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Report No: PAD5266

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF EUR 77.8 MILLION
(US$85.44 MILLION EQUIVALENT)

TO THE

REPUBLIC OF TÜRKİYE

FOR A

LAND MANAGEMENT INFRASTRUCTURE FOR GREEN AND SUSTAINABLE DEVELOPMENT PROJECT

May 2, 2023

Urban, Resilience and Land Global Practice
Europe and Central Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective Apr 30, 2023)

Currency Unit = Turkish Lira	
TRY 19.44 =	US$ 1
US$ 0.05 =	TRY 1
EUR 0.91 =	US$ 1
US$ 1.09 =	EUR 1

FISCAL YEAR
January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

2D	Two-Dimensional
3D	Three-Dimensional
ARA	Adaptation and Resilience Assessment
BIM	Building Information Model
CCDR	Country Climate and Development Report
CPF	Country Partnership Framework
DFIL	Disbursement and Financing Letter
DSM	Digital Source Model
EFA	Economic and Financial Analysis
ERR	Economic Rate of Return
FAO	United Nations Food and Agriculture Organization
FM	Financial Management
FRR	Financial Rate of Return
GCRF	Global Crisis Response Framework
GDP	Gross Domestic Product
GIS	Geographic Information System
GRS	Grievance Redress Service
IFR	Interim Financial Report
LIS	Land Information System
LRCMP	Land Registration and Cadastre Modernization Project
M&E	Monitoring & Evaluation
MAKS	Ministry of Interior's Address System
MEGSIS	TKGM Cadastre System
ML	Management Letter
MoTF	Ministry of Treasury and Finance
NDP	National Development Plan
NSDI	National Spatial Data Infrastructure
OECS	Organization for Economic Cooperation and Development
PDO	Project Development Objective
PFMC	Public Financial Management Control
PIU	Project Implementation Unit
PPSD	Project Procurement Strategies for Development
SBO	Strategy and Budget Office
SEP	Stakeholder Engagement Plan
SOE	Statement of Expense
STEP	Systematic Tracking of Exchanges in Procurement
TKGM	Directorate General of Land Registry and Cadastre // Tapu ve Kadastro Genel Müdürlügü
WBG	World Bank Group

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Turkiye	Land management infrastructure for green and sustainable development	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P179217	Investment Project Financing	Moderate

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	[ ] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
23-May-2023	31-Dec-2028

Bank/IFC Collaboration

No

Proposed Development Objective(s)

To improve the accuracy and accessibility of land administration information in Türkiye.

Components

Component Name	Cost (US$, millions)

Component A: Creating 3D City Models and Updating Cadastre Data	78.42
Component B: Real Estate Valuation	2.96
Component C. Institutional Capacity Building and Project Management	4.06

Organizations

Borrower:	Ministry of Treasury and Finance Republic of Türkiye
Implementing Agency:	General Directorate for Land Registry and Cadastre (TKGM)

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	85.44
Total Financing	85.44
of which IBRD/IDA	85.44
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	85.44

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2023	2024	2025	2026	2027	2028	2029
Annual	0.00	4.53	10.96	23.25	20.13	17.28	9.29
Cumulative	0.00	4.53	15.49	38.74	58.87	76.15	85.44

INSTITUTIONAL DATA

Practice Area (Lead)	Contributing Practice Areas
Urban, Resilience and Land	

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Low
4. Technical Design of Project or Program	Low
5. Institutional Capacity for Implementation and Sustainability	Low
6. Fiduciary	Moderate
7. Environment and Social	Moderate
8. Stakeholders	Moderate
9. Other	
10. Overall	Moderate

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Not Currently Relevant
Community Health and Safety	Not Currently Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Not Currently Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Not Currently Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Not Currently Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

Loan Agreement (LA), Schedule 2, Section I.A. 2. The Borrower, through TKGM, shall maintain throughout Project implementation a Project Implementation Unit, with terms of reference, qualified staffing authority, and budgetary resources necessary and appropriate to, in the Bank's opinion, effectively carry out the Project to the satisfaction of the Bank.

Sections and Description

LA, Schedule 2, Section I.A.3. The Borrower, through TKGM, shall ensure inter-institutional coordination through the establishment and convening, as needed, of a stakeholders advisory group to provide guidance, serve as a sounding board on strategic planning, and identify policy and technical issues to improve implementation and impact of the Project.

Sections and Description

LA, Schedule 2, Section I.A.4. In carrying out Part A.2 of the Project, the six million parcels for which the Borrower, through TKGM, shall update and verify the cadastral data shall be from the 11 million parcels not covered by the Land Registration and Cadastre Modernization Project.

Sections and Description

LA, Schedule 2, Section I.A.5. In carrying out the Project, the Borrower, through TKGM, shall ensure that: (a) all expenditures financed under this Agreement are directly incurred on account of the implementation, management, and monitoring of the Project; and (b) in the event that the goods, consulting services, non-consulting services, Training, Aerial Survey Operating Costs, or Project Operating Costs are shared with other projects or events, such expenditures are properly prorated to the respective budgets of the relevant projects and/or events.

Sections and Description

LA, Schedule 2, Section I.B.1. The Borrower, through TKGM, shall maintain throughout Project implementation, a POM, in substance and manner acceptable to the Bank.

Sections and Description

LA, Schedule 2, Section I.C.2. The Borrower, through TKGM, shall ensure that the Project is implemented in accordance with the Environmental and Social Commitment Plan ("ESCP"), in a manner acceptable to the Bank.

Sections and Description

LA, Schedule 2, Section I.D. The Borrower, through TKGM, shall: (a) prepare and furnish to the Bank not later than December 30th of each year during the implementation of the Project, a proposed Annual Work Plan and Budget; and (b) afford the Bank a reasonable opportunity to exchange views on each such proposed Annual Work Plan and Budget, and shall thereafter ensure that the Project is implemented with due diligence during said following year, in accordance with such Annual Work Plan and Budget as shall have been approved by the Bank.

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	Loan Agreement, Section 4.01. The Borrower, through TKGM, shall have prepared and adopted the Project Operations Manual, including procurement procedures and a financial management manual.

I. STRATEGIC CONTEXT

A. Country Context

1. **Türkiye enjoyed high growth rates between 2002-17 that supported poverty reduction, but shocks that began in late 2017 and early 2018 continue to cause risks to the economic and social gains made since the early 2000s.** Türkiye achieved rapid economic and social development in the 2000s, with poverty incidence more than halving and real Gross Domestic Product (GDP) increasing by 50 percent by 2008. Since the Global Financial Crisis, rapid growth continued but was increasingly associated with stagnant productivity, a rising current account deficit and growing foreign exchange-denominated debt stock. Türkiye experienced economic overheating in 2017, double-digit inflation, and a large current account deficit. The cumulative effects of economic vulnerabilities came to a head in mid-2018, with the tightening of global economic conditions. These events triggered a significant depreciation of the Turkish lira and turmoil in the Turkish economy. Spending fell, inflation accelerated, and the corporate sector's debt increased. Türkiye experienced three quarters of negative growth from late 2018 to mid-2019, coupled with sizable job losses. Poverty reduction progress stalled in 2018.

2. **An emergent economic recovery starting late 2019 was undermined by the COVID-19 pandemic, but the swift policy response led to a sharp rebound in the economy.** Over the course of late 2018 and 2019, the country's economy went through significant adjustments. Current account imbalances declined significantly, banks and corporates reduced their exposure to foreign currency debt, private sector credit growth resumed, and demand started to recover. By the end of 2019, economic activity was rebounding with strong growth in the fourth quarter but was disrupted by the onset of the COVID-19 pandemic in early 2020. The COVID-19 health crisis quickly turned into a deep economic turmoil all around the world and Türkiye experienced a contraction in GDP (10.4 percent, year-on year) in 2020 Q2. The government responded swiftly to COVID-19 with a large economic stimulus program, which generated a significant increase in economic activity in late 2020 that more than offset the decline recorded earlier in the year. However, the policy frameworks that ensured a strong economic rebound during the pandemic also heightened macroeconomic risks, including rising inflation, currency depreciation, corporate and banking sector vulnerabilities and decline in reserve buffers. The economy grew at 11.4 percent in 2021, and remained among the best G20 growth performers in 2022 despite growth slowing to 5.6 percent as exports, investment and manufacturing activity lost momentum in the second half of the year. The country's vulnerability has been exacerbated by the two devastating earthquakes that struck the southern provinces of Türkiye on February 6, 2023, which have reportedly caused the collapse or extensive damage to tens of thousands of buildings, including housing, public buildings and historical structures, and to critical infrastructure in the region. The impact on macro-financial conditions is still unfolding, with implications for growth, labor markets and poverty, the financial sector, and fiscal and external balances.

3. **The country has an opportunity to move rapidly to a more resilient, green, and inclusive growth path as its economy recovers from COVID-19 and the recent earthquakes.** The pandemic has generated a profound awareness of the links between human health, climate change, fragile ecosystems, and economic growth. Similarly, the February 2023 earthquakes and Türkiye's vulnerability to climate change events have reiterated the importance of resilient systems, including those related to appropriately recorded and regulated buildings and property, to ensure a speedy response to disaster. As pressures intensify to support post-pandemic and post-earthquake economic recovery, growth, and jobs, Türkiye has an opportunity to build back better, prioritizing strategies that can reduce its vulnerability to disasters and climate change, avoid the depletion of its natural resources and improve social inclusion. However, this transition to a more resilient, climate-proof, and inclusive future will require significant investments and integrated planning and systems at all levels of government.

4. **Türkiye's development path is also threatened by significant climate and disaster risks; achieving long-term**

sustainable growth will require reducing vulnerabilities to seismic and climate-related hazards. The country's overall level of climate and disaster risk associated with multiple hazards is considered high. With about 70 percent of Türkiye's population living in first- and second-degree seismic risk zones, earthquakes, as illustrated by those that occurred in February 2023, pose a significant risk to lives, livelihoods, infrastructure, and other assets, and can disrupt the Turkish economy. A single 200-year earthquake around Istanbul, for example, which concentrates approximately 15 million inhabitants, produces 27.5 percent of Türkiye's GDP, and collects 40 percent of the country's taxes as its largest city, could push 500,000 people into poverty.[1] In addition, many settlements are increasingly exposed to flooding and extreme weather events. In 2019, 935 extreme events occurred, caused mainly by heavy rains/floods, windstorms, snow and hail.[2] At the present time, there is no reliable information about the precise populations or activities that will be affected by various hazard events or the consequences of climate change, given that 70 percent of private buildings are unregistered[3], as shown by pilot studies. This project will address this situation by precisely mapping all buildings in urban areas and will enable detailed disaster risk management plans and policies to combat and mitigate climate change to be produced. Climate-related disasters have been striking with greater frequency and intensity over the last two decades. Going forward, climate models predict this trend to continue, with increasing anomalies in precipitation patterns with more frequent extreme rain and flooding, as well as protracted drought and wildfires, and sea-level rise. Long-term average annual losses due to natural disasters in Türkiye are estimated at US$711 million per year for earthquakes and US$843.4 million for floods. Together, these hazards could result in up to US$1.6 billion in losses per year.[4]

5. **The Government of Türkiye has made ambitious climate change commitments, such as ratifying the Paris Agreement in October 2021 and committing to net zero emissions by 2053.** Vast tracts of land will be needed for the climate actions the country has committed to, including for forest preservation and renewable energy. Simultaneously, large amounts of lands will undergo inundation, degradation or desertification making them unsuitable for cultivation or habitation due to climate change. When combined with rapid urbanization, an unprecedented demand for land is expected in the coming decades. Comprehensive land information, valuation and administration are needed to improve management of, and access to land critical for renewable energy plans and afforestation. Better management of public lands will help with demands for land, and together with land regularization/registration and reduction in uncontrolled land use conversion enable cities to grow greener. Within cities, moving to low-carbon pathways will require more compact urban growth through management of urban expansion and better use of existing and under-utilized land within cities through infill development and urban regeneration, which also requires sound land administration and management systems to be in place.

6. **Enhanced and integrated land administration and valuation systems provide the foundational data and information needed to improve forward-looking spatial planning, better guide resilience, disaster management and recovery planning, and facilitate response to climate change and the disaster events predicted to result from this.** In Türkiye, rapid urbanization has led to extensive informal/illegal urban development and pressures on infrastructure and the countryside with problems of land resources under pressure from climatic factors and depopulation. In addition, observed and anticipated climate change impacts, such as more intense precipitation, drought, extreme heat, flooding, and rising sea levels, are expected to increase the frequency and severity of disaster events and put pressure on energy consumption, especially in urban areas. These challenges require integrated land administration systems based on accurate cadastral and property information to identify vulnerabilities and the people and activities most at risk, and the location of utilities and infrastructure, to plan for, mitigate and respond to natural hazard events and the consequences of climate change, and to improve the economy. Without such systems, even the most basic of disaster mitigation and

[1] World Bank, 2021. Overlooked. Examining the impact of disasters and climate shocks on poverty in the Europe and Central Asia region.
[2] 2019 was recorded as the year with the highest number of hydrometeorological disasters and floods that occurred between 1944-2019. Turkish State Meteorological Service (2020). State of the Climate in Türkiye in 2019 (https://www.mgm.gov.tr/FILES/genel/kitaplar/2019MeteorolojikAfetlerDegerlendirmesi.pdf).
[3] These are buildings for which registration at the Land Registry has not been fully completed.
[4] World Bank. 2020. Türkiye, Understanding Disaster and Climate Impacts on the Poorest and Most Vulnerable.

recovery plans and interventions to mitigate climate change are challenging. This is what the project will address. For instance, remote sensing images can identify poorly insulated buildings and ones which give off above average emissions. However, this is of little value if one cannot identify what the buildings are, their uses, and who owns them. Investment is needed to fill the gap in cadastral and land registry information, as well as to improve the accuracy and quality of the existing information so that georeferenced data needed for disaster planning and mitigation, resilient urban development, and green and sustainable economic growth are made available. The Project will identify the buildings in urban areas, their uses, and their owners. Such information, when overlaid on environmental plans and risk maps, will result in improved disaster and climate action planning and the ability to produce targeted policies to enhance climate adaptation, the environmental sustainability and energy efficiency of the building stock, and the means of enforcing them. Improved property valuation systems are needed to enhance tax revenue capabilities, identify the principal beneficiaries of infrastructure investment, determine the cost-effectiveness of disaster planning and mitigation and urban resilience policies, and kick-start the development of a catastrophe and disaster insurance and recovery industry for businesses and households.

B. Sectoral and Institutional Context

7. **During the past two decades, Türkiye has taken huge strides towards the development of a modern cadastre system.** The improvement of Türkiye's cadastre began with the Bank-financed Marmara Earthquake Emergency Recovery Project (P068368, completed in December 2006), which sought to upgrade the cadastre in the disaster-affected areas by updating and improving obsolete registers and maps. Significant progress has been made in upgrading cadastral information[5] through a program of cadastral renovation and digitization (in particular with support of the ongoing Land Registration and Cadastre Modernization Project, LRCMP, P106284), with updating in digital format of about 13 million parcels out of the 24 million estimated parcels countrywide. About 36 million people (approximately a third of the Turkish population, 40 percent of which are female) have benefited from improved tenure security via increased accuracy in land records, as well as access to more efficient land services, and hundreds of institutions from access to improved cadastral data. Approximately additional 11 million parcels need to undergo the updating process in order to achieve the target of a fully renovated digital cadastre in Türkiye.

8. **Türkiye has also adopted the international best practice of a combined land registry and cadastre in the form of the Directorate General of Land Registry and Cadastre (*Tapu ve Kadastro Genel Müdürlügü*, TKGM[6]) rather than having these in the hands of different institutions.** TKGM is also responsible for mapping, and the recently created Department of Real Estate Valuation enables valuation activities to be coordinated with land registration and cadastre. Türkiye has also adopted international best practice in having a financing model for TKGM that is based on user service fees. Being dependent on user fees means recognition of the need to satisfy its clients, to bring in innovations that enhance their experience and meet their needs, and to keep abreast of international developments.

9. **TKGM has successfully brought in private surveying firms to undertake much of this work.** That resulted in the creation of a flourishing private sector in this area, which had previously not existed. Consequently, capacity in the sector has been significantly increased, allowing for achieving the targets set for cadastral improvements. The licensing system created by TKGM and careful quality control by TKGM over the cadastral work private surveyors undertake ensures that private sector surveyors work to high standards.

10. **The investments in cadastre modernization have set the stage for the next generation interventions in the sector that will use innovative approaches and state-of-the-art technologies to further improve the land administration**

[5] Information pertaining to parcels' identification, location, shape and boundaries, size, area, improvements, and ownership.

[6] TKGM operates both the cadastre and land registry and is also responsible for mapping and the production of aerial photos (orthophotos) and the development of mass appraisal. TKGM is mostly financed by fees paid by users rather than a budget from the Government. The fee income generates significant surplus revenue for the Government of Türkiye of which TKGM is permitted to retain a proportion as a revolving fund with which to finance innovation and improvements.

system. As traditional surveying technologies have been replaced by electronic and remote sensing methods, this has opened up opportunities for collecting and exploiting data that were previously not attainable. The new technologies (such as three-dimensional (3D) city models) have made it possible to tackle weaknesses in the land registry in Türkiye and, therefore, to make it a comprehensive and up-to-date source of information on the activities within cadastral parcels. Such an approach creates possibilities that were previously unattainable, for example, in property valuation[7]. The growth of the internet, cloud and mobile computing means that users of registry and cadastral data now have the technology to access this continuously and ubiquitously. Key users include those responsible for disaster risk planning and mitigation, urban planning, and climate change adaptation and mitigation. Without accurate registry and cadastral data, not only are such plans unable to reflect land uses and where the population resides but the agencies responsible for them lack the means of effectively executing the plans and taking action against those owners who breach them. Remote sensing change recognition enables cadastral spatial data to be regularly or even continuously updated. Digital technology enables cities to be built with networks of communications and sensors, but if these are to be utilized to achieve better urban management, geospatial data is needed that can provide insights and alerts. Sensors can measure flows, but without geospatial data, one cannot identify the reasons for the flows or their consequences, thereby enabling what is observed to be managed. Applications of geospatial data now exist that were unthought of when the foundation cadastre was being created and go far beyond the initial goal of providing citizens with secure land rights.

11. **The rapid urban expansion that Türkiye experienced in the past seven decades led to the construction of informal housing and buildings**. While the country made considerable progress in enabling external users to access cadastre and land registry data, the existing scale of informal development has resulted in significant discrepancies between the information recorded in the property registry and reality on the ground as the majority of the informal housing and buildings are unregistered. As such, the cadastre is not able to provide accurate information for policy makers about land uses[8]. Without accurate registry and spatial information, the appropriate spatial planning to make urban areas more resilient in the face of hazard events and climate change and disaster planning and recovery is extremely challenging. Businesses and households face major obstacles when trying to discover whether buildings they plan to invest in fully comply with the regulations. This prevents investors and households from bringing the pressure on developers to introduce or retrofit climate-resilient features as happens in developed economies. The banking sector is put at risk of collateral proving to be inadequate because of inadequate information and is compelled to protect itself by taking an excessive risk-averse approach to asset-backed lending and mortgages. The task of ensuring that new buildings comply with zoning plans and construction codes is made extremely difficult.

12. **In its 2021 Amasya pilot study, TKGM carried out the first systematic assessment of the gap between what is recorded in the land registry and reality on the ground, using state-of-the-art approaches**. It is found that 70 percent of the privately owned buildings and 88 percent of public buildings are unregistered, and 46 percent of the unregistered private buildings have been built in violation of zoning plans (see Table 1 below; further details can be found in Annex 3). The implication is that, unless the unregistered buildings (and their property units) are identified and recorded, there is no reliable information about what is located where, and, therefore, in the event of a disaster, what households,

[7] As an example, see Ying, Y., Koeva, M., Kuffer, M., and Zevenbergen, J. (2022), "Toward 3D Property Valuation—A Review of Urban 3D Modelling Methods for Digital Twin Creation", *ISPRS International Journal of Geo-Information,* volume 12, no. 2, 35pp., *https://doi.org/10.3390/ijgi12010002.*

[8] There are several reasons why informal housing exists, but a particular problem appears to lie with how new construction is dealt with. When owners seek to undertake new construction, they must obtain consent for the development and approval of construction designs by the local authorities. Owners can then register construction servitude rights on the parcel with TKGM and routinely mortgage these rights to finance the construction. However, owners can avoid registering the completed development. They have a strong financial incentive to do so as this avoids having to pay registration fees. Enforcement mechanisms need to be improved with it being possible to occupy buildings before a certificate of lawful occupancy has been issued and to be able to be supplied with utilities, raise mortgage finance, and to sell the properties without hindrance.

businesses, or the delivery of public services will be affected and the scale of the impact.[9] A private buildings and contents insurance market able to provide compensation to those affected by disaster events, such as those found in seismically active countries like New Zealand, cannot achieve its potential in Türkiye as commercial insurance companies do not have access to the adequate information they require to assess risks and determine premiums. In the absence of private catastrophe insurance, businesses in areas that experience hazard events are likely to be bankrupted, and households made destitute. While the scope of the problem may vary by province and region, the severity of the issue is evident. The proposed Land Management Infrastructure for Green and Sustainable Development Project aims to significantly minimize this informational gap through the development of an accurate buildings inventory (through the creation of 3D city models), that includes building locations, building units, activities, infrastructure, and population enumeration[10]. This inventory is an asset for all stakeholder institutions mandated to resolve building irregularities, improve spatial planning, and for understanding, preventing and remediating risks, thereby informing investments at the city-level so as to be more climate and hazard smart and more responsive to the needs of households and firms. This inventory will make it possible for effective action to be taken to prevent developments being built in violation of building codes and planning and zoning regulations and for policies to be formulated and executed to retrofit buildings that do not comply with codes.

Table 1: Amasya Pilot Study: Registration Status of Buildings in TKGM's System

Registration Status	Private Property		Public Property	
	#	%	#	%
Registered	4,868	30%	275	12%
Unregistered	11,339	70%	2,095	88%
TOTAL	16,207	100%	2,370	100%

Aslan, M., Cankurt, İ., Yıldırım, C., Ayyıldız, E. & Dursun, İ. (2022). Türk Arazi Yönetimine Yeni Bir Yaklaşım: Amasya Örneği, Türkiye Arazi Yönetimi Dergisi, 4(1), 34-45.

13. **A fundamental problem to be resolved is how to close the data gap between TKGM's cadastral system (MEGSIS), which manages parcels (parcel boundaries and other relevant attributes), and the Ministry of the Interior's system (MAKS), which manages and provides addresses.** The two systems for recording spatial information about buildings are not integrated. The cadastre parcels are stored and managed as geospatial objects (i.e., have a geometry in the Turkish national Spatial Reference System), but there is uncertainty about the number of individual property units that are to be found on parcels, something the MAKS system could answer if integrated with the cadastre. The Amasya pilot study has demonstrated the feasibility of integrating these two systems, and the proposed Project will support the roll out of such integration across all urbanized city and district centers in the country.

14. **There is evidence that the Government is losing revenue from registration fees and taxation because of the high number of unregistered buildings and inaccurate declarations of value**[11]. The income that the Government of Türkiye can earn from registration fees is significantly reduced by evasion by owners of unregistered properties, and municipalities' revenue from the annual property tax is compromised by the poor quality of valuations. This is significant as TKGM is an important generator of revenue for the Treasury. Additional property tax income will potentially result from untaxed properties being discovered in the 3D city modelling. Türkiye raises significantly less as percentage of GDP from property taxes (typically the main local tax revenue) than the Organization for Economic Cooperation and Development

[9] For instance, Pacific Risk Information System contains detailed, country-specific information on assets, population, hazards, and risks for 15 Pacific Island countries, with hazard specific risk maps showing the geographic distribution of potential losses for each country, which can be accessed through an open-source web-based platform.

[10] It should be noted that the provision of commercial fire insurance for cities in USA, which were largely comprised at that time of wooden buildings, was stimulated by the production of maps showing the location of each building and its construction type, which was accessible by insurance companies.

[11] Pilot studies carried out under the LRCMP indicate that the market values of properties are in the order of 1.9 – 3.0 times the assessed values. An outcome of the pilot studies has been the creation of a Department of Valuation within TKGM with the mandate to pursue mass valuations.

(OECD) average[12]. This potential loss of revenue puts pressure on budgets at both local and national levels. Inaccurate assessments that do not reflect market values have serious implications for unfairness and equity between taxpayers. As the rate of urbanization slows, the ability to fund infrastructure investment and the delivery of local services from sales of development land will inevitably decline. There will be a growing need for a reliable source of local tax revenues to finance the provision of local services and to service infrastructure debt. Investments to identify and register unregistered buildings supported by the project are a key first step towards having a solid financial basis for urban transformation and fair and equitable property taxation. The next step is to develop accurate market-based assessments which can open up the potential for central and local administrations to make use of property taxes and land value capture tools to help fund essential infrastructure and urban regeneration and transformation. Other applications of accurate market-based assessments include more transparent and efficient property markets, more reliable mortgage valuations and greater security of the banking system, the development of catastrophe insurance, and the use of valuations for a variety of public purposes (such as determining social security entitlements and inheritance and capital gains taxes).

15. **TKGM has been working closely with the Geographic Information Systems (GIS) Directorate of the Ministry of Environment, Urbanization and Climate Change on the development of a National Spatial Data Infrastructure (NSDI) for Türkiye**. This has included work on data standards and the governance of the NSDI. In this regard, the Project will support the ongoing cooperation between TKGM and the GIS Directorate of the Ministry of Environment, Urbanization and Climate Change (MoEUCC, responsible for NSDI) for the strengthening of this infrastructure and the sharing of key data sets with other government agencies. TKGM is responsible for supplying a number of key data sets for the NSDI including cadastral boundaries and property rights and obligations. The project will support the creation of additional key data sets, particularly the building and units inventory. The European Union's INSPIRE Knowledge Base contains 34 themes, which include buildings and orthoimagery. For these datasets to be of maximum value, it is vital that they are interoperable and accessible to those bodies that need to use them, hence the need for them to form part of the NSDI. Such datasets can then eliminate data silos and act as a "Single Source of Truth" upon which all users can rely. Redundant datasets maintained by other bodies can be eliminated with resultant cost savings and the risk of using out-of-date or unreliable data minimized. All users share the same high-quality up-to-date data maintained by those with the relevant expertise in specific datasets. The potential of data in themes, such as natural risk zones, meteorological geographical features, habitats and biotopes, atmospheric conditions, and biogeographical regions, in areas such as climate change prevention and mitigation and disaster risk management can only be realized if there is accurate information about buildings and cadastral parcels. Data about buildings and cadastral parcels is needed for the data in themes such as population distribution and demography and production and industrial facilities to be precisely georeferenced. Thus, the cadastre data that will be generated as a result of this Project will inform climate-related decision making.

C. Relevance to Higher Level Objectives

16. On February 6, 2023, as noted above, two very large earthquakes hit Türkiye causing massive damage, significant loss of life and huge economic loss. The World Bank is responding to the impacts of the earthquakes with a package that includes mobilizing support through projects that were already active before the earthquakes and delivering new projects to provide quick response. The new projects are scheduled to be presented to the World Bank Board of Directors in June 2023. In parallel, the World Bank is continuing to deliver its regular program of projects which were being prepared before the earthquakes hit. This Project is one of those projects that is part of the regular CPF program.

17. **The proposed Project is aligned with the World Bank Group (WBG) Country Partnership Framework (CPF) for Türkiye for FY18–FY21 (Report No. 110906-TR, discussed by the Board of Directors on August 29, 2017), which was extended to cover the FY22–23 period through the Performance and Learning Review (Report No. 142353-TR, March**

[12] Türkiye has a recurrent property tax system that raises 0.2 percent of GDP compared with an OECD average of 1.1 percent.

13, 2020). The CPF sets out the overall objective of supporting Türkiye in achieving more sustainable and inclusive development by focusing on growth, inclusion, and sustainability dimensions. The Project contributes to CPF Focus Area 3: Sustainability, with significant contributions to CPF Objectives 8 and 9. Under Sustainability, WBG reaffirmed its strong commitment to help Türkiye address the challenge of reorienting growth towards a more green, resilient and sustainable pattern. CPF Objective 8 focuses on the improved sustainability and resilience of cities, and this Project will support the improvement of the seismic and broader disaster resilience of public and municipal buildings, by generating and making available accurate spatial information about structures on the ground and their location. The information currently available is too patchy in terms of data on public and private buildings to enable resilience planning or the preparation of rigorous disaster recovery plans. The Project will generate improved and more reliable property and building data for both public and private buildings, making Türkiye better prepared to assess disaster risk and to respond to natural disasters as well as enabling more rational urban development. Improved data on property and buildings is essential for Türkiye's ambitious sustainability objectives, which require information about what is located where in terms of both private sector activities and public services, something that currently needs improvement in Türkiye. Without such information, policy interventions cannot be targeted effectively or prove successful. Under the revised CPF Objective 9, which focuses on strengthened results under climate action agenda, the Project activities will provide information on infrastructure assets such as roads and utilities in municipalities throughout Türkiye, which will enable the government determine further investments and planning, particularly for urban areas where levels of building informality are high and what public services are required to ensure their successful formalization and integration into the municipalities. Quality infrastructure investments and planning will benefit from the proposed Project's activities, as they will enable the Government of Türkiye assess the feasibility (financial, technical, environmental impact) of various initiatives. Furthermore, sustainability and conservation of natural capital (e.g., waterways, forests, carbon sinks) will benefit from the Project activities by enabling central and local administration actors to identify what areas under their jurisdictions are vulnerable to negative impacts of urban expansion and how these challenges should be addressed as part of climate-smart urban planning.

18. **The proposed operation will contribute to goals and policies set out in Türkiye's National Development Plan (NDP).** The 2019-2023 NDP lists "Livable cities and sustainable environment" as one of its objectives to be reached, among others, through the completion of an accurate digital cadastre, the establishment of a real estate value information center, and the strengthening of NSDI. The Project will support sustainable urban development through the improved land policies that the completion of cadastre modernization, upgrading of geospatial information systems, the production of multi-purpose cadastral data and maps make possible. An improved property valuation system would enable the cost effectiveness of targeted policy interventions to be assessed. The Project also contributes to the achievement of the National Geographic Information Strategy and Action Plan that promotes the development of NSDI and data sharing to provide quality, up-to-date geographical information to all sectors of the economy.

19. **The Project will facilitate the provision of the foundational land administration data that will enable key aspects of the World Bank's Country Climate and Development Report (CCDR) for Türkiye[13], the World Bank's Global Crisis Response Framework (GCRF)[14], Türkiye's Climate Change Action Plan (2011-2023), and the forthcoming World Bank Türkiye Adaptation and Resilience Assessment (ARA)[15] to be realized.** The approaches set out in these documents require detailed information about the location of the various activities and initiatives they describe, as well as their economic values based on accurate market-based information, something which is not currently available. Without this information, it will be difficult to implement key policy proposals contained in the CCDR, Türkiye's Climate Change Action Plan (2011-

[13] World Bank Group. 2022. Türkiye Country Climate and Development Report. CCDR Series. Washington, DC: World Bank. © World Bank. *https://openknowledge.worldbank.org/handle/10986/37521* License: CC BY 3.0 IGO.

[14] World Bank Group. 2022. Navigating Multiple Crises, Staying the Course on Long-term Development: The World Bank Group's Response to the Crises Affecting Developing Countries. Washington, DC: World Bank. © World Bank.
http://documents.worldbank.org/curated/en/099640108012229672/IDU09002cbf10966704fa00958a0596092f2542c

[15] World Bank Group. 2022 forthcoming. Türkiye Adaptation and Resilience Assessment: A Whole-of-Economy Approach to Climate and Disaster Risks.

2023), and ARA. As the CCDR notes, a resilient net zero pathway requires actions to enhance the resilience of critical public assets and services, land use plans, and financial resilience. Making the economy more energy efficient will require more stringent and well-enforced building codes, which implies a level of control over development that has not happened in the past and knowledge about activities on the ground that does not currently exist. The scale of informal development that has taken place in the past and the lack of information about it is a serious impediment to achieving a net zero pathway. The key principles in the forthcoming ARA include adapting urban and land use plans and protecting critical public assets and services and helping people and firms manage residual risks and natural disasters. This requires location data for the delivery of public services, the ability to enforce land use planning decisions, and information about the location of households and businesses in relation to disaster and climate risks. This is undermined by the current quality of data about both public and private buildings and land uses contained in the land register. Türkiye has developed digital map layers for hazards but currently lacks them for buildings and social, commercial, and public activities which are critical for disaster risk assessment. The areas that are likely to come under stress from climate-related change and are at risk from hazard events can be identified but not the activities that take place in these areas. The creation of 3D city models and of a buildings and unit register will provide essential data for more effective responses and action plans and to enable municipalities to incorporate climate and disaster risk assessments into their urban and investment planning processes. These activities are compatible with and complementary to the activities to be financed by the Türkiye Earthquakes, Floods and Wildfires Emergency Reconstruction Project (P176608) and the Climate and Disaster Resilient Cities Project (P173025). The Project will play an essential and pivotal role in facilitating these and other related investments to achieve their objectives by providing essential data building blocks. Under the GCRF, the proposed operation will complement Pillars 3 (Strengthening Resilience) and 4 (Strengthening Policies, Institutions and Investments for Rebuilding Better). Specifically, project activities related to 3D city models, cadastral updates (supported under Component A) and property valuation models (supported under Component B) will provide multiple benefits for enhancing disaster risk management, crisis response, and climate resilience under Pillar 3. Moreover, the activities under all three Components will contribute to advancing the objectives concerning resilient reconstruction, green and sustainable growth, institutional strengthening and capacity building and digital development under Pillar 4. The cross-cutting nature of land administration activities provides multiple contributions to achieving GCRF goals by providing accurate and up-to-date spatial information for policy-makers to make informed decisions in preparation for potential and future natural disasters and climate hazards.

20. Finally, the Project is designed to be flexible and allow new concepts and ideas for innovative uses of cadastral and geospatial information for government decision-making and planning. Flexibility will enable the project to better inform future land administration and land management frameworks in Türkiye, including how they can achieve the objectives of the National Climate Change and Adaptation Strategy. The Project has high potential to contribute to adaptation and mitigation initiatives in Türkiye while also implementing activities that are considered universally aligned with the Paris Agreement.

II. PROJECT DESCRIPTION

21. The Project builds upon previous World Bank-financed projects' achievements[16] and aims to bring Türkiye in line with best international practice in land administration and related systems. It will support the further updating of Türkiye's cadastre in digital format, and complete the process of establishing an accurate cadastre nationwide, facilitating the

[16] The first Bank funded operation targeting the land sector in Türkiye was the Marmara Earthquake Emergency Recovery Project (launched in 1999 and completed in 2006), which sought to upgrade the cadastre in the disaster-affected areas by updating and improving the registers and maps. The project pioneered the outsourcing of cadastre work to the private sector, an approach that significantly accelerated the pace of cadastre completion during the 2001 Agricultural Reform Implementation project, which was the second Bank-funded operation. Subsequently, the Government's decision to increase funding for cadastre modernization played an important role toward the efficiency enhancements in overall land administration, leading to the third Bank-funded operation, the 2008 Land Registry and Cadastre Modernization Project and its 2016 Additional Financing. As a result of the series of interventions, there have been visible and significant improvements in access by individual and institutional users to digital cadastral data, improvements in IT systems, and pilot studies of mass valuation and 3D city models.

provision of data to enable key aspects of the Türkiye CCDR, Climate Change Action Plan, WB GCRF and ARA (as described above). The Project will further develop an accurate and comprehensive buildings inventory for almost all urban areas in the country through an innovative approach – the creation of 3D City Models – by scaling up the Amasya province pilot activities. The complexity of urban areas means that a two-dimensional cadastre and land registration system no longer adequately serve the needs of land administration and urban renewal. As a result of 3D city modelling, public bodies and others will be able to access accurate information about buildings and property units in them as they actually exist, contributing accurate datasets to the NSDI on parcels, land rights and obligations, land uses, and public restrictions. As such, the Project will be an important step towards increased land tenure security for many citizens in Türkiye. City models of this nature are needed for sustainable development, mitigating the climate change impacts and improving adaptation to climate change and resilience to disaster events, urban transformation, and economic growth. Furthermore, the Project will support TKGM in its mandate to develop a property value information center and mass appraisal systems for property valuation, which will enable Türkiye to increase the yield from property taxes and relieve fiscal pressure on local administrations and the national government. It will also make a major contribution to the development of a transparent and efficient property market by making market data more widely available to market participants. This in turn is expected to stimulate investment and enhance economic growth. Mass appraisal allows the identification of the value of land and building assets, which is key to determining the cost-effectiveness of investment in infrastructure, disaster planning and recovery, and climate mitigation. It enables the principal beneficiaries of such policies to be identified, making possible the use of value capture methods to contribute to their funding.

22. Regarding data privacy, Türkiye has enacted important regulatory and institutional reforms to protect the right to privacy with respect to the processing and sharing of personal data. The enactment of the Personal Data Protection Law (Law No 6698) in 2016 and the establishment of the Data Protection Authority in 2017 were two important milestones to provide a strong regulatory framework and ensure supervision and enforcement of obligations, principles, and procedures related to personal data protection. All natural and legal persons in Türkiye, including public institutions, are obliged to ensure compliance with the Law while storing, processing, and sharing the personal data wholly or partially by automated or non-automated means. In line with Law No 6698, the Government issued a secondary regulation in 2022 to regulate the processing of land registry and cadastre data and electronic transactions. Within the scope of the Project, while receiving, storing, and sharing the data for 3D city models, cadastre update and property valuation, TKGM will follow requirements of the secondary regulation and ensure the protection of personal data through integration of data privacy and security requirements into protocols to be signed with other institutions and webservices used for data exchange and sharing with other institutions and the public.

A. Project Development Objective

PDO Statement

23. The Project Development Objective (PDO) is to improve the accuracy and accessibility of land administration information in Türkiye.

PDO Level Indicators

24. The proposed key PDO indicators for the Project are:

- Country area covered by updated, modernized digital cadastre (percentage)
- Urban areas with updated buildings inventory[17] (km^2)
- Institutions with access to the new spatial data[18] (Number)

[17] These will be the urban areas for which 3D city models will be created under the project.
[18] These will include in particular: municipalities in the project area, the Ministry of Environment, Urbanization and Climate Change, and the Disaster and Emergency Management Authority, AFAD.

- Web services needed to achieve interoperability of 3D city model information system with NSDI system implemented (Number)
- Quarterly reports of property market trends published on the Property Value Data Centre's website (Yes/No)

B. Project Components

25. **Component A: Creating 3D City Models and Updating Cadastre Data (EUR 71.4 million)**. This component will support: (i) the creation of 3D city models based on the proven approach tested in the Amasya pilot; and (ii) the completion of the update and verification of cadastral data for 6 million parcels (out of the total remaining 11 million parcels[19] not covered by LRCMP), in both urban and rural areas. As part of the cadastre updating activities, capacity building programs for addressing challenges concerning women's land rights and ownership will be discussed with TKGM to determine how to better address these issues as part of the public consultation step during the surveying process (see gender section below). While activities on the update and verification of cadastral data will be carried out in both urban and rural areas, for the creation of 3D city models, the Project will cover major urban areas (approximately 40,000 km^2, almost all urban areas in the country) in all 81 provinces in Türkiye. As part of these activities, the Project will finance the completion and renewal of the aerial surveys, the buildings inventory, 3D city modelling, the integration of the data from the MEGSIS and MAKS systems in the 3D city model information system, which has been developed by TKGM and is being tested, and the implementation of web services to achieve interoperability of the 3D city model information system with the NSDI system. Aerial surveys will be carried out by TKGM staff with TKGM own financing, with the Project covering the related operating costs; the rest of the activities will be fully financed by the Project. The Project will further support considerations of the policy options for addressing the irregularities in Türkiye's cadastre that are expected to emerge from the creation of 3D city models. The activities supported by the Project in each province will vary, as TKGM has already initiated aerial surveys and 3D city modelling in 46 provinces (see Table 2). The Component will require a multi-agency/multi-partner effort involving TKGM's Department of Cadastre, Department of Land Registry, Department of Mapping, Department of Real Estate Valuation and Department of Information Technologies, as well as the municipal authorities, the Ministry of Interior's General Directorate of Population and Citizenship (responsible for the MAKS address system), the Directorate General of GIS of the MoEUCC (responsible for NSDI), and other relevant stakeholders. It is expected that the use of 3D city models for the recording and registration of new buildings will become mandatory, based on a pilot that TKGM is carrying out in the Ankara province[20]. In terms of climate change adaptation, as well as the objectives of GCRF Pillars 3 and 4, the Component's activities will generate the data set on cadastral parcels, aerial imagery, and buildings that are essential to put in place effective disaster risk planning and climate change adaptation policies and measures. These cannot be otherwise accurately developed or executed, because they depend on knowing what activities, businesses, and people are located where and who the owners are whose behavior has to be influenced. In terms of climate change mitigation, the activities under Component A will support the tracking of trends in urbanization and urban sprawl that have contributed to uncontrolled land use conversion that has resulted in the loss of carbon sinks. Moreover, the information provided by the updated cadastral data and 3D city models will be shared with the Directorate of Climate Change of the MoEUCC to directly inform energy analysis, disaster and flood simulations, resource management and overall climate-smart decision-making for resilient, green and sustainable urban development, including sustainable, energy-efficient, low-carbon buildings. See Box 1 below for further details.

Table 2: Scope of 3D city modeling activities

Provinces	Aerial surveys		Buildings inventory	3D city modelling	Data integration
	initial	renewal			
46 (22,000 Km^2)	No	Yes	Partial	Partial	Yes

[19] The other 5 million parcels will be undertaken simultaneously by TKGM using Government resources.
[20] TKGM Circular 2021/4 of September 1, 2021.

35 (18,000 Km^2)	Yes	Partial	Yes	Yes	Yes
81 (40,000 Km^2)					

Box 1: <u>Three-dimensional (3D) city models to be scaled up in Türkiye</u>
What is a "3D city model"[21] in simple terms?

Why "model"? Models are simplified description and representations of objects in reality. A map is a two-dimensional (2D) model of a part of the Earth's surface reduced in scale, as seen from above. Land Information Systems (LIS) usually model and represent the real-world objects, and particularly three-dimensional (3D) real property objects[22] as two-dimensional (2D) cadastral map objects. i.e., LIS usually stores and manages **2D models**.

Why "3D city" model? Urban environments in metropolitan areas worldwide are becoming extremely sophisticated. Most of the global population nowadays is concentrated in cities. The bulk of national wealth in fixed assets is also accumulated in urbanized territories, forming a sound basis for local administration (tax) revenues. Today, some 56 percent of the world's population – 4.4 billion inhabitants – live in cities and more than 80 percent of global GDP is generated in cities.[23] Classic 2D cadastre models/LIS fail to intelligibly represent the reality in highly developed urban environments. **Three-dimensional (3D) city models** represent spatial urban data by means of 3D virtual environments that include terrain models, building models, as well as roads and transportation systems models. As such, 3D city models overcome the shortcomings and limitations of 2D representations as they can create, visualize, analyze, and manage complex urban information spaces[24].

3D city models approach in Türkiye TKGM has developed a state-of-the-art methodology and IT-technology to create and manage its 3D city models. In simple terms, this methodology cleanses, merges and combines authoritative spatial, legal and administrative land data. The basis of Türkiye's 3D city model is TKGM's accurate cadastral map[25] merged with an ortho-photo map[26] enabling the discovery and identification of all buildings – even non-recorded ones. The building stock inventory thus generated is further enhanced with adding a variety of thematic data[27]. The cadastre and photomap are combined with a digital surface model (DSM)[28], thus creating the 3D basis[29]. Exterior façades and roofs[30] of each building are modelled[31], and integrated with building information models (BIM)[32] showing the interior subdivision of space (property units) within the building. BIMs enable the identification of all the individual property units[33] to be linked to the land registry records and to further thematic data[34]. The 3D city model is combined with the zoning and public restrictions that affect each land parcel and/or building. Finally, the 3D city model is harmonized with the Türkiye spatial address registration system (MAKS). In this way, every land parcel, building, and property unit in the 3D city model is

[21] cf. *https://en.wikipedia.org/wiki/3D_city_model*
[22] Land parcels, buildings, apartments, crop fields, permanent plantations, and many others.
[23] https://www.worldbank.org/en/topic/urbandevelopment/overview
[24] cf. J. Döllner, K. Baumann, H. Buchholz: Virtual 3D City Models as Foundation of Complex Urban Information Spaces. *https://hpi.de/fileadmin/user_upload/fachgebiete/doellner/publications/2006/DBB06/CORP2006_doellner.pdf*.
[25] Showing legal land parcel boundaries, unique parcel identifiers, building footprints, unique building identifiers, and other real property features – all linked to the legal land registry records.
[26] The ortho-photo map is updated regularly by new aerial surveys every three to five years.
[27] Like, for example, category by legal status or irregularity, age, number of floors, areas, and others.
[28] The DSM is a by-product of the aerial surveys.
[29] Including terrain surfaces, peaks, slopes, ridges, riverbeds, and other topographic features.
[30] Also known as "exterior" 3D building model, created photogrammetrically from vertical and oblique aerial photography (captured in periodical aerial surveys by TKGM).
[31] Merging and combining them with the cadastre, photo map and terrain model
[32] By digitizing and vectorizing detailed architectural designs, or by using the standard BIMs provided by developers of new buildings.
[33] E.g., apartments, shops, offices, and others.
[34] Like, for example, land-use, restrictions, value and others.

uniquely (both semantically and spatially) identified and has a unique address. In a nutshell, the most important benefits and use foreseen from scaling up Türkiye's 3D city model are:

- A virtual "spatial" model for land, real property and the built environment, integrated with the records of land rights, restrictions and responsibilities
- A first-of-its-kind inventory of the building stock in Türkiye, categorizing buildings according to their specific legality/irregularity, thus enabling further good governance reforms in the land sector as well as advancing efforts to protect land tenure security in the country
- A building/development monitoring system (by periodical aerial surveys and 3D city model updates)
- The identification of buildings and taxable units and their characteristics for the development of mass valuation
- Urban development, simulation, and planning
- Climate change modelling
- Analysis of solar potential as a key resource of green energy
- Simulation of noise and air pollution analysis
- Building Digital Twins for Smart Cities.
- Provision of key data for disaster risk management preparation and response
- Support to urban and climate resilience initiatives through the identification of existing buildings, infrastructure and utilities located in high-risk areas such as flood zones and earthquake fault lines.

26. **Component B: Real Estate Valuation (EUR 2.7 million).** Based on the experience gained through previous mass valuation pilot projects in Fatih and Mamak carried out under LRCMP, as well as the Amasya pilot, the Project will support the development of proofs of concept to facilitate the establishment of a mass valuation system in Türkiye and generate the market values of individual property units. This support will focus on the collection of the required price information and data on the sample of properties needed for mass valuation modelling in the form of a Sales Price Register, the establishment of a Property Value Information Center for the storage, management, exchange and distribution of relevant valuation data for each of the principal valuation methods, including the Sales Price Register, leases, rentals, and building costs, and investment in hardware and software upgrading. The valuations can be used for a variety of purposes (property taxation, improving disaster risk financing and insurance in the event of climate-related natural hazards, and updating the value of collateral) and form one of the key datasets in an NSDI. The Project will demonstrate proof of concept and what will be required to roll out the system across the country as a whole and be representative of the main types of property. The rolling out of mass valuation models to the population of properties will require the use of 3D city models to identify buildings and taxable units and their characteristics. The municipal authorities will be an important source of key data on individual properties to be entered in the Sales Price Register, including zoning plans, zoning restrictions, and architectural design drawings. Capacity building activities will be included to ensure that municipalities can provide reliable data in the format needed (digitized/vectorized) to be shared/uploaded into TKGM system and other systems as necessary. The activities under this component will in due course help to inform the Government about which properties are considered more prone to carbon emissions and incentivize emissions reductions by factoring carbon output into the valuation methodology. The connection between real estate valuation and reducing carbon emissions will be further explored and integrated as part of the component's capacity building activities. Moreover, Component B activities will support the objectives of GCRF Pillars 3 and 4 by helping to provide important market value information to calculate the costs of resilient reconstruction and determine insurance premiums in support of crisis preparedness and disaster risk management efforts by the Government of Türkiye.

Box 2: Mass Valuation

Mass appraisal or mass valuations is a generic name for the methods that have been developed to solve large-scale valuation problems, such as when many properties must be assessed as at the same date for property taxation. The methods are characterized by their use of standardized procedures, common data sets, and statistical methods. At its simplest, mass appraisal is used to derive a statistical relationship between the market prices of a sample of properties for which there is recent evidence from transactions and the characteristics of them that influence their prices. This relationship can then be applied to the wider population of properties for which there is no recent price evidence by substituting the values of their characteristics into the equation. Mass appraisal models are intended to replicate statistically the ways in which human valuers form an opinion of the estimated market value of a property and can follow any of the main valuation methods as appropriate for the type of property. There are international standards governing how a mass appraisal system should function and how the accuracy of the assessments can be judged. Building a system of mass appraisal requires the creation of reliable data sets, which are currently not available in Türkiye. By contrast, Türkiye has a well-developed valuation infrastructure in which valuers are licensed by a competent body, valuation standards are based on international good practice, and the university system has well-developed valuation programs.

27. **Component C: Institutional Capacity Building and Project Management (EUR 3.7 million).** This Component will support capacity building and training of TKGM staff and other key stakeholders that are producers and/or users of spatial data (e.g., municipalities, the Population and Citizenship Affairs Directorate General of the Ministry of Interior, and others as relevant), including in the use of the new 3D city model tool. The Component will further finance IT infrastructure necessary for the scaling of the "3D City Model Information System" developed by TKGM, and support the enhancement of the existing Project Implementation Unit (PIU) and of TKGM's automated Monitoring & Evaluation (M&E) system. TKGM already has a strong supervision and inspection function, but the additional work under this project requires enhancement of TKGM's capacity. The Project will provide retroactive financing to cover for payment of key PIU specialists made on or after June 1, 2023, up to an aggregate amount of EUR 100,000. Additionally, the Component will cover costs associated with public awareness and dissemination events related to the benefits of project activities, including stakeholder consultations, throughout implementation, as well as targeted capacity building programs for customer-oriented service provision.[35]

28. **Gender**. Türkiye's legal framework is proactive in addressing gender equality concerning land and property matters. The Civil Code of Türkiye directs the equal division of property acquired during marriage. Moreover, in October 2001, Article 41 of the Constitution was amended to redefine the family as an entity "based on equality between spouses". Nevertheless, disparity in land and property ownership between women and men remains high in Türkiye. Available figures estimate that 36.5 percent of the country's real estate is recorded under the name of women[36] compared to 63.5 percent in the name of men. This low rate for women can have broader impacts on women's participation in the Turkish economy, as a lack of property documentation for land and property ownership negatively impacts one's ability, among other things, to access public services and credit markets. Despite legal backing, societal traditions and customary practices favor men concerning land and property ownership and use rights, such as preference towards male heirs in inheritance matters, resulting in female heirs receiving smaller portions of property allotments. Additionally, having male family members' names on land records documentation is typically favored as a means of assuring that land and property stays within the family.[37]

[35] As noted in the Citizen Engagement section, TKGM has a Quality and Customer Department with the responsibility for responding to citizen feedback and queries it receives. The target capacity building programs will be designed in close consultation with this department in order to identify and fill any gaps TKGM has with responding to citizen feedback.
[36] Ministry of Environment, Urbanization and Climate Change: *https://www.milliyet.com.tr/emlak/gayrimenkul-sahipliginde-kadin-erkek-esit-mi-68183*.
[37] For more details, see the OECD's *Social Institutions and Gender Index*: https://www.genderindex.org/wp-content/uploads/files/datasheets/2019/TR.pdf.

29. TKGM's ongoing efforts to record accurate parcel and land ownership information as part of cadastral updating is a key step in addressing challenges related to women's access to land and property in Türkiye, as the process helps to clarify the situation on the ground and identify where ownership issues are most prominent. Previous cadastral updating initiatives have greatly benefitted women. During the implementation of LRCMP, for example, over 5.3 million women (about 40 percent of total project beneficiaries) in Türkiye benefitted from having their use or ownership rights to land and property accurately recorded (both single and joint ownership) as a result of the project's cadastral updating activities. During LRCMP, TKGM leveraged its existing cadastral data and records to identify which parcels were listed under the name of women. These parcels were then updated during the cadastral updating process to ensure that women had access to a fully accurate, digital cadastral record that could later be leveraged as proof of ownership, subject to Government amnesty, in the event that their property was informal and also needed to be officially registered. Consequently, this process as part of cadastral updating and the subsequent achievements under LRCMP have contributed to women having increased land tenure security in the country as well as the ability to leverage their property for collateral and business investments, among other things.

30. Building on the successful process developed under LRCMP, the proposed Project will continue efforts to improve women's land and property rights through further investments under Component A activities, particularly updates to cadastral records for an additional six million cadastral parcels not covered by LRCMP. With the proposed Project, it is expected that about the same percentage of parcels as under the LRCMP (40 percent) will be recorded in the name of women. Efforts to reach out to female owners will be increased by ensuring that cadastre staff are well trained on the importance of recognizing women's land rights. The trainings to be provided to cadastre staff will include content for raising awareness of the importance of understanding specific concerns that women may face (e.g. concerns and/or misconceptions about loss of property upon marriage and associated impacts on aging parents' financial security), and for surveying both male and female household members, where surveyors need to consult residents under the cadastral renovation exercises of field-based improvement of location and information accuracy. Component A's 3D city model activities will also help to identify additional unregistered property ownership through the identification of informal buildings and via investments for developing a building inventory. To track progress on the inclusion of women, an Intermediate Outcome indicator is included in the Results Framework that measures the percentage of updated land parcels in digital format with use or ownership rights recorded in the name of women as a result of the Project.

31. **Climate Co-Benefits**: As mentioned in previous sections, improving the accuracy of recorded land rights and determining the actual buildings inventory achieved through a combination of activities under Components A, B and C, is a fundamental investment without which policies to reduce the impact buildings have on climate change will not be effective. The development of 3D city models provides the fundamental data set needed for the identification of buildings, which is essential for controlling the climatic impacts from the building stock. It will allow local administrations to stop the construction of illegal buildings that fail to satisfy environmental standards. It will enable investors and buyers to be able to check whether buildings meet environmental standards. The current discrepancies between what is recorded in the land register and cadastre and reality on the ground, particularly in terms of buildings and the extent of informal development, undermines planning and policy measures. As such, the Project activities will enable the improvement of spatial planning tools to inform climate-related decision making and support Türkiye in achieving its climate change adaptation and mitigation objectives. Access to improved geospatial information, including updated cadastral data, will contribute to enhanced climate resilient and disaster risk management planning and recovery, and will enable Government entities, non-governmental organizations, and academia to monitor climate change and plan for disaster recovery more effectively (including damage assessment, identification of compensation levels and eligibility, building back better efforts). Currently, the scale of unregistered development prevents these from being realized. The development of 3D city models should bring this to an end as it will no longer be possible for buildings to remain hidden from the official record. Moreover, the development of 3D city models and further expansion of/updates to land registry

and cadastre information (Component A) and support to property valuation (Component B) will enable the consequences of exposure to natural hazard events and risks to be understood since the location of buildings will be known. 3D city models will improve land-use zoning and the siting of critical infrastructure to enhance resilience. Improved control over informal development will reduce the population placed at higher risks and mitigate the risks from development of the wrong type and in the wrong location. To support the tracking of the benefits to climate change adaptation and mitigation as a result of improved geospatial information management, the Project's Results Framework includes an Intermediate Outcome indicator that measures access of institutions[38] to the new spatial data in 3D format to improve forecasting and assessment of the consequences of disaster and climate hazard events that will inform climate-related decision making.

32. **Citizen Engagement**. Citizen engagement will build upon TKGM's existing procedures and mechanisms utilized under LRCMP, particularly for the Project's cadastre modernization activities. As mandated by national legislation, TKGM has a notification procedure that includes informing landowners at the beginning of the cadastre process, with announcements to be made 15 days prior via local media, newspaper advertisements and other local public announcements. TKGM also holds an informative meeting in the affected settlements to inform the landowners on the purpose and content of the activities to be performed, the potential impacts of these activities on land and landowners, the objection mechanism, and how their objections will be handled. All landowners are invited and encouraged to present any questions and concerns they may have during the measurement studies on their parcels. These activities will be continued as part of cadastre modernization and it is planned that a similar process will be used for the creation of 3D city models. Building on the existing procedure, and as part of the development of the Stakeholder Engagement Plan (details below), the Project will also support the tailoring of messaging to account for the needs of vulnerable landowners in order to ensure their participation and cooperation in the project activities. Similar to LRCMP, the Project will also utilize both the Government of Türkiye's e-Government platform (CIMER) and TKGM's internal citizen engagement mechanisms via its Quality Management Department to receive feedback from citizens concerning project activities and respond accordingly[39]. An additional Intermediate Outcome indicator is included in the Project's Results Framework to measure citizen feedback (complaints, queries, recommendations) received that is addressed by TKGM. The Bank task team will regularly follow up with TKGM concerning this indicator to determine what recommendations can be included under the project activities.

33. Concerning the project's 3D city model activities, the uses, benefits and services offered by the tool will be disseminated as a first stage with stakeholder institutions via information awareness events such as stakeholder forums in order to obtain feedback on how the tools could be used for everyday needs of citizens in municipalities. Project financing for public awareness and dissemination events will be included under Component C as part of the Project management activities.

C. Project Beneficiaries

34. The primary beneficiaries of this Project will be Türkiye's citizens and businesses. Under the activities for updating cadastral data, for example, it is estimated that approximately 18 million people alone will benefit from improved tenure security via complete and accurate land records. Moreover, updates to cadastral data will benefit real estate markets; it is anticipated that clarity of property ownership and improved data about property units will contribute to increased mortgages as well as clarity for insurance companies concerning the determination of premiums in the event of a disaster and the need for citizens to make claims. The development of 3D city models will support the safety of citizens by helping to determine any potential hazard zones where homes and other buildings reside. The Project will benefit an estimated

[38] These will include among others the Directorate of Climate Change of the MoEUCC, and the Disaster and Emergency Management Authority, AFAD.

[39] TKGM operates a Call Center ("Hello 181") which functions on a 7/24 basis. Citizens can call and receive assistance regarding transactions and services, as well as request information, voice their opinion, offer suggestions and make requests to TKGM Management. The Call Center also compiles statistics on customer satisfaction using data collected through TKGM's annual customer satisfaction surveys.

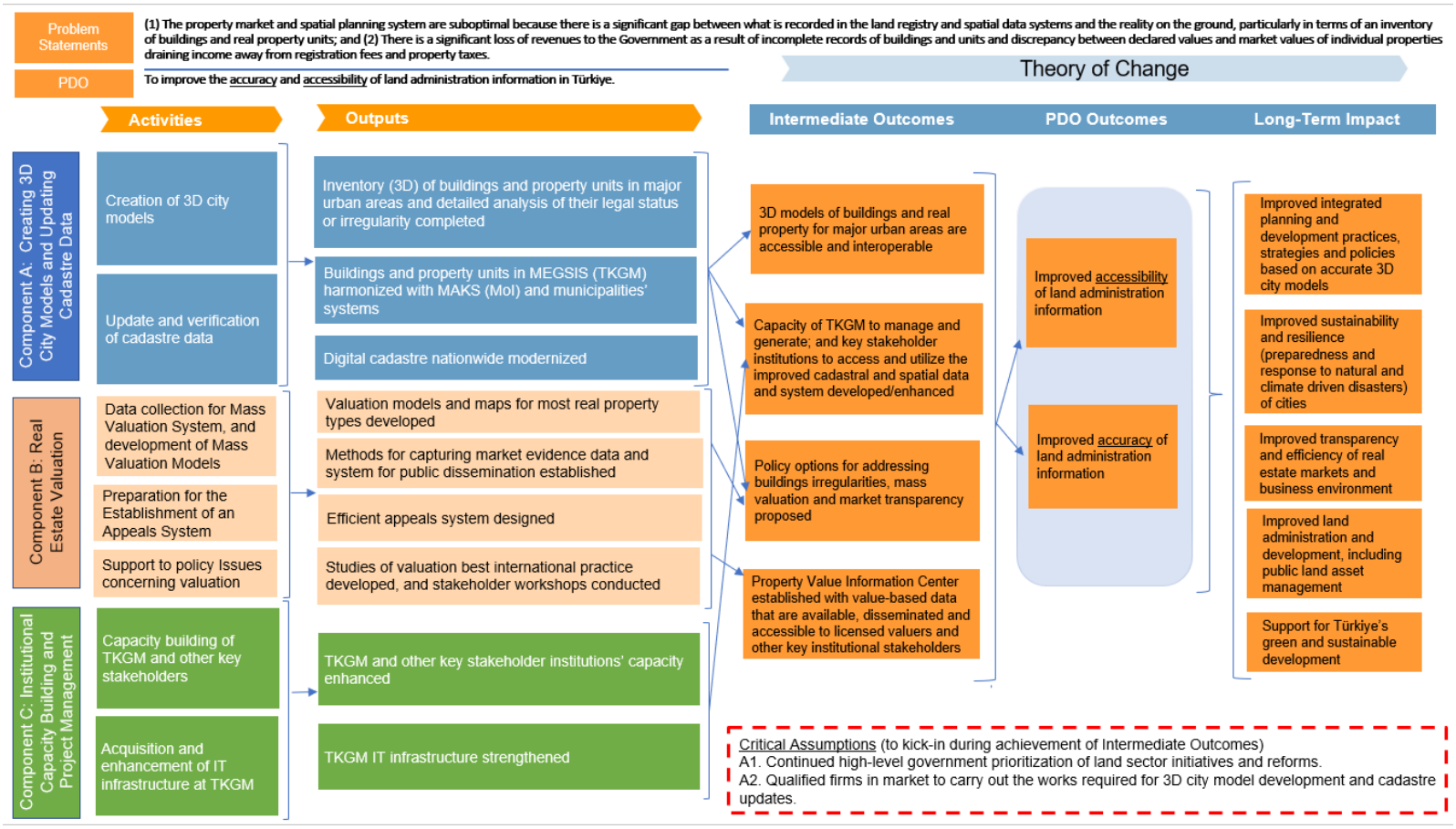
35 million people currently located in high seismic zones in Türkiye. The use of the 3D city models for initiatives such as (i) planning the provision of public services and utilities; and (ii) developing zoning ordinances and regulations for construction; and (iii) identifying informal properties, can also benefit the quality of life for citizens throughout Türkiye. Private sector decision makers will benefit from better access to data about buildings and individual units and market values in making investment and lending decisions. Since businesses use property assets as collateral for raising finance for expansion, improvements in quality of property market information from the collection and publication of more accurate data should result in improved investment in the economy. This has the potential to raise the transparency of Türkiye's property market with corresponding benefits in terms of increased investment quality and reduced risk premiums.

35. The Project will also directly benefit decision-makers from all levels of government (local to central), as the breaking down of information silos will facilitate a more collaborative environment between government ministries and agencies that maintain key datasets. It is widely recognized that municipalities lack the data they require to enhance disaster response, urban planning, and investment plans and improved and more reliable data about buildings and individual units will help considerably in achieving this. Activities related to 3D city models and cadastre innovations will help key stakeholders in government to better utilize location-based data for planning purposes as well as to achieve their respective objectives in various government strategies such as the NDP. The Project's capacity building initiatives will also build the technical expertise of government officials and staff to provide more effective public services throughout Türkiye. Long term sustainable growth in Türkiye requires a reduction in the physical, social, and economic shocks associated with geophysical and climate change-induced disasters. More broadly, institutions responsible for disaster management and response plans will benefit from data on buildings and individual units which is not currently available so that urban and investment plans are better able to take hazard events into account. Long-term average annual losses due to natural disasters in Türkiye are estimated at US$711 million per year for earthquakes and US$843.4 million for floods. When added to other hazards, such as protracted drought and wildfires, and sea-level rise, these could result in up to US$1.6 billion in losses per year[40].

D. Results Chain

36. **Theory of Change**. The proposed Project activities and related outputs and outcomes are expected to contribute toward the achievement of the PDO as shown in the diagram below. The key elements in the causal results chain for achieving the PDO of improved accuracy and accessibility of land administration information in Türkiye are: (i) improvement of the land registry and cadastre data quality[41]; (ii) harmonization/integration of the available datasets on land, buildings, property units and public restrictions between the key stakeholders (including but not limited to TKGM, Ministry of Interior, Ministry of Environment, Urbanization and Climate Change, and the municipalities) and provision of data and e-services to stakeholders through NSDI; and (iii) establishment of the basis for a mass property valuation system and improved market evidence. By doing so, the Project will set the foundations for raising additional revenues, improving resilience of cities to natural disasters, improving spatial and investment planning, enhancing real estate markets, supporting Türkiye's ambitious climate agenda, and improving governance of land and natural resources for sustainable development.

[40] World Bank, 2020. Türkiye, Understanding Disaster and Climate Impacts on the Poorest and Most Vulnerable.
[41] The data quality includes completeness, accuracy, consistency, validity, uniqueness and integrity.



E. Rationale for Bank Involvement and Role of Partners

37. The World Bank is uniquely placed to support TKGM in executing the project due to its global experience, financial resources, and technical expertise. The Bank has extensive experience in supporting land administration and geospatial information management systems and processes around the world and can therefore provide global best practice and knowledge to support project design and implementation. The Bank has accumulated broad experience in land administration globally and in the Europe and Central Asia (ECA) region, including from the previous LRCMP project as well as project supporting cadastre modernization, mass valuation, and NSDI in countries such as Croatia, Moldova, North Macedonia, Bosnia and Herzegovina and Serbia. The World Bank also has long-standing engagements in the local administration (municipal) sector in Türkiye, with effective technical and coordination support across both central and local administrations. These experiences, combined with the solid technical expertise of TKGM developed over the course of LRCMP, provide an excellent opportunity for the World Bank to continue its support to Türkiye's land sector through this project. The Bank also brings to the Project its expertise in catastrophe risk assessment and finance, such as the work undertaken by the Pacific Catastrophe Risk Assessment and Financing Initiative and the work that has been undertaken on increasing community resilience through improved land administration and geospatial information.[42]

38. Other development partners supporting the land sector in Türkiye do not work with TKGM directly. Currently, the United Nations Food and Agriculture Organization (FAO) is supporting the Ministry of Agriculture in its efforts to improve

[42] World Bank (2013) *Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI): Better Risk Information for Smarter Investments - Risk Assessment - Summary Report;* World Bank (2020) *Solid Ground: Increasing Community Resilience through Improved Land Administration and Geospatial Information*

land consolidation and land banking in rural areas.[43] Given the FAO initiative's focus on rural areas and agricultural land, the proposed World Bank-financed project is not expected to duplicate efforts, as the project will primarily focus on urban areas of the country. Nevertheless, some of the six million parcels that will benefit from the project's cadastral updates may be located in areas where FAO is supporting the Ministry of Agriculture. Consequently, the FAO initiative is expected to benefit from the legally recognized land records in support of land consolidation and land banking, as the various owners who need to be consulted will be identified.

39. The Project also presents an opportunity for learning that can be shared with other World Bank clients and partners in three critical areas. The first relates to the opportunity for a digital future that utilizes geospatial information in support of planning for a greener, resilient and more sustainable future, and second to ensure that sustainability and improved land administration and management tools are at the heart of long-term resilience and post-disaster recovery initiatives. Third, this project will focus on central government and local administrations collaboration for data sharing as part of the development of NSDI, which will help to establish Türkiye as a successful example of intergovernmental cooperation in the realm of geospatial information management from which other countries can draw lessons for their own initiatives.

F. Lessons Learned and Reflected in the Project Design

40. The Project design will build on the following key lessons drawn from previous efforts in Türkiye as well as from international best practice[44]:

41. **Collaboration with the private sector significantly enhances the efficiency of cadastral activities and services**. One of the key lessons learned from LRCMP has been that the privatization of the cadastral works can improve the efficiency of cadastral service delivery and the service fee collection. If TKGM continued to rely on in-house teams using traditional manual methods, it would have faced a 35-year work program. Initial cadastral and registration work has been accomplished 10 times faster. Since 2005, TKGM has ceased the use of its own personnel and has relied on the private sector to carry out cadastral fieldwork and now works with 350 private sector companies in its cadastral modernization projects. These developments have helped strengthen TKGM's technical capacity, prompting it to seek further reforms, and elevated its institutional confidence through its ability to manage large scale private contracts and ensure that the work was undertaken to an appropriate level of quality.

42. **The integration and interoperability of land and spatial information systems is a requirement for value addition of land and spatial information.** The Project is designed to incorporate the global best practice concerning the need for full coverage by a digital seamless cadastre that inventories all lands (including publicly owned and unregistered lands) and is maintained so that it reflects reality. This seamless cadastre should also be fully interoperable with external authoritative information systems, including address, zoning and spatial planning, civil and business registration and valuation. The development of this "Single Source of Truth", which contains the true, current real-world version of spatial data will help to enable spatial information systems to communicate and exchange data in an accurate, effective and consistent manner, thereby helping to facilitate the advancement of NSDI. The proposed project will build on this important lesson from past interventions concerning effective geospatial information management in order to ensure the successful development of the 3D city models for Türkiye.

43. The **Amasya pilot has provided proof of concept for the development of 3D city models**. Urban environments have developed in three dimensions and, as such, location and geo-referencing is needed in 3D and not 2D. This implies that building and development plans are linked to the cadastre, as well as other location-based datasets such as address

[43] Further details on FAO's activities in Türkiye concerning the support to *Enhancing agricultural land market development to address land abandonment and improve land consolidation procedures* can be accessed via the following link: *https://www.fao.org/publications/card/en/c/CC1807EN/*
[44] World Bank Technical Study: "Türkiye Land and Real Estate Issues – the Way Ahead", October 2021.

registries that help to pinpoint the location of buildings and other structures on the ground. The Amasya pilot project has proven this implication while simultaneously providing valuable experience on how to develop 3D city models both in terms of resolving technical issues as well as effective management solutions in cooperation between agencies and upgrading data access. It has demonstrated how MEGSIS data from TKGM can be linked to the address system from MAKS and how buildings missing from the cadastre and land registry can be identified using aerial imagery and populated with the units they contain from the MAKS address system. Rolling it out will prove useful but attention will have to be paid to issues of local development plans and permits not being digitized and the absence of architectural plans for many buildings and many of those that exist not being in digital form. In spite of these limitations, the result has been to produce a greatly improved sense of reality on the ground. TKGM has worked in developing systems that will ensure that in the future it will receive plans of and information about newly constructed buildings that will require minimal inputs from municipalities and make only marginal demands on them in terms of technical capacity in return for access to substantially better information.

44. **Investments in 3D city models and the advancement of NSDI set the stage for a natural next step concerning support to the advancement of property valuation for revenue generation and contributions to real estate market development**. A comprehensive mass valuation system of all types of property based on current market values, a tax register integrated with a 3D cadastre and address register, and digitized building records will help to prevent loss of revenues from property registration fees by enhancing municipalities' own revenues through annual property tax assessments that more accurately reflect market values. These also offer the potential for land value capture to support the provision of infrastructure and affordable quality housing. Revenue from registration fees is diminished through illegal buildings, informal transfers, and inability to check whether declared prices are the true ones. For this to be realized, there needs to be a comprehensive mass valuation system of all types of property based on current market values, with regular revaluations. This implies the collection of accurate data on prices and rentals, a tax register integrated with a 3D cadastre and address register and digitizing, plus 3D modelling of the construction records of buildings.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

45. The Project will be implemented by TKGM. Its existing Project Implementation Unit (PIU) for LRCMP, which has demonstrated strong performance in overall project management and implementation, will be maintained and will have responsibility for the project's fiduciary, safeguards and M&E aspects. The PIU will be strengthened as needed in light of the expansion of activities under the proposed project. Technical responsibility for the implementation of project activities will lie with TKGM's various departments, including the Department of Cadastre, Department of Land Registry, Department of Mapping, Department of Real Estate Valuation, and Department of Information Technologies. The Heads of these various departments will be part of a Project Coordination Committee that will work with the Regional Project Managers and the PIU's Project Officer to ensure proper coordination among the various departments within TKGM at both central and regional level throughout project activity implementation. Further details on the Project Management structure at TKGM for the proposed project can be found in Annex 1.

46. Partnerships between TKGM and key stakeholders will also be critical for ensuring successful implementation of the Project activities. These include partnerships with government agencies such as the Ministry of Interior's General Directorate of Population and Citizen given its management of the spatial address registry system (MAKS system), which contains data on buildings and building units for TKGM to develop 3D city models. Similarly, at the local level,

municipalities and, to a certain extent, Special Provincial Administrations[45] will play a key role in providing much of the data required by TKGM (architectural plans of existing buildings, zoning plans, building permits). The Directorate General of GIS of the Ministry of Environment, Urbanization and Climate Change, which is responsible for overseeing the NSDI in Türkiye, will also be a key stakeholder and recipient of the data produced under the project. There is well-established, ongoing cooperation between TKGM and these stakeholders, especially following the Amasya pilot activities and TKGM's piloting of various improved systems for information sharing at both the central and local level. A comprehensive protocol agreement between TKGM and the Directorate General of GIS and between TKGM and the Ministry of Interior is already in place that covers data sharing requirements between the MEGSIS and the NSDI platform, and MEGSIS and MAKS systems, respectively. Similarly, protocols for data sharing have been signed between TKGM and municipalities, which will be expanded to cover specific activities and data sharing to be supported by the project. Interinstitutional coordination for investments planning and implementation, including for activities supported by the Project, is ensured by quarterly coordination meetings that are regularly taking place at the provincial level and that are chaired by the Governor and by the relevant mayors and the provincial directorates of concerned ministries. In the context of the proposed Project, this ongoing interinstitutional coordination will be built upon at the central government level through a stakeholders advisory group comprised of key institutions that will be convened as needed to provide guidance and a sounding board regarding strategic planning and identify policy and technical issues to improve implementation and impact. The following table provides a summary of key stakeholders and their specific roles and responsibilities as they pertain to the implementation of the proposed project.

Table 3: Key Stakeholder Roles and Responsibilities during Project Implementation

Institution	Role	Responsibility
Ministry of Treasury and Finance (MoTF)	Borrower	Overall monitoring and supervision of project implementation
TKGM	Implementing Agency	Main institution responsible for implementing the project
Strategy and Budget Office (SBO)	Stakeholder	i) Technical monitoring of the project to ensure compliance to national development plan priorities ii) Annual budget allocation in the Annual Investment Program of the Government
Ministry of Interior's General Directorate of Population and Citizenship	Stakeholder	Management of the spatial address registry system (MAKS system), which contains data on buildings and building units critical for TKGM to develop 3D city models
Directorate General of GIS of the Ministry of Environment, Urbanization and Climate Change	Stakeholder	Overseeing and regulating the NSDI
Municipalities and Special Provincial Administrations	Stakeholder	Providing much of the data required by TKGM (architectural plans of existing buildings, zoning plans, building permits)

B. Results Monitoring and Evaluation Arrangements

47. Implementation progress towards the PDO will be monitored based on completed procurements, Project disbursements, and achievement of the results indicators. Under the LRCMP, TKGM has developed a comprehensive project management information system to monitor the progress of the Project activities and manage hundreds of

[45] Special Provincial Administrations are local representatives of all central government institutions responsible for delivering services in rural areas (including building permits). It is expected that about 5 percent of data integration will involve these administrations.

cadastral update and digitization contracts, with the input of regional and provincial cadastre offices. This system will be expanded as needed to ensure adequate monitoring of the Project PDO and intermediate results indicators and periodic reporting. In addition to implementation support missions conducted by the Bank every six months, TKGM PIU will be required to submit biannual progress reports to its management and the Bank for review. A Mid-Term Review will be carried out by the Bank at the mid-point of the Project implementation to assess the overall project progress, identify critical implementation issues, and make any necessary revisions to the project design or schedule.

C. Sustainability

48. TKGM has made vast strides in the improvement and accuracy of cadastral and textual land records as well as the provision of public services over the past two decades. As seen during the implementation of LRCRP, it has proven capacity to implement updates to cadastral data and has transformed from a paper-based institution to one that utilizes digital technologies for all aspects of its business operations. Nevertheless, the introduction of new initiatives such as 3D city models will require substantial capacity building efforts to ensure long-term sustainability. The project includes financing for capacity building and knowledge exchange programs for enhancing the knowledge of TKGM's technical staff and data providers (especially municipalities) to effectively maintain these new initiatives after project completion. Additionally, the ability of TKGM as a fee-earning institution to use its revenue streams such as those it generates via fees on property transactions to maintain the new systems to be developed under this project reduces budgetary uncertainties often faced by other similar institutions.

49. Moreover, the Project will benefit from already-existing working relationships and collaboration arrangements between the various government ministries and agencies that will participate in activity implementation, which will help to ensure the foundations for long-term institutional sustainability of project investments. For example, TKGM has signed protocols with the Ministry of Interior's General Directorate of Population and Citizenship as well as the Directorate General of GIS under the Ministry of Environment, Urbanization and Climate. TKGM has already developed applications that enable municipalities to upload data into its systems. There is also draft legislation being finalized requiring surveyors working with developers, as well as municipalities to provide 3D models of new buildings to TKGM. Türkiye also has a policy framework in place for NSDI, including regulations that define data production and sharing responsibilities, thereby helping to avoid duplication of efforts and clarification of roles among key stakeholders. This policy framework will also contribute to legal backing for the Project's activities. Finally, a stakeholders advisory group comprised of participating government agencies to drive the Project implementation will provide an open forum to help identify policy and other issues (such as gaps in technical expertise) that are required to ensure sustainability, accuracy and use of data and tools financed via the project. The Bank task team will also play a key role in helping to facilitate these discussions as project implementation progresses.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

50. **Technical.** The innovative 3D city modelling approach developed in-house by TKGM and proven in the Amasya pilot is feasible, fit for the purpose, and capable of bringing a significant and innovative quality improvement of cadastral and spatial data and e-services in urban territories. Specific emphasis is placed on the built environment and its characteristics, registered real property, zoning and public restrictions, addresses. The 3D city modelling approach of TKGM is informed by and follows global best practices in this field. TKGM is strongly committed to fulfilling its mandate and delivering high quality authoritative land administration and management information, in close collaboration with its government and private sector stakeholders from local and central levels. TKGM has the experience, the developed technological tools, procedures, standards and framework agreements which equip and facilitate all relevant stakeholders

to make their inputs in, to use, and to benefit from the outputs of 3D city modelling with minimum disruption and investment. TKGM can thus fulfill its pivotal role and mandate in the NSDI.

51. **Economic and Financial**. More than 95 percent of TKGM fee income comes from transactions which involve citizens buying and selling properties (land or built-up properties). TKGM statistics indicate that in the last ten years property transactions grew annually by 5.51 percent (from 1.83 million in 2012 to 3.23 million in 2022). In 2022, TKGM's transaction fee revenue amounted to EUR 2.61 billion, which puts TKGM at the top of revenue earning public agencies in the country. Based on this figure, the total value of the property market is estimated at EUR 65.32 billion (i.e., EUR 2.61 B/4 percent), at a transaction fee percentage of 4 percent in current practice. Analysis of TKGM data also reveals that the residential mortgage market is rather negligible, where most of the mortgage operations are commercial credits backed by real estate. About half of the 3.2 million annual real estate transactions pertains to housing units, with some 1.5 million units sold in 2021 according to TUIK[46]. The improvements in TKGM's land administration data are expected to induce a growth of 6 percent against the current rate of 5.5 percent, with the annual growth rate of average value of the transactions being enhanced from 1 percent without the project to 1.5 percent with project, where the current average value of a transaction is estimated at EUR 19,800 using the last five years' data.

52. The methodology behind the Economic and Financial Analysis (EFA) is the so-called Incremental Market Model which calculates the market size for the with and without project scenarios and attributes 0.4 percent of the incremental growth to the project interventions, without distinction as to the source of the underlying benefits. This is an exceedingly conservative estimate, because the real estate sector has an average share of about 5 percent in the GDP in Türkiye, where the construction industry saw a sizable growth of 38 percent in 2021[47]. The principal Project benefits, both economic and fiscal, can be summarized as follows: (i) increased operational efficiency in the land markets; (ii) enhanced financing of the housing sector; (iii) increased fiscal revenue (TKGM fee income); and (iv) rationalized mortgage markets.

53. Cost-benefit analysis using the above-described data and assumptions for a EUR 77.8 million investment package, 6 percent discount rate and a planning horizon of 20 years yielded an Economic Rate of Return (ERR) of 35 percent against a Financial Rate of Return (FRR) of 31 percent, where the ERR was estimated on the basis of an investment cost exclusive of tax and price contingencies value at 25 percent of the full cost. A sensitivity analysis was attempted for an investment package costing 100 percent more than what was assumed (i.e., EUR 150 million), which brought the ERR to 24 percent, and FRR to 21 percent, which are still high enough to justify the project at such elevated cost.

54. Regarding the fiscal impact, the analysis shows that as of the first project year, TKGM's fee revenue is positive at EUR 2.1 million, with EUR 101.4 million at the end of the implementation period. The total fiscal revenue over the implementation period is EUR 213 million, which is 2.7 times larger than the investment cost.

B. Fiduciary

(i) Financial Management

55. TKGM has adequate financial management (FM) arrangements in place. TKGM is subject to the Public Financial Management and Control Law No. 5018, which provides a strong FM framework. Additionally, TKGM is currently implementing the LRCMP with a Satisfactory FM rating. The FM staffing, planning, funds flow, disbursement accounting, reporting, internal controls and external audit arrangements are considered adequate, subject to revisions and updates by Effectiveness or at initial implementation stage.

56. The successful implementation of the Project will depend on budgetary availability. As TKGM is a general budget

[46] *https://data.tuik.gov.tr/Bulten/Index?p=Konut-Satis-Istatistikleri-Aralik-2021-45672*
[47] *https://www.gyoder.org.tr/files/202206/3b656303-4428-400b-8859-b97c20991137.pdf*

institution, it is subject to the relevant legal framework, which requires the project budget to be included in the annual Budget Law. In the event of insufficient budgetary allocation, TKGM will not be able to use the project funds to finance the project activities. TKGM mitigates this risk by closely monitoring the budgetary allocations and projected project expenditures and taking action with the Strategy and Budget Office when necessary. TKGM also has the possibility of using the revolving funds of the agency as bridge funds until the budgetary allocations are released, after which the funds are reimbursed to the revolving fund.

57. The overall residual FM risk is considered Low after the following measures are undertaken by TKGM: (i) experienced FM staff of TKGM are maintained in the PIU; (ii) the off-the-shelf accounting system used for project accounting (in addition to the accounting system maintained by the Ministry of Treasury and Finance) is tailored for the needs of this project in terms of categories, components, contract management and reporting requirements; and (iv) the FM manual currently in use is updated to reflect the FM arrangements for this new project.

58. The general FM requirements for TKGM are the following: (i) the PIU will maintain an adequate FM system to account for and record project transactions; (ii) the PIU will maintain at least one FM staff throughout the implementation and payment period of the project; (iii) the PIU will prepare interim financial reports (IFRs) for the project on a quarterly basis and submit these to the World Bank no later than 45 days after the end of each calendar quarter; (iv) the project financial statements will be audited by the Treasury Controllers on an annual basis on Terms of Reference acceptable to the World Bank; (v) the project audit reports and the management letter of auditors will be provided to the World Bank within six months after the end of the calendar year; and (vi) I project audit reports will be publicly disclosed by both TKGM/the PIU (via the agency's official webpage) and the World Bank.

59. There are no Effectiveness or disbursement conditions for FM.

(ii) Procurement

60. The World Bank Procurement Regulations for IPF Borrowers – November 2020 ("Procurement Regulations") will apply to the project. The World Bank's "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated October 15, 2006, and revised in January 2011 and as of July 1, 2016 (Anti-Corruption Guidelines)" will also apply**.**

61. A Project Procurement Strategy for Development (PPSD) has been prepared by TKGM pursuant to paragraphs 4.1 and 4.2 of the Procurement Regulations to determine the optimum procurement approach to deliver the right procurement result under the project.

62. TKGM will use the Bank's Systematic Tracking of Exchanges in Procurement (STEP), an online procurement tracking tool to prepare, clear, and update their Procurement Plans and conduct all procurement transactions. The procurements under the project will be performed by TKGM through the existing PIU that will be maintained. Thresholds for World Bank review and procurement methods to be applied will be set out in the Procurement Plan. Procurements not previously reviewed by the World Bank will be subject to ex-post review on a random basis, in accordance with the procedures set forth in Paragraph 4 of Annex II to the World Bank Procurement Regulations for IPF Borrowers. More details on the findings of the procurement assessment, the proposed procurement supervision arrangements, risks, and relevant mitigation measures to address them are provided in Annex 1.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No

Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

63. The environmental risk is rated as Low. The Project will mostly include desk-based studies such as mass valuation modeling, collection of required data for mass valuation system, extracting and analyzing property value data, determining their values and presenting value maps, and modernizing Real Estate Cadastre and Registration services. The Project will not support any civil works. The geodesic studies under the scope of the Project include surveys and measurements as field activities by use of theodolite, total station, and other tools. The environmental and OHS risks of the geodesic-related field activities are easily mitigable in the context of the national environmental and OHS legal framework. Therefore, the potential adverse environmental risks and impacts are likely to be minimal or negligible.

64. The social risk rating for the Project is classified as Moderate. The Project activities do not involve acquisition of land or any change to existing property rights. Since there will be no civil works within the scope of the Project, the potential risks to community health and safety, livelihoods, labor rights and working conditions, or cultural heritage are therefore limited. The social risks are related to any unresolved disputes that may exist between landowners leading to potential conflicts and non-inclusion of vulnerable groups in the cadastre update processes and other project activities. TKGM has a well-functioning objection mechanism that allows landowners to object to the results of cadastre update studies performed on their lands and also has a notification procedure as per the national legislation that includes informing the landowners and *Mukhtars* at the beginning of the cadastre update process with announcements to be made 15 days prior and informative meetings in the affected settlements to be held prior to the site study. For the resolution of existing disputes on land borders, TKGM makes efforts to find any evidence on past records and documents and consult with witnesses. Most of the disputes are resolved this way based on the experiences from the LRCMP, though a few cases result in the complainant going to court for resolution. Potential risks in the urban context with occupying buildings/units found to be irregular/illegal as part of the building inventory studies were assessed. TKGM will not carry out any formal registration of informal properties but will record them in their system, which will allow the Government to obtain an understanding of the type of irregularities and illegalities found on the ground. TKGM will not identify the formal/informal users of the buildings, only the building features on the lands will be identified and recorded. The data will only serve the Government to help develop new regulations/policies that remain to be defined and will not be known in the short or medium term.

65. The Project is anticipated to result in a wide range of benefits being introduced to the public at large. Some of the advantages of the cadastre renewal process include: (i) indisputable parcel boundaries and resolution of any issue with neighbors; (ii) buying, selling, and renting on indisputable sizes; (iii) no need to pay private experts to measure the parcels in case of any transaction regarding land (selling, buying, renting, providing as collateral, using for attachment proceedings, etc.); and (iv) improved accuracy in paying service providers for agricultural operations (tractor and combine operators). A land market with increased transparency is expected to be more functional and preferable to all stakeholders (investors, property owners, government, legal authorities, and financial institutions).

66. TKGM has prepared a Stakeholder Engagement Plan (SEP), which outlines the general principles and strategy to identify key stakeholders and plans for an engagement process per ESS10, and presents modalities of engagement that are tailored to the needs and characteristics of each stakeholder group defined under each Project component. TKGM disclosed the draft SEP and held consultations before Negotiations and subsequently disclosed the updated SEP with a summary of consultations. The existing grievance redress mechanism of TKGM will be utilized for project purposes as well as national-level grievance mechanisms such as CIMER and the Ministry-level call center, as defined in the SEP. TKGM will assign/hire an E&S expert in the PIU who will be responsible for the implementation of project activities in line with World Bank Environmental and Social Standards and the E&S instruments prepared for the project (Environmental and Social

Commitment Plan (ESCP) and SEP). The E&S expert will also be responsible for managing project-level grievances, recording and reporting the functioning of the grievance redress mechanism to the World Bank.

67. **Environmental and Social Standards Relevant to the Project**. ESS1: Assessment and Management of Environmental and Social Risks and Impacts; ESS2: Labor and Working Conditions; and ESS10: Stakeholder Engagement and Information Disclosure are relevant to the project. Türkiye does not have any recognized indigenous or traditional underserved local communities, and the project is not going to apply financial intermediary bodies. Furthermore, the proposed project does not trigger (i) the World Bank Operational Policy 7.60 on Disputed Territories, as it will not be implemented in such areas; or (ii) Operational Policy 7.50 on International Waterways, as the proposed activities will not generate any impacts on such waterways.

V. GRIEVANCE REDRESS SERVICES

68. ***Grievance Redress.*** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), please visit *http://www.worldbank.org/GRS*. For information on how to submit complaints to the Bank's Accountability Mechanism, please visit https://accountability.worldbank.org.

VI. KEY RISKS

69. **The overall residual Project risk is considered Moderate** based on adopted and planned mitigation measures. Upon review of risks pertaining to Political and Governance, Sector Strategies and Policies, Institutional Capacity for Implementation and Sustainability, and Stakeholders, it was determined that they are inherently moderate risks. Key risks are described below.

70. **Macroeconomic risk is rated Substantial**. There are two main macroeconomic risks for the Project: (i) a negative outlook in macro-financial conditions and any further significant depreciation of the currency could raise already elevated costs in the sector and foreign exchange risks would make it difficult for TKGM to properly manage the contract costs. This has already been experienced under the current project. Coupled with this risk, there is potential in the post-earthquake context of a sustained high domestic inflationary environment given logistics disruptions and massive reconstruction efforts in the construction sector; and (ii) heightened supply-side constraints due to a spike in imported IT goods prices and resulting heightened pricing uncertainties could lead to delays or failure in project delivery. The macro risks should be mitigated by applying a macro policy framework supporting macro stabilization and buffer accumulation, clearly communicated to investors, and implementation of ongoing corporate debt restructuring. The Bank will continue to conduct macro-financial analysis, maintain policy dialogue with economic agencies, and offer technical assistance as requested by the government. However, macroeconomic risk is not under the project control and, therefore the residual risk remains Substantial.

71. **Fiduciary**. **The combined rating for procurement and financial management is Moderate**. TKGM has established

fiduciary systems and capacity for the ongoing LRCMP. The FM rating is Satisfactory for the latter. The current systems would require adaptation for the needs of the proposed Project. As such, the FM risk is assessed as moderate, with low residual risk subject to the completion of the preparatory activities and maintenance of the existing FM capacity in the PIU. The procurement activities may be different than the ongoing LRCMP, which may need due attention. TKGM has experience in Bank procurement procedures, but under the Procurement Guidelines. The Project will be subject to the Procurement Regulations; therefore, inherent risk is identified as Substantial at this stage. The residual risk is Moderate due to agreed risk mitigation actions including the training of the new PIU staff on Bank procedures during Project implementation.

72. **Environmental and Social (E&S) risk is rated Moderate**. The environmental risk is rated as Low, and the social risk is rated as Moderate. Therefore, the overall E&S risk is rated as Moderate. A detailed explanation of the assessment of these risks and assigned rating is presented in the E&S section above.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Turkiye

Land management infrastructure for green and sustainable development

Project Development Objectives(s)

To improve the accuracy and accessibility of land administration information in Türkiye.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Improve the accuracy and accessibility of land administration information in Türkiye			
Country area covered by updated, modernized digital cadastre (Percentage)		80.00	90.00
Urban areas with updated buildings inventory (Square kilometer(km2))		15,000.00	40,000.00
Institutions with access to new spatial data (Number)		0.00	1,000.00
Web services needed to achieve interoperability of 3D city model information system with NSDI system implemented (Number)		0.00	4.00
Quarterly reports of property market trends published on the Property Value Data Centre’s website (Yes/No)		No	Yes

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Component A: Creating 3D City Models and Updating Cadastre Data			
Area of urban settlements covered by aerial photography (Square kilometer(km2))		22,000.00	40,000.00
Area of urban settlements covered by aerial photography, for renewal purposes (Square kilometer(km2))		0.00	22,000.00
Buildings with architectural plans for which 3D internal models have been created (Percentage)		40.00	90.00
Draft policy recommendations for addressing building irregularities (as a result of multi-stakeholder dialogue) (Yes/No)		No	Yes
Urban area for which MEGSIS and MAKS data are integrated (Square kilometer(km2))		0.00	40,000.00
Institutions with access to cadastre and 3D city model data to improve forecasting and assessment of the consequences of disaster and climate hazard events and inform climate-related decision making (Number)		0.00	5.00
Parcels updated, digitized and recorded in MEGSIS (Number)		20,000,000.00	26,000,000.00
Parcels updated in digital form recorded in the TKGM system under the name of women (Number)		6,000,000.00	8,500,000.00
Component B: Real Estate Valuation			
Property Value Information Center established (Yes/No)		No	Yes
Sales Price Register listing the properties for which price and characteristics data meet data standards established and available for use by licensed valuers (Yes/No)		No	Yes
Valuation models and value maps established for most real property types (Yes/No)		No	Yes
Component C: Institutional Capacity Building and Project Management			
TKGM staff trained (Number)		0.00	1,000.00

Indicator Name	PBC	Baseline	End Target
TKGM staff trained (female) (Percentage)		0.00	20.00
Staff of municipalities and other stakeholders trained (Number)		0.00	2,000.00
Staff of municipalities and other stakeholders trained (female) (Percentage)		0.00	30.00
Citizen feedback (complaints, queries, recommendations) addressed (Percentage)		0.00	100.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Country area covered by updated, modernized digital cadastre	Area of Türkiye that has a modern, updated digital cadastre recorded in the MEGSIS system at TKGM.	Every 6 months	TKGM data	MEGSIS	TKGM
Urban areas with updated buildings inventory	Urban areas for which 3D city models have been created, managed in the 3D city model information system, and integrated with the MAKS system	Annual	TKGM data	MEGSIS	TKGM
Institutions with access to new spatial data	Institutions at central and local levels with access to the new spatial data (3D city models) managed in the 3D	Annual	TKGM data	Protocols agreements	TKGM

	city model information system.				
Web services needed to achieve interoperability of 3D city model information system with NSDI system implemented	Web services are implemented so that the 3D city model information system is capable to interact and exchange 3D city model data with the NSDI system in real-time, based on the common data exchange format (CityGML).	Annual	TKGM 3D city model information system	TKGM 3D city model information system	TKGM
Quarterly reports of property market trends published on the Property Value Data Centre's website	The Property Valuation Data Centre publishes quarterly reports on its website of property market trends based on the data it has collected and analyzed.	Quarterly after year 3 of the project	Property Valuation Data Centre website	Property Value Information Center database and reports	TKGM

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Area of urban settlements covered by aerial photography	Urban settlements (city center and district center) covered by initial aerial survey.	Annual	TKGM data	Progress Report	TKGM
Area of urban settlements covered by aerial photography, for renewal purposes	Urban settlements (city center and district center) for which aerial resurvey has been carried out.	Annual	TKGM data	Progress Report	TKGM

Buildings with architectural plans for which 3D internal models have been created	Buildings for which the architectural plans exist and internal units have been modeled in 3D.	Annual	TKGM data	3D city model information system	TKGM
Draft policy recommendations for addressing building irregularities (as a result of multi-stakeholder dialogue)	Draft policy recommendations for addressing building irregularities as a result of multi-stakeholder dialogue are produced as a result of the project.	Annual	TKGM	Progress Report	TKGM
Urban area for which MEGSIS and MAKS data are integrated	Urban areas for which cadastre and 3D city model data are integrated with MEGSIS and MAKS data	Annual	TKGM data	MEGSIS	TKGM
Institutions with access to cadastre and 3D city model data to improve forecasting and assessment of the consequences of disaster and climate hazard events and inform climate-related decision making	Institutions that carry out forecasting impact and damage assessment of disaster and climate hazard events have access to new cadastre and 3D buildings and individual units data to inform climate-related decision making	Annual	TKGM	Protocol agreements	TKGM
Parcels updated, digitized and recorded in MEGSIS	Parcels that have been updated in digital form and recorded in the MEGSIS system at TKGM.	Every 6 months	TKGM data	MEGSIS	TKGM
Parcels updated in digital form recorded in the TKGM system under the name of women	Parcels in digital form that have been updated and recorded in the TKGM system (MEGSIS/TAKBIS) in	Every 6 months	TKGM data	MEGSIS	TKGM

	the name of women (individually or jointly).				
Property Value Information Center established	The software for the Property Value Information Center has been developed and value data are being collected.	Annual	TKGM data	Property Value Information Center database and reports	TKGM
Sales Price Register listing the properties for which price and characteristics data meet data standards established and available for use by licensed valuers	A register exists as part of the Information Data Center at TKGM that provides checked price and characteristics data for properties for which there is evidence from an arm's length transaction and licensed valuers have access to it.	Annual	TKGM	Sales Price Register, protocol agreement with the Valuers Association (TDUB)	TKGM
Valuation models and value maps established for most real property types	Valuation models and value maps established for residential, commercial and industrial properties.	Annual	TKGM data	Information Value Data Center report	TKGM
TKGM staff trained	Tracks the total number of TKGM staff who receive project-financed training.	Every 6 months	TKGM	Progress Reports	TKGM
TKGM staff trained (female)	Tracks the number of female staff at TKGM who participate in project-financed trainings.	Every 6 months	TKGM	Progress Reports	TKGM
Staff of municipalities and other stakeholders trained	Tracks the number of staff of municipalities and other stakeholders who participate in project-	Every 6 months	TKGM	Progress Reports	TKGM

	financed trainings.				
Staff of municipalities and other stakeholders trained (female)	Tracks the number of staff of female municipalities and other stakeholders who participate in project-financed trainings.	Every 6 months	TKGM	Progress Reports	TKGM
Citizen feedback (complaints, queries, recommendations) addressed	Queries, complaints, and recommendations that are received from users of TKGM services through the e-Government platform, TKGM's call center, and other channels that are addressed by TKGM within the deadline set by the regulations.	Every 6 months	TKGM data	Reports from TKGM's Department of Strategy Development, Quality Coordination Section	TKGM

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Turkiye
Land management infrastructure for green and sustainable development

Institutional and Implementation Arrangements

1. The project will be implemented by TKGM. Its existing Project Implementation Unit for LRCMP, which has demonstrated strong performance in overall project management and implementation, will be maintained and will have responsibility for the project's fiduciary, safeguards and M&E aspects. The PIU will be strengthened as needed in light of the expansion of activities under the proposed project. Technical responsibility for the implementation of project activities will lie with TKGM's various departments, including the Department of Cadastre, Department of Land Registry, Department of Mapping, Department of Real Estate Valuation, and Department of Information Technologies. The Heads of these various departments will be part of a Project Coordination Committee that will work with the Regional Project Managers and the PIU's Project Officer to ensure proper coordination among the various departments within TKGM at central and local level throughout project activity implementation. Further details on the Project Management structure at TKGM for the proposed project can be found below.

2. Partnerships between TKGM and key stakeholders will also be critical for ensuring successful implementation of project activities. These include partnerships with government agencies such as the Ministry of Interior's General Directorate of Population and Citizen given its management of the spatial address registry system (MAKS system), which contains data on buildings and building units for TKGM to develop 3D city models. Similarly, at the local level, municipalities and, to a certain extent, Special Provincial Administrations[48], will play a key role in providing much of the data required by TKGM (architectural plans of existing buildings, zoning plans, building permits). The Directorate General of GIS of the Ministry of Environment, Urbanization and Climate Change, which is responsible for overseeing the NSDI in Türkiye, will also be a key stakeholder and recipient of the data produced under the project. There is well-established, ongoing cooperation between TKGM and these stakeholders, especially following the Amasya pilot activities and TKGM's piloting of various improved systems for information sharing at both the central and local level. A comprehensive protocol agreement between TKGM and the Directorate General of GIS and between TKGM and the MoI is already in place that covers data sharing requirements between the MEGSIS and the NSDI platform, and MEGSIS and MAKS systems, respectively. Similarly, protocols for data sharing have been signed between TKGM and municipalities, which will be expanded to cover specific activities and data sharing to be supported by the project. Interinstitutional coordination for investments planning and implementation, including for activities supported by the Project, is ensured by regular coordination meetings that are taking place at the provincial level and that are chaired by the Governor and by the relevant mayors and the provincial directorates of concerned ministries. In the context of the proposed project, this ongoing interinstitutional coordination will be built upon at the central government level through a stakeholders advisory group comprised of key institutions that will be convened as needed to provide guidance and a sounding board regarding strategic planning and identify policy and technical issues to improve implementation and impact. The following table provides a summary of key stakeholders and their specific roles and responsibilities as they pertain to the implementation of the proposed project.

[48] Special Provincial Administrations are local representatives of all central government institutions responsible for delivering services in rural areas (including building permits). It is expected that about 5 percent of data integration will involve these administrations.

Table 1: Key Stakeholder Roles and Responsibilities during Project Implementation

Institution	Role	Responsibility
MoTF	Borrower	Overall monitoring and supervision of project implementation
TKGM	Implementing Agency	Main institution responsible for implementing the project
SBO	Stakeholder	i) Technical monitoring of the project to ensure compliance to national development plan priorities ii) Annual budget allocation in the Annual Investment Program of the Government
Ministry of Interior's General Directorate of Population and Citizenship	Stakeholder	Management of the spatial address registry system (MAKS system), which contains data on buildings and building units critical for TKGM to develop 3D city models
Directorate General of GIS of the Ministry of Environment, Urbanization and Climate Change	Stakeholder	Overseeing and regulating the NSDI
Municipalities and Special Provincial Administrations	Stakeholder	Providing much of the data required by TKGM (architectural plans of existing buildings, zoning plans, building permits)

3. **Project Management**. The General Director of TKGM will have the ultimate responsibility for the Project, and the Deputy General Director for Technical Affairs will act as the overall Project Coordinator. A similar project management structure for LRCMP will be applied to the proposed project for PIU arrangements, which may be assigned additional responsibilities and authorities as the project necessitates. The TKGM PIU team will have the following functions and responsibilities: procurement, financial management, safeguards, planning and budgeting, and Monitoring & Evaluation. In order to perform these functions satisfactorily, it is expected that the existing procurement (contracted) and financial management (assigned) staff who have hands-on experience in World Bank procedures will be maintained and additional support hired as needed. It is anticipated that one M&E expert with hands-on experience with World Bank procedures, and one environmental and social expert will be assigned (and/or contracted) to support the PIU.

4. The PIU team will be headed by a Project Officer, who will report to the Heads of Departments that will have technical responsibility for the implementation of different project components, will ensure proper coordination among the various departments within the TKGM. At the regional level, the head of the regional TKGM office will be responsible for the implementation of the activities in their region, including supervision of work and certification of payments, and will be supported by local TKGM teams. Teams will be established to perform quality control and supervision of the contracted work. Actual payments will be made by the General Directorate of TKGM after being endorsed by the Director who is responsible for the province.

5. **Annual Workplan**. Based on the information concerning agency prioritization, project assessments and financial audits, the PIU will prepare an annual workplan and budget to be submitted at the end of the previous calendar year, which will include: (i) all activities to be carried out under the project during the following year; (ii) other TA or training activities that may be required under the project including the purpose, cost and type of training and draft Terms of Reference; and (iii) a proposed financing plan. Each annual workplan will be discussed and approved by the World Bank.

Financial Management and Disbursements

6. **Result of the Assessment and Rating**. An initial assessment of the Financial Management (FM) arrangements for

the Project was undertaken between February and March 2023. The overall residual FM risk is assessed as Low at appraisal. TKGM has prior implementation experience in projects financed by the World Bank with Satisfactory FM ratings. The Project will use the existing systems with some additional tailored solutions to meet the requirements for effective FM of this Project.

7. **Budget**. TKGM is a general budget institution subject to the Public Financial Management and Control (PFMC) Law No. 5018. Thus, the Project will follow the national planning and budgeting procedures. Accordingly, TKGM's budget must include specific allocations for project expenditures for project funds to be utilized. The World Bank-financed projects are part of the institutional investment budget and must be approved by the Strategy and Budget Office (SBO) of the Presidency. TKGM should ensure inclusion of a sufficient budget allocation in its budget for each implementation year. The Project may be subject to budgetary constraints in case the allocation set forth in the annual budget law is smaller than the projected expenditures. Considering such challenges, TKGM should maintain continuous monitoring and follow-up, flagging any potential budget delays to the relevant authorities, namely SBO and MoTF, to identify solutions.

8. **Staffing**. An experienced staff from TKGM's financial Affairs Unit of the Department of Cadastre has been appointed to work in the PIU and handles the FM functions of the ongoing LRCMP. TKGM will maintain adequate FM staffing throughout the implementation of the project. As necessary, the PIU can recruit an FM consultant with Terms of Reference acceptable to the World Bank to support TKGM staff during project implementation.

9. **Accounting and Reporting**. TKGM is listed among Chart I institutions in the PFMC Law and thus its accounting is maintained in the Integrated Public Information Management System of the MoTF in Turkish lira, in accordance with the chart of accounts predetermined by MoTF. For the purposes of detailed project accounting and reporting, the PIU will maintain a separate accounting system to follow up with project transactions on a cash basis in foreign currency, and to generate regular, interim, un-audited financial reports (IFRs).

10. TKGM has already acquired off-the-shelf accounting and reporting software for the ongoing LRCMP. The software functions satisfactorily and generates project reports in desired content and format. Additionally, the FM unit of the PIU follows all project related activities, such as payments, transfers to and from the Designated Account, and contract monitoring tables in Excel spreadsheets. The Excel spreadsheets are reconciled with the data in the accounting software after each transaction. The software will be tailored and upgraded as necessary to meet the needs of the Project as well.

11. The IFRs will be prepared quarterly and will be submitted to the World Bank through Client Connection no later than 45 days after the end of each calendar quarter. The format and contents of the IFRs were agreed upon with the World Bank and attached to the Minutes of Negotiation.

12. At a minimum, the IFRs will include the following reports:

- Project Balance Sheet;
- Expenditure tables per activity, including explanation of significant variances between budgeted and actual figures;
- Expenditure tables per category, including explanation of significant variances between budgeted and actual figures;
- Designated account statement; and
- Contract management tables.

13. **Internal Controls**. TKGM applies the internal control mechanisms set forth in the PFMC Law, which stipulates adequate controls over expenditures. TKGM, though the PIU established in the Department of Cadastre, will utilize the project funds in coordination with other relevant TKGM departments and in line with the agreed project documents. TKGM will be responsible for all stages of procurement, as well as the verification of the receipt of goods and services by

relevant technical departments and preparation of supporting documentation for payments. There is a clear segregation of duties between the procurement function and payment function within the PIU.

14. The general procedures will be as follows: the responsible unit will prepare the technical documents to initiate the procurement process in coordination with the PIU. The relevant technical unit will also monitor the work of the subcontractors and do the final acceptance of the goods and services received. In order to make the payment to the subcontractor, the responsible technical unit will submit all necessary documentation (basically, progress reports signed by the regional and/or project managers, engineers and relevant experts and corresponding invoices) to the PIU in the Department of Cadastre. The finance unit of the PIU will send all documents to the Strategy Department Unit for ex ante verification (as per corporate thresholds identified in internal regulations), after which the Head of the Department of Cadastre approves the payment and sends the documents to the MoTF General Directorate of Public Accounting officer in TKGM for entering the transaction in the government accounting system and sending the payment order to the Central Bank of Türkiye. Copies of these documents are also maintained for updating project accounting records once payment confirmation is received from the Central Bank.

15. The PIU will also be responsible for submitting the payment orders with its supporting documents to the MoTF Accounting Officer (Sayman) responsible for TKGM: the payment orders, signed by the authorized personnel, will be submitted with supporting documentation to the PIU. The PIU will prepare the payment orders/bank transfer orders for verification, government accounting and execution of payments by the Sayman. The PIU will also be responsible for the withdrawals from the Loan account to the Designated Account in line with the Disbursement and Financing Letter. The Designated Account balance statements will be reconciled monthly with the project accounts.

16. The PIU will update the existing FM manual to include this new project. The FM manual, which will be considered as part of the POM, includes: (i) the financing and accounting policies and procedures for the project; (ii) organization of the FM unit, functions, staffing, and relevant job descriptions with special emphasis on the segregation of duties; (iii) the flows and templates for various transactions; (iv) disbursement procedures; (v) project budgeting, planning procedures, and financial forecasting; and (vi) project reporting auditing. The FM manual will be revised by Effectiveness and updated as necessary to reflect changes that may be required after the commencement of implementation.

17. **Auditing**. The annual project financial statements will be audited by the Treasury Controllers based on the International Standards on Auditing and in line with Terms of Reference acceptable to the World Bank. The audit reports, including a Management Letter (ML) providing recommendations for improving implementation arrangements, will be provided to the World Bank within six months after the end of each fiscal year. As per the World Bank's Access to Information Policy, the project audit reports excluding the ML will be publicly disclosed by TKGM and/or the PIU on a corporate webpage. The World Bank will also make the report accessible by the public on its own systems.

18. Table 2 below summarizes the audit requirements for the Project:

Table 2: Project Audit Requirements

Audit Report	Due Date
Project Financial Statements	Within six months after the end of each fiscal year and at the closing of the project.

19. **Funds Flow and Disbursements**. TKGM, through MoTF, will open a Designated Account in the currency of the loan at the Central Bank of Türkiye. Disbursement from the loan account will follow the transaction-based method, i.e., traditional World Bank procedures: advances, direct payments, special commitments and reimbursement (with full documentation and against Statements of Expenditures (SOEs). The withdrawal applications will be prepared and authorized by the PIU.

20. A detailed Disbursement and Financing Letter (DFIL) explaining all procedures was provided to TKGM prior to negotiations. Disbursements below agreed thresholds indicated in the DFIL will be made according to certified SOEs. Full documentation in support of SOEs would be retained by TKGM for at least seven years after the World Bank has received the audit report for the fiscal year in which the last withdrawal from the Loan Account was made. This information will be made available for reviewing during supervision by World Bank staff and for annual audits that will be required to comment specifically on the propriety of SOE disbursements and the quality of the associated record-keeping.

Table 3: Action Plan

Action	***Deadline****
TKGM will ensure that adequate allocations for the project expenditures are made in line with the procurement plan in the 2023 budget of the institution.	By Effectiveness
TKGM will upgrade and tailor the existing accounting and reporting software for the needs of the project.	Within two months after Effectiveness
TKGM will update the FM manual to include the project arrangements including the workflows, internal controls, and all FM arrangements of the project.	By Effectiveness**

*The deadlines are indicative for the finalization of the preparatory work by TKGM and not Effectiveness or disbursement conditions.
**The FM Manual is considered part of the POM, the preparation of which is an Effectiveness condition. For that reason, the deadline for the update of the FM Manual is aligned with the dated covenant for the preparation of the POM.

21. **Supervision**. During project implementation, the World Bank will supervise the Project' FM arrangements as follows: (i) during the World Bank's implementation support missions, the FM and disbursement arrangements will be reviewed on a risk-based approach to ensure compliance with the World Bank's minimum requirements; and (ii) the Project's IFRs as well as the Project's annual, audited financial statements and auditor's ML will be reviewed. A World Bank-accredited FM Specialist, located in the World Bank Ankara office, is a core member of the project team and will supervise FM aspects during formal supervision visits and in-between as required.

Procurement arrangements for TKGM

22. **Applicable regulations.** The World Bank Procurement Regulations for IPF Borrowers – November 2020 ("Procurement Regulations") will apply to the Project. A General Procurement Notice (GPN) will be published on the World Bank's external website and the United Nations Development Business online after project negotiations.

23. **Anticorruption guidelines.** The Bank's 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants,' (revised as of July 01, 2016) ('Anticorruption Guidelines') will apply to the Project.

24. **PPSD.** The Procurement Regulations require the Borrower to develop a PPSD. In this regard, TKGM has developed a PPSD for the procurement activities under the relevant components of the Project. The PPSD describes how procurement activities will support Project operations for the achievement of the PDO and deliver value for money. The PPSD is linked to the overall project implementation strategy by ensuring proper sequencing of procurement activities. It provides information on institutional arrangements for procurement, roles and responsibilities, appropriate procurement methods, procurement due diligence, and other requirements. The PPSD also includes a detailed description of the procurement capacity needed by the implementing agency for carrying out procurement with specific focus on managing contract implementation, governance structure, and accountability framework. In addition, the PPSD is supported by market research and analysis assessing market-related risks and opportunities that will affect the preferred procurement approach to market strategy. The Bank's Standard Procurement Documents (SPD) with minor modifications will be used as fit for purpose under the Project. For value for money and fit for purpose, procurements of non-consulting services for "Creation of 3D city models" and for "Updating cadastre data" will be in groups of contract packages. As such, it is stated

in the PPSD that thresholds for “Creation of 3D city models” and for “Updating cadastre data” are modified to reflect fit for purpose.

25. **The Procurement Regulations require the Borrower through the implementing agency to use the World Bank’s Systematic Tracking of Exchanges in Procurement (STEP) online procurement tracking tool to prepare, clear and update its procurement plans, and conduct all procurement transactions.** This ensures that comprehensive information on procurement and implementation of all contracts for goods, works, non-consulting services, and consulting services awarded under the whole project are automatically available. This tool will be used to manage the exchange of information (e.g., bidding documents, bid evaluation reports, no objections, etc.) between TKGM and the World Bank. TKGM/the PIU will create the procurement plan for the project through STEP before initiating any procurement activity. The completed PPSD and the Procurement Plan will be updated at least annually or as required to reflect actual project implementation needs. TKGM has developed a preliminary procurement plan that is agreed upon with the World Bank. However, entering the data of agreed contracts into STEP has been deferred to implementation. The PIU will record all procurement related complaints in the STEP complaint module.

26. The contracts agreed upon with the World Bank for financing and included in the procurement plan are listed in Table 4.

Table 4: Agreed contracts covering first 18 months

Activity Description	Activity Reference No.	Procurement Category	Procurement Method	Market Approach	Review Method	Estimated procurement Notice/Invitation	Estimated Contract	Estimated Contract Completion Date
Component A: Creating 3D city models and updating cadastre data								
A1: Creation of 3D city models.								
Non-Consulting Services Contracts for production of 3D Cadastre data and city modelling Group 1	NCS-3D-GRP1	NCS	RfB	Open - National	Prior	Oct-23	Dec-23	Jan-25
A2: Updating cadastre data								
Non-Consulting Services Contracts for Cadastre Updating Works Group 1	NCS-CDSTRE-GRP-1	NCS	RfB	Open - National	Prior	Sept-23	Nov-23	Sept-25
Non-Consulting Services Contracts for Cadastre Updating Works Group 2	NCS-CDSTRE-GRP-2	NCS	RfB	Open - National	Prior	Jan-24	March-24	Nov-25
Non-Consulting Services Contracts for Cadastre Updating Works Group 3	NCS-CDSTRE-GRP-3	NCS	RfB	Open - National	Prior	Apr-24	Jun-24	Feb-25
Component B: Real Estate Valuation								
B1: Collection of required data for mass valuation system								
Hiring Expert (Valuation of Residential Areas)	INDV-1	CS	INDV	Open - National	Post	Sept-23	Nov-23	Nov-28
Hiring Expert (Data Modelling)	INDV-2	CS	INDV	Open - National	Post	Sept-23	Nov-23	Nov-28
B2: Mass valuation modelling								
Hiring Expert (Mass Valuation)	INDV-3	CS	INDV	Open - National	Post	Sept-23	Nov-23	Nov-28

Component C. Institutional capacity building and Project Management								
Hiring Financial Management Expert for PIU	INDV-FM	CS	INDV	Open - National	Post	Sept-23	Nov-23	Nov-28
Hiring Procurement Expert for PIU	INDV-PS	CS	INDV	Direct Contracting -National	Post	May-23	May-23	Nov-28
Hiring Monitoring and Evaluation Expert for PIU	INDV-M&E	CS	INDV	Open - National	Post	Sept-23	Nov-23	Nov-28
Procurement of Financial Management SW	G-1	Goods	RFQ	Open - National	Post	Sept-23	Nov-23	Dec-23

27. **Advance Contracting and Retroactive Financing Procurement Regulations Paragraphs 5.1 and 5.2 (Advance Contracting and Retroactive Financing) permits that the Borrower may wish to proceed with the procurement process before signing of the Legal Agreement.** In such cases, if the eventual contracts are to be eligible for World Bank financing, the procurement procedures, including advertising, shall be consistent with Sections I, II, and III of the Procurement Regulations which cover the World Bank's Core Procurement Principles of economy, efficiency, transparency, fairness, fit-for purpose, value for money, and integrity.

28. **All the selection methods defined in the Procurement Regulations will be used under the project.** These include Request for Quotations (RFQ), Consultant's Qualifications-based Selection (CQS) and Quality and Cost Based Selection (QCBS) with higher threshold limit as appropriate. Procurement will follow either an international or national approach.

29. **TKGM has experience in Bank procurement procedures, but under the Procurement Guidelines.** The project will be subject to the Procurement Regulations; therefore, residual risk is identified as moderate at this stage.

Table 5: Identified Procurement Risks and Agreed Action Plan for TKGM

Action No.	Identified Risk	Mitigation Measure	Responsible Party	Time Frame
1.	TKGM does not have experience with World Bank Procurement Regulations.	A procurement specialist, dedicated to the project will be hired by TKGM as part of the PIU. TKGM may continue the employment of the current experienced procurement staff after project effectiveness, if not earlier.	TKGM	ToR will be prepared by TKGM immediately after loan negotiations. The selection will be initiated in advance and the contract will be signed within 60 days of loan effectiveness.
2.	Misinterpretation of the Procurement Regulations and terms and conditions of the contracts may cause noncompliance and also time and cost overruns in the contract implementation	Work closely with World Bank procurement specialist.	TKGM	Throughout project implementation
3.	The COVID-19 outbreak and Russia's invasion of Ukraine may impact procurement processes and supply chain.	Specific procurement arrangements to address this risk will be applied as deemed appropriate in the POM and	TKGM	Throughout project implementation

		introduction of changes in the procurement strategy.		
4	Incomplete environmental and social studies may delay commencement of the contract implementation.	All ESF studies will be completed before tenders.	TKGM	Throughout the Project.
5	Unclear procurement procedures may create unnecessary questions from the procurement stakeholders.	Develop a POM with a procurement section for their respective project components.	TKGM	Prior to loan effectiveness
6	Time and cost overruns in the construction contract implementation	Define realistic contract duration. Prepare designs and BoQs to reflect site conditions, scope and phases of the contract. Conduct realistic market survey during cost estimation. Establish strong project management and supervision mechanism.	TKGM	Throughout project implementation At the tender document preparation stage and contract management
7	Currency exchange rate fluctuations may result in cost and time impacts to contracts. Globally high inflation rates	Enable in tender documents for submitting Bid/Proposal in hard currencies even if the inclusion of contract price adjustment clauses may be included in the tenders open to national market Include price adjustment clauses in the tender documents even if the contract duration is less than 18 months	TKGM	At the tender document preparation stage

30. **Procurement supervision frequency.** The World Bank will review the procurement arrangements performed under Component A, including contract packaging, applicable procedures, and the scheduling of the procurement processes, for their conformity with the Legal Agreement. Those procurements that did not have ex-ante due diligence by the World Bank will be subject to ex-post due diligence on a sampling basis in accordance with the procedures set forth in Paragraph 4 of Annex II to the Procurement Regulations. A post review of the procurement documents will normally be undertaken annually during World Bank supervision missions, or the World Bank may request to review any particular contract at any time. In such cases, the PIU shall provide the World Bank the relevant documentation for its review.

31. **Complaint review**. The procurement complaints other than those covered under Annex III of the Procurement Regulations are to be handled by TKGM in accordance with the procedures agreed by the Bank and stipulated in the POM. Immediately upon receipt, the complaints will be recorded in the STEP complaint module by TKGM. TKGM will not proceed with the next stage/phase of the procurement process, including with awarding a contract, without satisfactory resolution

of the complaint(s). Such complaints will be addressed by TKGM within a reasonable time but not later than 15 business days of complaint receipt.

32. **Operating Costs** will not be part of procurement. Such operational costs are reasonable incremental expenses directly incurred on account of the implementation, management, and monitoring of the Project by the Borrower; such costs may include, as relevant, and as the Bank may agree, for the following: (i) Project audits; (ii) office supplies; (iii) office rental; (iv) vehicle rental; (v) office and equipment maintenance and repair; (vi) communications; (vii) translation and interpretation; (viii) travel associated with Project supervision; (ix) publication fees; (x) ownership of intellectual property rights; and (xi) other miscellaneous expenses directly associated with the Project and agreed between the Bank and the Borrower, through TKGM.

Implementation support plan and resource requirements

33. The following implementation support plan reflects the preliminary estimates of the skill requirements, timing, and resource requirements over the life of the project. Keeping in mind the need to maintain flexibility over project activities, the skill requirements may change over time to ensure that they continue to meet the implementation support needs of the project.

34. Implementation support will be provided in the form of direct support from the World Bank team and additional consultants will provide technical assistance as needed. During the first year of the project, it is foreseen that frequent missions will take place to essential areas to support TKGM in its initiation of project activities. Table 6 indicates the level of input that will be needed from the World Bank to provide implementation support for the proposed project for the initial 12 months and the remainder of the project implementation period.

Table 6: Implementation Support Plan

Time	Focus	Skills Needed	Partner Role
First 12 months	Support to: - Successful start of the Project; - Establishment of the FM system, M&E system and grievance mechanisms in line with World Bank standards - Launching Component A activities	All skills	- Task team to support smooth start-up - Ensure safeguards are on track - Support PIU - Ensure systems and processes in place to launch project activities
12 to 48 months	- Ensure adequate implementation support for all aspects of project - Ensure M&E measures are undertaken in accordance with planned activities - Monitor implementation of project activities, including site visits - Support to final evaluation and ICR	All skills	- Ensure ESF is on track - Support PIU - Provide technical assistance

Table 7: Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Task Team Leaders	56	18	International and Field-

			based Staff
Senior Land Administration Specialist	50	15	International or Field-based Staff
Senior Urban Specialist	28	7	International or Field-based Staff
Environmental Specialist	10	7	Field-based Staff
Social Specialist	28	Local travel as needed	Field-based staff
Procurement Specialist	50	Local travel as needed	Field-based staff
FM Specialist	20	Local travel as needed	Field-based staff
Technical Specialist (Geospatial Information Management)	40	10	International and local consultants
Technical Specialist (Property Valuation)	40	10	International and local consultants

ANNEX 2: Detailed Project Components Description

COUNTRY: Turkiye
Land management infrastructure for green and sustainable development

1. The Project will include four components:

2. **Component A: Creating 3D City Models and Updating Cadastre Data.** This component will support: (i) the creation of 3D city models using the proven approach from the Amasya pilot; and (ii) the completion of the update and verification of cadastre data for 6 million parcels (out of the remaining 11 million parcels[49]). As part of the cadastre updating activities, capacity building programs for addressing challenges concerning women's land rights and ownership will be discussed with TKGM to determine how to better address these issues as part of the public consultation step during the surveying process. While activities on the update and verification of cadastral data will be carried out in both urban and rural areas, for the creation of 3D city models, the Project will cover major urban areas (approximately 40,000 km^2, almost all urban areas in the country) in all 81 provinces in Türkiye. As part of these activities, the Project will finance the completion and renewal of the aerial surveys, the buildings inventory, 3D city modelling, the integration of the data from the MEGSIS and MAKS systems in the 3D city model information system, which has been developed by TKGM and is being tested, and the implementation of web services to achieve interoperability of the 3D city model information system with the NSDI system. The Project will further support considerations of the policy options for addressing the irregularities in the cadastre and land register that are expected to emerge from the creation of 3D city models. The activities supported by the Project in each province will vary, as TKGM has already initiated aerial surveys and 3D city modelling in 46 provinces (see Table 1).

Table 1: Scope of component A activities

Provinces	Aerial surveys		Buildings inventory	3D city modelling	Data integration
	initial	renewal			
46 (22,000 Km^2)	No	Yes	Partial	Partial	Yes
35 (18,000 Km^2)	Yes	Partial	Yes	Yes	Yes
81 (40,000 Km^2)					

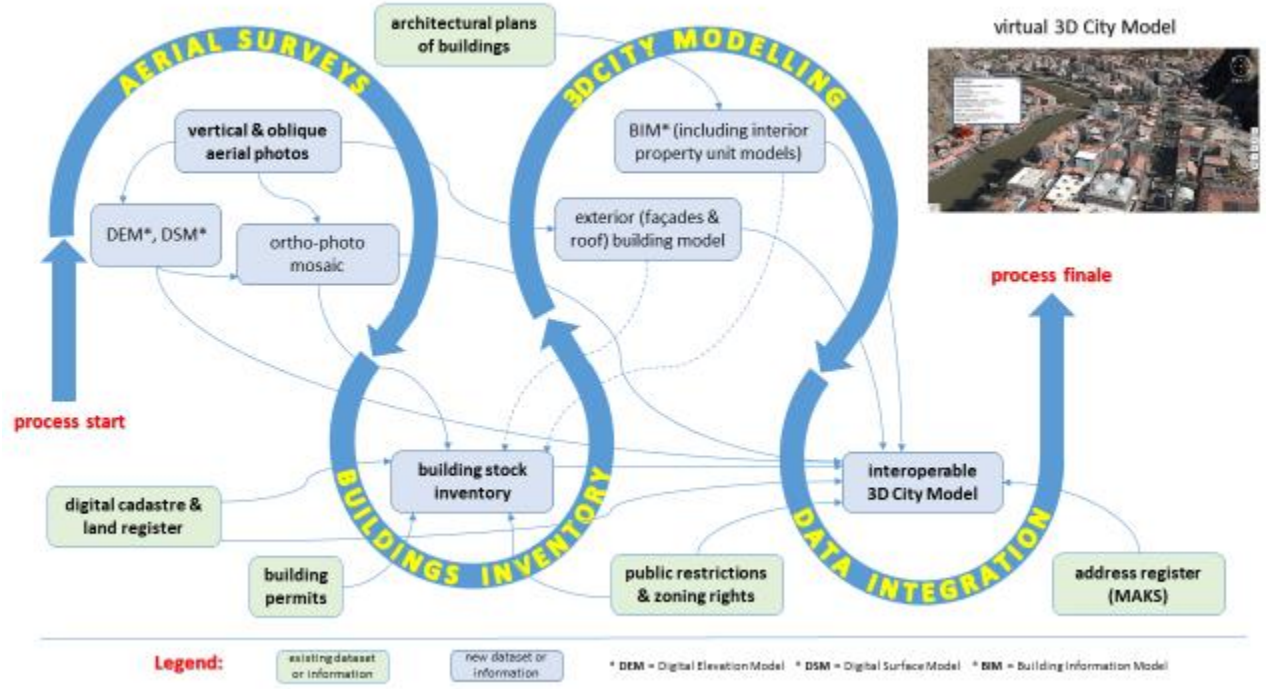
3. The Component will require a multi-agency/multi-partner effort involving TKGM's Department of Cadastre, Department of Land Registry, Department of Mapping, Department of Real Estate Valuation and Department of Information Technologies, as well as the municipal authorities, the Ministry of Interior's General Directorate of Population and Citizenship (responsible for the MAKS address system), the Directorate General of GIS of the Ministry of Environment, Urbanization and Climate Change (responsible for NSDI), and other relevant stakeholders. It is expected that the use of 3D city models for the recording and registration of new buildings will become mandatory, based on a pilot that TKGM is carrying out in the Ankara province[50]. In terms of climate change adaptation, the Component's activities will generate the data set on cadastral parcels, aerial imagery, and buildings that are essential to put in place effective disaster risk planning and climate change adaptation policies and measures. These cannot be otherwise accurately developed or executed, because they depend on knowing what activities, businesses, and people are located where and who the owners are whose behavior has to be influenced. In terms of climate change mitigation, the activities under Component A will support the tracking of trends in urbanization and urban sprawl that have contributed to uncontrolled land use conversion that has resulted in the loss of carbon sinks. Moreover, the information provided by the 3D city models will be shared with the Directorate of Climate Change of the MoEUCC to directly inform energy analysis, disaster and flood simulations, resource

[49] The remaining 5 million parcels will be undertaken simultaneously by TKGM using Government resources.
[50] TKGM Circular 2021/4 of September 1, 2021.

management and overall climate-smart decision-making for resilient, green and sustainable urban development, including sustainable, energy-efficient, low-carbon buildings.

4. ***A1: Creation of 3D City Models*.** This subcomponent will complete the building inventory of the major urban areas, analyze the legal status and record all buildings, verify the number of individual units in buildings, and integrate MEGSIS and MAKS data in the 3D city model information system that has been developed by TKGM and that is being tested. The creation of 3D city models consists of the following phased activities, some of which can run simultaneously in parallel (see Diagram 1):

Diagram 1: Schematic TKGM 3D city model approach



(i) ***Aerial surveys***. This activity will produce initial or renewed aerial photography (both vertical and oblique), which is then used to produce digital elevation model (DEM), digital surface model (DSM), and ortho-photo mosaics – all of which are required as information source in the following technological processes.

(ii) ***Building inventory***. This activity will establish, populate and verify the building stock inventory using the various existing datasets or information – the cadastre and land register, the ortho-photo mosaic, the building permits, the public restrictions and the zoning rights, as well as the newly created exterior building models and the building information models (BIM).

(iii) ***3D city modelling***. This activity will create: (a) 3D exterior building models of the façades and roofs by photogrammetric modelling of the aerial photos; and (b) 3D building information models (BIM) from the existing architectural plans of buildings, including 3D models of the interior property units.

(iv) ***Data integration***. This activity will harmonize and integrate the existing and the new datasets (cadastre and land register, address register, building stock inventory, exterior and interior 3D building models, DSM, ortho-photos) in TKGM's 3D City Model Information System. This interoperable system enables and underpins: a) the sharing and exchange of all the data (from MEGSIS, MAKS and TAKBIS data), and b) the Web-based access, visualization, and data delivery.

5. The first activity – aerial surveys – will be performed routinely by existing TKGM staff (in a three-year cycle), with TKGM own financing, while the Project will only cover the related operating costs (fuel, maintenance and repair). This will require the periodical integration of updates and renewal of ortho-photos and exterior building models, including within the lifespan of the project. As such, sustainability and maintenance of the 3D city models will be explicitly addressed. The other three activities – building inventory, 3D city modelling and data integration – will be outsourced and funded by the Project. TKGM has already developed an information system for managing the 3D city models and the project will support the implementation of the web services to ensure the interoperability with the NSDI system. The system is currently in the phase of final testing and deployment.

6. ***A2: Updating cadastre data*.** This sub-component will finance the cadastre update of six (6) million parcels out of the 11 million parcels not covered by the about to be concluded Land Registration and Cadastre Modernization Project (P106284). The remaning 5 million parcels will be undrtaken by TKGM using Governmant resources. The cadastre update works will target both rural and urban areas, and will be outsourced to private sector companies. The aim is to improve the quality of cadastral maps and the alignment between the map and ground reality, and to convert existing maps to the standard modern coordinate reference system of Türkiye. The digitization and updating methods[51] to be applied are fixed by law and well established in practice. As a result, Türkiye will complete the updated cadastre nationwide, thereby achieving the National Development Plan's goal. The updated cadastre data will be utilized by the Directorate of Climate Change of the MoEUCC as a foundational dataset for accurate, location-based planning for climate change adaptation decision-making and measures by providing the agency with up-to-date land parcel data for areas of Türkiye most at risk of natural disaster and climatic events. These data will also feed into the information contained in 3D City Models that will be used for the Directorate of Climate Change's climate-related decision making and activities such as energy analysis, disaster and flood simulations, and resource management.

7. **Component B: Real Estate Valuation.** Based on the experience gained through previous mass valuation pilot projects in Fatih and Mamak (conducted under the LRCMP), as well as the Amasya pilot, the Project will support the establishment of a mass valuation system in Türkiye through the (i) modelling of real estate values and (ii) the creation of value maps. The objective is to demonstrate proof of concept so that a strategy can be developed and costed for the roll out of the system across the country. TKGM has been charged by the Government of Türkiye with developing mass valuation so that this component will aid in the achievement of a key aspect of Türkiye's National Development Plan. Component B will produce a system for estimating the market values of individual property units, primarily using a system of mass valuation. The valuations can be used for a variety of purposes and form one of the key datasets in an NSDI. The principal use is for taxation. The main tax is the annual recurrent property tax, but the valuations should also be used for any other property-based taxes, including inheritance taxes, and capital gains taxes, and land registration fees. Other applications include the identification of vulnerable uses for disaster prevention and recovery plans, the improvement of disaster risk financing and insurance in the event of climate-related natural hazards, and updating the value of collateral taken by the banking sector for asset-backed loans. The activities under this component will also help to inform the Government about which properties are considered more prone to carbon emissions and incentivize emissions reductions by factoring carbon output into the valuation methodology. The connection between real estate valuation and reducing carbon emissions will be further explored and integrated as part of the component's capacity building activities. Moreover, Component B activities will support the objectives of GCRF Pillars 3 and 4 by providing important market value information to calculate the costs of resilient reconstruction and determine insurance premiums in support of crisis preparedness and disaster risk management efforts by the Government of Türkiye. Since valuations are valid only for the day to which they apply, a mass valuation system must be capable of regularly updating estimated market values, ideally annually but at intervals not exceeding three years.

[51] For details, please see Cadastral updating: the case of Turkey, Okan Yildiz & Çağrı Erden (2021), Survey Review; *https://doi.org/10.1080/00396265.2020.1759982*.

8. This component will focus on the collection of the required data needed for mass valuation, including price and the characteristics of the sample of properties used to generate mass valuation models. The component will also support the design and implementation of the Property Value Information Center for the storage, management, exchange, and distribution of relevant valuation data for the principal valuation methods, and investment in hardware and software upgrading. Work is needed on developing data flows from those with access to transaction prices (such as valuers and real estate agents) and building characteristics (municipalities) to TKGM and data quality management. Municipal authorities will be an important source of key data about the sample properties used in mass valuation modelling, including zoning plans, zoning restrictions, and architectural design drawings. Currently, there is no reliable database in which transaction prices are recorded. There is a history of buyers and sellers in many cases declaring as the purchase price a figure that is less than the real price. Consequently, it will be necessary to establish a database of proxy price data, including mortgage valuations, auctions, and data from real estate agencies. As the mass valuation models are refined, it is expected that this process will give rise to additional data requirements regarding price and property characteristics.

9. ***B1: Collection of required data for mass valuation system*:** Different valuation methods (sales comparison, income, and cost) requiring different types of data will be needed for various types of property. The Project will support TKGM to develop methods for collecting market evidence, for instance from valuations, auction sales, and by scraping websites for asking prices and reported transactions. Reliable data on transaction prices will be entered into a Sales Price Register, which should be made available to licensed valuers. Since this data is of importance for businesses, households, valuers, the banking sector, and policy makers, it would aid market transparency and efficiency for TKGM to develop a Property Value Information Center through which the market evidence it collects is disseminated publicly. The Property Value Information Center will in addition to the Sales Price Register also need to collect data on leases, rentals, and building costs in order to enable mass valuation models using any of the principal valuation methods as appropriate for the different types of properties to be developed.

10. ***B2: Mass valuation modelling*.** This subcomponent will use a sample of properties for which recent transaction prices and their characteristics are known to generate mass valuation models. A variety of models will be required for the different types of property using the sales comparison, income, costs, and receipts and expenditure methods of valuation as appropriate for residential, commercial, heavy industry and special purpose properties, and leisure properties. The models will be tested to demonstrate their validity, based on international standards. For certain types of property (those with uncommon characteristics or uses), it will not be possible to develop mass valuation models so other solutions may have to be found. To ensure sustainability the models will be capable of being updated regularly as data from more recent transactions becomes available. An important output from mass valuation modelling will be the production of value maps of unit prices.

11. ***B3: Preparation for the establishment of an appeals system***. Valuations are opinions and not facts. Therefore, taxpayers should have the opportunity to challenge assessments, including the evidence on which they are based and the methods used. This is particularly important as much of the evidence about individual units may have to be derived from comparable units rather than be the result of individual surveys. Taxpayers should have the opportunity to present corrections to the information about their properties without the need for full judicial review. They should also have the opportunity to present their own evidence on prices and to appeal to an independent tribunal. Many of the challenges are likely to be resolved without the need for a formal tribunal hearing as taxpayers may not always understand the process through which assessments are derived, challenges may not be valid, or TKGM identifies that the data it has used is inaccurate. The move towards market-based values is likely to require significant investment in communicating how values have been derived and in educating the public, businesses, and local administrations in how the new system functions. The precise way in which an appeals system can operate efficiently will need to be determined and will be informed by international experience and best practice. For a system to function effectively, it is likely to have to be locally based. Implicit in this is the need to build capacity and to develop quality management systems to ensure consistency.

This subcomponent will finance the preparation of draft legislation for the establishment of the appeals system and the capacity building of TKGM on the management of said system.

12. ***B4: Policy issues***. This subcomponent will support work on policy issues around mass valuation, such as the legal definition of market value for tax assessment, the valuation models and methodologies to be used, and the definition of what constitutes a separate taxable unit. There will also be a need to develop valuation standards for use in property taxation based on those adopted by the Capital Markets Board. Studies of best international practice will help inform the issues and appropriate policy outcomes.

13. **Component C. Institutional capacity building and Project Management.** This component will support capacity building and training of TKGM staff and other key stakeholders that are producers and/or users of spatial data (e.g., municipalities, the Population and Citizenship Affairs Directorate General of the Ministry of Interior, and others as relevant), including in the use of the new 3D city model tool. The component will finance the acquisition and enhancement of the IT infrastructure, especially for the scaling up of the 3D City Model Information System developed by TKGM. The Project will support the enhancement of the existing PIU and of TKGM's automated M&E system. TKGM already has a strong supervision and inspection function, but the additional work under this project requires enhancement of TKGM's capacity.

ANNEX 3: Economic and Financial Analysis

COUNTRY: Turkiye
Land management infrastructure for green and sustainable development

1. Urbanization in Türkiye gained momentum in the 1980s and continues into the present day. Consequently, construction activity has intensified, with about 75 percent of the population living in urban areas. However, and only until recently, the Turkish Civil Code and Zoning Law only allowed for registration (as opposed to recording) of legally built structures in cadastral maps and official registers of properties. This situation gave rise to significant discrepancies between actual property use on the ground and land registers at TKGM. An amendment in Zoning Law No. 3194 (Article 32) effected in 2020 addressed this constraint, making it legally possible to record buildings constructed in violation of the Zoning Law. With this legislation, TKGM is better able to complete its databases and monitor the country's building stock.[52]

2. With the legislative changes, TKGM management is exploring the possibility of further addressing the data discrepancy by introducing wholesale data integration and harmonization between two major datasets in the country: MAKS (Ministry of Interior) and MEGSIS (TKGM). The sources of the data in MAKS consist of that maintained by the Ministry of Interior and data transferred from municipal records. To further accelerate the underlying processes of data integration, TKGM introduced the 3D architectural model generation (or the 3D city model) concept, which would be bolstered by other features such as the inclusion of valuation and public restrictions in the system. Such moves were expected to act as motivating factors towards seeking financial resources and securing political support.

3. The Amasya Pilot application that began January 2021 was fully funded by the government. Urban cadastral renovation was needed both for refining existing 2D city cadastres in the cities through 22/A applications as well as develop the 3D city models for the buildings, for which state of the art aerial photos were needed. The first phase of the pilot comprised the preparation of base maps (small scale maps for cities). The next phase of the pilot, not initiated as yet, would include data integration and cadastre rollout together with all other supplementary features described above. During the Amasya Pilot implementation, TKGM expressed its willingness to seek the Bank's support for the remaining steps, which was estimated to cost EUR 77.8 million, including unfinished work in rural cadastre renovations.

4. Without the proposed project, it would likely be challenging for the Government to finance data integration and harmonization or to finish the remaining rural cadastre renovation work for 6 million parcels, particularly in the midst of the current macroeconomic context that tends to shift public sector priorities from the land sector to other sectors.

The Proposed Project

5. The Amasya Pilot provided insight into the anticipated effects of wholesale data integration at the TKGM, where the agency's teams identified a total of 18,577 buildings in the city of Amasya, of which 4,868 were legally registered buildings, 6,156 unregistered buildings, 5,183 illegal buildings and 2,370 public buildings. The pilot project collected and entered data for 45,191 independent units (apartments, detached houses, shops, warehouses, business premises etc.) corresponding to the above indicated 18,577 buildings, yielding an average of 2.8 independent units per building.

6. Prior to the pilot, Amasya's building stock was largely unknown. Legally registered private buildings constituted 30 percent of the stock (excluding public buildings). Some 70 percent of the remaining buildings were unregistered and absent in the TKGM records. Consultations with TKGM indicated that following full data integration in Amasya, the number

[52] Along with the buildings built in violation of the code, there are other buildings excluded in the TKGM registers: (i) buildings that have clear ownership rights (with minor infringements in terms of proper documentation); and (ii) others where ownership remains problematic (See https://www.doganturan.av.tr/tapusuz-gayrimenkullerin-satisi-mumkun-mudur/). To capture these buildings in the TKGM system, the owners are expected to follow up with TKGM to register or record them while also working to resolve legal issues besetting ownership matters.

of legally registered buildings (dark green areas – 30 percent) is expected to increase by about 20 percent in the next 5 years through migration of unregistered buildings (light green areas) into the registered buildings domain and reach some 36 percent. Under this scenario, the percentage for the unregistered legal buildings would be 34 percent (down from 38 percent), while the illegal building percentage would be 30 percent (down from 32 percent). This implies a significant degree of formalization of the market with an appreciable impact on real estate markets. A small percentage of improvement is also expected to occur in the number of illegal buildings though reconstruction/renovation or legal means. The table below shows the results of the Amaysa Pilot with calculation for the existing situation as well as projections over the next 5 years.[53]

Amasya Pilot Operation & Schema for Economic Analysis

Building Classification	
Category	**# of Buildings**
1. Registered Buildings	4868
a) Buildings with Established Apartment Ownership (EAO) and Registered in the Cadastre	2704
a) Buildings without Established Apartment Ownership (EAO) and Registered in the Cadastre	2164
2. Unregistered Buildings	11339
a) EAO and With Occupation Permit	884
b) Temporary Apartment Ownership (TAO) and with Occupation Permit	411
c) Temporary Apartment Ownership and no Occupation Permit	732
d) No EAO/TAO but recorded as building with bldg occupation permit	206
e) No EAO/TAO but recorded as building without bldg occupation permit	3283
f) Occupation permited & not registered	206
g) Unlicerned construction (illegal) & w/o bldg	5183
h) Mass Regularization	434
3. Public Buildings	2370
a) Registered/Recorded	88
b) Registered/Not Recorded	187
c) Not Registeed/Recorded (not regularized)	371
d) Not Registered/Not Recorded (not regularized)	1724

https://dergipark.org.tr/en/download/article-file/2270975
A New Approach to Turkish Land Management: The Case of Amasya District

Without Project - After Integration

Privately Owned Properies (Number of Buildings)

Description	Legal	Illegal	Total
Registered	4,868		4,868
Unregistered	6,156	5,183	11,339
Total	11,024	5,183	**16,207**

Privately Owned Properies (Percent)

Description	Legal	Illegal	Total
Registered	30%		30%
Unregistered	38%	32%	70%
Total	**68%**	**32%**	**100%**

With Project - After Integration

Privately Owned Properies (Number of Buildings)

Description	Legal	Illegal	Total
Registered	5,835		5,835
Unregistered	5,510	4,862	10,372
Total	11,345	4,862	**16,207**

Privately Owned Properies (Percent)

Description	Legal	Illegal	Total
Registered	36%		36%
Unregistered	34%	30%	64%
Total	**70%**	**30%**	**100%**

Key Derived Statistics	Quantity
Number of Private Properties (Buildings)	16,207
Number of Public Buildings	2,370
Total Number of Buildings	18,577
Percent of Private Properties	87%
Percent of Public Properties	13%
Total Number of Independent Units	45,191
Number of Public Independent Units	2,370
Number of Private Independent Units	42,821
Average Number of Independent Units per Private	2.64
Assumptions	
Each public building consists of a single independent unit	

Legal and registered means fully in compliance with the law, and securely titled

Legal and unregistered means incomplete procedures or the owners have not yet registered their properties.

Illegal means that properties can be legalized by amnesty or other means

Planned Project Coverage

7. As described above, TKGM has started the process of 3D city modeling and data integration and distinguishes

[53] TKGM authorities indicate that Amasya may not be a perfect replica of the other cities in Türkiye, and that deviations are to be expected. Nevertheless, the Amasya experience confirms that some 70 percent of the properties in the country are not reflected in the TKGM records. Additionally, due to volatility in Türkiye's property markets, it is still too early to assess the impact of the pilot operation in this respect. According to ZINGAT (a realtor) Regional Property Report, property prices have exhibited a noteworthy upward trend in Amasya in the last 2 years from TL 1,696/m^2 in 2020 to TL 7,802/m^2 in 2022, corresponding to an increase of some 360 percent. The markets must first stabilize in order to isolate project impact.

between Phase I (preparatory work) and Phase II (actual data integration) activities. Below is a chart summarizing the state of affairs with respect to both the first 46 provinces and the next batch of 36 provinces for Phase I and II activities.

Description	First Batch of 46 Provinces	Second Batch of 35 Provinces
Phase I – Base Map Preparation and 3D Photogrammetry	Already prepared by TKGM own resources covering mainly aerial photos for about 18,000 km2 and 46 provincial urban centers, and 10 district urban centers with 5 million buildings of which 1.14 million have architectural designs where data has already been entered for the first 500,000 buildings	To be covered under the proposed project for 22,000 kms of aerial photos, 35 provincial centers and the remaining 962 districts. Additional architectural designs will be prepared for entry outside the scope of the proposed project.
Phase II – Data Integration – TAKBIS & MAKS	To be covered under the proposed project	To be covered under the proposed project

Estimated Project Costs

8. Project costs are estimated at EUR 77.8 million (inclusive of tax and contingencies). It is assumed that the Government will not contribute counterpart funds. The disbursement profile is expected to resemble a normal curve shape with a sequence of 15 percent, 20 percent, 30 percent, 20 percent, and 15 percent spread over the five project years. Component A accounts for 92 percent of the investment package.

Project Costs (US$ and EUR Million)

Project Components	Project Costs		Percent
	US$ Million	EUR Million	
Component A: Creating 3D City Models and Updating Cadastre Data			
A1: Creation of 3D City Models	23.4	21.9	
A2: Cadastre Updating	53.0	49.5	
Sub-Total Component A	**76.4**	**71.4**	92%
Component B: Property Valuation	**2.9**	**2.7**	3%
Component C . Institutional Capacity Building and Project Management	**4.0**	**3.7**	5%
Total Estimated Project Cost (Including Tax, Price and Physical Contingencies)	**83.2**	**77.8**	100%

Comments/Notes: For EUR conversion an exchangge rate of 1.07 was used on March 29, 2023

Principal Project Benefits

9. There are some 50 million independent property units (IU) in Türkiye connected to about 17 million buildings, which implies an approximate average of about 3 IU/building. It should be noted that while TKGM's system of official records has so far captured some 22 million IUs (apartments, houses, businesses etc), against the actual total count of 50 million for the country as a whole (or perhaps even 55 or 60 million according to some unofficial estimates). This means,

overall, that TKGM databases contain only 44 percent of all properties in Türkiye. It is this magnitude of 22 million IUs[54] that account for the formal real estate and mortgage markets in the country. While unregistered properties can be transacted on the market through notarized contracts, these properties are generally of lower value because the property title is not guaranteed by the state, which is provided only for the securely titled real estate.

10. The proposed project will accomplish a number of feats that will help both to broaden and deepen the public registers at TKGM. The data integration and harmonization will broaden the TKGM data bases, which would eventually contain all properties in the country. This goal may or may not be reached within the project life because of uncertainties regarding whether all municipalities would fully cooperate to supply all of their data to become integrated with the MAKS system, which is the key instrument with which the TKGM databases are expected to share and harmonize data. The data deepening will involve refinements and quality enhancements of the data such as the incorporation of the additional features comprising 3D cadastre, address system, public restrictions, etc.

11. As external data begin to populate the TKGM system, there will be a degree of migration from the unregistered to the registered domain, which will have a very sizable impact on the formal land markets. It is expected that there will be an estimated 20 percent increase in TKGM's formal market datasets whereby the existing number of registered IUs in MEGSIS[55] (TKGM's spatial database) will increase gradually from 22 million IUs to 26 million IUs. The incremental increase of 4 million IUs will have a breakdown of 3 million IUs for housing units and 1 million for non-housing units (such as business premises).

[54] TKGM's public webpage (*https://www.tkgm.gov.tr/*) offers a live count of three critical indicators. As of February 20, 2023, the indicator values were:

- Total Number of Parcels: 58,723, 108
- Total Number of Independent Units: 23,023,555
- Total Number of Owners: 53,317,230

Hence, as of the start of the project design the agency has already added a million more parcels and independent units. The below chart was prepared using TKGM data about 6 months ago.

[55] All integrated and harmonized data will be kept under the so-called MEGSIS database, which is a broader version of TAKBIS as far spatial data content.

Without Project

MAKS Independent Units (IU) and TKGM Coverage (mil. units)

Descriptions		Status in TKGM Records		
		Registered in MEGSIS	Not Registered in MEGSIS	Total
Number of Independent Units per MAKS	Housing Units	15	15	30
	Non-Housing Units	7	13	20
	Total	22	28	50

Number of Buildings in MAKS	17

With Project

MAKS Independent Units (IU) and TKGM Coverage (mil. units)

Descriptions		Status in TKGM Records		
		Registered in MEGSIS	Not Registered in MEGSIS	Total
Number of Independent Units per MAKS	Housing Units	18	12	30
	Non-Housing Units	8	12	20
	Total	26	24	50

Number of Buildings in MAKS	17

Assumption: As a result of project interventions, the number of legally registered IUs will increase by 20% in five years with huge economic implications.

Assumptions, Parameters and Project Outcomes

12. More than 95 percent of TKGM fee income comes from transactions which involves citizens buying and selling properties. Such properties could be land or built-up properties. TKGM statistics indicate that in the last 10 years property transactions grew from 1.83 million in 2012 to 3.23 million in 2022. This corresponds to a compounded annual growth rate of 5.51 percent. In 2022, TKGM's transaction fee revenue amounted to EUR 2.61 billion, which puts TKGM at the top of revenue earning public agencies in the country. Based on this figure, the total value of the property market is estimated at EUR 65.32 billion (i.e., EUR2.61 B/4 percent) at a transaction fee rate of 4 percent in current practice.

2018 - 2022 TKGM Number of Transactions and Transaction Fee Collections (Million TL and Million EUR)							
Year	**Description**	**Units**	**Sales**	**Mortgages**	**Other**	**Total**	**Percent of Sales Fee Revenue**
2018	Transaction	Number	2,593,602	1,136,325	4,593,912	**8,323,839**	95%
	Fee Earned	Million TL	10,743	60	455	**11,257**	
	Average Xch Rate	TL/EUR	5.68	5.68	5.68	5.68	
	Fee Earned	Billion EUR	1.89	0.01	0.08	1.98	
2019	Transaction	Number	2,411,553	1,233,814	6,261,723	**9,907,090**	95%
	Fee Earned	Million TL	10,329	60	502	**10,891**	
	Average Xch Rate	TL/EUR	6.35	6.35	6.35	6.35	
	Fee Earned	Billion EUR	1.63	0.01	0.08	1.72	
2020	Transaction	Number	2,754,550	1,301,367	6,878,195	**10,934,112**	97%
	Fee Earned	Million TL	18,146	60	473	**18,679**	
	Average Xch Rate	TL/EUR	8.01	8.01	8.01	8.01	
	Fee Earned	Billion EUR	2.26	0.01	0.06	2.33	
2021	Transaction	Number	3,020,225	1,295,371	10,308,247	**14,623,843**	97%
	Fee Earned	Million TL	23,507	91	722	**24,320**	
	Average Xch Rate	TL/EUR	10.44	10.44	10.44	10.44	
	Fee Earned	Billion EUR	2.25	0.01	0.07	2.33	
2022	Transaction	Number	3,234,200	1,615,643	11,911,393	**16,761,236**	96%
	Fee Earned	Million TL	41,555	155	1,400	**43,110**	
	Average Xch Rate	TL/EUR	17.36	17.36	16.50	16.50	
	Fee Earned	Billion EUR	2.39	0.01	0.08	2.61	

13. Analysis of TKGM data also reveals that the residential mortgage market is rather negligible, where most of the mortgage operations are commercial credits backed by real estate. Of the 3.2 million annual real estate transactions, about one half pertain to housing units with some 1.5 million units sold in 2021 according to TUIK[56].

14. The improvements in the TKGM's land administration data are expected to induce a growth of 6 percent against the current rate of 5.5 percent, with the annual growth rate of average value of the transactions being enhanced from 1 percent without project to 1.5 percent with project, where the current average value of a transaction is estimated at EUR 19,800 using the last 5 years' data.

[56] *https://data.tuik.gov.tr/Bulten/Index?p=Konut-Satis-Istatistikleri-Aralik-2021-45672*

Assumptions and Parameters			
Description	**Units**	**Without Project**	**With Project**
Number of Sales Transactions in Base Year	Transaction	3,300,000	3,300,000
Annual Rate of Growth in Transactions	Percent	5.50%	6.00%
Years to Reach Transactions Growth Rate	Year	N/A	5
Average Value of a Transaction	EUR	19,800	19,800
Annual Rate of Growth in Value of Transactions	Percent	1%	1.50%
Years to Reach Trans. Value Growth Rate	Percent	N/A	5
Implementation Period	Year	N/A	5
Operational Period	Year	N/A	15
Planning Horizon	Year	N/A	20
TKGM Transaction Fee Rate	Percent	4%	4%
Discount Rate	Percent	N/A	6%
WB Loan	EUR Million	N/A	77.8
Incremental Market Growth % GDP Contribution	Percent	N/A	0.40%

Principal Project Outputs and Outcomes (Benefits)			
TKGM (TAKBIS) and MAKS Data Integration and Harmonization	**Level**	**Without Project**	**With Project**
		Pace of Data Integration and Harmonization	
Cadastral Update	Output	Slow	Faster
3D Photommetric Generation	Output	Slow	Faster
3D Cadastre and City Model Generation	Output	Slow	Faster
Compiling Public Restrictions Data	Output	Slow	Faster
Compiling Zoning Rights	Output	Slow	Faster
Completion of Building Inventory	Int. Outcome	Slow	Fast
Increase in Certified Registrations	Int. Outcome	10% in 5 years	20% in 5 years
Operational Efficiency of Land Markets	Outcome	Sub-optimal	Higher Efficiency
Enhanced Financing of the Housing Sector	Outcome	Modest	Enhanced
Increased Fiscal Revenues	Outcome	Modest	Substantial
Rationalized Mortgage Markets	Outcome	Modest	Substantial

Note: Dollar based data were converted into EUR at an exchange rate of 1.07 on March 2023.

Economic and Financial Analysis (EFA)

15. The methodology behind the EFA is the so-called Incremental Market Model, which calculates the market size for the with and without project scenarios and attributes 0.4 percent of incremental growth to project interventions, without distinction as to the source of the underlying benefits. This is an exceedingly conservative estimate because the real estate sector has an average share of about 5 percent of Türkiye's GDP, where the construction industry saw a sizable growth of 38 percent in 2021[57].

16. The principal project benefits, both economic and fiscal, can be summarized under the following captions:

[57] *https://www.gyoder.org.tr/files/202206/3b656303-4428-400b-8859-b97c20991137.pdf*

- Increased operational efficiency in the land markets[58]
- Enhanced financing of the housing sector
- Increased fiscal revenue (TKGM fee income), and
- Rationalized mortgage markets

Results and Discussion

17. Cost-benefit analysis using the above-described data and assumptions for a EUR 77.8 million investment package, 6 percent discount rate and a planning horizon of 20 years yielded an ERR of 35% percent against a FRR of 31 percent, where the ERR was estimated based on an investment cost exclusive of tax and price contingencies value at 25 percent of the full cost.

Cost Benefit Analysis (EUR)

Without Project										
Description	**Units**	**Baseline**	**Implementation Period**					**Operational Period**		
			2024	**2025**	**2026**	**2027**	**2028**	**2033**	**2038**	**2043**
Sales Transaction	Number	3,300,000	3,481,500	3,672,983	3,874,997	4,088,121	4,312,968	5,636,877	7,367,172	9,628,600
Average Value/Transaction	EUR/transaction	19,773	19,800	19,998	20,198	20,400	20,604	21,655	22,760	23,921
Real Estate (RE) Market	Billion US$	65.25	68.93	73.45	78.27	83.40	88.86	122.07	167.67	230.32
With Project										
Sales Transaction	Number	3,300,000	3,484,800	3,683,434	3,897,073	4,127,000	4,374,620	5,854,228	7,834,278	10,484,032
Average Value/Transaction	EUR/transaction	19,773	19,800	20,038	20,298	20,582	20,891	22,506	24,245	26,119
Real Estate (RE) Market	Billion US$	65.25	69.00	73.81	79.10	84.94	91.39	131.75	189.94	273.83
Financial Analysis										
Incremental RE Market Growth	Billion EUR	0.00	0.07	0.35	0.84	1.55	2.53	9.69	22.27	43.51
Benefit (0.4% Contribution to GDP)	Million EUR	0.00	0.26	1.42	3.34	6.18	10.10	38.74	89.07	174.03
Project Costs	Million EUR	0.00	11.67	15.56	23.34	15.56	11.67			
Cash Flow	**Million US$**	**0.00**	**-11.41**	**-14.14**	**-19.99**	**-9.38**	**-1.56**	**38.74**	**89.07**	**174.03**
Economic Analysis										
Incremental RE Market Growth	Billion EUR	0.00	0.07	0.35	0.84	1.55	2.53	9.69	22.27	43.51
Benefit (0.4% Contribution to GDP)	Million EUR	0.00	0.26	1.42	3.34	6.18	10.10	38.74	89.07	174.03
Project Costs	Million EUR	0.00	9.33	12.45	18.67	12.45	9.26			
Cash Flow	**Million EUR**	**0.00**	**-9.07**	**-11.03**	**-15.32**	**-6.26**	**0.84**	**38.74**	**89.07**	**174.03**
FRR	Percent	31%								
ERR	Percent	35%								
NPV @ 6%	Million US$	421								
Financial/Fiscal Analysis										
Incremental Transac. Fee Revenue	Million US$	**0.00**	**2.61**	**14.19**	**33.44**	**61.82**	**101.04**	**387.45**	**890.68**	**1740.27**
Note: Economic costs were calculated by removing taxes (18%), and price contingencies (7%), for a total of 25%.										

18. A sensitivity analysis was attempted for an investment package costing about 100 percent more than what was assumed (i.e., EUR 150 million), which brought the ERR to 24 percent and FRR to 21 percent, which are still high enough to justify the project at such elevated cost.

19. Regarding the fiscal impact, the analysis shows that as of the first project year, TKGM's fee revenue is positive at EUR 2.1 million, with EUR 101.4 million at the end of the implementation period. The total fiscal revenue over the implementation period is EUR 213 million, which is the equivalent of 2.7 times the investment cost.

[58] Comparison of yields from property investments in Türkiye with other countries provides interesting insights, pointing to a lower level of transparency and efficiency. Türkiye was ranked as the 43rd (out of 99 countries) most transparent commercial property market in 2020 by JLL in its Global Real Estate Transparency Index. This put it in the category of semi-transparent markets in the same group of other large emerging economies, such as India, Indonesia, The Philippines, Mexico, Brazil, and Chile. The category above is described by JLL as "Transparent" and includes countries such as Malaysia, South Korea, Poland, South Africa, and Spain. Yields affect the value of properties.