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ECONOMIC PRINCIPLES AND ECOLOGICAL CONSEQUENCES OF LAND USE IN URBAN AND SUBURBAN AREAS

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Abstract. *The paper analyses the underlying economic factors of the large cities, urban center in different geographical regions. It describes the ecological consequences of extensive land use in the urban region, determine the expenses of the city budget of the ecology related factors, such as trash collection and utilization, carbon emissions reduction, level of green areas, costs of their maintenance and sustainable development. The future projections are based on the Paris climate agreement and national or city level plan of sustainable development till 2035. The article deals with difference of income, land prices and land use models of the large cities, how they are different and like other metapolicies worldwide and in the geographical region.*

The paper examined the issue of how government regulate land use in the context of the large city, legal status of the cities and what role they pay in economic development. The determining economic principles that were introduced in this research are land prices for different use cases, such as industrial, commercial, and residential relative to general level of economic development of the city. Other key factors are rent prices withing the context of income and number of employees, corporations that operate in the city. Following cities Shanghai, New York, Mexico City, Paris, and Kyiv, were picked to analyze the land use patterns, ecology related expanse and future forecast modeling. In this paper we highlighted several key differences between those cities. Size of the urban land area and metropolitan areas are where most of differences are. While the geographical boundaries of the core city itself or the downtown areas produced similar results, regardless of the city geographical or economic development levels. Results of economic modeling of the ecological related budget spending, sustainable development 2035 plan, highlight that cities with larger budgets, such as NY city or Shanghai, spend relatively to the total sum less on the ecology, while cities that encountered with ecological problems, such as Mexico City, plan to spend more on the future sustainable development. At the same time, some cities in the countries that signed Paris agreement, do not have specific economical plans on future development, such as Kyiv.

Keywords. *Urbanization, economics, land use, land management, ecology price, economic modeling.*

Topicality.

Cities are new determining factors of the national and regional economic growth; they contribute great deal to the change in the of ecological situation worldwide. Modern world is globalized field, where large cities form regional centers of influence. In this paper we study the state of land use relative to urbanization process through the world, with each test city representing its local geographical region or continent. To help us outline the basic economic principles we used the following economic parameters - size of the cities and local suburban areas, transportation and infrastructure, companies' data and land prices, real estate – housing and offices, as well as ecological data. It is worth noting that definition of the city itself is important determining factor of any research work conducted in this field of study. Each country or nation provide their own definition to what city is. While large organizations such as UN has their own definitions, it outlines that not all cities through the world are classified using the same criteria [1]. Cities can be classified by size of the urban area, total population, or based on the local governmental structure.

Analysis of recent research and publications.

Modern day problems and issues related to the urban land use and future forecast planning have been studied by many urban economists, incl. B. Cohen, J. Harvey, E. Glaeser, B. Ward, R. Grundmann, A. Martyn and others. They contributed great deal of scientific knowledge and models to the urbanization and economics of the cities. Their work helped establish basic rules of the urban land use and provide valuable scientific research frameworks for further study. Many of the recent research publications were focused on the direction of studying specific city or area within country. [2] While studying specific city or urbanization factor it is essential to establish initial economic models and forecast tools in larger context. Otherwise, narrow viewpoint can prevent researchers from seeing the patterns which render economic model for future modeling incomplete, let alone it such model lack focus on sustainable development. We can look at the cities as isolated events or without comparison to other cities, many of the new megalopolis are following in the footsteps of the older cities, while encountering same problems. Ecology is one of the factors that must be extensively uses in economic planning of the cities. The research objective of this paper is to outline and describe cities as patterns so they can be used for future planning.

The aim of the study. The purpose of the research paper is to examine real world economic and social data of the cities to help us and other researchers in this field formulate the urbanization as the process deeply connected to land use. We plan to find how land use is similar, what are the difference within different cities, does it directly corelated to the city economic data. This information can be used in context of economic forecasting and land use planning, for Ukraine and other developing countries with new urban centers of regional impact. For research purposes we picked largest cities from different continents – Asia, South and North America, Europe, and Africa and city of Kyiv, to serve as comparative example.

Materials and methods of research.

Data taken from the United Nations World Urbanization Prospects report, world bank and that of the Statista service were used for this research work. Research, economic analysis, numerical. Withing the scope of research we analyzed spatial and world map data to determine cities position, classify land cover by use category. The main research methods of the research work are system analysis and data modeling, data tables were used to organize and present relative economic and social data for each city. Graphs and charts are used to present practical results of the study and outline future state for the sustainable development plan.

Research results and their discussion.

For the study we picked and grouped the largest cities on the continents and ranked them by general city population number. The geographical location of the selected cities is shown in Fig. 1. Table 1 provides information on the population and their area, which is divided into three groups: general, urban, and suburban (metropolitan area).

The selected cities are the following (Fig.1 and Table 1) – Tokyo, New Delhi, Shanghai, Sao Paulo, Mexico City, Cairo, New York city, Istanbul, Manila, Lagos, Moscow, and Paris. We added city of Kyiv in the study as representation of urban center from Ukraine. We used this developing city to compare it with larger already established metropolis and note the differences between larger cities and relatively new urban centers.

Figure 1 represents land use by following groups - white marks denoted large area of croplands, light grey is wild lands areas, dark grey is seminatural lands and neutral gray rangelands. In the context of the study, land areas are identified by types of their use to visualize the connections between urban centers and neighboring land areas. For example, in Europe and central part of North America, a significant amount of land is used for agriculture purposes (croplands). They serve to provide food for densely populated areas and large cities in the region. While majority of the India territory and eastern parts of China are densely populated, which proved hard to determine land use in those areas. In Figure 1 you can see that large mega policies are located mainly

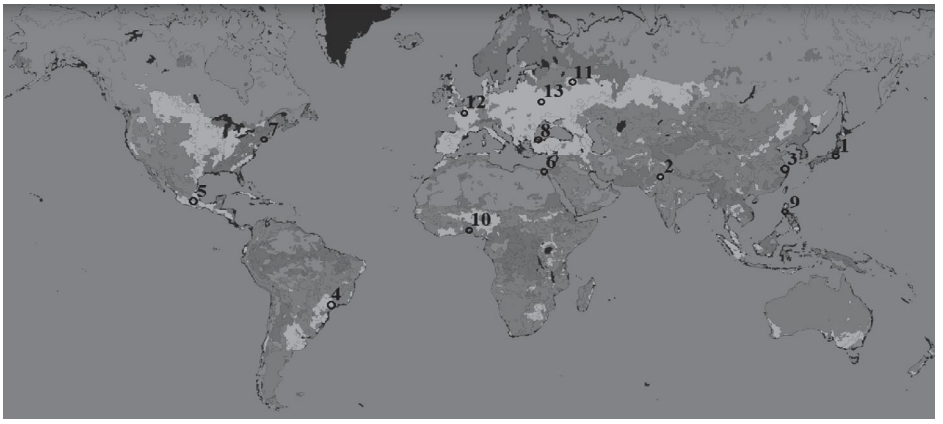

Fig.1 Map with urban centers per region and land use by type [1]

on agricultural land or seminatural land areas. Nine cities from the study group are located on the coast, which is due to transport routes, historical events, and favorable geographical location.

To conduct a comparative analysis of the largest cities, general information on total amounts of lands areas used for urbanization was collected per country. This collected data represents total amount of land area used by. It proved useful for comparative analysis, to determine which share of the total urban land area is used by the largest city per country. The data is as follows, represented in sq. km - US urban land area 80,203 (9,147,420 total land area), Mexico – 102,418 (1,943,950 total land area), China 380,679 (9,388,211 total land area), Ukraine 32,600(579,320 total land area), France 86,463 (547,556 total land area), Japan 108,678 (364,550 total land area), Brazil 134,981 (8,358,140 total land area), India 222,688 (2,973,190 total land area), Egypt 24,270 (995,450 total land area), Turkey 44,090 (769,630 total land area), Philippines 10,817 (298,170 total land area), Nigeria 17,196 (910,770 total land area), and Russia 187,538 (16,376,870 total land area) .

However, a direct correlation between the size of megacities and countries of their location is hard to establish. For instance, the biggest city in Japan Tokyo represents 7% of total urban area in Japan, while Sao Paolo 8% of Brazil, Manila 17% of Philippines, Moscow 3% of Russia, and New York 14.5% of United states urban land area. City of Kyiv is interest exception, and the city represents 4% of total urban land use area in Ukraine, however simple map analysis shows that majority of officially denoted area of Kyiv is occupied by green lands without any buildings.

It is worth mentioning that data in Table 1 Suburban area and population columns represents metropolitan area data, as separately defined in each of the

Table 1. **Largest urban centers in region***

№	City name	Country/Continent	Total area, sq. km	City Population	Suburban area, sq. m	Suburban population
1	Tokyo	Japan/Asia	8,230	13,515,271	6,039	23,884,797
2	Delhi	India/Asia	3,483	16,753,235	1,251	12,863,765
3	Shanghai	China/Asia	6,341	24,281,400	2,341	9,718,600
4	São Paulo	Brazil/South America	11,698	12,252,023	8,582	9,793,977
5	Mexico City	Mexico/North America	7,947	8,918,653	4,831	12,077,347
6	Cairo	Egypt/Africa	3,085	9,500,000	1,075	10,576,000
7	New York City	US/North America	11,667	8,398,748	10,881	14,281,200
8	Istanbul	Turkey/Asia	5,196	15,519,267	2,620	365,267
9	Manila	Philippines/Asia	1,873	1,780,148	1,830	21,307,852
10	Lagos	Nigeria/Africa	1,965	13,463,000	1,058	7,874,435
11	Moscow	Russia/Europe (Asia)	5,891	12,410,000	3,380	4,715,000
12	Paris	France/Europe	2,509	2,148,271	2,404	10,096,536
13	Kyiv	Ukraine/Europe	1407	2,967,360	12,695	407,640

* prepared based on personal research data, UN report, World Bank and Statista services [3, 4, 5, 6]

presented countries. The data in Table 1 are arranged by population of large cities (metropolises). Cities are divided into countries and continents to better understand the regional features of large cities. Most cities have a densely populated and small central part and a disproportionately large suburban area, where a large number of people live as a rule. But there are some exceptions - the cities of Kiev, Moscow, Istanbul. At this stage, the reason for this may be historical features and economic development, as well as various factors of land use and development.

One of the difficulties of the study was the different definition of city boundaries in each country. Factors that led to this are historical events, the colonial past of countries, economic booms and more. However, the study of these data goes beyond the scope of our study.

To highlight this notion, we studied how each of the selected countries interprets the definition of "big city - metropolis". It should be noted that some countries, including Ukraine, grant a separate status of capital, federal territory center and large city. The selected countries define big city as follows, Japan - Metropolis prefecture; India - Union territory ; China and Brazil– Municipality; Mexico - City-state; Egypt – Governorates; United States – city; Turkey - Metropolitan municipality; Philippine - Highly urbanized city; Nigeria – state; Russia - Federal city; French – Commune; Ukraine – city with special status.

Analysis of the data shows that there is no direct relationship between the population of megacities and the land area of cities. This factor may be the result of a specific geographic location, for example on poisons (Japan, the Philippines) or near mineral deposits (Lagos) or convenient highways (Istanbul) or economic and industrial development (Shanghai, Kiev). In addition, as noted above, the legal regulation and demarcation of urban areas affects the presentation of the data in Table 1. A clear example of this is Paris, which is usually a connected urban center, but at the state level the central part of the city is a historic center with population. The official data states that 2 million people live in city of Paris, you as the total population of Paris metropolis is more than 10 million. This type of discrepancy between the official regulation and real-world state can lead to significant economic and social consequences, such as the level of average wages, concentration of enterprises and so on.

In the future, it will be interesting to explore the relationship between the size of these cities in the context of their historical development, how they were applied, developed, grew, and so on.

Table 2 represents aggregated results of research work on economics data of the selected cities. The cities in the table are arranged by aggregated land price in USD from the most expansive to the cheapest land plot of 1 square meter. The indicators next to land price are as following, c denotes land price for commercial use, i – land price for industrial use and r – for residential use. The aggregated land price presents average land price of mixed use, such as commercial, industrial, and residential, in case if such data was available for specific city.

It is worth mentioning that some of the research data can have large deviation with real world data, due to lack of quality information. The biggest difference can be in the following categories, São Paulo, Shanghai and Mexico City number of companies in the city, city of Lagos industrial land use price and number of people employed in the city,

Table 2. Land prices, real estate rent and general employment data*

№	City	Land price in the city, $ per sq. m	Office rent avg. price, $ per sq. m	Housing rent price, $ per sq. m	Number of companies in the city	Number of people employed	Average salary, $ per month
1	Tokyo	2,394 i. 16,299 c. 9346 avg.	64.2	53.5	728,710	9,657,306	1,858
2	Manila	4078 c. 2600 i. 3339 avg.	20.8	9.4	219,184	5,770,000	584
3	New York City	3045 avg.	66	53.5	2,963,144	4,550,000	4,235
4	Paris	2977 c. 808 i. 1892 avg.	85	48	866,247	1,800,000 in city 5,400,000 in metropolitan	4,365
5	São Paulo	744 i. 2200 c. 1472 avg.	23.2	11	342,000	1,600,000	634
6	Shang-hai	304 i. 5386 mixed use 1826 r. 1217 c. 1115 avg.	13	7	8, 000, 000	875,308	3,019,781
7	Moscow	1557 c. 374 i. 965 avg.	27.5	21.1	722,100	7,000,000	978
8	Kyiv	879 avg. 3512 down-town 900 avg.	25	12.7	294,458	1,149,074	568
9	Istanbul	690 i 801 c 745 avg.	7	2	403,040	4,660,000	634
10	Mexico City	167 i. 642 c. 404 avg.	25.7	9.3	343,200	1,511,033	660
11	Cairo	146 i 437 c. 291 avg.	27.5	7.8	-	2,907,000	500
12	Delhi	269 c. 230 i. 249 avg.	7	0.8	875,308	3,019,781	412
13	Lagos	98 c. 5 i. 23 r. 42 avg.	7.8	21	1,276,222 2200 largest companies	3,452,300	921

* prepared based on personal research data, UN report, World Bank, Open Data bot and Statista services [3, 4, 5, 6, 7]

Manila, and Delhi commercial land use price. Ukraine does not have open land market so land prices in Kyiv denote rent price per year. Average office rent

price for the Mexico City, São Paulo, Lagos, Cairo and Manila mostly represent prices for A and A+ offices and renovated B class office spaces.

We should outline that in city of Shanghai most of offices for rent are available in form of workspace in shared office, while large number of companies registered in the city can be understood if compared to that of China, which ash more the 77 million companies' country wide. More than 140,000 companies in São Paulo are related to green economy and sustainable development. Mexico City shows large number of new companies, with more than 40000 new enterprises being registered each year. More than 15% of all the country enterprises are registered in Manila, capital of Philippines, with total number of companies being 1,420,000 per country. City of Lagos show large number of companies registered in the city, while most of them are self-employed, and small businesses, with 2200 large companies have been established in the city.

Tokyo show the highest average value of land among the selected cities. The land price for industrial use per 1 sq. m cost 249,600 yen or 2,394 USD, while the value of land for commercial use 1,699,300yen or 16,299 USD. The city of Tokyo GDP is 104,339,162 million yen while the major industries include transport and communication industries; wholesalers; eating and drinking establishments; retail, financial, and insurance industries; publishing and printing industries; electronic device manufacturing industries. The city of New York ranks 3rd in terms of average land price per 1 sq. m., but the city downtown has one of the most expensive land lots, which can range around 24,610 USD per sq. m and located in Manhattan (city total land value is aprox. 2.5 trillion USD).

The city of Delhi study shows narrow enterprise focus in urban and suburban areas. The share of unincorporated non-agriculture enterprises in Delhi is estimated as located within main urban area is 97.33%, while 2.67% were in rural areas. The proportion of sole proprietorship companies in Delhi is at 53.82% compared to 46.18% corporations. Majority of Delhi work force, around 34%, is located within city limits, which makes total urban work force at approx. 67%, while the rest work in suburban areas and rural region.

Capital city of Philippines, Manila, is the place of largest business activity country wide. The data shows that out of all services-related business establishments around 34% or 74,102 companies are in Manila metropolitan region. Another example of concentrated workplace city is Cairo, where more than 11% of national work force is employed. Based on this data we can summaries that large cities are main places of business activity and have larger employment rate then rural area, in general. However further research in this specific area is needed to prove our statement.

Within context of land use statistics and price modeling it is important to determine the distribution of the total city land and surrounding areas. In this research we outlined that city land is distributed by following categories – city downtown, city limits, urban land area, sub-urban (metropolitan), city area include downtown, urban land area includes city area, while the sub urban area encompasses areas outside of main urban (area with high buildings and population density per sq.km), while still being part of the city large area [8].

For further research and modeling we picked five cities, Shanghai, Mexico City, New York, Paris, and Kyiv for com-

parison. The figure 2 shows the lands use distribution of the city and divided into four categories, as described above.

City of Shanghai shows the largest downtown size of 1498 sq km, main reason for this being the administrative divisions and how city is officially established. The city is divided into 16 districts, 3 counties., with 205 towns, 9 townships, 99 subdistrict committees, 3,278 neighborhood committees and 2,935 villagers. Downtown part of Shanghai consists of two large cities. Mexico City, Kyiv and Paris downtown are represented by historical central part. While Lower Manhattan forms the New York downtown area. New York metro area connects central part of New York city with other metropolitan cities (Newark, Jersey City, Paterson, Elizabeth, and Edison), majority of transitional territories are relatively scarcely densely populated areas.

To better understand possible outcomes and consequences of the large cities we determined what are the ecological costs of urbanization and calculated the respective data per five cities. For calculations we used three categories of city expenses that are related to ecological situation and Paris Agreement. They are carbon emissions, in tons per year, solid waste in tons per year and city green areas upkeep and development yearly budget. Results of the calculations is presented in Table 3. The biggest differences within the cities that we studied lies in how they handle waste and what are the ecological consequences of it. In Kyiv and through ought Ukraine costs of waste disposal in landfill areas are relatively low and most of the garbage is stored there [9]. Data from 2020 shows that out of 999,100 tons of waste, 800 tons were utilized, while 200300 tons burned, and the rest were carried to the landfills. Diesel trucks carry large part of New York city waste and produce a lot of carbon emissions, as processing factories and landfill area lies outside of city limits. For example, trucks carry Manhattan's garbage 7.8 million miles every year. Landfills emissions in US are responsible for 36% of all methane emissions country wide [10]. City of Shanghai has daily garbage recycling rate of 22,000 tons, which is below 20% of total waste and is one of the lowest rates in the region. Both Shanghai and Mexico City authorities employ volunteers to supervise the trash separation, and collection. The data showed that there are 30000 volunteers in Shanghai and 10000 in Mexico. The bigger share of the waste

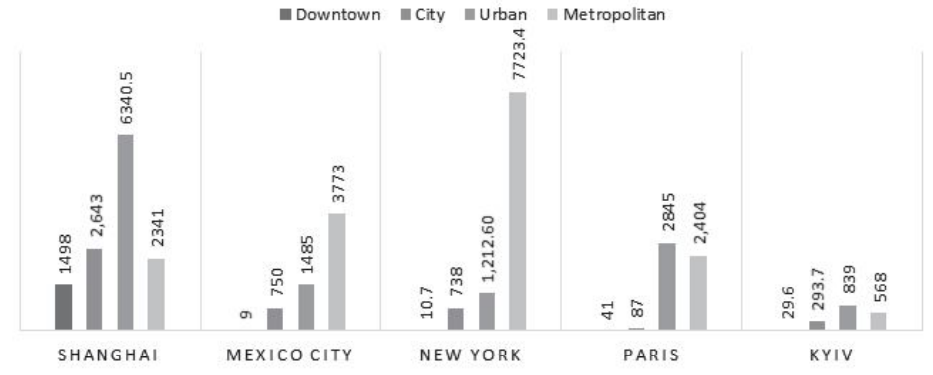

Fig.2 Land use by category, in sq. km.

is organic, which contaminates the rest of the waste and emits more methane during decomposing process.

Cities presented in Table 3 are ranged by population size. We based our calculations on the scientifically established social costs of carbon emissions - 50 $ per ton, optimal size of green area being 9 sq. m. per single city inhabitant and 270 kg of waste per year per capita as worldwide average data. For costs of waste collection and processing we used the data from official statistics sources. In France waste collection for individuals cost around 60eur per kg and it is processed. The average price of garbage processing and collection in Shanghai is at 149 USD. Majority of waste in Kyiv is transported, not processed, or sorted and stored in landfill with cost being 9.44 USD per kg [11]. While in New York city the accumulated costs of garbage recycling are 686 USD per ton, and government of Mexico City pays 21.45 USD to garbage collectors.

Accumulated ecology related expenses are visualized as charts in Figure 3. We used the data from Table 3 to calculate the ratio of accumulated ecology related cost to the city expenses in 2019, the line shows sustainability 2035 plan prediction (based on Paris Agree-

Table 3. **Current state, forecast and normal range– waste, co2 and green areas data***

City tons per year		Carbon emissions		Waste		Green area	
		social cost, $	tons per year	Costs of waste collection (and processing), $	km2	yearly budget, $	
Shanghai	normal	3,400,000	-	6,555,978	-	218.5	-
	current	8,500,000	425,000,000	8,030,000	1197,353,300	1,201 (19%)	3,245,207,483
	planned	9,010,000	-	1,525,700	-	-	-
Mexico City	normal	2,940,000	-	2,408,036	-	80.2	-
	current	6,000,000	300,000,000	7,300,000	156,585,000	33 (2.2%)	224,230,840 105,522,100 green
	planned	5,040,000	-		-		-
New York	normal	31.4 ml	-	2,267,662	-	75.6	-
	current	157 ml	7,850,000,000	14,000,000	9,604,000,000 432,000,000 for exporting	2546 (21%)	891,000,000 now 3,000,000,000
	planned	133.4 ml	-	7,000,000	-	-	-
Paris	normal	4,375052	-	2,726,064	-	90.8	-
	current	16,843950	842,197,500	10,057,989	720,956,651	250 (8.8%)	900,000,000
	planned	12632962	-	5,028,994	-	-	-
Kyiv	normal	9,800,000	-	801,187	-	26.7	-
	current	5,300,000	265,000,000	999,100	9,431,504	450 (54%)	216,664,414
	planned	20736	-	-	-	-	-

* prepared based on personal research data, UN report, World Bank, State Statistics Service of Ukraine, and Statista services [3, 4, 5, 6, 10]

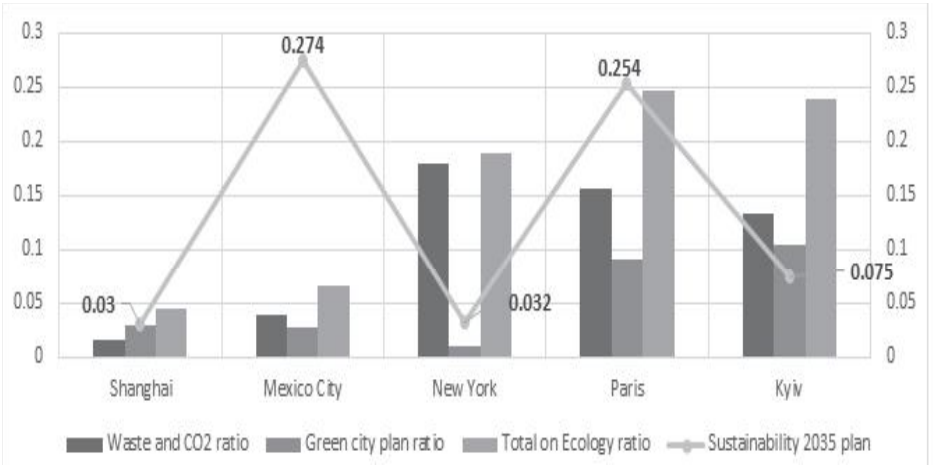

Fig.3 Ratio of accumulated ecology cost to the city expenses per 2019 and sustainability 2035 plan prediction data

ment plans per city). For city expenses amount we used the following data from 2019, Shanghai –108 billion USD (249 billion USD in 2035y.), Mexico City – 11.2 billion USD, New York - 92.5 billion USD, Paris – 12 billion USD (20.5 billion USD in 2035y.), Kyiv – 2 billion USD (3.2 billion USD in 2035y.). As a result, we calculated the accumulated ecology expenses of each city for 2019 and for 2035. For three cities changes are not overly dramatic, city of Shanghai spent 2.9% of its budget on ecology with predicted rise to 3% in 2035. The situation is different in Kyiv, we predict the decrease from 10% in 2019 to 7% in 2035, while ecology related spending will increase in city of New York from 1.8% n to 3% in 2035. Mexico City and Paris are where the most dramatic changes will occur, based on our prediction modeling. Mexico City will increase aggregated amount ecology related spending from 2.7% to 27.4% in 2035, and the amount will increase in Paris, as well, from 9% to 25.4% in 2035. In context of these results, it is important to consider the total amount of city budget spending in absolute figures. For example, budget of New York is 46 times larger than budget of Kyiv and 7.7 times that of Paris.

Conclusions and prospects.

Eight of the thirteen cities that we studied are located on the shore [12]. With possible rise of sea levels in near or distant future many of them will have to adapt to new ecological situation. It is important that the necessary steps are taken in advanced and that economies of both city and nation are ready for future challenges. Based on the results of our study we determined that on average cities spend around 3% of their budget on ecology and only plan to increase that amount in future. In this research we did not study direct ecological impact and economic consequences that it will have on land prices, city economy and alternative energy technologies. This will be covered in future work, what can be said now is the fact that we need new policies and approach to ecology aspects of land use and urban economics, as they are all part of the whole.

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ЕКОНОМІЧНІ ПРИНЦИПИ ТА ЕКОЛОГІЧНІ НАСЛІДКИ ВИКОРИСТАННЯ ЗЕМЛІ В МІСТАХ ТА ПРИМІСЬКИХ ТЕРИТОРІЯХ

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Анотація. *У статті проаналізовано основні економічні фактори, що впливають на розвиток великих міст та міських центрів у різних географічних регіонах світу. Автор описує екологічні наслідки екстенсивного землекористування у міських регіонах, визначає видатки з міських бюджетів на такі екологічні фактори, як збір та використання сміття; зменшення викидів вуглецю; рівень зелених насаджень, витрати на їх утримання та сталий розвиток. Розрахунки екологічного прогнозування та економічних наслідків, що переведені в статті, базуються на Паризькій кліматичній угоді та національному або міському плані сталого розвитку до 2035 року. Стаття присвячена різниці дохідної частини бюджетів міст-мегаполісів, цінам на землю та моделям землекористування у великих містах. Представлено дані, по відмінностям та подібності між мегаполісам, що розташовані в різних географічних регіонах.*

У статті розглядалось питання про те, як уряд регулює використання земель у контексті великого міста, правовий статус міст та яку роль вони відіграють в економічному розвитку. Визначальними економічними принципами, які були запроваджені в цьому дослідженні, є ціни на землю для різних випадків використання, таких як промислові, комерційні та житлові, щодо загального рівня економічного розвитку міста. Іншими ключовими факторами є ціни на оренду житла в залежності від доходу та кількості працівників, корпорацій, що працюють у місті. Наступні міста Шанхай, Нью-

Йорк, Мехіко, Париж та Київ були обрані для аналізу моделей землекористування, екологічних витрат та майбутнього моделювання витрат на сталий розвиток. У цій роботі ми висвітлили кілька ключових відмінностей між обраними містами. Розмір міських земель та зон урбанізації - це найбільший фактор відмінності, окрім бюджетних витрат, що пов'язані з екологією. Слід зазначити, що показники площі географічних меж центральної частини міста і прилеглих до нього районів міста дали подібні результати, незалежно від географічного розташування та рівня економічного розвитку міста. Результати економічного моделювання бюджетних витрат, пов›язаних з екологією, план сталого розвитку на 2035 рік підкреслюють, що міста з більшими бюджетами, такі як Нью-Йорк чи Шанхай, витрачають на відносну суму менше на екологію, тоді як міста, які стикалися з екологічними проблемами, такі як Мехіко планують витратити більше на майбутній сталий розвиток. У той же час деякі міста країн, які підписали Паризьку угоду, не мають конкретних економічних планів щодо подальшого розвитку, наприклад, Київ.

Ключові слова. *Урбанізація, економіка, землекористування, управління земельними ресурсами, витрати на екологію, економічне моделювання.*

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ЭКОНОМИЧЕСКИЕ ПРИНЦИПЫ И ЭКОЛОГИЧЕСКИЕ ПОСЛЕДСТВИЯ ЗЕМЛЕПОЛЬЗОВАНИЯ В ГОРОДАХ И ПРИГОРОДНЫХ РАЙОНАХ

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Аннотация. *В статье анализируются основные экономические факторы, влияющие на развитие крупных городов и городских центров в разных географических регионах мира. Автор описывает экологические последствия широкого землепользования в городских районах, определяет расходы из городских бюджетов на экологические факторы, такие как вывоз и использование мусора; сокращение выбросов углекислого газа; уровень зеленых насаждений, стоимость их содержания и устойчивого развития. Расчеты экологического прогнозирования и экономических последствий, переведенные в статьи, основаны на Парижском соглашении по климату и национальном плане устойчивого развития городов к 2035 году. В статье основное внимание уделяется разнице в доходной части бюджетов мегаполисов, цен на землю и моделей землепользования в крупных городах. Данные представлены различиями и сходствами между мегаполисами, расположенными в различных географических регионах.*

В статье рассматривается вопрос о том, как правительство регулирует использование земли в контексте большого города, правовой статус городов и какую роль они играют в экономическом развитии. Определяющими экономическими принципами, представленными в данном исследовании, являются цены на землю для различных случаев использования, таких, как промышленные, коммерческие и жилые, в отношении общего уровня экономического развития города. Другими ключевыми факторами являются цены на аренду в зависимости от дохода и количества сотрудников, корпораций, работающих в городе. Для анализа моделей землепользования, экологических издержек и будущего моделирования затрат на устойчивое развитие были выбраны следующие города: Шанхай, Нью-Йорк, Мехико, Париж и Киев. В данной работе мы выделили несколько ключевых различий между выбранными городами. Размер городских земель и зон урбанизации является самым большим фактором различия, в дополне-

ние к бюджетным расходам, связанным с экологией. Следует отметить, что показатели площади географических границ центральной части города и прилегающих районов города дали аналогичные результаты, независимо от географического положения и уровня экономического развития города. Результаты экономического моделирования бюджетных расходов, связанных с экологией, план устойчивого развития на 2035 год подчеркивают, что города с большим бюджетом, такие как Нью-Йорк или Шанхай, тратят относительно меньше средств на экологию, в то время как города, столкнувшиеся с экологическими проблемами, такие как Мехико, планируют тратить больше средств на будущее устойчивое развитие. В то же время в некоторых городах стран, подписавших Парижское соглашение, нет конкретных экономических планов дальнейшего развития, например, Киева.

Ключевые слова. *Урбанизация, экономика, землепользования, управление земельными ресурсами, экологических издержек, экономического моделирования.*