

TAXING THE RENTAL INCOME IN AGRICULTURE: ANALYSIS OF ALTERNATE OPTIONS

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ABSTRACT

The interplay of land tenure system and land management practices is a complex and context-specific issue with significant implications for agricultural development and rural livelihoods. The present research investigates the influence of land tenure systems on land management practices in Punjab, Pakistan, explicitly investigating the factors governing land renting decisions while examining the economic implications of absentee landlords on effective resource use technology adaptation and tax collection. Globally, the canon of taxation has been used with dual objectives: Taxation is the primary source of income generation worldwide, as it has also been used for policy-level regulations/incentivization. Pakistan lags far behind in taxing individual income, especially agricultural income. In practice, the tax on agriculture is not an income tax but a land tax in Pakistan. This study also investigates the incentives/ causes of renting out land and the possible implications of absentee landlords on water management and technology adoption. Similarly, it examines the tax compliance behavior of tenants, own-croppers, own-cum tenants, and absentee landlords. In addition, it aims to explore the agricultural tax collection estimates and the institutional barriers in tax collection. The primary data was collected through a cluster sampling technique from 436 farmers (owners, tenants, and own-cum tenants) and 121 lessors through a well-structured questionnaire from four selected districts in Punjab. The data were analyzed using multinomial logit, ordered probit, and logit model. The research finds that livestock, cultivated areas, and family labor have significant positive impact on leasing decisions, education, and distance to market. The government subsidy also positively impacts land water management practices and technology adoption. The study's findings show that knowledge about tax, satisfaction with tax authorities, tax contribution to society, tax contribution to the agriculture sector, social benefits, and education positively affect tax compliance. Thus, the estimation of tax collection carried out in this study suggests a potential of Rs. 79 billion agricultural income tax in Punjab. Thus, various factors contribute to the poor collection of agricultural taxes, including poor administration structure and farmer compliance behavior. The tax authority should take steps to enhance the tax compliance rate.

PREFACE

The proportion of absentee landlords in Pakistan is increasing for various reasons, especially in Punjab, where landlords (especially the large farmers) stay away from practical farming by involving tenants/leases, which can lead to inefficient use of farm resources and negatively impact agricultural productivity. The present research investigates the influence of land tenure systems on land management practices in Punjab, specifically focusing on the factors leading to land leasing decisions. On the other side, agribusiness is expanding due to changing land rentals. Under such a scenario, a review of tax policies and the agricultural markets' system needs is inevitable. Similarly, it could be interesting to explore the tax compliance behavior of the farmers to understand their knowledge and trust towards the existing tax system and responsibility towards society. Similarly, reviewing the tax collection mechanism at the tehsil and mauza levels could help understand hindrances in tax collection at the field level. Consequently, this study helps to tailor the tax policies to enhance tax collection based on the information gathered from farmers and local tax administration.

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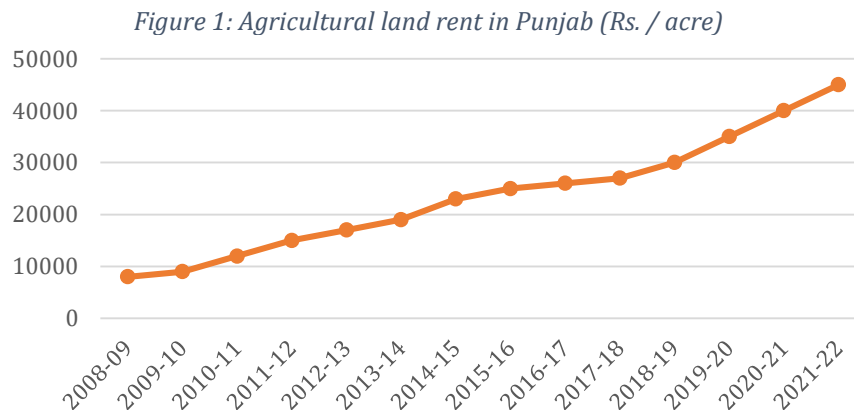
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INTRODUCTION

Agriculture is a vital sector for Pakistan's economy, contributing about 42% of the labor force, and around 65% of the population depends on agriculture for their livelihood (GOP, 2021). However, the land distribution in Pakistan is highly skewed, with a small number of large landowners holding a maximum portion of the agricultural land. According to the (GoP, 2010) and studies by (Naseer et al., 2016), only 2% of large farmers hold 45% of the land. These large landholders dominate land ownership and have better access to off-farm income opportunities, creating a significant disparity between them and most landless or smallholder farmers who struggle to secure additional land for their livelihoods. This uneven land distribution contributes to substantial social and economic disparities in rural areas.

High land concentration is associated with land absenteeism, where owners do not reside on or directly manage their land, negatively impacting farm productivity and agricultural surplus distribution (Boberg-Fazlić et al., 2022; Dower & Pfütze, 2020; Keswell & Carter, 2014). Historical data shows increased tenancy, particularly in Punjab, raising concerns about absentee landlords. While some studies (Deininger et al., 2022; Ali et al., 2012) suggest that transferring land to motivated small farmers improves efficiency, others highlight adverse effects on productivity and irrigation investments in developing countries (Ali et al., 2012; (Kumari & Nakano, 2016). Secure land rights and long-term contracts boost farm efficiency and yield (Jacoby & Mansuri, 2008). The motive to participate in land rental markets differs in developing economies, with smallholders competing with corporate farms (Han et al., 2021). Successful long-term leasing arrangements are facilitated by access to credit, family labour, and better land characteristics (Rashid & Sheikh, 2015).

As agricultural land rents are rising (Figure 1), renting out agricultural land has led to the issue of absentee landlords who have a less personal connection to the ground and the people who work on it and grab the rent. Absenteeism results in a lack of interest in the farm's long-term success, leading to short-term thinking and a focus on quick profits over sustainable practices. Thus, a need for more access to local resources, services, and information could influence the farm's productivity. Taxing absentee landlords may provide a significant source of revenue for the government, which can be used to fund public services, infrastructure development, and other essential community needs (Lee, 2019). Thus, developing countries need a comprehensive agricultural income tax system under changing agribusiness structures and land markets (Sengupta & Rao, 2012).



Source: GOP (2022).

Worldwide, there are differences in the taxes imposed on agricultural land and rental revenue. While some nations apply land taxes, others tax rental income directly. Landlords who are absentee—that is, who do not live on or oversee their property—often encounter distinct tax consequences. Due to computation difficulties, taxes on agricultural revenue can be complicated, while land taxes are fixed. To avoid underutilization and inefficiencies in agriculture, ensure equitable resource allocation, and increase overall production, absentee landlords must be effectively taxed.

There are reported taxation issues in agriculture (Nasim, 2012; OECD, 2022; Salam, 2022). Under such conditions, agrarian income tax under different tenancy arrangements and its compliance in Pakistan is of prime importance. Revenue generation influences the welfare and living standards of the citizens, delivery of social services, investment in infrastructure, and economic development of the country. (Guerra & Harrington, 2018). Taxation is a sustainable source of government income, ensuring wealth redistribution and equitable growth (Mittone & Saredi, 2016).

Taxation on agricultural income or land varies globally. Some countries levy land taxes, while others opt for income taxes. Land tax is fixed and straightforward, whereas agricultural income tax faces calculation issues. A mix of both might be ideal. In Egypt, taxes are on land rents, while countries like Chile, Croatia, Australia, and Nepal tax gross agricultural income (OECD, 2020). Developed countries have a high tax-to-GDP ratio, but in Pakistan, it is just 9.1%, with direct tax contributing 4.3% (OECD, 2022).

In Pakistan, agricultural income taxation is contentious, as rural areas depend on agriculture and large landholders evade taxes. Effective agrarian taxation should be simple and managed locally (James, 2004). Provincial governments handle agricultural taxation, but it is poorly implemented, generating minimal revenue (Nasim, 2012). Forecasted revenues could be significant if properly collected (Salam, 2022).

Poor tax collection is due to outdated administrative structures and compliance issues. Tax compliance depends on farmers' knowledge, perception, and attitudes (Sebele-mpofu & Chinoda, 2019). The Theory of Planned Behavior explains farmers' tax compliance, influenced by attitudes, subjective norms, and perceived control (Ajzen & Fishbein, 1970; Ramayah et al., 2009). Effective taxation requires understanding these behavioral factors.

In conclusion, the literature emphasizes the multifaceted nature of land rents, leasing decisions, and agricultural taxation. Understanding these dynamics is crucial for fostering equitable relationships between landlords and tenants, promoting sustainable agricultural practices, and establishing effective taxation systems to support rural development.

REVIEW OF LITERATURE

High land concentration is also associated with land absenteeism, where landowners do not reside on or directly manage their land. This absenteeism negatively impacts farm productivity and leads to an imbalance in the distribution of agricultural surplus, as documented by (Boberg-Fazlić et al., 2022; Dower & Pfütze, 2020); Keswell & Carter, 2014). Absentee landlords often neglect the land, leading to underutilization and inefficiency in agricultural practices.

Historical data indicates that tenancy trends have increased over time, particularly in Punjab. Mohammad & Qureshi (1987) and (Naseer et al., 2016), reported that farms ranging from 50 acres to 150 acres farms ranging from 150 acres and above were operated under a tenancy at 41% & 67% respectively. This trend raised concerns about absentee landlords, who often lack a direct stake in the productivity and efficient utilization of resources.

Global literature on land tenure and productivity portrays a mixed picture. Some studies like (Ali et al., 2012), and (Deininger et al., 2022), suggested an increase in allocative efficiency and production by transferring land from less motivated but affluent farmers to small farmers with ample family labor. (Jin & Deininger, 2009) and (Lohmar et al., 2001) have highlighted the more effective use of potentially idle land when rented to more diligent smallholders. Additionally, research by (Feng et al., 2010) indicated higher use of chemical fertilizers on the lands that have been rented out with no adverse impact on yield in the short run.

Conversely, various studies have reported adverse impacts of land tenure systems, especially in developing countries (like Pakistan, India, and other Asian and African countries), on productivity and irrigation investments (Ali et al., 2012; Kumari & Nakano, 2016; Akram et al., 2019a). These studies also termed secure land rights, such as long-term contracts and ownership, are crucial for encouraging investments in soil quality and productivity-enhancing measures, thus boosting farm efficiency and yield (Jacoby & Mansuri, 2008). Sharecropping arrangements, in particular, are associated with reduced productivity and resource use efficiency, as shown by (Kassie & Holden, 2007; Besley & Ghatak, 2010). Nonetheless, some studies, like those by (Lawry et al., 2017) and (Ghebru & Holden, 2013), have reported positive impacts of secure land tenure on income, welfare, and consumption patterns, ultimately improving overall livelihoods.

The motive to participate in land rental markets differs in developing from transitional economies where small farmers have to compete for land with corporate farms (Han et al., 2021). Smallholders with better access to assets (Machinery, etc.) tend to rent in the land more (Abate & Schaapp, 2022), whereas farmers belonging to clusters also have more tendency to rent in. Literature suggests that the capacity to adopt legal arrangements, awareness of government policies (legislation), and access to credit facilitate successful long-term land leasing arrangements. Similarly, family labor, availability, and the skill set available to perform specific operations have been found to facilitate land leasing arrangements (Adenuga et al., 2021; Akram et al., 2019b). Other studies, like (Rashid & Sheikh, 2015), attached a higher value and probability of leasing to lands having better location and physical characteristics like fertility, access to surface water, and good-quality groundwater.

Taxation on agricultural income or land is implemented in different ways across the different countries of the world. Many countries tax agrarian land, while others have opted for income tax. Land tax is paid in lump sums; thus, it is equivalent to fixed rent or debt payments irrespective of

circumstances, whereas agricultural income tax has calculation problems. Therefore, a mix of land and output taxes could be preferred in agriculture. In Egypt, farmers pay taxes on the land rents received under tenancy contracts (Mohammad & Qureshi, 1987). While in several other countries, agricultural income is treated like income from other sources and is taxed equally. Chile taxes gross agricultural income at 25 percent, Croatia at 24 percent, Australia at 16 percent, and Nepal at 25 percent of the gross income (OECD, 2020). Moreover, the tax-to-GDP ratio in developed countries is nearly 40 percent, while personal income tax contributes 23 percent of government revenues. However, Pakistan has just 9.1 percent of revenue as a percentage of GDP, while direct tax contributes just 4.3 percent to revenues, of which income tax is a meager part (OECD, 2022).

Farmer's tax compliance is based on tax knowledge, perception, and attitudes (Sebele-mpofu & Chinoda, 2019). Tax compliance behavior is also considered a social contribution and a psychological contract (Alm et al., 2012). Attitude toward tax compliance depends on the potential of trust in government, justice perceptions, and the socioeconomic status of the taxpayers (Hartmann et al., 2022). Many internal and external factors that impact farmers' compliance with tax payment obligations relate to their willingness to collaborate with the local government and its institutions. However, economists are interested in external issues such as income, tax rates, and fines. The psychological study focuses on internal issues, including taxpayers' tax knowledge, attitudes toward the administration, personal norms, perceived social norms, and motivating tendencies toward fairness (Mensah et al., 2020).

2.1 Research Gap

The studies reported above have found the implications of tenancy arrangements on crop yield and soil fertility. Still, they have not informed the determinants of leasing decisions, resource use efficiency, technology adoption, and access to agricultural services and inputs. Similarly, changes in rental markets have implications for tax collection. Thus, investigating the existing tax system for effective agricultural tax under changing agricultural rental is immensely important. Therefore, the specific objectives of the projects are as follows:

- Investigate the causes of renting land and the possible implications of absentee landlords' land on water management and technology adoption.
- Tax collection estimates under various tenancy arrangements.
- Analyze the farmers' compliance behaviors towards agricultural income tax under various tenancy arrangements.
- Examine the institutional hurdles in agricultural income tax collection.

RESEARCH METHODOLOGY

3.1 Data Collection

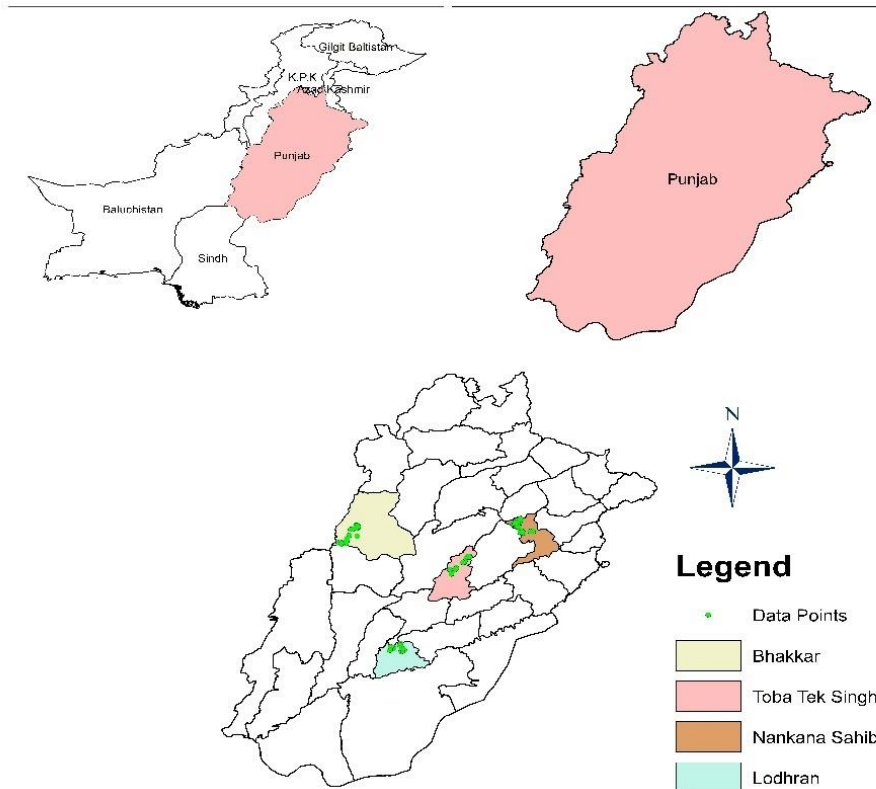
This study employs various research techniques to meet the objectives. The primary data is collected through a multistage sampling scheme from respondents in Punjab through a well-structured questionnaire via 'Kobocollect'. Two teams of enumerators were trained for data collection. The questionnaire contains information on land tenure systems, land management practices, farmers' leasing decisions, and taxation (Annexure B). Four districts from Punjab, Lodhran (Cotton-Wheat zone), Bhakkar (Low-intensity Punjab), Toba Tek Singh (Mix zone), and Nankana (Rice-Wheat Punjab), (Figure 2) were randomly selected from each region. A mix of respondents (tenants: 20%, sharecroppers: 20%, owners: 60%, and relevant absentee landlords) were chosen as feasible representative of the four classes to be included in the study. From each district, one tehsil and two mouzas were randomly selected. The respondents were 557, with 436 farmers (owner, tenant, owner-cum-tenants) and 121 lessors (Table 1).

Table 1: District and category wise distribution of data

| Districts | Categories | | | | Total |
|--------------|------------|------------|------------------|------------|------------|
| | Owner | Tenant | Owner-Cum-Tenant | Lessor | |
| Lodhran | 61 | 30 | 34 | 20 | 145 |
| Bhakkar | 74 | 24 | 25 | 24 | 147 |
| TT Singh | 44 | 31 | 22 | 38 | 135 |
| Nankana | 50 | 22 | 19 | 39 | 130 |
| Total | 229 | 107 | 100 | 121 | 557 |

Source: Author's own calculations.

Figure 2: Geographical locations of the respondents



Source: Author's own calculations.

3.2 Econometric Techniques:

3.2.1 Investigate the Causes of Renting Land

To investigate the renting-out decisions, we employ multinomial logistic regression. The dependent variable (Y) represents the type of tenancy status of the farmer.

Literature suggests that several factors may influence the leasing decisions of a farmer/ landlord, including the availability of labor, primary occupation, age, education, land type, distance from land, access to road and credit, rent in the area, etc. (Bawa & Callahan, 2021; Goswami, 2017).

Functional Specification of the Model:¹

The latent variable Y_i represents the categories of the farmers according to their tenancy status.

$$Y_i^* = \beta_0 + \beta_1 EDU_i + \beta_2 FAMT_i + \beta_3 DISM_i + \beta_4 LSi + \beta_5 AGMACH_i + \beta_6 API_i + \beta_7 CA_i + \beta_8 FAMBi + \beta_9 DIST_i + \beta_{10} TYPL_i + \beta_{11} PSIN_i + \beta_{12} LNDR_i + U_i \quad (1)$$

U_i is the term for random disturbance, presumed to have a normal distribution with a mean of zero.

3.2.2 Implications of Absentee Landlords on Land and Water Management and Technology Adoption

The ordered probit model is employed to identify the factors affecting the adoption of land and water management practices and technology. The ordered probit model is a straightforward extension of the binary probit model that can be used in cases with multiple ranked discrete dependent variables (Munkin & Trivedi, 2008). When the dependent variable takes more than two values, but these values have a natural ordering, the ordered probit model is appropriate (Gailmard, 2014).

The dependent variables for the ordered probit model can be formulated as a threshold model with a latent dependent variable, as below:

$$Y^* = \beta^1 X + \varepsilon \quad (2)$$

where Y^* = unobserved dependent variable (while we cannot observe Y^* , we can observe only the categories of response), X = a vector of respondent characteristics, β^1 the vector of regression coefficients that we wish to estimate. It is assumed that ε , a vector of unknown parameters to be estimated is normally distributed with a zero mean. Eq. (2) can be used to specify the empirical model given in Eq. (3) below:

$$Y^* = \beta_0 + \beta_1 EDU + \beta_2 AGE + \beta_3 FMEM + \beta_4 FEXP + \beta_5 DISM + \beta_6 WEATH + \beta_7 CULAREA + \beta_8 LNDR_i + \beta_9 LLV + \beta_{10} DGS + \beta_{11} DBL + \beta_{12} HCD + \beta_{13} DIST_i + \varepsilon \quad (3)$$

where Y^* = Land and water management practices for the first phase and technology adoption of the second phase regression (ordered dependent variable with 0, 1, and 2).

3.2.3 Tax Collection Estimates under Various Tenancy Arrangements

To analyze the tax scenarios under various tax collection regimes, we employ scenario analysis of how tax collection is affected by multiple rates on absentee landlords.

3.2.4 Analyze the Farmers' Compliance Behaviors towards Agricultural Income Tax under Various Land Tenancy Arrangements

We employed the logit model developed by (Cox, 1959) and (Walker & Duncan, 1967) to study the determinants that affect farmers' tax compliance behavior toward agricultural taxation. In the binary

¹ Description of variables is placed at Annexure-II.

logit model, the dependent variable (Tax compliance behavior) is a dichotomous variable (yes=1; no=0), and the independent variables are in qualitative and quantitative form.

The Logit function can be derived from the odds ratio as follows:

$$\ln(\text{Oddsratio}) = \ln \frac{Y_i = 1}{Y_i = 0} = \ln \frac{p(y = 1)}{(1 - p(y = 1))} = \beta_0 + \beta$$

The logit function of the probability of adoption can be written as:

$$\ln \left[\frac{p(y = 1)}{(1 - p(y = 1))} \right] = \beta_0 + \beta$$

The empirical form of the model is as follows.

Y_i (Tax compliance=1, 0=otherwise) = f (age, education level, knowledge of tax system, farmers treated agri. tax, satisfied tax authorities, governance system, and justice, crime and conflicts, indirect taxes in agri., tax contribute to society, agriculture sector, the government listens to farmers, social benefits, and poor agriculture services).

3.2.5 Examine the Institutional Hurdles in Agricultural Income Tax Collection

Finally, a focus group discussion in each tehsil with relevant stakeholders including farmers and tax collection authorities is conducted to explore the institutional hurdles and suggest better tax policy measures under changing agricultural market conditions.

FINDINGS AND DISCUSSIONS

4.1 Investigating the Causes of Renting Land

Table 2 shows the descriptive statistics of the variables used to analyze the causes of renting land. It shows three categories of farmers. The owner category represents farmers who own and cultivate their land. Owner cum tenants are the farmers who own their land and rent-in the land to cultivate. The tenants do not have their land, but rent-in is used to cultivate the land. It shows that the average education of owner, tenant, and own-cum tenant, is 8.58, 7.02, and 8.71 years respectively. The average age is owner, owner cum tenants and tenants are 48, 45, and 39 years respectively. On the other hand, 43% of respondents live in the joint family system. The average farming experience is 17.85 years for all farming categories. The percentage of off-farm jobs and businesses other than agriculture is 19.5% and 13.7%, respectively. In addition, the owner, tenant, and own-cum tenant get updated weather, price, and production technology on the phone, which are 40%, 34%, and 30%, respectively. It further shows that the average farm acreage of the owner, tenants, and owner cum tenants is 11.23, 10.49, and 15.87 acres, respectively.

Table 2: Socioeconomic characteristics of farmers under different tenancy status

| Variable | Unit | Categories | | |
|---|------------|------------|--------|------------------|
| | | Owner | Tenant | Owner-Cum-Tenant |
| Education | Years | 8.82 | 7.02 | 8.71 |
| Family Type | Joint (%) | 48 | 45 | 39 |
| Distance to Agri. Market | Kilometers | 4.53 | 5.85 | 4.62 |
| Farming Experience | Years | 19.95 | 17.36 | 19.02 |
| Business other than agriculture | Yes (%) | 21 | 18.68 | 15 |
| Livestock | Yes (%) | 74 | 69.15 | 84 |
| Total Cultivated Land | Acres | 11.23 | 10.49 | 15.87 |
| Agri. Machinery | Yes (%) | 50.7 | 59 | 31.8 |
| Canal Irrigated Area | % | 10.48 | 12.14 | 4 |
| Tubewell Irrigated Area | % | 9.6 | 20.56 | 17 |
| Canal + Tubewell Irrigated Area | % | 78.6 | 67.28 | 79 |
| Barani/Rainfed Area | % | 1.31 | 0 | 0 |
| Rent of Canal Irrigated Area | Rs./Acre | 0 | 99,000 | 115,714 |
| Rent of Tubewell Irrigated Area | Rs./Acre | 0 | 96,695 | 117,333 |
| Rent of Canal + Tubewell Irrigated Area | Rs./Acre | 0 | 89,305 | 108,987 |

Source: Author's own calculations.

The multinomial logistic regression analysis reveals the factors influencing the likelihood of renting land among different categories of farmers in Pakistan, namely Owners, Owner-cum-Tenants (OCT), and Tenants. The results in Table 3 represent the coefficients of owner-cum-tenant and tenant categories while considering the owner as the base category.

Table 3: Estimates of multinomial logistic regression for land leasing decisions

| Variables | Categories | | |
|----------------------------------|------------|------------------|-----------|
| | Owner | Owner-cum-Tenant | Tenant |
| | Base | | |
| Education | - | -0.075** | -0.160*** |
| Family Type (Nuclear=0, Joint=1) | - | 0.818 *** | 0.354 |
| Distance to Market | - | -0.005 | 0.056** |
| Farming Experience | - | -0.042*** | -0.052*** |
| Livestock | - | 0.888** | 0.007 |
| No. of Family Labor | - | -0.013 | 0.633*** |
| Agriculture Machinery | - | 0.074 | -1.07** |
| Agri. Practices Index | - | 0.006 | -0.121** |
| Cultivated Area | - | 0.059*** | 0.042** |
| Family Business | - | -0.285 | 0.065 |
| District Names (Base: Bhakkar) | | | |
| Nankana Sahb | - | 0.785* | 0.982** |
| TT Singh | - | 0.448 | 1.074** |
| Lodhran | - | 1.34*** | 1.611*** |
| Type of Land | | | |
| Canal + Tube Well | - | 0.672 | -0.074 |
| Tube Well | - | 1.677** | 1.633** |
| Land Rent | - | 0.003** | 0.001 |
| Constant | - | -7.069*** | -0.974* |
| Number of obs | 436 | | |
| Pseudo R2 | 0.1850 | | |

Source: Author's own calculations.

In the Owner-cum-tenant category, for each additional year of education, the likelihood of renting in land decreases by 8 percent in log odds compared to the based category (owner). This finding is in line with the study of Schulte et al. (2022). Similarly, with increased one-year farming experience, there is a corresponding decrease of 4 percent in the log chances of being in the owner-cum-tenant category compared to the owner category.

The family type plays an important role, with joint families in the OCT category being significantly more likely to lease in land (0.818) compared to the base category. This trend could be attributed to the pooled resources and labor availability in joint family systems. Similarly, having livestock increases the likelihood of leasing-in land for owner-cum-tenant (0.888), indicating that these families may need additional land to support their livestock operations.

Distance to the market has significantly positive effects on renting-in land. While it does not have a significant effect on OCT. However, an increase in distance to market increases the likelihood for tenants to renting-in land (0.056). Similar findings were reported by Kassegn & Abdinasir (2023), who noted that proximity to markets facilitates easier access to agricultural inputs and better opportunities for selling produce, thus making leasing more attractive. The number of family labor also significantly increases the likelihood of tenants renting-in land (0.633). This is associated with the findings of Kundu & Goswami (2022), who highlighted that family labour availability can reduce labour costs and make leasing land more viable.

Irrigation methods significantly impact land renting decisions. Lands irrigated by tube wells are more likely to be rented-in than irrigated by canals, with 1.677 for owner-cum-tenant and 1.633 for

Tenants. This preference might be due to the perceived reliability and control over the water supply provided by tube wells (Niamatullah *et al.*, 2022).

Geographical location also influences renting decisions. The likelihood of renting-in land is higher in Lodhran compared to other districts like TT Singh, Nankana Sahib, and Bhakkar, with a particularly high coefficient for both owner-cum-tenant (1.34) and Tenants (1.611). This finding highlights regional variations in land rental markets.

The analysis also indicates that landowners who adopt more agricultural practices and have access to farm machinery are more likely to retain their land, reflecting their commitment to intensive farming and utilization of their investments. On the other hand, land rent positively influences the likelihood of renting-in land for owner-cum-tenant (0.003), though this effect is relatively minor.

4.2 Economic Implications of Absentee Landlords on Land and Water Management Practices (LWMP) and Technology Adoption (TA)

Variables in Table 4 show that the average education of owner, tenant, and own-cum tenant, is 8.58, while the average age is 44. On the other hand, 43% of respondents live in the joint family system. The average farming experience is 17.85 years. The percentage of off-farm jobs and businesses other than agriculture is 19.5% and 13.7%, respectively. In addition, the owner, tenant, and own-cum tenant get updated weather, price, and production technology on the phone, which are 40%, 34%, and 30%, respectively. It further shows that the average farm acreage of the owner, tenants, and owner cum tenants is 11.23, 10.49, and 15.87 acres, respectively.

Table 4: Socioeconomic characteristics of farmers under different tenancy status

| Variable | Unit | Categories | | |
|----------------------------------|---------|------------|--------|------------------|
| | | Owner | Tenant | Owner-Cum-Tenant |
| Education | Years | 8.82 | 7.02 | 8.71 |
| Age | Years | 44.32 | 41.8 | 41.13 |
| Family Member | No. | 7.8 | 7.9 | 7.9 |
| Distance to Agri. Market | Kms | 4.53 | 5.85 | 4.62 |
| Farming Experience | Years | 19.95 | 17.36 | 19.02 |
| Weather information on the phone | Yes (%) | 47 | 41.12 | 52 |
| Total Cultivated Land | Acres | 11.23 | 10.49 | 15.87 |
| Canal Irrigated Area | % | 10.48 | 12.14 | 4 |
| Tubewell Irrigated Area | % | 9.60 | 20.56 | 17 |
| Canal + Tubewell Irrigated Area | % | 78.60 | 67.28 | 79 |
| Barani/Rainfed Area | % | 1.31 | 0 | 0 |

Source: Author's own calculations.

Table 5 shows that tenant and own-cum tenant have a percentage of provision of documents for subsidy and bank loans of 14% and 9%, respectively. In addition, landlord involvement in decision-making related to crops, water management, technology adoption, and land conservation and management practice are 4%, 2%, 4.4%, and 2%, respectively.

Table 5: Land tenure arrangements of farmers under different tenancy status

| Variables | Unit | Categories | | |
|---|----------|------------|--------|------------------|
| | | Owner | Tenant | Owner-Cum-Tenant |
| Landowner visits | City (%) | - | 25 | 53 |
| Provision of Land Documents for Subsidy | % | - | 14.01 | 15 |
| Provision of Land Documents for Bank Loan | % | - | 8.41 | 11 |
| Support from landowner in case of Crop Damage | % | - | 9.32 | 7 |

Source: Author's own calculations.

Table 6 presents the distribution of the Land and Water Management Practices (LWMP) Index across different land tenure arrangements, such as Owners, Owner-cum-Tenants, and tenant farmers. The land and water management practices index is categorized into three different levels: Low (1-4), Medium (5-7), and High (8-10), showing various kinds of involvement in water and land management practices.

Table 6: Land and water management index

| LWMP Levels | Owner (%) | Owner-cum-Tenant (%) | Tenant (%) |
|--------------|-----------|----------------------|------------|
| Low (1-4) | 42.36 | 39 | 57.01 |
| Medium (5-7) | 49.34 | 52 | 38.28 |
| High (8-10) | 18.3 | 9 | 4.71 |

Source: Author's own calculations.

Table 7. presents the distribution of the Technology Adoption index across different land tenancy arrangements: owner, owner-cum-tenant, and tenant farmers. The technology adoption index is categorized into three levels: Low (1-4), Medium (5-7), and High (8-10), showing various kinds of involvement of technology adoption in agricultural practices.

Table 7: Technology adoption index

| Technology Adoption Levels | Owner (%) | Owner-cum-Tenant (%) | Tenant (%) |
|----------------------------|-----------|----------------------|------------|
| Low (1-4) | 37 | 63 | 59 |
| Medium (5-7) | 37 | 27 | 32 |
| High (8-10) | 26 | 10 | 9 |

Source: Author's own calculations.

This indicates significant challenges in accessing and adopting advanced agricultural technologies, likely due to short-term land tenure and limited investment capacity.

Table 8 presents the results of an ordered probit regression analysis examining the effects of various factors on land and water management practices under different tenancy arrangements. We estimated three different regression equations where data is divided into three groups: Owner-cum-Tenants, Tenants, and pooled data (Owner-cum-Tenants and Tenant combined). The dependent variable, land and water management practices, is categorized into three levels: 0 (low), 1 (medium), and 2 (high). In addition to other explanatory variables, the regression equations contain the three variables of interest which show the support from the lessor to the farmers. The control variables are

age, education, family members, farming experience, distance to market, weather information, total cultivated area, family labor, type of land, and district.

Table 8: The effects of tenancy arrangements on land and water management practices with ordered probit model

| Land and Water Management Practices | OCT | Tenant | OCT + Tenant |
|--|------------|---------------|---------------------|
| Education | 0.012 | -0.029 | -0.001 |
| Age | 0.058** | 0.014 | 0.035** |
| Family Member | -0.046 | -0.053 | -0.042* |
| Farming Experience | -0.049* | -0.017 | -0.029** |
| Distance Market | -0.058* | 0.015 | -0.031 |
| Weather Information | 0.594** | 0.322 | 0.437** |
| Total Cultivated Area | 0.021* | 0.030* | 0.029*** |
| Land Type | | | |
| Canal + Tube Well | -0.381 | -0.412 | -0.458 |
| Tube Well | -0.255 | -0.508 | -0.403 |
| Landlord Visit | -0.055 | -0.002 | -0.021 |
| Support by absentee landlords | | | |
| Documents Govt. Subsidy | 0.436 | 1.017** | 0.568** |
| Documents Bank Loan | -0.292 | 0.587 | 0.098 |
| Help Crop Damage | -0.041 | -0.759 | -0.335 |
| Districts | | | |
| Lodhran | -0.528* | 0.443* | 0.736** |
| Nankana sahib | 0.622 | 1.418 | 1.859 |
| Toba Tek Sing | 0.153 | 1.008 | 1.430 |
| /cut1 | 0.664 | 1.313 | 1.736 |
| /cut2 | 2.446* | 3.205* | 3.508** |
| Observations | 100 | 107 | 207 |
| Pseudo R2 | 0.1567 | 0.1677 | 0.1419 |

*Notes: (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$.*

Source: Author's own calculations.

The results are interpreted based on the estimated coefficients, which indicate the direction and significance of the relationships between the predictors and the levels of land and water management practices (LWMP). Age has a significantly positive effect on land and water management practices in the owner-cum-tenants and owner-cum-tenants, and Tenant combined. This indicates that older farmers are more likely to engage in higher levels of land and water management practices (Oduniyi & Tekana, 2021).

Distance to the market has a significantly negative effect on the LWMP in owner-cum-tenants indicating that greater distance to markets may reduce the effective land and water management. Weather information has a significantly positive effect on LWMP in the owner-cum-tenants and

pooled data. This underscores the importance of access to weather information in promoting better land and water management practices (Frisvold & Murugesan, 2013).

The cultivated area has significantly positive effects across all groups, suggesting that larger cultivated areas are associated with higher levels of land and water management practices. Further, landlords providing documents for Government subsidies have significantly positive effects observed in all categories suggesting that access to government subsidies encourages better land and water management practices.

Significant negative effects are observed for Lodhran in all categories, and positive but not significant effects for Nankana Sahib and Toba Tek Singh as compared to Bhakkar district. It indicates regional differences in land and water management practices. The cut points define the thresholds between the management practice categories. Significant values indicate clear distinctions between low, medium, and high levels of land and water management practices.

The ordered probit regression results provide insights into the factors influencing land and water management practices under different tenancy arrangements. Age, access to weather information, and total cultivated area consistently promote higher levels of these practices. Conversely, farming experience and family size reduce the likelihood of adopting advanced land and water management practices. Additionally, proximity to markets and access to government subsidies are important factors in enhancing these practices.

Table 9 describes the effect of absentee landlords on the technology adoption of farmers. We regress the three different equations of the ordered model where owner-cum-tenant, tenants, and pooled data are employed. The technology adoption index has three levels (small=0, medium=1, and high=2). In addition to various control variables, the regression equations also have the treatment variables which shows the support of landlords to the farmers.

The results are interpreted based on the estimated coefficients, which indicate the direction and significance of the relationships between the predictors and technology adoption levels. Education significantly positive effects on technology adoption are observed particularly for owner-cum-tenants & tenant and pooled data. This suggests that higher education levels increase the likelihood of medium or high technology adoption in these groups (Challa & Tilahun, 2014). Distance to the market has a significantly positive impact on technology adoption in the owner-cum-tenants and tenant combined group and the owner-cum-tenants, tenant combined with lessor group, suggesting that proximity to markets facilitates higher technology adoption.

The total cultivated area shows consistently significantly positive effects across all groups, indicating that farmers with larger cultivated areas are more likely to adopt higher levels of technology (Hu et al., 2022). The canal + tubewell irrigation system has a significantly positive effect on the owner-cum-tenants and pooled data compared to just canal-based irrigation method. Similarly, tubewell-based irrigation has a significant positive effect on the technology adoption in pooled data as compared to canal-based systems. It highlights the importance of irrigation infrastructure in technology adoption where farmers having tubewells are more inclined towards technology adoption.

The coefficients of landlord visits have a significant positive effect on TA in the owner-cum-tenants case. Which may suggest a better relationship between the landlord and farmer for decision-making. Thus, landlords providing documents for government subsidies and loans have significant positive effects on the owner-cum-tenants suggesting that access to subsidies and loans encourages higher technology adoption (Wu et al., 2022).

Table 9: The effects of tenancy arrangements on technology adoption

| Technology Adoption | OCT | Tenant | OCT + Tenants |
|------------------------------------|----------|----------|---------------|
| Education | 0.062* | 0.015* | 0.122** |
| Age | 0.043 | 0.053* | 0.047*** |
| Family Member | 0.020 | 0.041 | 0.029 |
| Farming Experience | -0.025 | -0.052** | -0.038** |
| Distance Market | 0.048 | 0.065 | 0.048** |
| Weather Information | 0.061 | 0.349 | 0.253 |
| Total Cultivated Area | 0.081*** | 0.086*** | 0.080*** |
| Land Type | | | |
| Canal + Tube Well | 1.719* | -0.148 | 1.242** |
| Tube Well | 0.312 | 0.915 | 0.748* |
| Landlord support to farmers | | | |
| Landlord Visit | 0.101* | 0.000 | 0.002 |
| Documents Govt. Subsidy | 0.861* | 0.788 | 0.584* |
| Documents Bank Loan | 1.096* | -1.092 | 0.280 |
| Help Crop Damage | 0.048 | 0.476 | 0.117 |
| Districts | | | |
| Lodhran | -0.968* | 0.323 | -0.022 |
| Nankana sahib | 0.570 | 0.922 | 0.962 |
| Toba Tek Sing | 0.688 | 0.696 | 0.919 |
| /cut1 | 5.347*** | 4.242** | 4.706*** |
| /cut2 | 6.489*** | 5.026*** | 5.548*** |
| Observations | 100 | 107 | 207 |
| Prob > chi2 | 0.0000 | 0.0002 | 0.0000 |
| Pseudo R2 | 0.3649 | 0.2604 | 0.2658 |

Source: Author's own calculations.

4.3 Tax Collection Estimates under Various Tenancy Arrangements

Table 10 shows the tenure classification of farm-cultivated areas in 2021. For under 1 to under 5, the cultivated area is 7166034 acres, and for 5 to under 12.5 categories, the value is 11523551 acres. Furthermore, for 12.5 to under 25 its value becomes 6302079 acres, and for 25 to under 50 is 3208488 acres. The categories lie between 50 to under 150 is 2058807 acres and lastly for the 150 and above category, its value is 830343 acres. These values are necessary for estimating the tax collection.

Table 10: Tenure classification of farm cultivated area in 2021 (acres)

| | Owner Cultivated Area | Owner Self-Operated Area | Shared and Leased | Tenant Cultivated Area | Cultivated Area |
|---------------------------|-----------------------|--------------------------|-------------------|------------------------|-----------------|
| Under 1 to Under 5 | 6124316 | 226874 | 201714 | 613129 | 7166034 |
| 5 to under 12.5 | 8665870 | 709446 | 840761 | 1307472 | 11523551 |
| 12.5 to Under 25 | 4227452 | 642524 | 703308 | 728794 | 63020795 |
| 25 to Under 50 | 1942502 | 380441 | 559534 | 326010 | 3208488 |
| 50 to Under 150 | 1230277 | 225823 | 423661 | 179045 | 2058807 |
| 150 and Above | 500825 | 50016 | 197258 | 82242 | 830343 |

Source: Author's own calculations.

The estimates of the income-based agricultural tax show that implementing agricultural income tax without differentiating lessors' income may generate tax revenues of 65 billion rupees, however, implementing the progressive income tax on farmers' income and 5% tax on lessors' income may generate extra 14 billion rupees (Rs. 79.61 Billion in total). On the other hand, currently implemented land-based agricultural tax could generate just Rs. 4.62 billion.

Table 11: Tax collection estimates based on agricultural income tax

| Sr. No. | Tax collection Types | Tax Collection Estimates (Rs. Billion) | | | | | | Total Tax Collection |
|---------|--|--|---------------|-----------------|----------------|-----------------|------------|----------------------|
| | | 1-5 acres | 5<acres= 12.5 | 12.5< acres =25 | 25< acres = 50 | 50< acres = 150 | Acres> 150 | |
| 1 | Flat Tax Rate Estimates without Differentiating Lessor Income (1.2% based on farmers' perceptions) | 15.25 | 24.50 | 13.00 | 6.75 | 4.26 | 1.72 | <u>65.48</u> |
| 2 | Flat Tax Estimates Differentiating Lessor Income (1.2% of farmers and 2.5% on lessor based on farmers' perception) | 15.61 | 25.45 | 13.59 | 7.13 | 4.51 | 1.84 | 68.12 |
| 3 | Tax based on different Tax for farmers and Lessors (Progressive income tax based on farmers' perceptions) | 12.02 | 21.95 | 12.58 | 7.87 | 5.33 | 2.21 | 61.97 |
| 4 | Tax based on different Tax for farmers and Lessors (Flat tax on farmers 1.2% and 5% on lessors' income) | 17.46 | 30.30 | 16.68 | 9.09 | 5.81 | 2.45 | 81.79 |

| | | | | | | | | |
|---|--|-------|-------|-------|-------|------|------|--------------|
| 5 | Tax based on different Tax on farmers and Property Tax Lessors (Progressive tax on farmers' income and 5% on lessors' incomes) | 14.62 | 28.63 | 16.63 | 10.12 | 6.74 | 2.86 | <u>79.61</u> |
| 6 | Tax estimates Based on land-based tax as implemented by Govt of Punjab | 0.00 | 0.00 | 1.89 | 1.28 | 1.03 | 0.42 | <u>4.62</u> |

Source: Author's own calculations.

4.4 Analyze the Farmers' Compliance Behaviors towards Agricultural Income Tax under Various Land Tenancy Arrangements

Table 12 shows the descriptive statistics of the variables used to analyze the farmers' and lessor compliance behaviors towards agricultural income tax. It shows three categories of farmers such as owner, OCT, and Tenants. It shows that the average education of owner, tenant, own-cum tenant, and the lessor is 8.82, 7.02, 8.71, and 9.77 years respectively. The average age is owner, owner cum tenants, tenants, and lessor are 44, 41, 41, and 48 years, respectively. Further, the average tax compliance of owner, tenant, OCT, and lessor are 36.24, 40.18, 41, and 58.68. A good percentage of knowledge about agriculture income tax, which is 19.12. Thus, they strongly agree that the percentage of fair treatment of farmers in the tax system is 5, and their satisfaction level with tax authorities is about 44.

Table 12: Tax compliance behavior of farmers and lessor

| Variables | Unit | Categories | | | |
|--|-----------------------|------------|--------|------------------|--------|
| | | Owner | Tenant | Owner-Cum-Tenant | Lessor |
| Age | Years | 44.32 | 41.80 | 41.13 | 48 |
| Education | Years | 8.82 | 7.02 | 8.71 | 9.77 |
| Non-Compliance with Agri. Taxes should be Punishable | Yes (%) | 36.24 | 40.18 | 41 | 58.68 |
| Knowledge of Agri. Income Tax | Poor (%) | 34.49 | 47.66 | 29 | 24.79 |
| | Fair (%) | 37.12 | 34.58 | 44 | 47.11 |
| | Good (%) | 21.39 | 13.08 | 23 | 19.01 |
| | Very Good (%) | 6.11 | 1.87 | 3 | 8.26 |
| | Excellent (%) | 0.87 | 2.80 | 1 | 0.83 |
| Fair Treatment of Farmers in the Tax System | Strongly Disagree | 18.78 | 23.36 | 20 | 21.49 |
| | Disagree | 49.34 | 42.06 | 52 | 43.80 |
| | Neutral | 24.89 | 28.97 | 24 | 24.79 |
| | Agree | 6.99 | 5.61 | 2 | 9.92 |
| | Strongly Agree | 0 | 0 | 2 | 0 |
| Satisfaction Level with Tax Authorities | Strongly Dissatisfied | 26.20 | 31.77 | 31 | 30.58 |
| | Dissatisfied | 44.10 | 44.86 | 41 | 39.67 |
| | Neutral | 21.83 | 17.76 | 18 | 23.14 |
| | Satisfied | 7.42 | 5.61 | 10 | 6.61 |
| | Strongly Satisfied | 0.44 | 0 | 0 | 0 |

| | | | | | |
|--|-----------------------|-------|-------|----|-------|
| Satisfaction Level with Govt. Authorities | Strongly Dissatisfied | 41.09 | 42.06 | 38 | 36.36 |
| | Dissatisfied | 38.43 | 42.06 | 39 | 42.15 |
| | Neutral | 15.28 | 12.15 | 18 | 19.01 |
| | Satisfied | 5.24 | 3.74 | 3 | 2.48 |
| | Strongly Satisfied | 0 | 0 | | 0 |
| Satisfaction Level with the Justice System | Strongly Dissatisfied | 37.99 | 42.06 | 38 | 36.36 |
| | Dissatisfied | 30.13 | 28.04 | 34 | 31.40 |
| | Neutral | 26.20 | 23.36 | 22 | 27.27 |
| | Satisfied | 5.68 | 0.93 | 5 | 4.13 |
| | Strongly Satisfied | 0 | 5.61 | 1 | 0.83 |
| Can Agriculture Taxes Contribute to the Society? | Strongly Disagree | 17.47 | 16.82 | 20 | 13.22 |
| | Disagree | 36.68 | 33.64 | 31 | 29.75 |
| | Neutral | 24.89 | 31.77 | 28 | 27.27 |
| | Agree | 20.09 | 15.89 | 20 | 21.49 |
| | Strongly Agree | 0.87 | 1.87 | 0 | 8.27 |
| Do You Think Govt? Waste Taxpayer Money? | Strongly Disagree | 8.73 | 5.61 | 2 | 9.92 |
| | Disagree | 18.78 | 14.02 | 13 | 8.26 |
| | Neutral | 15.72 | 19.63 | 16 | 19.83 |
| | Agree | 33.62 | 37.38 | 31 | 41.32 |
| | Strongly Agree | 23.14 | 23.3 | 38 | 20.66 |
| Poor Agricultural Services from Govt. | Strongly Disagree | 12.22 | 11.21 | 7 | 10.74 |
| | Disagree | 18.34 | 25.23 | 9 | 21.49 |
| | Neutral | 27.07 | 18.69 | 35 | 26.45 |
| | Agree | 28.82 | 36.45 | 32 | 29.75 |
| | Strongly Agree | 13.54 | 8.41 | 17 | 11.57 |
| Crime Rate and Conflict | No Crime | 26.20 | 15.89 | 32 | 26.45 |
| | Some What | 60.26 | 66.35 | 50 | 62.81 |
| | High | 13.54 | 17.76 | 18 | 10.74 |
| | Strongly Disagree | 11.79 | 10.28 | 7 | 12.39 |
| Heavy Indirect Taxes on Agri. | Disagree | 13.54 | 19.63 | 11 | 10.74 |
| | Neutral | 12.22 | 10.28 | 12 | 18.18 |
| | Agree | 30.57 | 28.04 | 26 | 30.58 |
| | Strongly Agree | 31.88 | 31.77 | 44 | 28.09 |
| | Strongly Disagree | 17.47 | 16.82 | 20 | 13.22 |
| Agri. Tax contribute growth of Agri. | Disagree | 36.68 | 33.64 | 31 | 29.75 |
| | Neutral | 24.89 | 31.77 | 28 | 27.27 |
| | Agree | 20.09 | 15.89 | 20 | 21.49 |
| | Strongly Agree | 0.87 | 1.87 | 0 | 8.27 |
| | Strongly Disagree | 35.37 | 35.51 | 39 | 27.27 |
| Govt. Listen to Farmers | Disagree | 46.72 | 44.86 | 38 | 44.63 |
| | Neutral | 14.41 | 12.15 | 20 | 23.97 |
| | Agree | 3.06 | 6.54 | 3 | 4.13 |
| | Strongly Agree | 0.44 | 0.93 | 0 | 0 |
| | Yes | 13.54 | 14.95 | 15 | 25.62 |
| Social Benefits | No | 86.46 | 85.05 | 85 | 74.38 |

Source: Author's own calculations.

The results of binary logistics regression for the tax compliance behavior of farmers are reported in Table 13. It shows the detailed examination of various factors which affect the tax compliance behavior of farmers and lessor among different tenancy arrangements, including owners, owner cum tenant, tenant, and lessor, and all categories combined.

Table 13: Factors affecting the tax compliance behavior using binary logistic regression

| Tax Compliance | Owner | OCT | Tenant | Lessor | Pooled |
|----------------------------------|----------|----------|----------|---------|----------|
| Knowledge of Agri. Taxes | 0.234 | 0.285 | 0.436 | 0.478** | 0.335*** |
| Farmers treated Agri. Tax System | 0.131 | 0.205 | -0.550 | 0.386 | 0.149 |
| Satisfied Tax Authorities | 0.552** | 0.511 | 1.48*** | 0.612* | 0.503*** |
| Satisfied Governance System | -0.326 | 0.202 | 0.332 | -0.210 | -0.102 |
| Satisfied Justice System | 0.019 | 0.042 | 0.401** | 0.119 | 0.006 |
| Crime & conflicts | 0.030 | 0.028 | 0.641 | 0.766* | 0.211 |
| Indirect Taxes in Agri. | -0.280* | 0.200 | -0.538** | -0.271 | -0.236** |
| Tax Contribute Society | 0.583*** | 0.305 | 0.161 | 0.479* | 0.447*** |
| Tax Contribute Agri. Sector | 0.466** | 0.899** | 0.611* | 0.239 | 0.408*** |
| Govt. Listen Farmers | 0.446** | -0.342 | 0.267 | -0.024 | 0.186 |
| Social Benefits (taxes) | 0.507 | 0.252 | 1.684** | 1.033** | 0.836*** |
| Govt. Waste Taxes | 0.109 | -0.891** | -0.243 | -0.209 | -0.085 |
| Poor Agri. Services | -0.354** | -0.062 | 0.303 | 0.085 | -0.111 |
| Education | 0.001 | 0.171* | -0.038 | 0.072 | 0.041* |
| Age | 0.010 | -0.029 | -0.044** | 0.027 | 0.002 |
| Constants | -3.909** | -2.29 | -3.021* | -6.50** | -3.93*** |
| Number of obs. | 229 | 100 | 107 | 121 | 557 |
| <i>LR chi2(15)</i> | 67.81 | 46.94 | 38.07 | 48.90 | 148.12 |
| <i>Prob > chi2</i> | 0.000 | 0.000 | 0.000 | 0.000 | 0.0000 |
| <i>Log likelihood</i> | - | -44.217 | -53.089 | -57.920 | -298.774 |
| | 116.047 | | | | |
| <i>Pseudo R2</i> | 0.226 | 0.346 | 0.263 | 0.297 | 0.198 |

*Notes: (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$.*

Source: Author's own calculations.

Knowledge of agriculture tax statistically impacts tax compliance, especially for lessor and the pooled sample. The coefficient for lessor is 0.478, statistically significant at the 1% level, which means that knowledge of agriculture tax and tax compliance behaviour shows a statistically positive relation. Likewise, the pooled sample exhibits a significant coefficient of 0.335 at the 1% level. Similar findings (Kamil, 2015; Palil & Mustapha, 2011; Azime & Ramakrishna, 2018) show the significance of educational initiatives and transparent tax authority communication through raising farmers' knowledge of agricultural taxes, which might increase tax compliance.

Another important factor, such as satisfaction with the tax authorities, shows a statistically positive impact on tax compliance. The results of Kamil (2015) show a positive, significant relationship between tax authority and tax compliance of farmers. A unit increase in the satisfaction level with the tax authority increases tax compliance behavior. However, Palil (2010) has no significant relationship between the tax authority and the tax compliance behavior of farmers, and they are not affected by the tax authority.

Tax compliance is also influenced by perceptions of the justice system and crime and conflict situation in the area. Tenants who are satisfied with the judicial system have a positive coefficient (0.401), showing that an efficient justice system can enhance compliance. Conversely, the effect of crime and conflicts on lessors is significantly favorable (0.766), suggesting that Low levels of crime

and conflicts impact tax compliance in lessors. The results are similar to those of the study by Palil (2010), which shows a positive, significant relationship between the justice system and tax compliance. However, Assfaw & Sebhat (2019) show that they have no significant effect on each other.

Higher indirect taxes have a statistically negative impact on tax compliance, as shown by the significant negative effects for owners (-0.280) and the pooled sample (-0.236). This means that if indirect taxes increase, farmers are less likely to comply with them. The belief that taxes support agriculture and society greatly increases compliance. For example, the coefficient for owners' contribution to society and pooled data shows that farmers are more likely to comply with tax laws when they believe their taxes benefit society and the agriculture sector. The finding is similar to the studies of Assfaw & Sebhat (2019) and Biru (2020).

The government listening to farmers has a significant effect on their tax compliance behavior. When the government listens to farmers, farmers are more compliant with taxes and more satisfied with the tax system. According to the owners, farmers' compliance increases when they feel heard by the government, whose government responsiveness coefficient is 0.446, which is significant at the 5% level.

Social benefits also have a statistically positive impact on tax compliance. These results are similar to the study of Biru (2020) and Assfaw & Sebhat (2019), which shows that when farmers receive benefits or rewards after paying taxes, they are more compliant. Thus, social benefits and tax compliance have a positive significant relation.

Government waste tax money and poor agriculture services have a negative statistical impact on the tax compliance behavior of farmers. Tax compliance is also influenced by education. According to the OCTs, better compliance is associated with higher education levels, where the education coefficient is 0.171 and significant at the 10% level. The result is like the studies of Mutai & Omwono (2022) and Assfaw & Sebhat (2019). When farmers are more educated, their tax compliance level also increases. However, the study of Mensah et al. (2020) shows that education has no significant effect on tax compliance.

4.5 Examine the Institutional Hurdles in Agricultural Income Tax Collection

Three focus group discussions were held in May 2024 in three districts: Nankana Sahib, Lodhran, and Bhakkar with the stakeholders: farmers, and tax authorities. Research team documented all the discussions. Various open-ended questions were asked to facilitate the discussion which are summarized below with respective responses.

Farmers' responses regarding their decision on renting out land reflected their inability to cultivate land as youth has moved away from rural areas and the remaining households in the rural areas are not able to cultivate the land. A considerable number of farmers are also of the view that they have better access to the civic amenities and off-farm income opportunities in the urban areas. They were using the rental income for consumption purposes.

In response to a question on issues related to the agricultural tax, majority of the farmers responded that they have received the land-based tax estimates from the village 'numberdar' and they have paid the tax which amounts from Rs. 2000 to Rs. 6000 but they have not been given any receipt or tax payment confirmation. Farmers believe that formal receipts of the tax amount would improve their trust in the tax collection system. They also believe that income-based taxation would not work as majority of the farmers are small, less educated and have no system of accounting prevailing. The income-expenditure statements for them is next to impossible. Abiana (water tax) is paid by tenants while land-based tax (if applied) is paid by landlords

On the question of increasing land rents, the majority attributed this increase to the high wheat prices in the recent past. Similarly, higher prices of other cereals like maize and potato also led to increase in rents. On the other side fuel and electricity prices were comparatively low. Thus, farmers were interested to rent in land as they could make enough profits. However, because of the increase in inputs cost and reduction in prices of maize and wheat crops situation is not so good for tenants.

Responding to the question of investment in land and water interventions, the general response of the farmers was that only long-term secure land tenure arrangements encourage farmers to make investments in land and water management. In Punjab, usually tenancy agreements are not formalized for long-term rather based on annual or bi-annual terms which discourages such investments. But farmers apply farmyard manure equally to own land and rented in manure to improve soil fertility and crop yields. However, when it comes to lined water courses, orchard / tree plantation then farmers avoid investing in rented lands.

Next Topic of the discussion was the perception about income based agricultural taxation. Farmers believe that they are willing to pay agricultural income tax. However, when it comes to uncertainty in agricultural inputs and outputs markets it discourages farmers from cooperating with the government on this matter. As agriculture is a nature-dependent business, losses are very common. If the government itself calculates the revenues of the farmers and applies income tax it could be a disaster for farmers. Thus, an easy tax estimation system along with ensuring benefits to farmers in return could convince farmers to pay taxes.

In the discussion held with Kangowhs, key points were focused around the challenges and strategies of AIT collection. The usual practice was to collect land-based agri. tax from farmers twice a year. Tax targets are usually achieved around 70%. The idea of income based tax emerged to tax the farmers according to the worth of farming. Patwaris themselves estimated the income of the farmers based on cultivated land and traditional estimates of yield and cost. However, tax authorities were of the view that it was not feasible for a Patwari to estimate the incomes of hundreds of farmers in his assigned territory and then collect tax.

Tehsil tax authorities were of the view that due to land distribution; farm size is in gradual decline. It was observed that only around 2000 farmers in Tehsil Lodhran possess land over 12.5 acres. Thus, the land-based tax could result in poor tax collection. Another important constraint that was observed is the lack of human resources, as there are only a few officials (Patwaris) assigned to evaluate the harvests of nearly 50,000 farmers in a Tehsil. Similarly, lack of cooperation among various government departments hinders the tax collection, e.g., cooperation between revenue department, land record authority and agri. Department is poor. Tax authorities were of the view that technology could solve this problem. Digitalization of the tax collection mechanism can improve tax collection as the centuries-old patwari system cannot handle the income-based tax system. Cooperation among various government institutions for sharing information can enhance the capacity of the tax collection authorities.

CONCLUSION

Agriculture is vital to Pakistan's economy, employing 42 percent of the workforce and supporting 65 percent of the population. However, the distribution of land is highly biased, as 2 percent of large farmers own 45 percent of the land. Such inequality creates significant social and economic inequality, as large landowners have better access to off-farm income, while smallholders find it difficult to access more land. High concentration of land leads to absenteeism, where owners do not live or manage their land, reducing productivity. While transferring land to motivated smallholders can increase efficiency, securing land rights and long-term contracts is crucial. Rising land rents and landlords going out of business underscore the need for an agricultural income tax system to support public services and infrastructure. Absentee landlords lack a personal connection to their land and workers, leading to short-term thinking and a focus on quick wins rather than sustainable practices. Effective taxation of absentee landlords could generate significant revenue for the government, which would promote equitable growth and improve public services.

The studies above highlight the impact of tenancy arrangements on crop yield and soil fertility but do not address the determinants of leasing decisions, resource use efficiency, technology adoption, or access to agricultural services and inputs. Changes in rental markets affect tax collection, making it crucial to investigate the existing tax system for effective agricultural taxation under changing rental conditions. The project's specific objectives are: investigate the causes of land renting and implications of absentee landlords on water management and technology adoption, estimate tax collection under various tenancy arrangements, analyze farmers' compliance with agricultural income tax, and examine institutional hurdles in agricultural tax collection.

Data were collected from 557 respondents, with 436 farmers (owner, tenant, owner-cum-tenants) and 121 lessors from three districts of Punjab: Bhakkar, Lodhran, and Toba Tek Singh. Various statistical and econometric methods including logistic regression, ordered probit model, and budgeting methods were employed to meet the requirements of the objectives.

The results show that farmers who have more family labor and live away from markets tend to rent in the land. Similarly, farmers having livestock also tend to rent in land. As compared to Bhakkar, the likelihood of farmers to rent in land is higher in other districts. It may be due to the reasons that these areas have high-value crops. As compared to canal irrigated land the likelihood of renting in tubewell is higher. This is because farmers may keep canal-irrigated land by themselves and are more interested in renting out tubewell-irrigated land.

As for the economic implications of absentee landlords on land and water management practices are concerned, those absentee landlords who support farmers in acquiring subsidies to farmers insert significant positive effect on the land and water management practices of the farmers. On the other hand, absentee landlords who frequently visit their land and provide support to tenants to acquire government subsidies and bank loans have a significant positive effect on the technology adoption of the farmers. This may suggest that good working relations between landlords and tenants can enhance soil health and technology adoption.

Currently, Punjab province generates around Rs. 2.5 billion from the target of Rs. 4.5 billion from land-based tax on agriculture. Our estimates exhibit tax collection estimates under various tenancy

arrangements and suggest that imposing the property tax rates (5%) on lessors' income could generate an extra Rs 74 billion amounting to Rs. 79 billion in agriculture income tax in Punjab.

Tax compliance behavior of the farmers is positively influenced by the satisfaction toward tax authorities and satisfaction toward the government. An increase in tax knowledge has a statistically positive effect on compliance behaviors. However, the perception that there are huge indirect taxes on agriculture reduces the farmers' compliance behavior. Similarly, the perception of poor agricultural services also decreases tax compliance behavior.

Study shows that the centuries-old patwari system is an important Institutional hurdle in income-based agriculture tax. E-based tax estimation and collection is the way forward for the proper implementation of income-based agricultural tax.

RECOMMENDATIONS/ POLICY IMPLICATION

Land leasing arrangements have significant effects on agricultural productivity as these affect land-based investments, especially investments in land structure improvement and high-efficiency irrigation. Negative effects of leasing arrangements can be minimized through formal leasing agreements for a specified longer time period. There is a need to regulate the land leasing agreements by promoting long-term land leases.

Historical evidence suggests that a high percentage of large farmers have opted for leasing out their agricultural lands and switching their livelihoods in urban centers. These enjoy the rental income without the imposition of property rental taxes as they declare the income from agriculture source. There is a need to re-design the agri. Taxation tools especially for the farmers who have leased out their lands and are earning rental income. Our analysis showed that considering the agricultural leasing income as rental income and subjecting such income to the property tax regime would enhance the agricultural income tax collection to Rs. 79 billion.

Building the capacity of the provincial tax authorities and bringing transparency in the agriculture income tax estimation and collection would build the confidence of the farmers in the tax regime. Bringing in digitalization and IoT tools would improve efficiency in the tax system. Bringing in the digitalization and IoT tools would improve efficiency in the tax system with broader dissemination of information and tax advocacy.

REFERENCES

- Abate, L., & Schaap, M. (2022). *Resilient agriculture for inclusive and sustainable Ethiopian food systems: Baseline report 2022*. Stichting Wageningen Research Ethiopia.
- Adenuga, A. H., Jack, C., & McCarry, R. (2021). The case for long-term land leasing: A review of the empirical literature. *Land, 10*(3), 1-21.
- Ajzen, I., & Fishbein, M. (1970). The prediction of behavior from attitudinal and normative variables. *Journal of Experimental Social Psychology, 6*(4), 466-487.
- Akram, M. W., Akram, N., Hongshu, W., Andleeb, S., ur Rehman, K., Kashif, U., & Mehmood, A. (2019b). Impact of land use rights on the investment and efficiency of organic farming. *Sustainability, 11*(24), 1-18.
- Akram, N., Akram, M. W., Wang, H., & Mehmood, A. (2019a). Does land tenure systems affect sustainable agricultural development? *Sustainability (Switzerland), 11*(14), 1–15. <https://doi.org/10.3390/su11143925>
- Ali, A., Abdulai, A., & Goetz, R. (2012). Impacts of tenancy arrangements on investment and efficiency: Evidence from Pakistan. *Agricultural Economics, 43*(SUPPL. 1), 85-97.
- Alm, J., Kirchler, E., Muehlbacher, S., Gangl, K., Hofmann, E., Kogler, C., & Pollai, M. (2012). Rethinking the research paradigms for analysing tax compliance behaviour. *CESifo Forum, 13*(2), 33–40.
- Assfaw, A. M., & Sebhat, W. (2019). Analysis of tax compliance nce and a its determinants: Evidence from Kaffa, Bench Maji and Sheka Zones category B tax payers, SNNPR, Ethiopia. *Journal of Accounting, Finance and Auditing Studies, 5*(1), 32-58.
- Azime, H., Ramakrishna, G. (2018). Tax compliance attitude of rural farmers: An analysis based on survey data in Ethiopia. In A. Heshmati & H. Yoon (Eds.), *Economic growth and development in Ethiopia: Perspectives on development in the Middle East and North Africa (MENA) region*. Springer, Singapore.
- Bawa, S. G., & Callahan, S. (2021). *Absent landlords in agriculture—A statistical analysis*. Economic research report 281. United States Department of Agriculture (USDA).
- Besley, T., & Ghatak, M. (2010). Property rights and economic development. In D. Rodrik & M. Rosenzweig (Eds.), *Handbook of development economics* (Vol. 5, Issue C). Elsevier.
- Biru, A. M. (2020). Factors that affect tax compliance behavior of small and medium enterprises: evidence from Nekemte City. *European Journal of Business and Management, 29*-41.
- Boberg-Fazlić, N., Lampe, M., Martinelli Lasheras, P., & Sharp, P. (2022). Winners and losers from agrarian reform: Evidence from Danish land inequality 1682–1895. *Journal of Development Economics, 155*(January), 102813.
- Challa, M., & Tilahun, U. (2014). Determinants and impacts of modern agricultural technology adoption in West Wollega: The case of Gulliso District. *Journal of Biology, Agriculture and Healthcare, 4*(20), 63-77.
- Cox, D. R. (1959). The regression analysis of binary sequences. *Journal of the Royal Statistical Society: Series B (Methodological), 21*(1), 238-238.
- Deininger, K., Ali, D. A., & Neyter, R. (2022). *Impacts of transparent online auctions on public land lease revenue evidence from legal and administrative changes in Ukraine* [Policy research working paper 10201]. World Bank.
- Dower, P. C., & Pfitze, T. (2020). Land titles and violent conflict in rural Mexico. *Journal of*

- Development Economics*, 144, 102431.
- Feng, F., Jun, Y. B., Liu, X., & Li, L. (2010). An adjustable approach to fuzzy soft set based decision making. *Journal of Computational and Applied Mathematics*, 234(1), 10-20.
- Frisvold, G. B., & Murugesan, A. (2013). Use of weather information for agricultural decision making. *Weather, Climate, and Society*, 5(1), 55-69.
- Gailmard, S. (2014). Statistical modeling and inference for social science. *Social Science*, 1-373. <https://doi.org/10.1017/CBO9781139047449>
- Ghebru, H. H., & Holden, S. T. (2013). *Links between tenure security and food security: Evidence from Ethiopia* [IFPRI Discussion Paper 01288]. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2343158
- GOP (Government of Pakistan). (2010). *Agricultural census 2010: Pakistan report*. Pakistan Bureau of Statistics. <https://www.pbs.gov.pk/publication/agricultural-census-2010-pakistan-report>.
- GOP (Government of Pakistan). (2021). *Pakistan economic survey 2020-21*. Islamabad: Finance Division.
- GOP (Government of Pakistan). (2022). *Pakistan economic survey 2021-22*. Islamabad: Finance Division.
- Goswami, B. (2017). Rental market of agricultural land: Changing context and need of tenancy reform. In B. Goswami, M. P. Bezbaruah, & R. Mandal (Eds.), *Indian agriculture after the Green Revolution: Changes and challenges*. London: Routledge.
- Government of Punjab. (n.d.). *The Punjab agricultural income tax rules, 2001*. <https://punjabcode.punjab.gov.pk/uploads/articles/2-agrcultrual-income-tax-rules-2001-pdf.pdf>
- Guerra, A., & Harrington, B. (2018). Attitude–behavior consistency in tax compliance: A cross-national comparison. *Journal of Economic Behavior & Organization*, 156, 184-205.
- Han, W., Zhang, Z., Zhang, X., & He, L. (2021). Farmland rental participation, agricultural productivity, and household income: Evidence from rural China. *Land*, 10(9), 1-22.
- Hartmann, A. J., Gangl, K., Kasper, M., Kirchler, E., Kocher, M. G., Mueller, M., & Sonntag, A. (2022). The economic crisis during the COVID-19 pandemic has a negative effect on tax compliance: Results from a scenario study in Austria. *Journal of Economic Psychology*, 93, 102572.
- Hu, Y., Li, B., Zhang, Z., & Wang, J. (2022). Farm size and agricultural technology progress: Evidence from China. *Journal of Rural Studies*, 93(2), 417-429.
- Jacoby, H. G., & Mansuri, G. (2008). Land tenancy and non-contractible investment in rural Pakistan. *The Review of Economic Studies*, 75(3), 763-788.
- James, S. S. (2004). *Policy options for the taxation of agriculture land and agricultural income in India* [Working paper WP04SJ1]. Lincoln Institute. https://etd723z5379.exactdn.com/app/uploads/2024/04/907_james_complete_pdf.pdf
- Jin, S., & Deininger, K. (2009). Land rental markets in the process of rural structural transformation: Productivity and equity impacts from China. *Journal of Comparative Economics*, 37(4), 629-646.
- Kamil, N. I. (2015). The effect of taxpayer awareness, knowledge, tax penalties and tax authorities services on the tax compliance: Survey on the individual taxpayer at jabodetabek & bandung. *Research Journal of Finance and Accounting*, 6(2), 104-111.

- Kassegn, A., & Abdinasir, U. (2023). Determinants of rural households' livelihood diversification strategies: In the case of north Wollo zone, Amhara National Regional State, Ethiopia. *Cogent Economics and Finance*, 11(1).
- Kassie, M., & Holden, S. (2007). Sharecropping efficiency in Ethiopia: Threats of eviction and kinship. *Agricultural Economics*, 37(2-3), 179-188.
- Keswell, M., & Carter, M. R. (2014). Poverty and land redistribution. *Journal of Development Economics*, 110, 250-261.
- Kumari, R., & Nakano, Y. (2016). Does land lease tenure insecurity cause decreased productivity and investment in the sugar industry? Evidence from Fiji. *Australian Journal of Agricultural and Resource Economics*, 60(3), 406-421.
- Kundu, A., & Goswami, P. (2022). Causes behind Tenancy contract among the marginal farmers of West Bengal, India and its' impact on their livelihood. *Artha Vijnana*, LXIV(1), 1-19.
- Lawry, S., Samii, C., Hall, R., Leopold, A., Hornby, D., & Mtero, F. (2017). The impact of land property rights interventions on investment and agricultural productivity in developing countries: A systematic review. *Journal of Development Effectiveness*, 9(1), 61-81.
- Lee, K. (2019). Absentee ownership, land taxation and surcharge. *The Annals of Regional Science*, 62, 47-68.
- Lohmar, B., Rozelle, S., & Zhao, C. (2001). The rise of rural-to-rural labor markets in China. *Asian Geographer*, 20(1-2), 101-123.
- Mensah, N. O., Amrago, E. C., Asare, J. K., Osei Tutu, F., & Donkor, A. (2020). Poultry farmers willingness to pay for agricultural tax: Evidence from the Bono region, Ghana. *World Journal of Entrepreneurship, Management and Sustainable Development*, 17(2), 290-306.
- Mittone, L., & Saredi, V. (2016). Commitment to tax compliance: Timing effect on willingness to evade. *Journal of Economic Psychology*, 53, 99-117.
- Mohammad, F., & Qureshi, S. K. (1987). Agricultural taxation in Pakistan: Revisited. *The Pakistan Development Review*, 26(4), 419-432.
- Munkin, M. K., & Trivedi, P. K. (2008). Bayesian analysis of the ordered probit model with endogenous selection. *Journal of Econometrics*, 143(2), 334-348.
- Mutai, G. C., & Omwono, G. (2022). Analysis of factors affecting tax compliance in the real estate sector in Kenya: A case of real estates in Eldoret Town. *International Journal of Education, Business and Economics Research*, 2(2), 12-38.
- Naseer, A., Ashfaq, M., Abid, M., Razzaq, A., & Hassan, S. (2016). Current status and key trends in agricultural land holding and distribution in Punjab, Pakistan: Implications for food security. *J. Agric. Stud*, 4(4), 14-27.
- Nasim, A. (2012). Agricultural income taxation: estimation of the revenue potential in Punjab. *The Pakistan Development Review*, 51(4), 321-335.
- Niamatullah, M., Rehman, A., & Saqib, R. (2022). Impact of tubewell irrigation on agricultural production in District Dera Ismail Khan, Khyber Pakhtunkhwa-Pakistan. *Sarhad Journal of Agriculture*, 38(2), 525-531.
- Oduniyi, O. S., & Tekana, S. S. (2021). The impact of sustainable land management practices on household welfare and determinants among smallholder maize farmers in South Africa. *Land*, 10(5).

- OECD (Organisation for Economic Co-operation and Development). (2020), *Taxation in agriculture*. OECD Publishing, Paris.
- OECD (Organisation for Economic Co-operation and Development). (2022). *Revenue statistics in Asia and the Pacific 2022: Strengthening tax revenues in developing Asia*. OECD Publishing, Paris.
- Palil, M. R. (2010). *Tax knowledge and tax compliance determinants in self assessment system in Malaysia* (Doctoral dissertation, University of Birmingham).
- Palil, M. R., & Mustapha, A. F. (2011). Factors affecting tax compliance behaviour in self assessment system. *African Journal of Business Management*, 5(33), 12864.
- Ramayah, T., Yusoff, Y. M., Jamaludin, N., & Ibrahim, A. (2009). Applying the theory of planned behavior (TPB) to predict internet tax filing intentions. *International Journal of Management*, 26(2), 272.
- Rashid, S., & Sheikh, A. T. (2015). Farmers' perceptions of agricultural land values in rural Pakistan. *The Pakistan Development Review*, 54(4), 809-821.
- Salam, A. (2022). Taxation of agricultural incomes in Pakistan: Conceptual issues, data challenges and empirical estimates. *Business Review*, 17(2), 72-92.
- Schulte, O., Nguyen, T. T., & Grote, U. (2022). The Effect of renting in cropland on livelihood choices and agricultural commercialization: A case study from rural Vietnam. *European Journal of Development Research*, 34(6), 2878-2898.
- Sebele-Mpofu, F. Y., & Chinoda, T. (2019). Tax knowledge, tax system complexity perceptions and attitudes of the commercial sugarcane farmers and their influence on tax compliance in the Lowveld Area, Zimbabwe. *International Journal of Innovative Science and Research Technology*, 4(4), 407-418.
- Sengupta, D. P., & Rao, R. K. (2012). Direct Tax Code and taxation of agricultural income: A missed opportunity. *Economic and Political Weekly*, 51-60.
- Walker, S. H., & Duncan, D. B. (1967). Estimation of the probability of an event as a function of several independent variables. *Biometrika*, 54(1), 167-179.
- Wu, L., Hu, K., Lyulyov, O., Pimonenko, T., & Hamid, I. (2022). The impact of government subsidies on technological innovation in agribusiness: The case for China. *Sustainability*, 14(21), 14003.

ANNEXURES

Annexure I

Table 14: Punjab agricultural income tax rates in Punjab, Pakistan

| Area-Based Agricultural Income Tax | | |
|---|--|--|
| Sr. No. | Land Ownership | Tax Rate Rs. per acre |
| 1 | Upto 12.5 | 0 |
| 2 | 12.5 acres to 25 acres | 300 |
| 3 | 26 acres to 50 acres | 400 |
| 4 | 50 acres or more | 500 |
| | Mature Orchards Irrigated | 600 |
| | Mature Orchards Unirrigated | 300 |
| Income-Based Agricultural Income Tax | | |
| 1 | If total income does not exceed Rs.400,000/= | 0 |
| 2 | If total income is more than Rs.400,000 but does not exceed Rs.800,000/= | 1000 |
| 3 | If total income is more than Rs.800,000 but does not exceed Rs.1200,000/= | 2000 |
| 4 | If total income is more than Rs.1,200,000 but does not exceed Rs.2,400,000/= | 5% of the amount exceeding Rs 1,200,000 |
| 5 | If total income is more than Rs.2,400,000 but does not exceed Rs.4,800,000/= | Rs 60,000 plus 10% of the amount exceeding Rs 2,400,000 |
| 6 | If total income is more than Rs.4,800,000/= | Rs 300,000 plus 15% of the amount exceeding Rs 4,800,000 |

Source: Government of Punjab (n.d.).

Annexure-II: Description of Model's Variables

| Sr. No. | Objective | Methodology | Dependent variables | Independent variables | |
|---------|---|--|----------------------------------|---|---|
| 1 | Investigate the causes of renting land and the possible implications of absentee landlords' land on water management practices and technology adoption. | Investigate the causes of renting land | Multinomial logistic regression | Tenancy Status (Y=0 if owner, Y=1 if tenant and Y=2 if owner cum tenant) | Education, family type, distance to market, farming experience, livestock, family labor, agri. machinery, agri. practices index, total cultivated area, family business, land type, land rent, district name |
| | | Implications of absentee landlords on land and water management practices (LWMP) | Ordered probit model | Land and Water Management Practices Index (y=0 poor, Y=1 moderate and Y=2= high) | Education, age, family member, distance to market, weather information, cultivated area, type of land, landlord visit, landlord provide land documents for government subsidy, bank loan and help crop damage and also districts. |
| | | Implications of absentee landlords on technology adoption (TA) | Ordered probit model | Technology Adoption Index (y=0 poor, Y=1 moderate and Y=2= high) | Education, age, family member, distance to market, weather information, cultivated area, type of land, landlord visit, landlord provide land documents for government subsidy, bank loan and help crop damage and also districts. |
| 2 | Tax collection estimates under various tenancy arrangements | Scenario analysis | ... | ... | |
| 3 | Analyze the farmers' compliance behaviors towards agricultural income tax under various tenancy arrangements | Binary logit model | Tax compliance (y=0 No, y=1 yes) | Age, education level, knowledge of tax system, farmers treated agri. tax, satisfied tax authorities, governance system, and justice, crime and conflicts, indirect taxes in agri., tax contribute to society, agriculture sector, the government listens to farmers, social benefits, and poor agriculture services | |
| 4 | Examine the institutional hurdles in agricultural income tax collection | Focus Group Discussions (FGDs) | ... | ... | |

Annexure III: Questionnaire

Questionnaire serial number: _____

Survey date: _____

Investigator: _____

District: _____

Tehsil: _____

Village: _____

APPENDIX: RESEARCH QUESTIONNAIRE

Dear respondent

Objective: REQUEST TO FILL THE QUESTIONNAIRE

The Study Seeks to find out the Taxing the Rental Incomes in Agriculture: Analysis of Alternate Options. The information you provide shall be confidential and used only for Academic and Research purposes. Please answer all questions as accurately and honestly as possible.

QUESTIONNAIRE

Taxing the Rental Incomes in Agriculture: Analysis of Alternate Options

A RASTA funded project (2023-24)

Objectives:

1. Investigate the causes of renting out/ renting in land and sharecropping and the possible economic implications of absentee landlords on water management and technology adoption.
2. Tax collection estimates under various scenarios.
3. Analyze the farmers' compliance behaviors towards agricultural income tax under various land cultivation methods (tenancy, sharecropping, own cropping).
4. Examine the institutional hurdles in agricultural income tax collection.

A. Socioeconomic characteristics (Tick the option where needed)

A1. Name of Respondent: _____

A2. Education: _____ years

A3. Age: _____ years

A4. Farming experience: _____ years

A5. Distance to nearest agricultural market: _____ Km

A6: Did you get a loan from a bank or borrow money in the last two years from any source?

Yes

No

A7: What is your major source for loans or borrowing?

1= ZTBL, 2= Commercial banks; 3= Arthi and shopkeepers

4= Friends and relatives; 5= others _____ (specify)

- A8. Does any family member do an off-farm job? Yes No
- A9. Does any family member do business other than farming? Yes No
- A10. Primary occupation: Agriculture Job Business
- A11. Do you have livestock animals? Yes No
- A12. Do you have a mobile phone? Yes No
- A13. What type of phone? Simple Smartphone
- A14. Do you get weather information by phone? Yes No
- A15. Do you get information on the prices of agricultural inputs/outputs from the phone? Yes No
- A16. Do you learn the production technology of crops on the phone? Yes No

B. Farm Particulars

- B1. Total agricultural land: _____ acres
- B2. Total cultivated area: _____ acres
- B3. Own area _____ acres.
- B4. Area rented in _____ acres.
- B5. Area shared in _____ acres.
- B6. Area rented out _____ acres.
- B7. Area shared out _____ acres.
- B8. Rent of canal irrigated land _____ (Rs. / acre/year)
- B9. Rent of tube-well irrigated land _____ (Rs. / acre/year)
- B10. Rent of tube-well + Canal irrigated land _____ (Rs. / acre/year)
- B11. Rent of Barani/Rainfed land _____ (Rs. / acre/year)

C. Labor

- C1. Total Number of permanent workers on the farm: _____ No.
- C2. Number of family workers on the farm: _____ No.

D. Land Tenure Arrangements and Economic Implications

- D1. For how long have you been cultivating the same land? _____ years
- D2. Does the landlord allow the use of land documents to get government subsidies/support?
Yes No
- D3. Does the landlord allow the use of land documents to get a bank loan? Yes No
- D4. Does the landlord help you in case of crop damage? Yes No
- D5. What is your relationship with the landlord? a) Relative b) Friend c) Acquaintance

D6. How frequently does the landlord visit the land?

- a) Weekly b) Monthly c) Once in 6 months d) Once in a year e)
Once in two years or more

D7. What is the level of involvement of your landlord (if applicable) in making decisions related to crop cultivation?

- a) Highly involved b) Somewhat involved c) Not involved

D8. What is the level of involvement of your landlord (if applicable) in making decisions related to water management on the land you cultivate?

- a) Highly involved b) Somewhat involved c) Not involved

D9. What is the level of involvement of your landlord (if applicable) in making decisions related to technology adoption on the land you cultivate?

- a) Highly involved b) Somewhat involved c) Not involved

D10. What is the level of involvement of your landlord (if applicable) in making decisions related to land conservation and management practices?

- a) Highly involved b) Somewhat involved c) Not involved

D11. Please write if there is anything else you want to share_____.

E. Farm and Land Management Practices

E1. Which techniques are being used in water and land management of agriculture fields? (Select Multiple)

- a) Sprinkler Irrigation b) Drip Irrigation c) Furrow Methods
d) Laser land levelling e) Crop Rotation f) Mulching
g) Green Manuring h) FYM g) Water testing
i) Soil testing j) Agro-forestry k) Cemented water courses

E2. What type of modern agricultural practices do you adopt?

- a) Tunnel farming b) Organic fertilizers c) Drone sprayer d) Vertical Farming
e) others, please specify _____

E3. Do you own agricultural machinery? Yes No

E4. If yes, please specify what kind of machinery.

- a) Tractor b) Trolley c) Tiller d) Chisel e) Harrow f) Blade
g) Laser leveler h) Thresher i) Rotavator j) Boom Sprayer k) Bund maker
l) Peter engine m) Tube well n) Solar system for tube well
o) Silage maker p) Reaper q) Subsoiler r) Happy Seeder

E5. Do you apply FYM? Yes No

E6. Do you apply gypsum? Yes No

E7. Do you adopt crop rotation? Yes No

E8. Do you apply fertilizer as per crop requirements? Yes No

E9. Do you do soil sampling? Yes No

E10. Land leveler? Yes No

E11. Do you do water sampling? Yes No

E12. Do you do moisture conservation? Yes No

E13. If yes which method do you use? _____

F. Cropping Area and Yield

F1. If Cultivated Own land

| | Name of Crop | Area/a/ares | Soil fertility Ver good=1, good=2, Poor=3 | Underground water quality Ver good=1, good=2, Poor=3 | Cost of Production (Rs./acre) | | | | | | | Yield (Munds) | Price (Munds) |
|------------|--------------|-------------|---|--|-------------------------------|------------------|-----------|------------|-------|------------------|----------------------|---------------|---------------|
| | | | | | Seed | Land preparation | Pesticide | Fertilizer | Labor | Canal Irrigation | Tube well Irrigation | | |
| Khari Crop | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Rabi Crops | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

F2. If cultivated Shared in land

| | Name of Crop | Area/a/ares | Soil fertility Ver good=1, good=2, Poor=3 | Underground water quality Ver good=1, good=2, Poor=3 | Cost of Production (Rs./acre) | | | | | | | Yield (Munds) | Price (Munds) |
|------------|--------------|-------------|---|--|-------------------------------|------------------|-----------|------------|-------|------------------|----------------------|---------------|---------------|
| | | | | | Seed | Land preparation | Pesticide | Fertilizer | Labor | Canal Irrigation | Tube well Irrigation | | |
| Khari Crop | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Rabi Crops | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

F3. If cultivated Rented in land

| | Name of Crop | Area/a/ares | Soil fertility Ver good=1, | Underground water quality Ver | Cost of Production (Rs./acre) | | | | | | | Yield (Munds) | Price (Munds) |
|--|--------------|-------------|----------------------------------|----------------------------------|-------------------------------|--|--|--|--|--|--|---------------|---------------|
| | | | | | | | | | | | | | |

| | | | good=2, Poor=3 | good=1, good=2, Poor=3 | Seed | Land preparation | Pesticide | Fertilizer | Labor | Canal Irrigation | Tube well Irrigation | Harvesting | | |
|--------------------|--|--|-------------------|------------------------------|------|---------------------|-----------|------------|-------|---------------------|----------------------------|------------|--|--|
| Khari f Crop | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Rabi Crops | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

G. Lessor Information

G1. Age of the head of the household: _____ years

G2. Education of the head of the household: _____ years

G3. Where do you live? Rural Area Urban Area

G4. Number of family members: _____

G5. Rented out acres: _____ Acres

G6. Farming Experience: _____ years

G7. How do you rate your knowledge of agriculture?

- a) Very poor b) Poor c) Neutral d) Good e) Very good

G8. Pieces of rented out land: _____ No

G9. Rent of rented-out land: _____ Rupees/acre

G11. Distance of rented-out land from home: _____ Km

G12. Primary source of family income: Agricultural rent Job Business

G13. Do you own livestock: a) Yes b) No

G14. The proportion of total household income other than agriculture: _____ %

G15. Involvement in decision making a) Yes b) No

G16. Proportion of landholding under irrigation:

Canal__Acres; Tube wells ___ Acres; Canal+Tubewell: ___ Acres; Rainfed___ Acres

G17. How often do you visit your rented-out land?

- a) Weekly b) Monthly c) Once in 6 months d) Once in a year e) Once in two years or more

G18. Please write if there is anything else you want to share _____.

H. Tax Scenarios, Budgeting and Scenario Analysis, Farming practice, tax compliance behavior and trust in the tax system

H1. Do you perform financial planning and record-keeping? Yes No

H2. How frequently do you file agricultural income tax returns?

- a) Never b) Rarely c) Sometimes d) Always**

H3. In your opinion, how important is it for farmers to comply with agricultural income tax regulations?

- a) Not important b) Little important c) Average d) Important e) Very Important**

H4. How do you rate your knowledge of agricultural income taxes?

- a) Poor b) Fair c) Good d) Very Good e) Excellent**

H5. Do you think farmers are treated fairly in the agri. tax system?

- a) Strongly Disagree b) Disagree c) Neutra d) Agree e) Strongly Agree**

H6. How much are you satisfied with the tax authorities?

- a) Strongly Dissatisfied b) Dissatisfied c) Neutra d) Satisfied e) Strongly Satisfied**

H7. How much are you satisfied with the governance system?

- a) Strongly Dissatisfied b) Dissatisfied c) Neutra d) Satisfied e) Strongly Satisfied**

H8. How much are you satisfied with the justice system?

- a) Strongly Dissatisfied b) Dissatisfied c) Neutra d) Satisfied e) Strongly Satisfied**

H9. How do you rate the crime and conflict situation in your area?

- a) No crime b) Somewhat c) Extreme**

H10. Do you think that there are heavy indirect taxes on agriculture?

- a) Strongly Disagree b) Disagree c) Neutra d) Agree e) Strongly Agree**

H11. Do you believe in paying agri. taxes is a fair way to contribute to society?

- a) Strongly Disagree b) Disagree c) Neutra d) Agree e) Strongly Agree**

H12. Do you believe that agricultural tax compliance positively contributes to the growth of the agricultural sector?

- a) Strongly Disagree b) Disagree c) Neutra d) Agree e) Strongly Agree**

H13. Do you think that the government listens to farmers?

- a) Strongly Disagree b) Disagree c) Neutra d) Agree e) Strongly Agree**

H14. Do you receive any social benefits after paying taxes? Yes No

H15. Have you faced any penalties for non-compliance with agricultural tax? Yes No

I. Taxes on Absentee Landlords and Sharecropper Income

I1. There should be separate taxes on the income of landlords and sharecroppers. Yes
No

I2. Whose income should be taxed more? a) lessor b) lessee.

I3. Assuming the imposition of tax on rental incomes, would this impact your decision on the current land tenure arrangement? Yes No

- I4. What would be the suitable rate of agricultural income tax on farmers cultivating own land?
a) 1%-5% b) 6%-10% c) 11%-15% d) 16%-20% 2) >20%
- I5. What would be the suitable rate of agricultural income tax on sharecroppers?
b) 1%-5% b) 6%-10% c) 11%-15% d) 16%-20% 2) >20%
- I6. What would be the suitable rate of agricultural income tax on tenants?
a) 1%-5% b) 6%-10% c) 11%-15% d) 16%-20% 2) >20%
- I7. What would be the suitable rate of agricultural income tax on lessors?
a) 1%-5% b) 6%-10% c) 11%-15% d) 16%-20% 2) >20%