

The e-Governance of Land Record and Social Dispute Resolution: An Impact Evaluation of the Punjab Land Record Management Information System (PLRMIS) in the Punjab Province Pakistan

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Abstract: Complexity in administration and limited accessibility of land records have been a long-standing issue in developing countries. In Pakistan, except for the province of Punjab (the treatment province) where land-record has been computerized in 2017, the land record is administered through traditional land registers and cadastral maps in paper formats requiring a hard work of the local administrators called “Patwaris” at the grass-root level. As an important step towards e-governance, the Punjab provincial government in 2017 established a Land Record Management Information System (PLRMIS) that simplified the procedure of land registration and transfer through digitization of the land-records. This research attempts to adopt a quasi-experimental approach to link the introduction of PLRMIS with land-related dispute resolution in Punjab and to scientifically evaluate the social impacts of this project. This paper outlines the importance of the area, research design and proposed Difference-in-Difference method of the program’s impact evaluation as well as preliminary tests on the secondary data collected from courts’ proceedings. This research is being conducted under the Joint Research Project of the KDI School of Public Policy, South Korea in collaboration with the Department of Management Sciences, COMSATS University Islamabad, Attock Campus, Pakistan. The purpose of this paper is to share the proposed research design with conference participants and elicit important comments on the validity of the approach being adopted.

Keywords: Land Record Digitization, Quasi-Experimental Design, Dispute Resolution, Impact Evaluation

Acknowledgement: This research is being conducted under the joint research project titled “Impact Evaluation of Land Record Computerization in the Punjab Province, Pakistan”, funded by the KDI School of Public Policy, South Korea and to be completed in collaboration with COMSATS University Islamabad, Attock Campus, Pakistan.

1. Introduction

Land in the Punjab province of Pakistan is known for its fertility, agricultural diversity and its contribution to the rural economy of the country. However, ownership and administration issues associated with land have been causing significant constraints for both government and the general public in realizing its real value. These issues include inequalities in land distribution, tenure insecurity and difficulties associated with registration and transfer system of land (Ali, 2013; Thakur et al., 2005; Marshall, 1975). The century's old inefficient and manual land record system has increased the land transaction cost (both formal and informal) and land-related disputes in rural and urban areas (Cheema, 2006). As a result, the land market has become contracted while land prices are often unpredictable and in excess of the discounted value of the potential agricultural earnings from it. The low mobility of land contributes to perpetuating the highly unequal distribution of land and related livelihood opportunities across the province.

In the past, land reforms were largely carried out for the purpose of securing property rights (Conning & Deb, 2007). These reforms include land entitling (Zhang et al., 2020), land administration (Conning & Deb, 2007; Enemark, 2009; Gignoux & Wren-lewis, 2013), imposed redistributive reforms (Adams & Howell, 2001; Conning & Deb, 2007), negotiated or market-led reforms (Gauster & Isakson, 2007) and reforms through restitution (Conning & Deb, 2007; Gignoux & Wren-lewis, 2013). Some of them were successful and others resulted in unintended outcomes (Besley, 1995; Deininger, 2003; Feder & Nishio, 1999). Many of the national and international organizations and governments have played a crucial role in such reforms. For instance, the world bank solely committed billions of dollars in different parts of the development world (World Bank 2005; Holstein 1996; USAID 2005). The core components of these reforms include economic, political, credit supply, environment, sustainable development (Hernando de Soto 2000; Douglass North 1990; Conning & Deb, 2007). Failure in land reforms often happens when there are unknown community arrangements, poor implementation, and lack of accountability (Scott 1999; Lauria-Santiago 1999; Swinnen 2000; Conning & Deb, 2007). But the risk can be minimized by efficient monitoring, accountability, participation, and feedback along with pilot studies before scaling up to costly program intervention (World Bank 2005, Conning & Deb, 2007). A strong feedback mechanism is key to the effective monitoring, evaluation and accountability in reforms packages ensuring intended outcomes. For this purpose, different types of impact evaluation studies are carried by qualified researchers to identify the various reasons and to recognize the outcomes associated with the reforms package that contribute in evidence-based policy making.

Digitization of records is an important catalyst to the land reforms. Recently, there have been successful attempts to transform the governance mechanism through e-governance where information technology is used to enhance access to, and delivery of, government services to benefit citizens, businesses and government from local level to national and international levels (Arfeen & Khan, 2012). The introduction of PLRMIS in the Punjab province of Pakistan is one such example of transforming governance mechanisms that is intended to enhance productivity and reduce conflicts arising from conventional record administration. Initially the program was implemented in

eighteen¹ districts of the province (henceforth collectively called Treatment Group 1), while in the 2nd phase expanded to the entire province² (henceforth called Treatment Group 2). Following are the key evaluation questions related to the impact of PLRMIS program:

- i) To what extent the introduction of *PLRMIS* has affected land-related disputes in the Punjab Province?
- ii) Are there differences in changes overtime in the land-related key variables observed between Treatment Group 1 and Treatment Group 2 in the Province?
- iii) What challenges are still remaining in the governance, functioning and public participation and how stakeholders view these challenges?

In this paper, the researchers adopt a quasi-experimental approach to finding the true impact of the digitization of the land record in the Punjab Province, Pakistan. The following section describes a brief history of the land administration in Punjab, context, and objectives of the program while section 3 discusses methods, experimental design, data and empirical specification of the study. Section 4 briefly discuss the preliminary results of the PLRMIS data while the last section outlines the future plan.

2. Context and Program Description

The history of land administration and revenue generation in the Indian Sub-continent can be traced back in the 13th and 14th centuries when the first Indian Sultan, Ala Uddin Khilji started the registration and administering the land record (Ali, 2013). Successive rulers initiated and maintained the land record tradition throughout their reigns and extracted land revenue such as Sher Shah Suri of 16th century who introduced fixed crops rates (Thakur et al., 2005) that significantly improved the measurement of land records. Akbar, the most powerful emperor of Mughal Empire in the 17th century, brought substantial reforms in the land administration such as determining different classes of lands and revenue estates (Ali, 2013). The Mughal Empire was followed by the British rule during which the land administration system was enhanced to raise more land revenues (Marshall, 1975). In view of the complication in uniform implementation of laws across sub-continent, the British government introduced and modified state-specific regulations over the course of nearly 90 years (Thakur et al., 2005). The "Punjab Land Alienation Act 1900" that prohibited land transfer ownership from agriculture to non-agriculture class was an important intervention by the British rule in India (Cheema, 2006). Although minor amendments took place over the years, the major land related laws of the British government such as "Transfer of Property Act of 1882" and "Punjab Tenancy Act of 1887", continued to exist after the independence of Pakistan and India in 1947. For example, the "Land Revenue Act of 1887" was amended with "Punjab Land Revenue Act of 1967". The overall land administration system in Pakistan is carried out within the framework of the British Era's laws

¹ Districts in the Treatment Group 1 include, Jhlem, Chakwal, Khushab, Sargodha, Jhang Toba Tek Singh, Khanewal Multan, Lodhran, Vehari, Pakpattan, Sahiwal, Faisalabad, Kasur, Hafizabad, Gujranwala, Sialkot and Narowal.

² The remaining eighteen districts that exposed to the 2nd phase of the program include Rawalpindi, Attock, Mianwali, Bhakkar, Layyah, Deraa Ghazi Khan, Muzaffargarh, Rajanpur, Rahim Yar Khan, Bahawalpur, Bahawalnagar, Okara, Nankana Sahib, Lahore, Sheikhpura, Chiniot, Mandi Baha Uddin and Gujrat

and regulations (UN-HABITAT, 2012). Appendix I shows a detail timeline and land related legislations in Pakistan over the course of 140 years.

Considering the importance of improving land administration, the functioning of land market, and linking it to the broader areas of governance and administration, the Punjab provincial government in collaboration with the World Bank (WB), introduced the Land Record Management Information System (PLRMIS) through establishing the Punjab Land Record Authority in 2017. The aim of this system was to facilitate public-access to land and bring transparency into the land records. Initially the program was implemented in eighteen districts in Punjab in late 2013 and later expanded the program to the entire province in late 2016. Figure 1 shows the distribution of districts that exposed to treatment in two phases.

Figure 1: Distribution of Early Treatment and Control Districts in Punjab



2.1. Theory of Change

The *PLRMIS* is expected to influence the stakeholders through institutional, social and behavioral mechanisms. Intuitional mechanism involves the transformation of methods that are followed and written in the standard operating procedures for a task. In the context of *PLRMIS*, various intuitional changes have occurred during and after the implementation of *PLRMIS*. These include, the web-based software development-a crucial output of the project-, establishment of the Arazi Record Centers (ARCs) and the business processing and re-engineering of the land record management system. Information technology development such as software development enhances the institutional performance of an individual as well as organization (Horton, D., & Mackay, R., 2003). Under the *PLRMIS*, a well-standardized monitoring dashboard that enables top-level management to track each activity at all levels. Additionally, the dashboard works a guide for staff following standard operating procedures of all four levels of management record system. The establishment of ARCs enable the issuance of “Fards”-a basic land record document- that expedite the process of land related transactions. ARCs further achieve four objectives including client satisfaction, saving

of time, reducing cost of a transaction and improvement in land tenure security. Finally, the legal and policy framework of *PLRMIS* enhances the institutional capability to work smoothly according to the defined outputs of the project. One of the key objectives of the program is to enhance public services delivery. Unlike the conventional system, under the *PLRMIS*, women have access to land records easily and can perform land transactions with convenience.

On the behavioral side of the program's influence, various trainings and capacity building steps were taken to create a positive attitude among the key stakeholders-employees of the land department-. These measures gained support for the project by decreasing the fears about job security and explaining to the participants about new roles under the new system. Initially, Land Record Staff at the Tehsil level (called "Patwaris") resisted the program by holding strikes and refusing to work. After extensive negotiations, the program included incentives for employees and capacity building such as construction of new field offices furnished with IT facilities, transportation allowance and allocation of 2% of land revenues to Revenue Officers.

Social awareness is an essential part for any project because the general public responds lately especially people who live in rural areas. Under the new program, a number of public awareness campaigns were launched that encouraged the general public to actively benefit from the digitized record management systems. Major awareness measures included conducting of 36 workshops with 5,663 internal key stakeholders namely Officers of the District Administration (District Collectors, Additional District Collectors, Assistant Commissioners) and Revenue functionaries (Tehsildars, Girdawars/Kanungos, Patwaris) between December 2011 and February 2014. Moreover, 250 representatives of the Punjab Bar Association and Field Revenue Staff were consulted about effective implementation of the program.

The main objectives of *PLRMIS* are given below:

- To reduce number of procedure (steps) to complete a property registration (Efficient Land Registration).
- To reduce the total (transaction) cost incurred on property registration (Cost Reduction).
- To increase the level of tenure security of land-right holders.

2.2. Key Features of the Program

- Automated Issuance of Land Ownership Documents ("Fard") in 23,183 out of the total 25,709 revenue states (Rural and Semi-Urban) covering 90% of the land in Punjab. The system has improved service delivery standards by issuing "Fard" in 30 Minutes and Mutation in 50 Minutes.
- Establishment of the 151 state-of-the-art Land Record Centers integrated with 45 Sub-registrar offices across Punjab. This has increased collateral value of land due to improved authentication.
- Online availability of land record 24/7 at the website and efficient procedure of land registration.
- Creation of 4000 direct and 10,000 indirect jobs in the province.

2.3. How does the PLRMIS Work?

The PLRMIS Project was designed by the Project Management Unit using the experiences of the pilot projects in districts of Kasur, Lahore, Rahim-Yar Khan and Gujrat ~~and~~ also utilizing the experience from other countries. Currently, the PLRMIS system is fully operational in all districts of Punjab since 2017. It allows the right holder to search, obtain and register the land he owns using simple procedure e.g the right holder has to go to the service center. The staff will search their record by his name, father/husband name, or khewat number using his/her computerized national identity card. The service center staff then asks for the thumb impression through a bio-metric device and a photo. The right holder then gets copy of their record within 10-15 minutes after paying the specified fee.

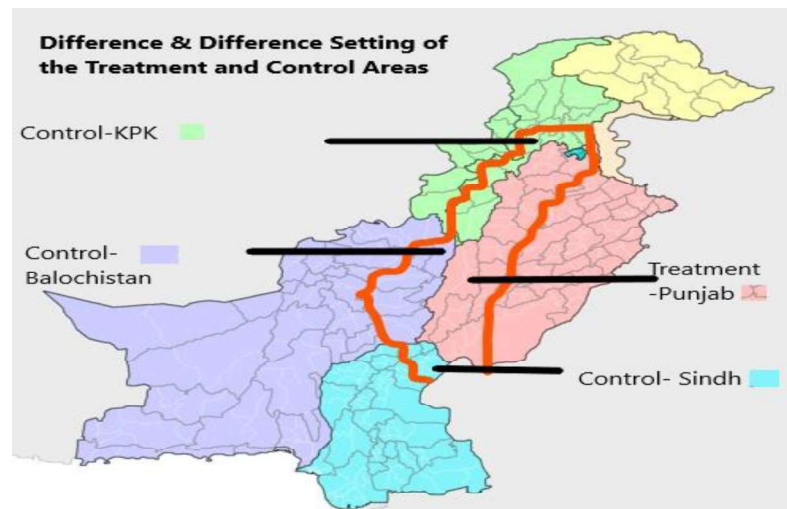
3. Methods

3.1. Experimental Design

The Punjab province occupies a total area of 205,345 km², and is the most populated province of Pakistan with over 80 million inhabitants (55% of the Pakistan's total population). Most of the Punjab's population is distributed across the rural areas where agriculture is the dominant sector of economy.

In view of the implementation of the PLRMIS across all districts of the Punjab province and whereas, similar facility doesn't exist in all its neighboring provinces, the researcher attempts to adopt a quasi-experimental approach that involves Difference-in-Difference (DiD) design coupled with qualitative interviews from the field to evaluate the effect of the land record digitization on the land related disputes. For the quantitative analysis, the researcher finds comparable control groups (regions) that have not been affected by the program precisely due to the administrative division of the districts and provinces in Pakistan yet have similar socio-economic characteristics across the border with the treatment province (see figure-2). Given the phase-in implementation of the PLRMIS program in Punjab, we find two types of treatment groups. Firstly, the districts within Punjab Province, that were initially exposed to the program are the treatment group 1 while the remaining districts are considered as control group for the first phase of the program. The second phase of the program expands to the entire province that include all 36 districts of Punjab, called the treatment group 2. For this later treatment group 2, the control regions belong to the districts of the provinces that border alongside the Punjab province. More specifically, there are three provinces that share border with the treatment (Punjab) province. These are the Province of Khyber Pakhtunkhwa, Balochistan and the Sindh province. The bordering districts of these provinces have same geographic, natural, and social characteristics as districts in the bordering region in the Punjab province. We attempt to select districts and associated revenue estates within all districts identified through red line in figure-2, and to differentiate the treatment and control regions in terms of the outcome variables.

Figure 2: Difference-in-Difference Setting of the Program Area and Adjacent Control Regions



3.2. Data

Our data comes from two main sources; primary source that involves collection of data through field survey and secondary sources that include records from government offices including published record of courts proceedings. Data on the outcome variable (e.g. number of land-related disputes) is being collected from the police stations records located within the jurisdiction of each revenue estate. In Pakistan, the distribution of police stations follows similar pattern of division of revenue estates, however the number of police stations depends on the crime rate and population within each sub-unit of a district (See table 1). This research utilizes data on the number of police stations collected through systematic surveys from each police station as an outcome variable. Parallely, the researchers have obtained data on the number of disputes and related information from the courts official records that allow for preliminary tests on the validity of our research design.

Data on the land record computerization is obtained from the PLRA website as well as designated centres (ARCs) in the province of Punjab. The researchers are working on carefully designing a systematic survey to obtain information about estate-specific incidence of conflicts and their historical records from government records (through police stations) and from concerned parties in the conflict. This survey will enable the researcher to clearly identify the origin of a conflict and if the availability of digital information on the land related record helped them (concerned party) resolve the issue without going through prolonged court cases.

Table 1: Distribution of Police Stations in Pakistan

Province	No. of Divisions	No. of Districts	Police Stations
Punjab [Treatment]	8	35	705
Sindh [Control]	5	22	566
Khyber Pakhtunkhwa [Control]	7	34	198

Balochistan [Control]	6	34	117
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Source: Pakistan Bureau of Statistics (PBS), 2018

3.3. Empirical Strategy

The pre-program land legislations that came from the Land Revenue Act (1967) and the Registration Act (1908), did not sufficiently entitle the landowners with the ownership right certified by State. The ownership rights and other related documents associated with land records were merely presumed to be accurate. However, it's evident from several court rulings that this presumptive status of rights had led to many disputes among landowners and concerned parties and the government due to the contestable nature of the land record and insufficient documentation. A number of studies have pointed to the dispersed and duplicative nature of land record in Pakistan causing uncertainties in the land administration and impeding economic development besides threatening the poor and vulnerable communities' rights protection (Qazi, 2006). One of the main reasons of increasing disputes in rural areas is the ambiguity in land records that is often exploited by the relatively upper class of the society rendering the poor land owners deprived of their ownership rights (Mahmood, 2004; Carey, 1997). The researcher's idea is that if the ambiguity or loopholes in the land records are resolved, then, it will reduce the probability of conflict that originates primarily from such an ambiguity. Figure 2 shows the results chain of the program that identifies the functional relationship of the program components with the dispute resolutions in the treatment province.

3.3.1. The Model

Individual-level panel data is a powerful tool for estimating policy effects. Initially, in the simplest case we expect to collect data on two time periods and a binary *Treatment* indicator, $Treatment1_{it}$, which is unity if unit i is exposed to *PLRMIS* program at time t . The following is the main specification for estimating all our outcome variables.

Program's Effect Estimation for Phase 1:

$$Y_{ijt} = \beta_0 + \beta_1 Treatment1_{ijt} + \beta_3 X_{ijt} + \gamma_i + \delta_j + \tau_t + U_{ijt}$$

Where

Y_{ijt} represents the outcome variable in unit i in district j of Punjab at year t

$Treatment1_{ijt}=1$ if the surveyed responding unit i belongs to district j of Punjab province (treatment group 1) & $t \geq 2014$ (estate is exposed to *PLRMIS* 1st Phase)

$Treatment1_{ijt} = 0$ Otherwise

X_{ijt} = Vector of characteristics at the responding unit level (refer to the variable list section 2.2.1 above)

$\gamma_i (i = 1 \dots n)$ = The unknown intercept for each responding unit (n entity-specific fixed effects).

δ_j ($j = 1 \dots n$) = The unknown intercept for each district in the Punjab province (n district-specific fixed effects).

τ_t ($t = 1 \dots n$) = Time trend. t is time as binary variable (dummy), so we have t-1 time periods.

u_{ijt} = Error term to be clustered at individual responding unit level.

Program's Estimation for Phase 2:

$$Y_{ijt} = \beta_0 + \beta_1 Treatment2_{ijt} + \beta_3 X_{ijt} + \gamma_i + \delta_j + \tau_t + U_{ijt}$$

Where

Y_{ijt} represents the outcome variable in unit i in district j (observed in Punjab, KP, Sindh, Balochistan provinces) at year t

$Treatment2_{ijt}=1$ if the surveyed responding unit i belongs to district j of Punjab province (treatment group 2) & $t \geq 2017$ (estate is exposed to *PLRMIS* 2nd Phase)

$Treatment2_{ijt}=0$ Otherwise

Our empirical strategy rests on the following key assumptions.

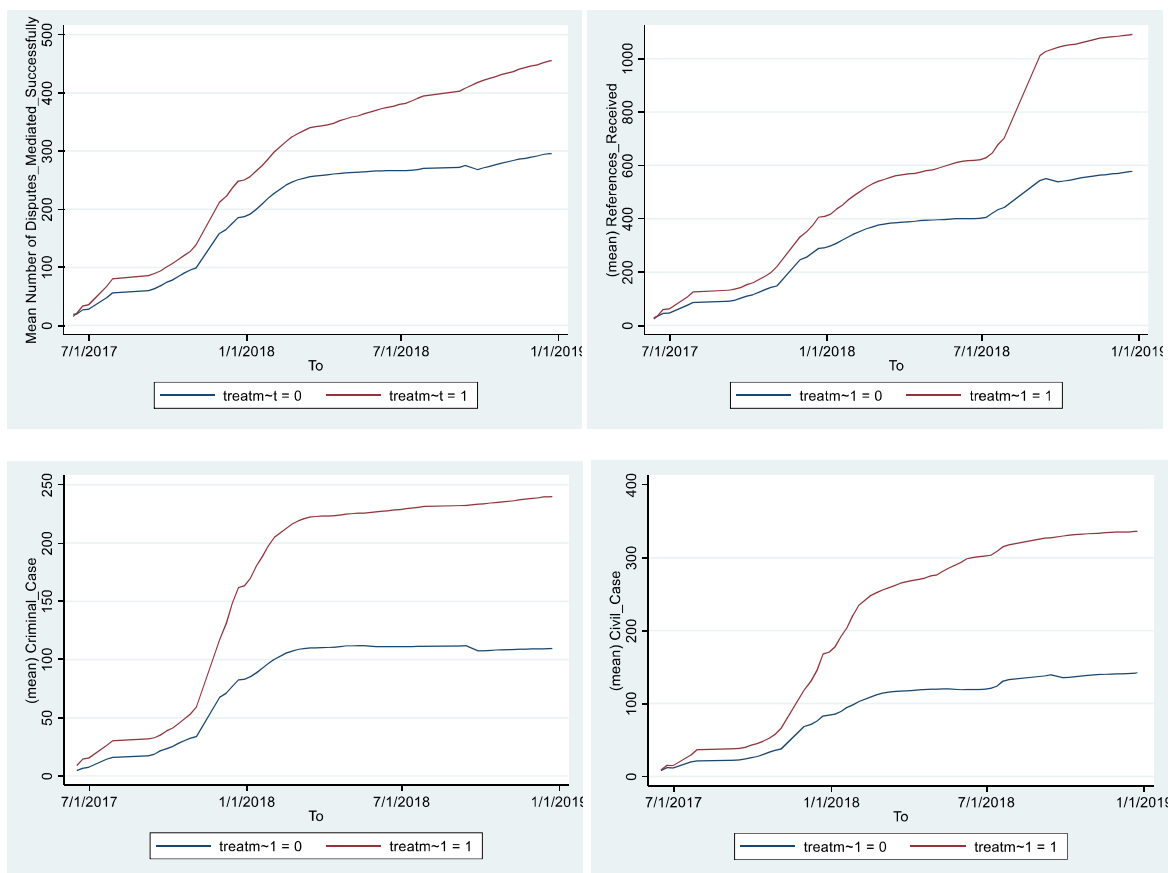
- a) **Strict Exogeneity:** Our fixed effect DID design aims to difference out unmeasured confounders using techniques that eliminate biases from group- or time-invariant factors. For this, we assume that the timing of treatment exposures in the DID design is statistically independent of the potential outcome distributions, conditional on the group- and time-fixed effects. There is no such intervention as *PLRMIS* or any other system in the control districts. Although, recently, governments of these provinces are trying to introduce such a system, the existing land related record is still operated manually
- b) **The Common Trend:** The outcome variables in the treatment region (treatment group 1 and treatment group 2) follows a similar nature and mechanism as in the control districts in Punjab2, Sindh, Balochistan and KP. Before the introduction of the *PLRMIS* system, the difference in terms of land-related disputes after controlling for province and district fixed effects is expected to be insignificant. Existing research also points to the commonality on key aspects in our design. Despite variation between urban and rural areas, land disputes, registration of land, transaction cost, land use & development, land tenure and land market values follow a similar pattern Punjab, Sindh, KPK and Balochistan. A number of studies such as CPIN (2020), Khalid and Begum (2013), Gazdar (2009), USAID (2010), Niazi (2003), MOCC (2020), NDMA (2020), and LandLinks (2020) have pointed to this commonality.
- c) Pakistan has a parallel court structure in all provinces, and the formal court system has powers to hear and resolve the land-related dispute cases. Land related disputes are the most common cases in the courts of Pakistan. According to one estimate, over a million land related cases are pending countrywide covering all four provinces, i.e. Punjab, Sindh, KPK and Balochistan. Significant causes of land disputes are inaccurate or fraudulent land records,

erroneous boundary descriptions that create overlapping claims, and multiple registrations to the same land by different parties (USAID 2008; Dowall and Ellis 2007; Ali and Nasir 2010).

4. Preliminary Results on the Court’s Records

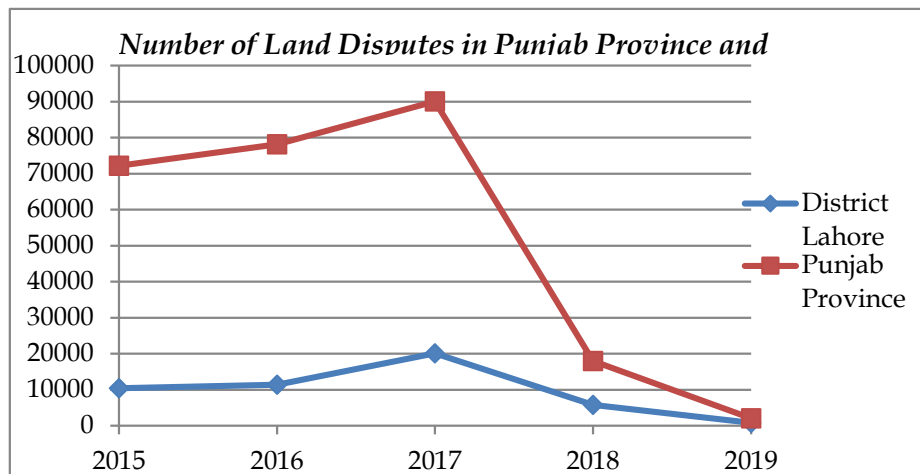
We obtained data from the provincial court’s Dispute Resolution Centers’ records on the number of dispute references received, references mediated successfully, references for which mediations failed, criminal cases, civil cases and rent related cases across all districts from the Punjab Province for the period 2017-2019. One limitation with this data is that it does not allow us to obtain evidence on the pre-program difference of the treatment and control groups. We conduct an ex-post analysis of the mean difference of the early treated districts in Punjab and the early control districts to see the difference in performance of the court cases. Figure 3 shows the mean differences between the treatment group 1 and treatment group 2 shown in figure 3. Significant difference in terms of court related response growth can be observed from the data that signifies better performance of districts that were early treated compared to later treated districts. This analysis however is preliminary, and we don’t conclusively verify the causality of the program based on this data. Our data process has been halted due to COVID-19 pandemic. We expect to come up with our primary data and subsequently test on the specification as soon as the pandemic is over.

Figure 3: Mean Difference Between the Early Treated Districts of Punjab and Early Control Districts.



Preliminary data by the PLRA (Figure-4) also shows a sizable drop in the land related disputes however, these aggregate data of Punjab and district Lahore do not provide causal evidence of the program impact. Analysis of data on the individual police stations and associated revenue estates in treatment and control districts can only provide a basis for causal inference with regard to the program impact.

Figure 4: Land Disputes in Punjab and District Lahore (Source: Researcher own work PLRA data)



5. Discussion and Future Plan

The challenge for valid impact evaluation studies in land related reforms is to find the counterfactual of the treated group. The best idealized method is to assign randomized treatment to households but in most cases, it is costly and hard to implement a program through randomized control trials (RCTs) (Conning and Deb, 2007). The next best alternate to RCTs is the quasi-experimental approach that utilize the program introduction in an area as a treatment region while finding a close counterfactual region that carries similar characteristics except the program introduction

The PLRMIS system is likely to be expanded across Pakistan. Although, the *PLRMIS* success on key outcome such as reducing procedural time and cost etc is known, however, it is not known as to whether the program has contributed into lessening the land-related conflicts. In this proposed project, considering the *PLRMIS* as a quasi-natural experiment, the researcher plans to carry out a rigorous impact evaluation of the program to come-up with evidence-based policy recommendation for the government to bring governance reforms.

The proposed quasi-experimental approach to this one-year research project is expected to be completed in several stages. In the first stage of the project we have reviewed existing literature on land related policy interventions and impact evaluation methodologies with a special reference to social dispute resolution. Our research team is currently engaged in extensively reviewing the literature and preparing for the development of a strong research design in the following months. We plan to develop an effective survey design before going to field for actual data collection. The data collection process may take up to four months that will be followed by the data cleaning and

processing. Data analysis, testing and examining the results are to be done in the middle of the year 2020.

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