

Analysis of the Effects of Law 6360 on Rural Communities and the Agricultural Economy

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Abstract

Equal access to healthy and sufficient nutrition is a human right. As well, food production was always a hot topic. With globalization, food production has changed, mainly making transmission to corporate farming. Small-scale farmers are disadvantaged in opposition to corporate farming, which puts a huge number of the population at risk. The last legislation regarding land use in rural areas, Law 6360, passed in Turkey causing a shift in administrative responsibilities and the local identity of rural organization. In this research, I aim to discover how is agricultural production covered by governmental agencies regarding national production, and how rural communities are affected after the imposition of this law.

1. Introduction

In 2012, law 6360 passed and it has been in use since 2014. The law changed the governance structure of villages in 14 new cities, in addition to 16 cities abiding by "Big City Law", that first accepted in the 1982 Constitution of Turkey. My interest is in understanding the outcomes of the agricultural system regarding rural communities and the rural economy. The initial research question is thus, how does Law 6360 affect the identity of agricultural production in the old villages, which are now considered neighborhoods after the change of local governance authorities?

In this regard, I will cover this topic from agricultural monopolization and the safety of rural communities. In effect, agricultural production is a multifaceted network that involves multiple parties in each layer of execution. Until the last product is met with the consumer in the retail market, there are production, processing, storage, and distribution steps.

Additionally, at every layer and after the last utilization by consumers, there are disposal operations of waste products. During these processes, large stakeholders may gain excess power due to ease of access to funds and recipient parties. In result, large stakeholders can impose unfair demands against small-mid-scale stakeholders by acting as a gatekeeper.

The importance of this law regarding rural communities and agrifood systems is that a shift of governance for villages by changing its title to "neighborhoods" creates new costs for village residents. Due to the law, municipality services started covering these rural lands as well, taking away responsibilities from village heads, and creating infrastructure expenditures for farmers and residents. Those costs include water usage and infrastructure taxes, as a general application of city laws. Besides the costs, "neighborhood" status redefined the usage of common areas, and as a result, restricted the collective use of rural lands for grazing and mutual farming. After this change, the property rights of these lands passed to the municipality, in parallel passing the control and distribution of development rights.

My research therefore aims to unveil the shifting identities of rural life and the agricultural economy after the imposition of this law. In the literature, the social sphere of the effects of this law is poorly represented. Much of the research focuses on constitutional properties and local governance responsibilities of these cities. Only a couple of them focused on the effects on the rural community, and the change of property deeds by the causal factors of this law.

The perplexing factor is that nearly 80% of agricultural lands are owned by small-scale farmers. On the other hand, farmer migration is not only related to farmland ownership but

also to a decrease in manual labor necessity. For this reason, unveiling the relationship between the shift of the identities of rural communities and the redefinition legal status of the lands will not be direct. The positioning of large stakeholders may vary by their roles in different areas. As a result, small-scale producers may continue to produce but as subcontractors for large stakeholders.

In these terms, regarding my research question on the identity of rural agricultural economies, My hypotheses are as follows:

H1: Rural farmers are not supported and protected by government agencies, making the agricultural labor population vulnerable to market shocks. Rural communities are affected by the newly imposed law.

H2: Diminishing profits, increasing costs, and restriction of common lands caused people to give up their rights on rural lands, and solidified corporate farming practices.

H3: The dissipation of local community production and augmentation of industrial farming created disconnected societies, where the local agricultural production is regulated by global market conditions, and retail consumption became highly outsourced.

To test my hypothesis I will conduct surveys and interviews with micro to macro stakeholders, I will research property deed transfers in law-imposed cities, and, I will analyze the agents and the risks in agrifood systems by complex social systems approach.

2. Literature Review:

The food security discussions goes back before than Sustainable Development Goals, to 1974¹. Naturally, food is not a newly debated topic. Famines of drought and issues regarding increasing population have always been a major topic of political discussions(Ahlerup 2023).

¹ https://link.springer.com/chapter/10.1057/9780230589780_11

If we look back in history, harming laboring ox and plow were strictly prohibited actions that are punished in the Ancient Greece(Hyde 1917). The reason because they were an agricultural community.

More recently, starting with industrialization and early globalization, another issue arose again, population started to increase faster. In light of this, Thomas Malthus stated that population growth continually surpasses food production, and this is inevitable.

Neo-Malthusianist thought, following that, focused on population planning(Mellos 1988).

Despite the fact that numerous birth control tools have been made available, the world population is steadily increasing. The fact is that Malthus was wrong, and natural resources can also grow exponentially, as we are witnessing with selective breeding and sophisticated agricultural techniques.

There are more than 200 ways to define food security. The issue may regard present or future security, resilience to insecurity, sustainability, efficiency in macronutrients and micronutrients, cultural adaptability, and equitability are some of the constituents of the definition (Maxwell 1992). On the other hand, there is a conflicting notion that is "food sovereignty", proposed by La Via Campesina and local farmer associations. The main difference, food security generally supported by the UN and EU, focuses on food as a trade meta that is output to be maximized. Food sovereignty, on the other hand, puts more weight on local sufficiency; thus addressing the localities where food can be produced but is actually expensive for local access due to global prices. For this definition, food sovereignty is the precondition for food security. Applications such as monoculture crops, and high-yielding hybrid seeds are not good practices for food sovereignty, because they harm the local varieties and self-sufficiency. The difference between security and sovereignty is also iterated by FAO, consequently, the definition of food security proposed by WTO is not equivocally accepted. (Lee 2007).

Smallholders are at the center of controversies. Job-wise, small farm operations create employment and support rural cultures. However, they are the most vulnerable to shocks with less profit margin. As well, they are the ones who can benefit less than big holders from credit and programs. For this reason, addressing the smallholder situation can greatly improve food security and create rural livelihoods (Bahru 2022). High-yielding seeds, irrigation infrastructure, fertilizers, and farming machines are expensive inputs for smallholder access, thus there needs to be government intervention in support. Yet for this reason, smallholders are the first to be affected in case of the removal of subsidies (Chandel 2023).

One of the questioned topics about agricultural zones is the division of land use. First and foremost, the term division itself is vague. Generally, the term is used for fragmentation. That is, actually, the first meaning that comes to mind, physical fragmentation. However, we can also talk about activity fragmentation, ownership fragmentation, and social fragmentation. Sometimes scholars used different terms such as fragmentation and segmentation to define different types of partial use of the farmland (Sabates-Wheeler 2002). Besides, all of these fragmentations may coexist with different types of ownership, such as cooperatives, trade unions, family groups, and individuals whether as land owners or operators. Therefore, in reality, the different types of relationships between participants and the land complicate the management of the situation. As a result, policy units and research organizations are mostly ineffective in preparing suitable fragmentation management practices (Ntihinyurwa 2021).

As with this, fragmentation is not necessarily harmful in all cases. It is possible for a single person to have a fragmented holding of lands. In this sense, it would be even beneficial to have diverse holdings. In the case of a hazard, a person will have diversified risk with a geographically distributed portfolio. Similarly, a dissected topography will necessitate

fragmentation or we might expect to see fragmentation by crop types due to climatic risks (King 1982).

A different application is seen in Turkey. In 1945, a new bill was prepared for the state-managed distribution of farmlands to peasants. It is titled "A Law Providing For Land Distribution and Establishing Farmers' Homesteads" and later is changed to " Law Making the Farmer a Land

Owner", which depicts how it has been initially designed. The distributed land was mostly state-owned, therefore it was a project for increasing the wealth of peasants and utilizing uncultivated lands. It also aimed to feed the landless people on their own lands. The project didn't go well because not everyone was able to benefit from the law. Around, it is recorded in the 1950s that there were 2 million courts annually on the subject of land disputes between people and sometimes villages. In resume, Turkey has a very fragmented landholding structure (Aktan 1966).

Followingly, Turkey's agricultural lands decreased between 1990 and 2018. There are 4.7 million hectares loss of land use from agriculture. Today, small and mid-scale farmers, which are farmers with less than 100 decares of land, hold 83% of agricultural land. The average magnitude of a parcel is 13 decares, which is way below the average of the US, which is 44.4 acres (TOB, 2019). Also, another topic to point out is the use of agricultural land. Because the reduction of land use does not simply represent everything. The main issue is, 2.6 million hectares of land got permission for non-agricultural use (Yıldızcan 2023). This may cause a problem that is not easily reversible. It should be noted that agricultural production and food security are one of the first indicators of a growing national economy (Köse 2021).

The Government of Turkey was supportive of agriculture. The government subsidies between 1989-2013 have a positive impact on the growth of agricultural production (Terin 2013). The first Five-Year Economic Development Plan proposed improvements in agriculture in a general manner, as a repetition of earlier plans. Yet more importantly, the new constitution after the 1960 revolution underlines the state's responsibility for the administration of land distribution and agricultural organization while protecting the natural environment (Aktan 1966). Later, many subsidies were given out to support landowners and agricultural production. However, there was an information gap that prevented peasants from applying for these subsidies. Additionally, record-keeping in agriculture was very hard. Therefore, the subsidies were given based on the property structure and land size, but not production or the cost of labor. In return, the most benefited were the already wealthy farmers and big landowners. Even so, landowners rented their land to benefit from subsidies (Günaydin 2009).

Trade is a crucial component of agrifood systems, for delivering food to consumers. On the economic side, there are three important notions. The agricultural products are not durable, therefore they need to be stored and transported in suitable conditions. Secondly, there grew a key actor between the retailers and producers, who are intermediaries. The situation shows that intermediaries hold very strong power which can be applied to gatekeeping. The reason why new players such as farmer unions emerged is the role of a counterbalance for increasing the bargaining power of producers. The third notion is that agriculture is generally a low-profit and high-risk business with expensive machinery assets. As a result, producers face high sunk costs (Rogers 1994).

Bargaining power is a key concept for the security of producers. Traditionally, debates were about power and the organization of the oligarchy. Oligarchy is where a small number of producers control the rest of the chain. On the other hand, the situation in agrifood systems can be quite the opposite. Oligopsony is the system where a small number of buyers control the trade system. The situation is depicted as the shift of downstream and upstream powers; in oligarchy, there are few producers (upstream) and many buyers (downstream), contrastingly, in oligopsony there are many producers and few buyers. The change is not simply a wealth transfer but also affects consumer access. Exploitative abuse is the use of this power to impose an unfair trade (Bougette 2019).

The situation is very problematic, the imposition of an unfair trade has real consequences for producers. Simply, not complying with an unfair trade deal will erase your products from the correspondent retailer's shelves, and even can lead to a joint delisting action (Caprice 2015).

In the agrifood chain, many firms are potential buyers apart from supermarkets, such as pharmaceutical corporations. Like in the supermarket sector, the biggest four to six firms that process agricultural products control 60% to 80% of global agro-pharmaceutical trade (Özügürü 2023). To address this situation there is a competition law. However, the competition law has been biased against producers in recent years, and supermarkets benefited from unfair treatment (UN 2016). After the real cases of Carrefour came to light, supermarkets started to get fined as well. The protection of producers now reiterated as protection from abuse of dependence². This is still hard to prove unless an explicit confession (ARTE³), because mostly the law enforcement goes unnoticed due to the urgency of economic dependence of farmers who cannot negotiate the terms.

²<https://www.economie.gouv.fr/dgccrf/Publications/Vie-pratique/Fiches-pratiques/abus-de-dependance-economique>

³ <https://boutique.arte.tv/detail/hypermarches-la-chute-de-empire>

As a support mechanism, cooperatives are key for producer security. They can increase market access, help build social networks, and reduce transaction costs. Additionally, farmers can strengthen cooperatives by building a reputation network, and increase credit access through them (Peng 2022). However, in Turkey, laws about cooperatives are not productive. Notably, trade activities of such unions are prohibited, therefore they are not actively supporting farmers. As a result, cooperatives are just associations (TOB 2019).

Another factor defining agricultural identity is government regulations and non-governmental organizations. They are effective in support, organization, and qualification in agricultural practices. On the other hand, international agreements affect global food trade. Different applications of taxes between countries, tax deductions for multinational organizations, diverse tax bindings, and treasury support for different crop producers will affect global and local food sovereignty procedures.

There are government incentives, as well as NGO support, for the adoption of new innovations in agriculture. However, there are possible pitfalls. Firstly, equal access to innovation requires equal access to information. High-tech agricultural practices such as remote sensing, aerial photographing, and farm automation lead to incurred costs for consultation with experts. As a result, small-scale farmers will inevitably stay behind of the state-of-the-art innovations.

Secondly, market reach is highly problematic for small-scale farmers. As a result, many of them work as subcontractors for big firms, therefore they are susceptible to non-fair pricing. Similarly, costs are higher for small-scale operators due to the marginal cost effect which reduces profitability.

Law 6360 was accepted in 2012, and implemented in 2014⁴. Until 1981, there was not a statement on the definition of "Metropolis". In 1981, Law 2561 definitions for connecting the places around metropolis to central municipality⁵. Originally, the law is rooted in the first law of "Metropolis" in 1984⁶. Initially started with three cities, one city 1986⁷, three in 1987⁸, one in 1988⁹, seven in 1993¹⁰, one in 2000¹¹, and lastly, fourteen in 2012¹².

During the process, a law adopted in 2004 redefines the definition of a metropolis, considering the radius around the center of the metropolis. Also known as compass law (pergel yasaı¹³), fourteen existing metropolises had bounded nearby villages by different kilometer radiuses¹⁴. The law also brought an application for existing municipalities which made it possible to enlarge the center by a 10km radius for increasing the population of the central municipality to 750 thousand, enabling the change to being a metropolis.

The last one, Law 6360, changed the term "central municipality" to city, allowing fourteen new cities to become a metropolis, as mentioned in Article 5 and Article 6¹⁵. With this change, the "compass law" was abandoned. As a result, Aydın, Balıkesir, Denizli, Hatay, Malatya, Manisa, Kahramanmaraş, Mardin, Muğla, Ordu, Tekirdağ, Trabzon, Şanlıurfa and Van became the new metropolises.

⁴ <https://www.mevzuat.gov.tr/mevzuatmetin/1.5.6360.pdf>

⁵ https://www5.tbmm.gov.tr/tutanaklar/KANUNLAR_KARARLAR/kanuntbmmc064/kanunmgkc064/kanunmgkc06402561.pdf

⁶ <https://www.resmigazete.gov.tr/arsiv/18453.pdf>

⁷ <https://www.resmigazete.gov.tr/arsiv/19139.pdf>

⁸ <https://www.resmigazete.gov.tr/arsiv/19500.pdf>

⁹ <https://www.resmigazete.gov.tr/arsiv/3508.pdf>

¹⁰ <https://www.resmigazete.gov.tr/arsiv/21693.pdf>

¹¹ <https://www.resmigazete.gov.tr/arsiv/21693.pdf>

¹² <https://www.mevzuat.gov.tr/mevzuatmetin/1.5.6360.pdf>

¹³ <https://dergipark.org.tr/tr/download/article-file/461751>

¹⁴ <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=5216&MevzuatTur=1&MevzuatTertip=5>

¹⁵ <https://www.resmigazete.gov.tr/eskiler/2012/12/20121206-1.htm>

This change brought additional costs for villagers. Mostly, water use is priced, which is a crucial component of agricultural production. Water use costs are recorded as one of the most complained costs of this law in a survey study.

3. Methodology of Analysis

Resume

As the case study, I will choose 10 similar cities, from the west and the east, half of them newly accepted as “Big City”(Metropolis). For the sample, I will use regression with the difference in differences method. Difference in differences method is used for eliminating error terms related to structural events. For example, climate shocks or market shocks may play a role in farmer migrations. Analyzing only Law 6360 affected cities, we cannot eliminate these errors. However, by adding an external observation that is not affected by the law, we will be able to analyze the effects of the impositions.

The main issue for using the difference in differences (DID) method is proving the similarity structure of treatment and control groups. For this reason, I will use variables such as the size of the output by market value or crop amount, as also crop types, and population sizes. Furthermore, I will analyze the data of property deed distribution by the scale of producers for assessing the initial difference in rural identities.

Initially, by this method, I will analyze the effects of Law 6360 on farmer migrations. As mentioned, farmer migrations are also caused by technological innovations and decreasing demand. With differences in differences, I want to treat Law 6360 as a natural experiment. This method is applied by the Central Bank of Turkey, for analyzing the effects of Syrian refugees on local labor wages by comparing recipient cities versus non-recipients(Ceritoglu 2017).

On this topic, I will reach out to residents of villages in selected cities to learn about their experiences. For this, I aim to conduct surveys in the villages for field exploration and perform an interview with one or two locals for a deeper understanding.

For the second hypothesis, I will perform a budget analysis regarding new costs by Law 6360. Then, by using land registry data, I aim to discover the land transfers. In a similar fashion to my first analysis, I will use DID on groups of cities to assess the effect of Law 6360 on property rights transfers. Additionally, I will conduct satellite imagery recognition analysis to assess reconstruction changes in the land use of the villages in selected cities.

For my last hypothesis, I will create a corpus including EU and UN statements in their publishings on agricultural production, food shocks, and rural economies. Initially, I will provide a critique of the food security approach. Food security and food safety discourse is using a globalized approach to the food crisis. This means that international agencies are focusing on maximum agricultural output with outsourced and centralized distribution structures. The most explicit example of it is the distribution of standardized hybrid seeds and the reduction of local varieties. Additionally, food production will not convert into economic improvement for vulnerable countries. This is because the processing, storage, and distribution stages require high investment, which are controlled by retail market giants.

Therefore I support that, food sustainability starts from local sustainability first and not with maximum output, which is stated as food sovereignty in the literature¹⁶. Local sustainability means that starting from minimal boundaries, each administrative unit must cover most of its food needs through close-distance trade exchanges. However, in today's market conditions, we are seeing that crops are chosen not by local distribution of types but by maximum economic yield in global markets. This causes outsourcing of different types to

¹⁶ <https://www.ncl.ac.uk/media/wwwnclacuk/centreforruraleconomy/files/discussion-paper-11.pdf>

abroad. For example in Turkey, grain production is steadily decreasing while vegetable and fruit production is increasing. As a result, Turkey became a net importer of wheat in the last 5 years¹⁷.

Additionally, for global and local comparative analysis, we should discover other production tools in the agricultural stability of a country. Some examples of these are technological tools, fertilizers, and energy sources. The importance is that underdeveloped countries are dependent on these areas to developed countries. Consequently, the foreign exchange rates affect purchasing power, which in turn deepens the gap between these countries. Therefore, we must also look at the facility-level investment in research, development, and production in underdeveloped countries. Otherwise, they will not be able to receive the necessary share from global agricultural capital volume.

Propensity Score Matching

The propensity score, denoting the likelihood of a unit being assigned to a specific treatment based on observed covariates, serves as a valuable tool in mitigating selection bias. To estimate propensity scores, traditional methods like logistic regression have been widely employed. However, the advent of machine learning techniques has introduced alternatives, with classification and regression trees (CART) being particularly noteworthy. Machine learning models, such as random forests and gradient boosting, have demonstrated promise in enhancing the accuracy of propensity score estimation. The application of ensemble methods like random forests aggregates predictions from multiple decision trees, while gradient boosting sequentially builds trees to correct errors of previous models. These advanced approaches not only offer alternatives to logistic regression but also contribute to refining

¹⁷<https://arastirma.tarimorman.gov.tr/tepge/Belgeler/PDF%20Tar%C4%B1m%20%C3%9Cr%C3%BCnleri%20Piyasalar%C4%B1/2022-Ocak%20Tar%C4%B1m%20%C3%9Cr%C3%BCnleri%20Rapor%C4%B1/Bu%C4%9Fday.%20Ocak-2022%20Tar%C4%B1m%20%C3%9Cr%C3%BCnleri%20Piyasa%20Raporu--+.pdf>

propensity score analyses by capturing intricate relationships within the data (Lee 2020). By use of propensity scores, we can take control and treatment group samples for the difference-in-differences (DID) method.

Satellite Imagery

High-quality satellite pictures have lots of details that need preprocessing for algorithms to understand. Lately, there have been big improvements in how we do this. We can now make maps that cover a whole region or even the entire world. We can focus on specific areas in images, use various features from remote sensing, and even combine map data with information about things like soil, roads, farms, crops, and population. All these advancements make classifying images much more advanced and useful. In order to perform classification challenges, CNN-based algorithms have proven useful since 2012. In order to determine the structure of features and attributes of the image, a collection of convolution filters is employed in each layer (Safarov 2022).

The U-Net segmentation model, a prominent architecture in the realm of semantic segmentation, distinguishes itself through its unique U-shaped design, integrating both contracting and expansive pathways. The contracting path efficiently captures contextual information through convolutional and pooling layers, while the expansive path restores spatial resolution through upsampling and transposed convolutions. Noteworthy is the use of skip connections, facilitating the amalgamation of high-level features from the contracting path with fine-grained details from the expansive path. This architecture has demonstrated significant efficacy in tasks such as medical image analysis, providing precise delineation of structures. In comparison to traditional convolutional neural networks (CNNs), U-Net excels in preserving intricate details, particularly valuable in tasks requiring accurate segmentation. Implementation of the U-Net model involves defining the model architecture through deep

learning frameworks such as TensorFlow, Keras, or PyTorch, where the model's components, including convolutional, pooling, and upsampling layers, are intricately specified. Leveraging these frameworks allows for ease of model instantiation, adaptation, and training, making the U-Net segmentation model a versatile tool in image analysis applications.

For training, annotating is an option. We can also use pre-trained models which might be sufficient for our cases. There are publicly available datasets for detecting forest, urban, and agricultural lands, among others. The pretrained datasets for use are DeepGlobe¹⁸, Dstl Kaggle dataset¹⁹, LandCoverNet²⁰ to be employed in this research for land classification task.

Parcel Transfers

By parcel transfer data from parselsorgu.gov.tr, we can identify hotspots and cold spots. For this, we can transform acquired data into a tabular format. After this, hotspot and coldspot analysis will serve to distinguish the important zones. For this, we calculate the Getis-Ord G_i^* statistic or Moran's-I statistic. Based on our results, I will apply classification algorithms with vector-based or density-based classification algorithms to improve our analysis²¹.

Automated Text Analysis

For automatic text analysis, there are multiple methods available. Firstly, there are traditional dictionary-based, keyword-oriented, or bag-of-word approaches. Secondly, there are supervised machine learning algorithms for text analysis. The second one is better, especially in a multicultural context (Wang 2019). However, text analysis with this method requires many annotated training data. Lastly, we can utilize natural language processing models.

With many recent developments in the area, large language models become very powerful for

¹⁸ <http://deepglobe.org/>

¹⁹ <https://www.kaggle.com/competitions/dstl-satellite-imagery-feature-detection/data>

²⁰ <https://github.com/pavlo-seimskyi/semantic-segmentation-satellite-imagery>

²¹ <https://www.analyticsvidhya.com/blog/2021/03/introducing-machine-learning-for-spatial-data-analysis/>

natural language processing. They require much fewer annotations, with higher accuracy than traditional machine learning models. Plus, dictionary-based models may present bias due to the selection of keywords in filtering methods (Yörük 2021).

For interpreting the text in NLP analysis, we must vectorize the words. This is a necessary process because machine learning algorithms generally cannot work with non-numerical data. The vectorization process in NLP is named word embedding. A word embedding is a representation of a word. The word embedding model is the successor of n-grams and tokenization models. Word embedding helps us extract the features from our text corpus in NLP analysis for context-based automated text research²².

Interviews and Surveys

In our interviews, I will look at how Law 6360 is affecting the finances and the habits of small-scale farmers. The main thing I want to find out is how this law has influenced their economic and livelihood situation. This step will also reveal a wider picture of the subject. I will ask about things like their relationship with agriculture to understand how the network is formed. I am also looking to understand how land ownership is changing among small-scale farmers. And lastly, I want to learn what agricultural actors think about government policies, subsidies, and recent evolutions on a global scale.

On the other hand, with the surveys, I am focusing on how people in rural areas are and how are their demographics distributed. My main question is about overall views – basically, how people think about recent applications. I am also asking about things like how easy it is for people to get important services like healthcare and education. It is a way of estimating rural life's health. Looking at what people think about the quality of infrastructure, like roads and

²²<https://www.analyticsvidhya.com/blog/2021/03/introducing-machine-learning-for-spatial-data-analysis/>

buildings, municipality projects, and trade networks will help us understand how they experience. Lastly, I will question how involved people are in decision-making in their communities. This helps us know how much residents contribute to making choices about what happens around them, and if there is a communal organization in rural residencies.

4. Data Collection

For the purposes of my research, I need to access different types of data. Briefly, those are;

Legal Gazette Archives, Land Registry and Cadastre Archives, NGO publication archives, Satellite imagery, TURKSTAT Database, Ministry of Agriculture and Forestry of Turkey Database, Field Surveys & Interviews.

And each of those requires different methods for collection. Here, I will explain their acquisition steps.

Legal Gazette Archives

Legal Gazette of Turkey publishes new legislations and regulations for public announcement. The database is accessible at <https://www.mevzuat.gov.tr/>, and open for foreign and local researchers, free of charge. Archives consist of all legislations of the Turkey Republic, which is 17,367 records in total. However, initially, there is not a bulk search option. For this reason, it is needed to apply individually to the system or consider a web-scraping method to receive the data.

After the collection, the application of automated text analysis by natural language processing will help to understand constitutional covering on rural and urban identity, agricultural organization and governmental intervention, and food safety regulations.

Land Registry and Cadastre Archives

The Land Registry and Cadastre Directorate started the TARBİS²³ (Registry Archival Information System) Project for digital access to databases. Since 2012, all around Turkey, the land registration processes started using TAKBİS²⁴ (Registry Information System) in governmental offices. Therefore, there are digital archives but not readily reachable due to the ongoing project TARBİS. Another information system in use, called Parcel Search System²⁵ shows land transfers from 2012 to today for Turkey. It is possible to conduct research by address or geographical information.

The aim is to analyze the property transfers that are occurring in the new metropolises. It is possible to acquire parcel data in GeoJSON, and Shapefile format among others. However, the information about the owner of the property is not shared. It would be ethically hard to acquire such data. Therefore I will only be able to analyze when and how many times a parcel has been traded. By registration of parcels and analysis of trade statistics, I will later use the data for field survey sampling.

NGO Publication Archives

There are currently 45 NGO members regarding Food Safety under European Commission²⁶. In addition to this list, the platform also covers public entities of EU partners, such as United Nations (UN), Organisation for Economic Co-operation and Development (OECD), and Food and Agriculture Organisation (FAO). The members are conducting local-global projects and publishing papers on food safety and security. Therefore, there is a huge number of articles, and mainly the public resources have indexed archives.

²³ <https://www.tkgm.gov.tr/projeler/tapu-arsiv-bilgi-sistemi-tarbis>

²⁴ <https://www.tkgm.gov.tr/projeler/tapu-ve-kadastro-bilgi-sistemi-takbis>

²⁵ <https://parselsorgu.tkgm.gov.tr/>

²⁶ https://food.ec.europa.eu/safety/food-waste/eu-actions-against-food-waste/eu-platform-food-losses-and-food-waste/platform-members_en#list-of-members-public-entities

The Sustainable Development Goals is being discussed since the beginning of 2000²⁷, stating 17 goals for a sustainable future. Food safety and security is a general topic, touching on both hygiene and equality statements. EU and UN-related organizations carry out agricultural support in Latin America and Africa²⁸. I will classify the content of the type of aid. Initially, I will eliminate direct aids such as nutrition support and livestock materials, and then perform classification for agricultural production and trade organization.

Satellite Imagery

Landsat 7 has been in the atmosphere since 1999, servicing more than 20 years, and stopped operations in 2022. The United States Geological Survey is an agency on earth information systems. In 2008, satellite images and many other remote sensor data became public for no charge of access. Currently, the query system is reachable at <https://earthexplorer.usgs.gov/>, and due to their new downloading manager, it is possible to bulk download.

Currently, Landsat 8 and Landsat 9 are in orbit. Additionally, there are other remote sensors such as MODIS and Sentinel, with different bandwidths and band counts. Although Landsat 7 covers a more substantial timeframe for researching continuity and changes, Landsat 8 has been on the mission since 2013 which is also suitable for the purposes of this research.

Landsat 8 has narrower bandwidths and higher calibration, which means higher resolution for analysis. It has 3 more sensor bands, however, because I mainly need visual spectrum for area analysis, and near-infrared for vegetation analysis, which equals 4 bands in total. However, high-resolution satellite imagery has very large file sizes, therefore, high storage costs will occur for high-frequency data.

TURKSTAT Database

²⁷ <https://sdgs.un.org/goals>

²⁸ [https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/749815/IPOL_BRI\(2023\)749815_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/749815/IPOL_BRI(2023)749815_EN.pdf)

TURKSTAT (Türkiye İstatistik Kurumu) is the national information and research agency of statistics of the Republic of Turkey. Most of the aggregated data can be reached through digital databases free of charge. However, for personal data requirements that are not directly visible on the website, or for data that have different aggregation models, and thematic maps, pricing procedures occur²⁹. The data is accessible at a 50% discount for faculty members and students from Turkey. The pricing model is defined as 1MB unit of data, which is not explicitly calculable. However, they offer estimated cost calculation data for the project and sampling forecast.

The necessity of TURKSTAT is the analysis of similarities and dissimilarities between the cities. For a treatment evaluation for Law 6360, I need to prove the characteristics of observations. The aim is to claim the robustness of control observations. Additionally, in collaboration with the Ministry of Agriculture and Forestry, Central Bank, and the Ministry of Treasury and Finance, TURKSTAT includes all financial metrics by thematic divisions. I will support demographical metrics with the financials.

Ministry of Agriculture and Forestry of Turkey Database

Turkish Ministry of Agriculture and Forestry holds data about agricultural lands and crops, livestock, and fisheries. The project of the soil survey system started in 2017, however, the website was unreachable in 2024 January³⁰. However, there are statistics on farm investments, farm incentives, and organic agriculture statistics, therefore, it is expected that agricultural organizations are as well registered. They provide year-to-year statistics of crop production, national consumption, export, and import, in collaboration with TURKSTAT.

²⁹ https://www.tuik.gov.tr/Kurumsal/Veri_Bilgilerin_Ucretlendirilmesi

³⁰ <https://www.tarimorman.gov.tr/Konular/Bitkisel-Uretim>

The agency also shares the rural and agricultural support and development projects carried out by the local agencies or in collaboration with international agencies. Consequently, the Ministry of Agriculture and Forestry database includes projects on both food products and other vegetable products, making it a crucial database for analyzing the operations regarding land use.

Field Surveys & Interviews

The most crucial part of the research is the first-hand observations and carefully designed interviews. As the core of this study focuses on shifting rural identities, we must consider the collection of points of view from those who witnessed. Any secondary and non-custom-made data will be insufficient for connecting the macro analysis to microenvironments. The first reason is that priori, agricultural labor is generally low-educated and informal. Therefore, many participants in agricultural production will not be able to easily reach out to public discourse or high-rank responsibility. On the other hand, high-rank individuals are dealing with many topics regarding agricultural organization and, therefore will not be able to focus on individuals promptly. As a result, bridging the information gap will be the most important and original contribution of this research. Today, small-scale farmers hold about 83% of agricultural lands³¹.

5. Challenges and Limitations

Considering the assessment of agricultural output and rural identity, the first problem is the lack of data and data rigor. As mentioned in the discussion of data sources, public data is not readily shared by researchers.

³¹https://cdniys.tarimorman.gov.tr/api/File/GetFile/330/Sayfa/1416/1778/DosyaGaleri/1._tari_msai_yapi_ve_donusum.pdf

Some of the links in the Ministry of Agriculture and Forestry are broken. Some of the mentioned projects, especially the ones on technological adaptation and record holding, seem to be out of date. For this reason, the process will require an application to the ministry and a bureaucratic process.

The same problems apply to TURKSTAT, while the data record rigor is better, there seem to be leaps in certain years. The reason could be that TURKSTAT does not carry out every topic regularly. Some research may happen once in a while with no explicit statement on the following date. For example, the research on time-use is executed first time in 2006, then the second one in 2014-2015. There is 8 years gap, and the only indication of the frequency of the research is stated as five to ten years ³².

NGO publication database is very large, and due to its variation across different NGOs, it will require selective research by hand. Especially in smaller NGOs, it is possible that the data is less updated and less ordered. Plus, acquired text data may differ in file formats, which can be image recognition friendly or not. This would require extra preprocessing steps. The process will be computationally and storage-wise demanding.

Satellite imagery is quite big in file size, about 380 MB for a single path-row grid. Turkey's eastern part of Samsun-Osmaniye line consists of around 5 paths and 3 rows, meaning 15 grids without full coverage around edges. Full coverage will need extra grids because satellite imagery is provided in grids only, not for specific areas. Therefore, considering an area such as Southeaster Anatolia will necessitate a minimum of six grids, equaling 2.3 GB. If I want to look for 20 instances, about 4 observations for 5 years, the raw storage requirement will be 40~50 GB. After that, another problem exists, some part of that area is in UTM 38N and some in the 37N zone, which makes two satellite imagery incompatible for processing. We

³² <https://data.tuik.gov.tr/Bulten/Index?p=Zaman-Kullanim-Arastirmasi-2014-2015-18627>

will need to reproject two zones to a common reprojection, like EPSG:3857, for merging and feeding it to the image recognition algorithm. Thus, all these steps will necessitate extra storage and computation time. Only then, I will be able to test and train image recognition using a library such as TensorFlow, Keras, or Pytorch.

Legal Gazette seems relatively more accessible because all the records are easy to find and store. The only problem is the indexability of the database because as mentioned, it uses a graphical interface. If indexing is not possible, web scraping will be needed, however, it won't be possible to use it at high speed due to the prevention of overload. Yet, with around 17,000 records, it will be relatively easy. All of the archives are ready for character recognition algorithms.

Finally, the field survey and interview part will be more physically demanding. In the first place, I will sample 5-10 cities based on the results that I derived from statistical resources. In those cities, there may be villages of different characteristics, because of their proximity to the center, primary economic activity, or resident number. Additionally, I will define control group villages, which are villages that are not affected by Law 6360. Based on this consideration, I will narrow the sample of treatment and control groups for economic output, land distribution, and cultural proximity. These variables, therefore, carry the main components of their propensity score. However, an in-depth consideration after data exploration is unavoidable.

After this selection, I will be able to assess the issues such as accessibility and travel costs. Additionally, cultural differences and communication problems may inhibit the flow of information. Apart from surveys, interviews with village heads and trade chambers will require upfront correspondent planning.

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