% per hectare over the last two years. The reduction in District Swat is more modest yet worrying at 0.08% per hectare per year. Swat yields more fruit than any other district in the province, but yields per hectare are painstakingly low. This is not due to lack of effort or hard work on the part of farmers. Rather, it is due to lack of access to

ISSN Online: 3007-3154
ISSN Print: 3007-3146

agricultural information, research, modern technologies, and market intelligence (Memon et al., 2015). The farmers still use the time-tested methods that have been inherited through the generations, and are enriched with their own experience. As valuable as this local knowledge is, it cannot withstand contemporary agriculture challenges.

The problems of peach farmers in Swat are not only numerous but also complementary. The issue of global warming is causing panic in the agricultural sector. The temperature in the area is rising at a rate of 0.5 degrees Celsius per year. This growth decreases rainfall and snowfall, alters normal growing periods, heightens water stress, and exposes orchards to pests and diseases. The climate change is not a far-off menace; it is a reality and a lived experience among Swat farmers.

Outside climatic factors, farmers have had unending issues of market access, availability of credit, expensive inputs and insufficient education. The peach marketing channel is long, complicated and obscured. The vulnerability and the urgency of transactions are facilitated by the fact that the fruit is perishable. Already slim profit margins are consumed by the high cost of inputs, such as fertilizers, pesticides, empty cartons, transportation. This non-formal credit makes farmers enter informal credit arrangements with the commission agents and input dealers who in most cases impose implicit interest's rates that are very high as compared to formal banks, when they are not even available.

The world is now a global village in this modern age. In developed nations and the emerging economies, farmers are employing the latest technologies-precision agriculture, real time market information, climate forecasting, mobile advisory services, to get better farming. Elsewhere, in rural Pakistan, the situation is the opposite. The problem is that farmers do not know how to get access to, assess and apply information, knowledge and modern technologies. The outcome is low productivity, falling profitability, and a slow but steady decrease in the share of the agricultural sector to household and national welfare. This research has three particular contributions to the current literature, which is considered through the prism of sociology.

To begin with, this research examines the impact of access to market price information on the profitability of peaches in District Swat, but through the lens of framing information as a social resource within the context of local power structures. It does not only inquire about the relevance of information, but how this information is accessed, who has the control and the socio-economic impacts of unequal access to information by the farming household.

Second, this paper empirically demonstrates the extent of information divide. It measures the disparities between informed and uninformed farmers in per-acre profitability, output prices, input cost and household income. It also determines the main sources of information and traces the social relations with the help of which the information flow- or lack of it- occurs.

Third, this paper investigates how different farm-specific characteristics affect profitability, such as the area of orchard, the number of peach plants, the total area, and the age of orchard, but it does not just see them as technical factors but as a measure of asset wealth and social stratification. The analysis shows how information access amplifies or alleviates the current disparities in terms of landholding size and other resources.

The rest of this paper is structured in the following way. Section 2 will provide a literature review of the literature on the topic based on agricultural economics, rural sociology and development studies. Section 3 explains how data will be collected, the sampling strategy and the empirical model applied in the analysis. Section 4 discusses the results, starting with descriptive statistics of constraints and information sources, and comparing informed versus uninformed farmers, and finally, multivariate regression results. The findings are

ISSN Online: 3007-3154
ISSN Print: 3007-3146

discussed in section 5, along with the conclusion and policy recommendations to achieve information equality and enhance the socio-economic status of peach farmers in rural Swat.

Literature Review

This review brings together literature in the field of agricultural economics, rural sociology, development studies and communication studies to create a comprehensive framework of how market access to information affects smallholder farmers socio-economically. The review is divided into five thematic subsections (i) theoretical views on information as a social and economic resource; (ii) empirical evidence of access to information and farm outcomes; (iii) the role of information intermediaries and power relations; (iv) structural constraints and institutional failure; and (v) identification of the research gap addressed in this study.

Information as a Form of Capital

Regarding classical economics, information eliminates uncertainties and enhances efficiency in decision making. Theoretically, Sandmo (1971) established that a risk-averse firm produces less than it would in a state of certainty and the expected profit will be lower. Price information is a good way to minimize the uncertainty so that producers would be able to approach the best certainty solution. This economic rationale is correct in so far as it goes. It considers information as a free public good or a commodity and can be bought in a frictionless market. And in truth it is neither of the two.

The sociological theory is a more subtle one. In line with Bourdieu (1986), it is possible to interpret information as a kind of cultural capital a type of non-financial social capital that allows people to move and progress economically. The access to information does not happen randomly; it is determined by social status, networks, education, and affluence. People who already have some other types of capital (economic, social and cultural) have an advantage to acquire and use information, which results in cumulative advantage. Granovetter (1985) also suggested that any economic activity is entrenched in social relations. Market transactions are not atomistic transactions between rational actors; they are influenced by trust, social networks, obligations and power asymmetries. An exemplary paradigmatic case of embedded economic action is that of farmer-commission agent, where the information asymmetry is not a market failure, but rather an inherent aspect of the social relationship.

Conceptualizing sustainable livelihood From a livelihood perspective, Chambers and Conway (1992) have defined sustainable livelihood as the one that is able to endure and bounce back to its position after experiencing stresses and shocks whilst not losing its capabilities and assets. Information is a strategic skill that increases the capacity of the household to make strategic decisions, access markets, negotiate lower prices and adjust to the dynamism of situations. Market information access is not just about making more profit but about creating livelihood resilience and lessening vulnerability.

Access to Information and Farm Results

Empirical evidence has shown that access to information has a positive effect on farm productivity, profitability and efficiency. Ahmad et al. (2007) discussed the effect of extension service on the farm productivity of District Swat, Khyber Pakhtunkhwa, Pakistan. They used t-tests to compare the productivity of farmers with and without access

ISSN Online: 3007-3154
ISSN Print: 3007-3146

to the extension using primary data (n=100) and systematic random sampling. Their findings indicated that extension services were able to boost the output of rice by 61 percent, onion by 47 percent and tomato by 37 percent. Interestingly, but significantly, the impact on the productivity of plum and peach was not significant, which shows the peculiarities of orchard-based agriculture and the necessity of the crop-related information systems.

Lwoga et al. (2011) researched the access and use of agricultural information and agricultural knowledge in remote Tanzanian villages by farmers. On semi-structured interviews, participatory methods, and focus groups, they were able to identify that information-seeking and knowledge requirements were very much location-based on 181 farmers in six districts. Neighbors, friends and family were the largest sources of information with the extension department services coming next. The advanced technologies that were identified as having potential were mobile phones and radio, and the use of printed materials was very low. Notably, they ended up concluding that information and knowledge enhance livelihoods in the rural and urban settings but the pathways as well as obstacles vary greatly depending on the setting.

Abdul-Salam and Phimister (2017) investigated the efficiency impacts of information access to small-scale agriculture in Uganda. With panel data and a standard stochastic frontier model with a technical efficiency model, they developed an index of the ability of farmers to use information through a two-parameter Rasch model. Their results showed a statistically significant and positive correlation between access to information and ability of a farmer to access it and farm efficiency. The average efficiency of farmers with more access to information was 90, which is about 33 percent more than the efficiency of farmers with less access. That is a large difference, implying that access to information itself can shift a farmer who is far below average to along the efficiency frontier.

Rehman et al. (2013) studied the effect of farmers' socio-economic characteristics on access to agricultural information in Pakistan. They used primary data, consisting of subscribers to the three leading agricultural magazines in Punjab Province (Ziraat Nama, Jadeed Ziraat and Kissan), and had 361 respondents, which included print media and fellow farmers as sources of agricultural information. What is more important, their regression analysis revealed that the size of landholding and education level were significantly and positively correlated with the access to agricultural information but not farming experience and age. This result is critical: it implies that access to information is not only a matter of time in the profession, but it is systematically biased in favor of more asset-rich and educationally rich people.

Intermediaries in Information and Power Relation

One of the themes that have been repeatedly using the literature is the place of intermediaries, such as commission agents, brokers, wholesalers, input dealers, who mediate the flow of information between markets and farmers. These agents carry out critical roles: aggregation, transport, quality evaluation, price discovery and in many cases credit provision. Nevertheless, they also have a structurally strong position. Khan and Khan (2014) examined the production and marketing expenses of peaches in District Swat, using primary data gathered on 270 farmers in the most productive villages (Barikot, Charbagh, Khwaza Khela, Matta, and Kabal) in the 2010-2011 crop year. They added the cost of production (hoeing, pruning, manure, irrigation, pesticides and labor), and marketing (empty carton, grading, picking, decoration materials, transportation, loading and unloading). Their results showed that the average per-acre costs of production amounted to PKR 34,100 and average per-acre costs of marketing were PKR 94,955 almost

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

three times less. The unit price was in PKR 267 per carton and the net profit was PKR 121,455 per acre. Most importantly, they found the significant limitations to farmers are unavailability of market information, perishability of peaches, natural disasters, high cost of inputs and unavailability of funds, high transportation expenses, and fluctuation in prices in domestic markets. The first listed was the lack of market information, which implied its perceived priority by farmers themselves.

The study conducted by Svensson and Yanagizawa (2009) was based on the effect of a market information service that was initiated in Uganda in 2001 in 21 districts. The dissemination of information was carried out using different radio stations in eight local languages. They compared the average price of maize at the farm gate between July 2004 and June 2005 using the Uganda National Household Survey 2005 and concluded that in project districts, the average farm-gate price of maize increased by one small, but statistically significant, percentage point above the price in the rest of Uganda, to 191 Uganda shilling per kilogram. More significantly, they established that market information services result in more farm-gate price, which gives direct testimony that information interventions can become a shifting the terms of trade to the benefit of the producers. Nevertheless, they also observed that the benefits were not equally distributed; those farmers who had better access to radio, were more literate and had closer market place benefited more.

Using primary data of five towns in Nsukka Local Government Area of Enugu State in Nigeria, Obidike (2011) specifically looked at the issues affecting rural farmers in accessing farm information. The study listed various impediments through random sampling of 20 farmers per town and descriptive statistics; the lack of road access by the extension workers to the villages, bad television and radio signal, no money to buy newsletters, bad PR of the extension officers, no electricity to most villages, illiteracy, and the inability of radio and television stations to broadcast agricultural information in the local Nsukka language. This research is useful since it goes beyond economic factors to capture the real, lived obstacles that hinder the flow of information to rural producers.

Institutional failure and Structural Constraints

The literature has consistently cited the existence of structural constraints which mediate or censor access of information even in cases where there is technical existence of information sources. Das (2014) explored the use of information and communication technology (ICT) to gain access to agricultural information in India based on the data of the National Sample Survey Organization that comprised 517,770 farm households. The researchers concluded that radio continued to be a more significant channel of distributing information about agriculture as compared to television or newspapers. Smallholders had much less access to agricultural information as compared to larger farm holders. Moreover, access to agricultural information using ICT was more likely to be used with the level of education and formal training. This observation supports the cumulative advantage theory: the more advantaged one is, the more he or she is in a position to embrace new technologies that would leave him or her in a better position.

Adio et al. (2016) investigated the use of the agricultural information sources and services by farmers to boost farm production in Kwara State, Nigeria. A stratified random sampling and purposive process were used to choose a sample of 447 out of a population of 55,522 respondents in six local government areas in a survey design. The sources of information available were found in the study to be: colleagues, town criers, mobile phones, television, film shows, radio, media, and family relations. The main goal of accessing these sources of information by farmers was to enhance productivity. The research is especially

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

remarkable in that it records the heterogeneity of sources of information, even in a comparatively resource-limited environment, but also states that not all sources are as accessible and trusted.

The estimates of output supply and input demand elasticities of rice production in Pakistan were developed by Junaid et al. (2014) based on the primary data collected in three villages, Gujranwala District, Punjab. Their results showed using a normalized restricted translog profit function on a sample of 100 farmers that there was a positive and elastic response to the rise in rice price: a 1 percent rise in rice price raised output supply by 1.873 percent. Elasticities of output to land, education, fertilizer price and irrigation cost were 1.274, 0.169, -0.873 and -0.953 respectively. The changes in the price of fertilizer, education, the cost of land, the price of output, and the cost of irrigation had elasticity of profit of 1.101, -0.832, 0.200, 1.920, and -1.13 respectively. The study has methodological significance as it illustrates how normalized profit functions can be used to examine price and non-price variables influencing farm outcomes-the same methodological approach that is used in the current study.

Nguyen and Jolly (2010) employed the normalized profit function and the adaptive expectation method in the analysis of the supply of catfish farm in the United States. Jorgenson and Lau (1974) first estimated the normalized profit function which yielded short and long run supply elasticities of 0.25- 0.26 and 0.47-2.1 respectively. Their findings indicated that the size of farms and cost of feed were important and positively correlated with catfish supply, but the negative effects were on the price of feed and wage rate. In the long-run, the pond area responded to price incentives. The presented study offers the immediate methodological precedent to the present study, as it has shown that the normalized profit function can be used effectively to study the supply response within a specialized production system in agriculture.

Public Extension Institutional Failure

The ineffectiveness of public agricultural extension systems in third world countries is not new. Bajwa et al. (2010) examined the success of extension strategies applied in the approaches of Farmers Field School in Punjab, Pakistan and discovered that although participatory strategies were promising, the whole system of extension was hierarchical, underfunded and not based on the needs of farmers. The programs that had been launched and implemented during decades, such as the Village Cooperative Movement, the Village Agricultural Industrial Development Program, the Basic Democracy System, the Training and Visit Program, etc., were canceled one by one without any real analysis of their effectiveness. The programs were substituted by other ones, instead of being systematically enhanced on the basis of evidence. This institutional turnover has made farmers cynical towards public extension and dependent on informal sources.

Okunade (2007) evaluated the effectiveness of extension teaching methods in knowledge, skill and attitude acquisition to women farmers in the Osun State in Nigeria. The research also discovered that the fundamental role of an extension agent, to share information in a timely fashion to assist farmers to become aware of emerging technologies and consequently encourage the adoption of these technologies was not being fulfilled successfully. The disparity between the intended role and the actual performance of extension systems is a theme that is common in many contexts of countries.

Research Gap and contribution of this study

The above reviewed literature offers compelling evidence that access to information is important to farm outcomes, that intermediaries are a potent force in information flows

ISSN Online: 3007-3154
ISSN Print: 3007-3146

and that structural constraints and institutional failures systematically disadvantage poorer, less educated, and more remote farmers. Nevertheless, there is still a great gap.

To begin with, the majority of available literature is on annual crops (rice, maize, cotton) as opposed to perennial crops that are grown on orchard. The production cycles, marketing arrangements, and information requirements of peaches and other fruits are different. Due to long-term investment, and the realization of fruit over a number of years, the impacts of information asymmetry are especially severe in the case of orchard crops. Second, although there is a substantial body of literature that recognizes intermediaries, only a few studies have quantitatively reported the extent of information divide and its influence in a single integrated framework on profitability. Third, there is no specific study that has used a sociological perspective to the issue of market access to information among peach farmers in Pakistan and more specifically in District Swat; the most significant fruit-producing area in the country.

This research fills these gaps by: (i) narrowing down to peach farmers in District Swat; (ii) gathering primary data on information sources, cost of inputs, output prices, and profitability; (iii) comparing informed and uninformed farmers in a variety of socio-economic measures; (iv) estimating a normalized profit relationship to isolate the role of information and other factors; and (v) interpreting the findings in the

Data and Empirical models

Research Design and Data Collection

The cross-sectional survey design was used. The primary data was gathered among peach farmers in Tehsil Matta, District Swat, Khyber Pakhtunkhaw, the country of the largest peach production. A formatted interview guide (see Annexure-1) was created, tested on 15 farmers, and given in the local language (Pashto) so as to be understandable and culturally competent. The 2018-2019 cropping year was the data collected, computerized in Excel, and analyzed with SPSS.

Population and Sampling

The number of peach farmers in total was 5,000 in 13 Union Councils of Tehsil Matta (Agricultural Extension Department, Swat). Using an online sample size calculator (www.surveysystem.com) with a 95% confidence interval, a sample size of 357 was determined. There was a cluster sampling method with each of the 13 Union Councils being a cluster. In order to have sufficient representation, 28 farmers in each cluster were randomly chosen and this led to a final sample size of 364 respondents.

Conceptual and Empirical Framework

A risk-averse farm household is conceptually assumed to maximize utility (well-being) as a function of profit (π) which is a function of output price (P), input costs (w) and production technology (Sandmo, 1971). When there is no perfect price information, the farmers experience price uncertainty and make decisions based on expected utility. When market information is available, this uncertainty is minimized and the farmer would prefer a larger output price which would earn him/her more profits hence leading to better socio economic well beings.

A normalized profit function was adopted to empirically estimate the effect of information and so other farm specific factors on profitability, as was adopted by Jorgenson and Lau (1974) and Nguyen and Jolly (2010).The model is specified as:

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

$$\ln\pi^* = \ln A^* + \gamma_1 \ln P_s + \gamma_2 \ln P_u + \gamma_3 \ln P_d + \gamma_4 \ln P_m + \gamma_5 \ln P_c + \gamma_6 \ln P_t + \gamma_7 \ln Ora + \gamma_8 \ln np + \gamma_9 \ln tla + \gamma_{10} \ln orag + \sum_{i}^{1} \delta_i D_i + \epsilon_i$$

Where $\ln\pi^*$ is the normalized profit while normalized profit function is obtained by dividing profit by output price (Jorgenson and lau,1974), P_s is the normalized pesticide spray cost, P_u is the normalized price of urea fertilizer, P_d is the normalized price of dap fertilizer, P_c is the normalized commission agents charges, P_t is the normalized transportation charges normalized by output price, Ora is the orchard area, , np is the number of peaches plants, tla is the total land area, $Orag$ is the orchard age, D_i is the dummy variables which is farmer access to output price information and ϵ_i is the error term.

Is the orchard area, $Orag$ is the orchard age, Np is the number of orchard plants, D_i is the dummy variables and u_i is the error term and using ordinary least square method for model.

Results and Discussion

Structural Constraints to Agricultural Activities

Table 4.1 indicates profound structural problems. Even more alarmingly, an astounding 86.3% of farmers are unhappy with the existing public agricultural extension department, which signifies a total institutional failure in terms of providing knowledge. As a result, farmers depend on the private sector, which mostly consists of commission agents, in critical decisions. The high input costs (99.5%), the complete absence of institutional credit (100%), is not merely an economic issue; it is a structural dependence-creating factor. The informal credit relationship between farmers and commission agents and input dealers forces farmers into relationships of power imbalances, which likely influence their bargaining power and access to information. The fact that three-quarters of them believe that the prices of peaches have been rising (with costs rising faster) indicates that smallholders have a typical terms-of-trade issue.

Table 4.1 Structural Constraints to Agricultural Activities

Constraints	Respondents	Percentage
Satisfied from Agriculture department	314	86.3
High Agriculture input cost	362	99.5
Restriction on fertilizer	364	100.0
Loans not obtained from bank	364	100.0
Not enough capital	102	28.0
Peaches price is increasing	332	91.2

* Source: Authors own calculation with survey data.

Social Structure of Access to Information

Table 4.2 illustrates a very concentrated and even vulnerable information system. Nine out of ten of farmers use only the commission agents as their source of output price information. This forms a typical patron-client association in which the intermediary possesses a vital resource (price knowledge). Although the farmers complain that they are getting the right information, this reliance gives the commission agent a very high level of power in the transaction, which may be to fix the price or to send the farmers to the markets

Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

that will be the most profitable to the agent. The 10 percent most uninformed people are the most marginalized and vulnerable in this system.

Table 4.2 Social Structure of Access to Information

Source of output price information	Respondents	Percentage
Commission agent	329	90.4
No Access / Not Informed	35	9.6

* Source: Authors own calculation with survey data.

Socio-Economic Disparities, Informed and Not Informed Farmers

The following tables provide powerful evidence of socio-economic stratification based on information access.

4.3.1 Asset Base

Informed farmers have a much larger scale, a larger total land area (2.38 vs. 1.18 acres, $p<0.01$), area under orchard (2.07 vs. 0.91 acres), and more peach plants (397 vs. 176). Access to information does not spread randomly; it is linked to higher wealth of assets implying a cumulative advantage.

Economic Well-being

Total annual income (PKR 880,000 vs. 474,000) and income specifically in their orchard (PKR 572,000 vs. 154,000) are higher by far with informed farmers. Most importantly, the other income is less among informed farmers, which implies that informed farmers orchard farming is a primary livelihood source, but off-farm activities, which have less returns, are more likely to be relied on by uninformed farmers.

Profitability and Output Price

This is the socio-economic output. Profitability per acre of informed farmers (PKR 401,970) is almost 2.7 times as that of uninformed farmers (PKR 150,750). Likewise, their mean price per-carton (PKR 458.14) is 52 times more than that of ignorant farmers (PKR 300.70). This is not merely a question of profit; it is also a question of basic difference in the ability to invest in household nutrition, education, health and future farm productivity. The statistical significance ($p<0.01$) is a strong indicator of information dividend.

Table 4.3.1 Asset Base

Variable	Means		T-test (Prob)	
	Informed	Not-Informed	T	Sig
Total land	2.38	1.18	4.721	0.000
Orchard area	2.07	0.91	4.903	0.000
Number of plants	397.31	176.31	4.888	0.000
Age of orchard	7.26	6.91	0.737	0.465

* T-statistics is derived assuming that the variance is not equal.
* Source: Authors own calculation with survey data.

Table 4.3.2 Economic Well-being

Variable	Means		T-test (Prob)	
	Informed	Not-Informed	T	Sig
Total annual income	880000	474000	5.756	0.000

Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

Income from orchard	572000	154000	6.363	0.000
Other income	276000	314000	1.135	0.260

* Source: Authors own calculation with survey data

Table 4.3.3 Profitability and Output Price

Variable	Means		T-test (Prob)	
	Informed	Not-Informed	T	Sig
Per acre profitability	401970	150750	5.852	0.000
Average output price	458.14	300.7	12.450	0.000

* Source: Authors own calculation with survey data.

Multivariate Analysis, Factors Affecting Profitability

The Ordinary Least Squares (OLS) estimates of the normalized profit function are in the Table 4.4. The model attributes 83% of the variation in the profitability of peaches (R-squared = 0.830), which is large given the cross-sectional data at the farm level. The outcomes demonstrate the impact of different input prices, fixed assets and price information availability on profitability.

Input Prices (Negative Effects), as economic theory predicts, all the variable input prices are negatively related to profitability. The normalized pesticide spray cost (NPPAP) is negative and statistically significant (coefficients: -0.190, $p < 0.05$). When the cost of pesticides goes up by 1 percent, it decreases profitability by 0.19. The normalized urea fertilizer price (NUFP) is negative and significant (coefficient: -0.340, $p < 0.10$). An increment in urea price (1 percent) decreases the profitability by 0.34. The price of normalized DAP fertilizer (NDEP) has a negative and significant (coefficient: -0.288, $p < 0.05$) value. One percentage of DAP price decreases profitability by 0.29. The normalized manure price (NFYMP) has a negative value which is non-significant (coefficient: -0.005, $p = 0.814$).

The normalized commission agents charges (NCAC) are negative and extremely important (coefficient: -0.483, $p < 0.01$). One percent increment in the commission charges will decrease the profitability by 0.48. This is a measure of the economic price of requiring intermediaries. The normalized transportation charges (NTTC) are also negative and noteworthy (coefficient: -0.134, $p < 0.01$). An increase in transport costs by 1 per cent decreases profitability by 0.13.

Fixed Assets (Positive effects), Profitability is positively and statistically related to all the fixed asset variables. The positive and significant coefficient is orchard area (ORA) (coefficient: 0.132, $p < 0.05$). The profitability increases by 0.13 with a 1 percent increase in orchard area. The positive and highly significant coefficient of number of peach plants (PEP) is: 0.772, $p = 0.01$. The plant density is the most powerful of the asset variables because it generates profitability at an increased rate of 0.77 at 1% increment. The total land area (TLA) is positive and significant (coefficient: 0.024, $p < 0.05$). Given a 1 percentage point growth in total landholding, profitability increases by 0.02, which is not that substantial. The age of orchard (OAG) is positive and significant (coefficient: 0.201, $p < 0.05$). Increasing the age of orchards by 1 per cent enhances profitability by 0.20 due to increased productivity of mature trees.

Price Information (Key Variable), The most significant variable in the study is access to price information (INF) which is a dummy variable (1 = informed, 0 = not informed). It has a positive and significant coefficient (coefficient: 0.286, $p < 0.05$). In the absence of other factors, farmers who have access to output price information enjoy 28.6% increase

Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

in profitability. This observation proves the fact that availability of market information is not only beneficial but revolutionary to peach farmers in District Swat.

Table 4.4 Multivariate Analysis, Factors Affecting Profitability

Variables	Coefficients	Std.Error	P-values	t-values
(Constant)	2.490	0.347	0.000	7.179
log of NPPAP	-0.190	0.118	0.037	-1.615
log of NUFP	-0.34	0.019	0.068	-17.89
log of NDEP	-0.288	0.136	0.035	-2.115
log NFYMP	-0.005	0.013	0.814	-0.374
log of NCAC	-0.483	0.050	0.000	-9.748
log of NTTC	-0.134	0.040	0.001	-3.333
log of ORA	0.132	0.061	0.012	2.178
log of PEP	0.772	0.067	0.000	11.522
log of TLA	0.024	0.008	0.042	3.000
log of OAG	0.201	0.091	0.028	2.208
INF	0. 286	0.128	0.026	2.234
R-squared 0.830		NO: Obs 364		

Sources: Authors own estimation with survey data.

Conclusion and recommendations

Conclusion

This paper offers a sociological reflection of availability of market information and its far-reaching socio-economic implication on peach growers in rural Swat, Pakistan. The results indicate that there is a sharp information gap which is systematically related to economic well-being. With price information at their disposal, farmers experience a much better per-acre profitability and per-carton prices, leading to higher household income and a lower dependence on precarious off-farm employment. This information dividend is not just an economic efficiency gain; it is literally a better livelihood security and social equity.

In its turn, the research reveals a structural dependency that is very deep-rooted. The full breakdown of public extension services, and the complete absence of institutional credit has left a vacuum that has been filled by a near monopoly of commission agents as the only source of price information to 90 percent of the farmers. This patron-client relationship, which can be measured by the high negative effect of commission charges on profitability, systematically moves value off the primary producer. The asymmetry of information is not a chance; rather, it is the structural foundation of the power of the intermediary.

The analysis supports that the access to information is a strong predictor of economic outcome, competing with and interacting with traditional assets such as land. It is thus not a peripheral intervention but a core antipoverty and rural development strategy to address this information gap.

Dialogue Social Science Review (DSSR)
www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 1 (January) (2026)

Recommendations

On the basis of these results, the following recommendations can be suggested:

Reform and Re-focus Public Agricultural Extension: The present system has broken down. The extension model required is a new, decentralized and demand-driven one. This model should also focus on the distribution of the real time market prices (through mobile phone, radio and community boards) rather than the transfer of technology on top-down basis. The retraining of extension agents should be done as market facilitators.

Enhance Pluralistic Information Systems: To eliminate the monopoly of commission agents, information services that are owned and controlled by farmers or cooperatives must be encouraged. This may involve the provision of subsidized access to market price applications, periodic broadcasting of prices by local FM Radio and Da Hawa Pa Chapu and placing of market information displays in village councils.

Overcome the Credit Constraint: It is a serious policy failure that 100% of farmers are not sable to obtain bank loans. The government should embark on horticultural-specific agricultural credit programs with simplified low-interest and low collaterals. This would make the farmers less financially dependent on commission agents and input dealers, and enable them to demand independent information and higher prices.

Invest in Farmer Education and Capacity Building: To make use of information, it must be understandable and actable. The integration of literacy and numeracy programs with agricultural training on cost benefit analysis, marketing and quality standards will help the farmers become more able to make use of information.

Future Research: There is an urgent need to conduct a qualitative, ethnographic research in order to map the exact social dynamics of the farmer-commission agent relationship. It is essential to know the unwritten rules, social rules and processes of control in this system in order

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