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Environmental & Socio-economic Studies

DOI: 10.2478/environ-2024-0005

Environ. Socio.-econ. Stud., **2024, 12, 1: 51-62**

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Original article

Agricultural land use in Vietnam in the context of urbanization: status and policy implications

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ABSTRACT

This article generalizes the urbanization process and its impact on agricultural land use in Vietnam. The high rate of urbanization has led to a great demand for purchasing agricultural products, especially high-quality ones, and as a result, this affects agricultural development. On one hand, it offers new chances to expand the domestic market and to encourage exports. On the other hand, the conversion of agricultural land into non-agricultural land under accelerated urbanization leads to a large area of arable land being abandoned or polluted, consequently affecting food security and sustainable development. Therefore, to meet the people's food needs in the context of urbanization, it is necessary to have proper solutions to improve the efficiency of agricultural land use, such as: implementing land laws aimed at developing agricultural production in the direction of large-scale, concentrated commodities; executing land-use planning, performing agricultural production planning towards specialized cultivation with a stable term to ensure profitable investment; boosting the restructuring of the agricultural sector; developing collective and cooperative economics in agriculture; having policies to support, forecast, and search for markets for consumption and the processing of agricultural products; creating a transparent land-use rights market.

KEY WORDS: agricultural land; land use policy; land use change; impacts of urbanization

ARTICLE HISTORY: received 18 September 2023; received in revised form 28 January 2024; accepted 6 February 2024

1. Introduction

Urban expansion is a key factor that has reduced rice growing areas, although agricultural intensification has kept rice yields high despite shrinking growth areas (DREBOLD, 2017; MORTON, 2020). According to the UNITED NATIONS (2012), the proportion of the global urban population in 2017 reached 55% with 4.2 billion people (an increase of 25% compared to 1950) and it is forecasted that the urban population will be approximately 5 billion people in 2030 (an increase of 1.35 billion people compared to 2017). Urbanization creates upgraded infrastructure; improved public services; and investments in education, society and health systems. However, urbanization struggles with many issues such as poverty, food security, and nutrition (WIJITKOSUM, 2016), reduced area of arable land and forest land (BURKE ET AL., 1991; QIAO ET AL., 2013), abandoned arable lands (ZHOU ET AL., 2020), environmental pollution (MCKENZIE & WILLIAMS, 2015); deterioration of agro-ecosystems, and loss of biodiversity in agricultural landscapes (PLIENINGER ET AL., 2016). It is estimated that 3.7% of the world's arable land will be lost by 2030 to urbanization (BREN D'AMOUR ET AL., 2017).

In Vietnam, the agricultural sector plays a key role in its reform process, making an important contribution to the achievement of hunger eradication, poverty reduction and ensuring food security (OTSUKA, 2013; WEGREN & ELVESTAD, 2018; LE & CAROLYN, 2021).

Agriculture creates 85% of jobs for rural residents and is the source of livelihoods for more than 65% of the country's population (General Statistics Office of Vietnam, 2017). Since the reform process, Vietnam's agriculture has undergone major changes and gained many valuable achievements. In particular, in the context of the strong outbreak of the Covid-19 pandemic, agriculture is considered a bright spot and a pillar of the economy, with a growth rate of 2.88% (General Statistics Office of Vietnam, 2022b). To maintain agricultural production, agricultural land must be protected. However, some studies have shown the impact of the urbanization process on agricultural production because a large area of agricultural land has been converted to non-agricultural land (Ngu et al., 2015; Thu, 2015; Phuong, 2017; Anh & Trang, 2020; Yen, 2022). To ensure food security and agricultural development under urbanization, the government can implement specific policies and proper solutions as follows: applying new production models (Heimlich & Barnard, 1992); developing organic agriculture (Tsubota, 2006); steering urban development away from the most suitable soils for farming and diligent development to limit the fragmentation of parcels; strengthening the land market and removing the remaining barriers for farmers to transfer land to colleagues can further help to keep farmland in production (Zhou et al., 2020). This article aims to assess the status of urbanization and its impacts on agricultural land and proposes some solutions for the rational use of land resources for Vietnam in the coming time.

2. Methodology

This study was developed from literature research using numerous sources of documents, including research articles and academic writings, reports and official documents of government agencies and non-governmental organizations, etc., together with data on natural, socio-economic conditions of some major cities. Analysis and discussion were performed on urbanization and urban development in Vietnam and its impacts on agricultural land use all over Vietnam. Based on strategic analyses of policy, and the institutional framework of the current land use management systems of Vietnam, the study proposed some directions for agricultural land use in the context of urbanization.

3. Results and discussion

3.1. Urbanization and urban development in Vietnam

The first urban area in Vietnam was established in the 3rd century BC, and was named Co Loa citadel. During the feudal period, some urban centres were formed in places with favourable geographical locations with the main functions of administration, commerce, and defence. In the 11th century, Thang Long Citadel appeared. Then in the 16th–18th centuries, the urban centres of Phu Xuan, Hoi An, Da Nang, and Pho Hien were formed.

During the French colonial period, the urban system was small, the main functions were mainly administration and defense In the 1930s, a number of large urban centres in Ha Noi, Hai Phong, and Nam Dinh were formed. Between 1945 to 1954, the process of urbanization took place slowly, and urban areas did not change much. From 1954 to 1975 the urban development followed two different trends. In the South, the Saigon government used "urbanization" as a means to herd people to serve the war. In the North, urbanization was associated with the process of industrialization based on the existing urban network. From 1965 to 1972, most cities were destroyed by war, and the urbanization process slowed down. From 1954 to 1975, the process of urbanization developed quite quickly because the North was completely liberated and cities began to be built to serve the construction of socialism (Pham & Phan, 2020). The urban population in 1955 was 2,748,000 people with an urbanization rate of 10.96%, which increased to 10,242,000 people with an urbanization rate of 21.50% in 1975. During this period, the average annual urbanization rate reached 13.64% (Kim, 1996).

In the 1975–2009 period, the region developed strongly with various purposes as an industrial city, port city, tourist city, administrative city, and complex city. In 2009, the urban population was 25,584,700 people with an urbanization rate of 29.74% (General Statistics Office of Vietnam, 2010). In 2020, the urbanization rate reached 39.3%, corresponding to an urban population of 35,867,200 people which rose by 9,406,700 people compared to 2010. The average annual urbanization rate in this period reached 35.5% (General Statistics Office of Vietnam, 2021).

The increase in the urban population was mainly caused by the migration of people from rural areas to urban areas (General Statistics Office of Vietnam, 2021). The policy for developing urban areas in the period 2011–2020 focused on improving the quality of life, implementing green growth, and developing sustainable and smart cities (Communist Party of Vietnam, 2021; Central Committee of the Communist Party, 2022, Government of Viet Nam, 2022). Although the proportion of the urban population in Vietnam has increased (Fig. 1), it is still low compared to the urbanization rate of the world and many countries in the region (Brunei 78.3%, Malaysia 77.2%, Indonesia 56, 6%, Thailand 51.4%, Philippines 47.4%) (World Bank, 2022).

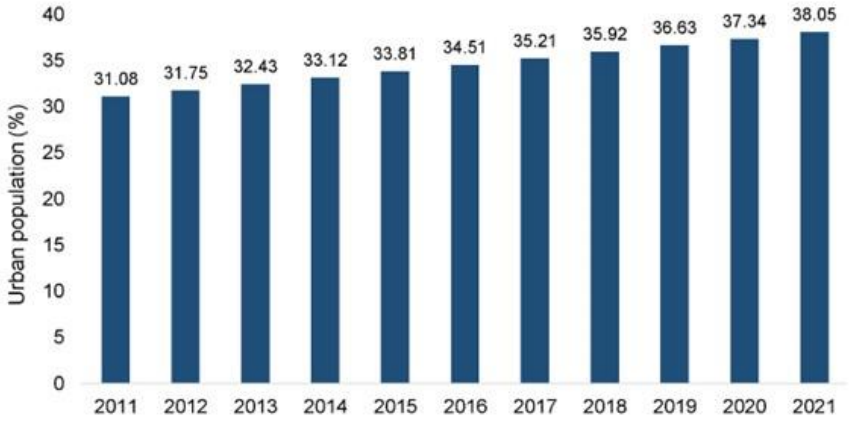


Fig. 1. Proportion of Vietnam's urban population during the period 2011-2021 (data source: Statista, 2023)

There is a significant difference in the proportion of urban and rural populations within socioeconomic regions as well as within the 63 provinces and cities. The southeast region has the highest proportion of the urban population (62.8%); in contrast, the northern midlands and mountainous regions have the lowest (18.2%). The provinces with the highest proportion of urban population include Da Nang, Binh Duong, and Ho Chi Minh City (87.2%, 79.9%, 79.2% respectively), and the opposite occurs in Ben Tre, Thai Binh, and Bac Giang with rates of 9.8%, 10.6%, and 11.4%, respectively.

Vietnam's current administrative decentralization according to Article 110 of the 2013 Constitution and Article 2 of the Law on Organization of Local Government includes 3 administrative levels as follows: provincial level (including province/centrally-run city); district level (including rural district/urban district/town/provincial city/city under centrally run city); and commune level (including commune/ward/ town). In addition, there is also a special administrative-economic unit established by the National Assembly. Vietnam's urban administration hierarchy is shown in Figure 2 and the number of urban areas from 2010 to 2022 is shown in Table 1.

Urban development is unequal while lowland and coastal regions develop faster than mountainous and highland regions. In the 2010–2020 period, cities directly under the Central Government (special cities) such as Ha Noi, Ho Chi Minh City, Da Nang, Hai Phong, and Can Tho as well as class I cities tended to expand the space from the central urban core to the periphery. There were 755 urban areas in 2010 which increased to 888 in 2022. This includes Ha Noi and Ho Chi Minh City (two special urban areas), 22 urban areas of class I, 33 urban areas of class II, 47 urban areas of class III, 94 urban areas of class IV, and 690 urban areas of class V.

Since 1986, the increased urbanization rate with the level of urban growth in Vietnam has advantages for socioeconomic development, promoting economic and labour restructuring towards industrialization and modernization. However, urban development still has many limitations: the low rate of urbanization compared to the target rate in the Socioeconomic Development Strategy 2011–2020; the low quality of urbanization, as a consequence, waste of land resources, and the low level of economics. In practice, urbanization is not close, or synchronous, to the process of industrialization, modernization and new rural construction. It lacks attention to climate change adaptation, coping with large-scale epidemics, and increasing environmental pollution. The ability of the poor and migrant workers to access public services and social welfare in urban areas is still low and inadequate. The capacity of urban management and governance is weak and slow to reform.

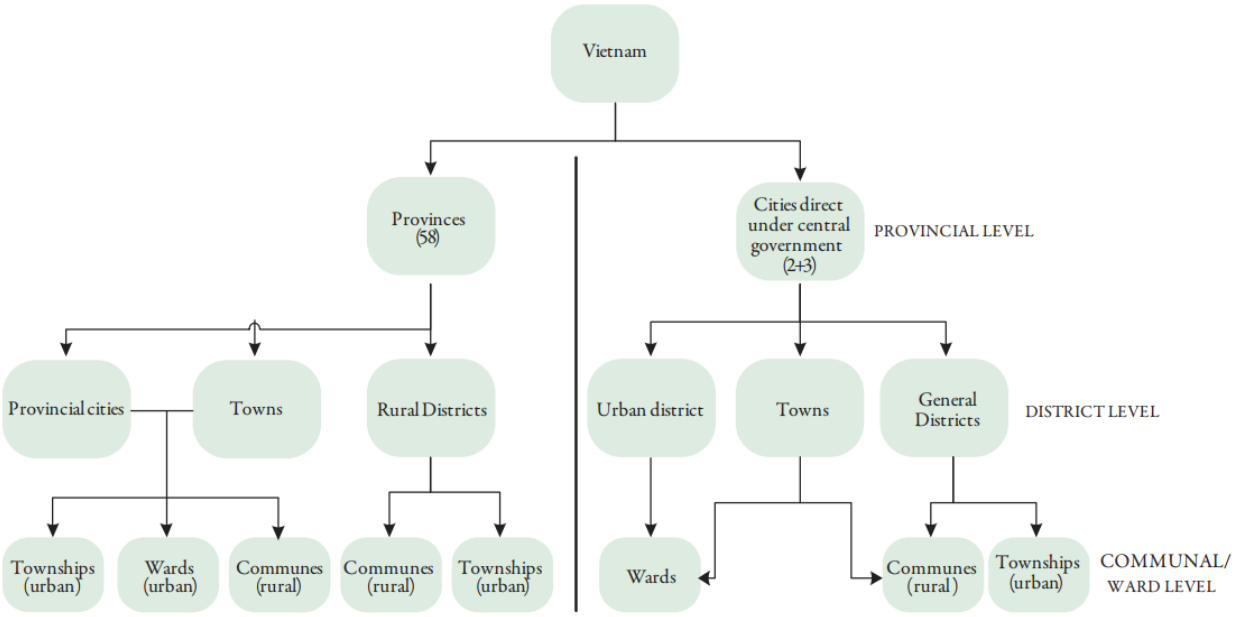


Fig. 2. Vietnam's urban administration hierarchy (source: Urban Solution, 2011)

Table 1. Number of Vietnam's urban areas during 2011–2022

Types of urban area	2010	2020	2021	2022
Special	02	02	02	02
I	10	23	22	22
II	12	32	32	33
III	47	48	48	47
IV	50	90	91	94
V	634	668	674	690
Total	755	862	869	888

Since 1986, the urbanization rate has tended to increase along with urban growth in Vietnam, creating favourable conditions for socio-economic development, and promoting economic and labour restructuring towards industrialization and modernization. Urban space has expanded, and technical and social infrastructure is of interest for investment. The quality of life of urban residents has gradually improved. However, urban development still has many limitations: the urbanization rate has not been achieved according to the target set out in the Socioeconomic Development Strategy 2011–2020; the quality of urbanization is not high, urban development in breadth is predominant, causing the waste of land resources and a low level of economic concentration; the process of urbanization has not been closely and synchronously linked with industrialization, modernization, and new rural construction; the structure and quality of urban infrastructure have not met the requirements of the population and economic development in urban areas; urban development has not yet adapted to climate change or large-scale epidemics; environmental pollution in big cities tends to increase and develop complicatedly; access to public services and social welfare of the poor and migrant workers in urban areas is still low and inadequate; urban management and governance capacity is weak and slow to be renewed.

3.2. Orientation of urban development in Vietnam

In recent years, the urban area has an important role as a driving force in promoting socioeconomic development which accounts for 70% of the country's GDP. In the forthcoming years, Vietnam as a developing country will aim to achieve the criteria of an industrialized country by 2030 with modern industry and a high-middle income rank. Vietnam will become one of the leading industrialized countries in Asia as well as a developed country with a high income which has been proposed by the Resolution of the XIII National Congress (CENTRAL COMMITTEE OF THE COMMUNIST PARTY,

2022). Therefore, urban areas are required to develop quickly and extremely efficiently to be the motivation and foundation for developing regions and localities.

The content of urban development is expressed clearly in the Document of the XIII Congress, which focuses on perfecting the institution of urban development and urban economy, emphasizing building a civilized and smart city, diversifying types of cities which are suitable to regional cultures, developing satellite cities, and limiting the tendency to over-concentrate on big cities. In 2025, the urbanization rate will reach about 45% and it will grow to over 50% by 2030. The XIII Congress Document also orients the urban development process in a holistic and systematic way, paying special attention to the overall planning, and applying modern technology to build a civilized and ecological city (COMMUNIST PARTY OF VIETNAM, 2021).

According to the orientation at the 13th Party Congress, the Central Committee of the Communist Party of Vietnam issued Resolution No. 06-NQ/TW, dated January 24, 2022, on planning, construction, management, and sustainable development of urban areas in Vietnam until 2030, with a vision toward 2045. This is the first resolution of the Communist Party of Vietnam to provide the most comprehensive guide regarding the process of urbanization and sustainable urban development in Vietnam which is based on improving awareness about the role of Vietnamese cities. In detail, urbanization is considered to be an important driving force in rapid and sustainable socioeconomic development. Urban planning and infrastructure development must be one step ahead to ensure the harmonious, balanced, and synchronous development of urban infrastructure. Urban renovation and reconstruction should be focused on all resources for urban development and to promote urban identity. Urban areas are to be developed with the tendency of the models to be green, smart, sustainable, and adaptable to climate change (CENTRAL COMMITTEE OF THE COMMUNIST PARTY OF VIETNAM, 2022).

Based on Resolution No. 06-NQ/TW of the Central Committee of the Communist Party of Vietnam, the Government issued an action plan for planning, construction, management, and sustainable development of urban areas until 2030, and a vision for 2045. The Government has 33 tasks and has assigned specific agencies to implement the goals of urbanization; the number of urban areas (achieve nearly 950–1,000 urban areas by 2025, and about 1,000–1,200 areas by 2030); the ratio of trasportation land to urban construction land (reaching about 11–16% in 2025, 16–26% in 2030); average green area per urban resident (reaching about 6–8 m^2 in 2025, about 8–10 m^2 in 2030); floor area per capita in urban areas (at least 28 m^2 in 2025, at least 32 m^2 in 2030; contribution of economic urban to GDP (about 75% in 2025 and about 85% in 2030) (GOVERNMENT OF VIET NAM, 2022).

3.3. The impact of urbanization on agricultural land in Vietnam

In Vietnam, after 1986, urbanization took place widely, thanks to economic integration and globalization. This is quite different from urban expansion in Western countries that have achieved this through the industrialization process. The speed of urbanization and population growth leads to an increasing demand for land for housing, business, and infrastructure development. This issue affects the change of land use structure in urban and rural areas in the direction of reducing agricultural land and increasing non-agricultural land. A general picture of how land use has changed over the country is presented in Figure 3.

According to the Decision 10/1998/QD-TTg, to approve the orientation of the master plan toward the development of Vietnam's urban centres by 2020, the urban land area was recorded as 460,000 hectares with 1.4% of the total area, but it exceeded 480,000 hectares by 2005 in practice. The growth rate of urban land is the highest in Ha Noi and Ho Chi Minh City with approximately 3.8% to 4% per year (THE PRIME MINISTER OF VIET NAM GOVERNMENT, 1998). Figure 4 shows the expansion of the urban areas of Ha Noi from 1993 to 2020.

Land belongs to the entire people with the State acting as the owner's representative and uniformly –leased land, or recognition of land use rights. Obviously, land users do not have ownership, they only have land use rights, therefore, the State implements land acquisition to have land funds for socioeconomic development (YUEN ET AL., 2021; YEN, 2017; SETO ET AL., 2012). This is different from countries with multiple land ownership systems such as France, Russia, Japan, and Korea, where the State, or Federal government, has the right to expropriate land, or the Chinese Government which applies land requisition (PHAN ET AL., 2020).

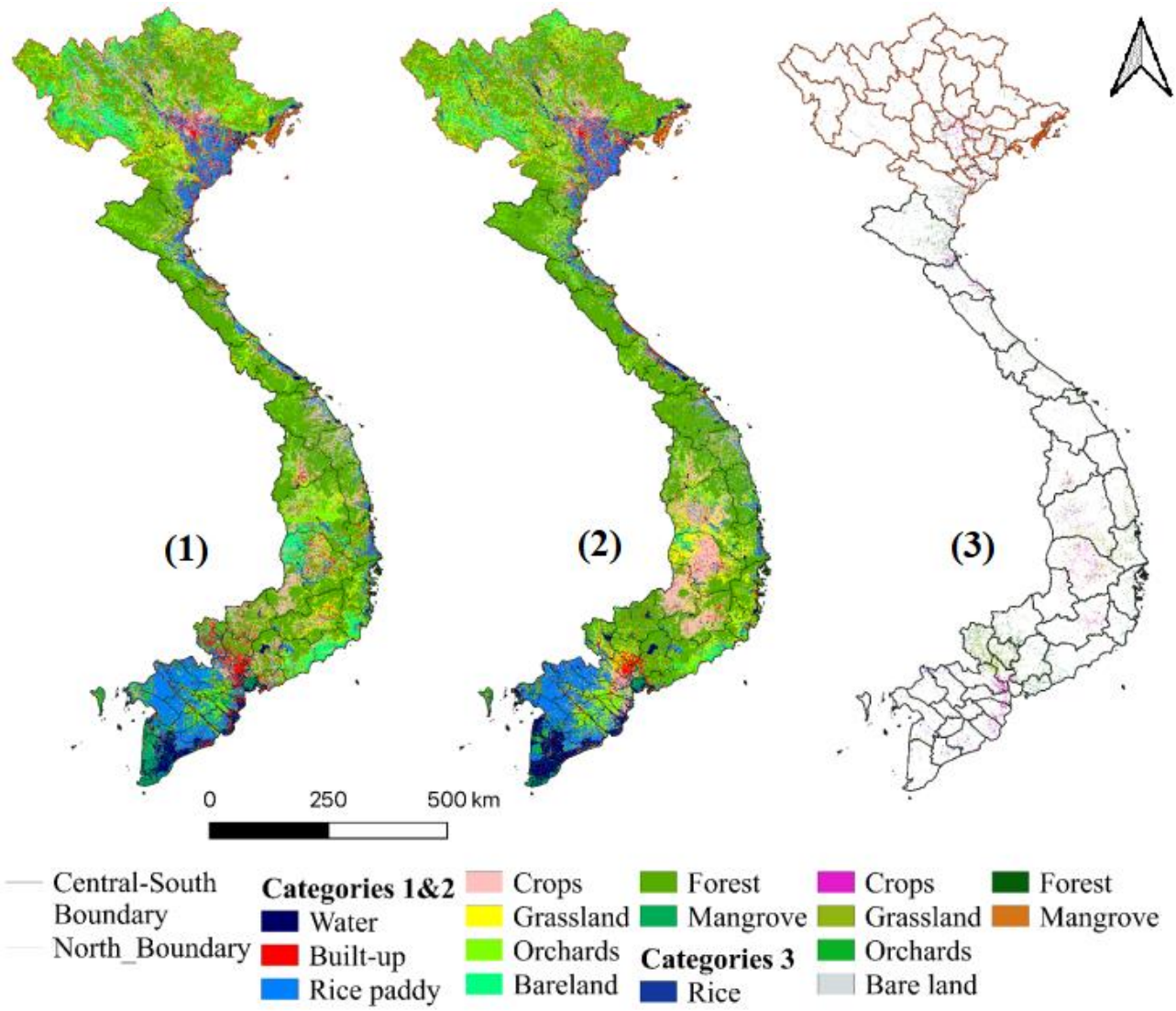


Fig. 3. Land Cover and Land Cover Change in mainland Vietnam (2007, 2015 and 2017). (1) – Land cover map of 2007; (2) – Land cover map of 2015 in the North and 2017 in the Central and South; (3) – Map of land cover change from agricultural categories to built-up land according to spatial distribution (Source: Tuan, 2022)

According to the MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT (2005), the acquired agricultural land in the period 2000–2005 was 366,400 hectares, of which the land area for urban development was 70,300 hectares, accounting for 19.19% of the total area of acquired agricultural land (MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT, 2005). According to the GENERAL DEPARTMENT OF LAND MANAGEMENT (2010), in the period 2006–2010, the total area of recovered agricultural land was 220,900 hectares, of which the land area for urban development was 22,500 hectares, accounting for 10.19% (DAO, 2014). In the period 2011–2015, 89,400 hectares of rice land were converted to urban land, allocated in three regions including the Southeast, the Red River, and the Mekong Delta (TRAN ET AL., 2023).

Numerous studies on the impact of urbanization on agricultural land use change in Vietnam have been conducted. YUEN ET AL., (2021) showed that rapid urbanization is accelerating the loss of agricultural land in both the Red River Delta and the Mekong River Delta. In Ha Noi, a major city in the Red River Delta, 1,420 hectares of agricultural land was lost corresponding to 3% per year from 2000–2007 (YUEN ET AL., 2021). According to YEN (2017), Bac Ninh's urban population growth rate in the period 2005–2015 was quite high at 9.3%. During this period, the area of agricultural land converting to non-agricultural land was 4,900 hectares which was concentrated mainly in Bac Ninh City, Tu Son Town, and the districts of Tien Du, Yen Phong, and Que Vo. This result shows that over 80% of agricultural land has been converted

to non-agricultural land which has led to unemployment due to the lack of skills to adapt to non-agricultural jobs (YEN, 2017). In the peri-urban areas, the process of urbanization also creates a sharp change in land use. The conversion of a large part of agricultural land to urban residential land, land for non-agricultural use, and land for public purposes leads to the loss of the main livelihood of peasants, forcing them to switch to other non-agricultural activities. This is a big challenge for farmers, especially the poor farmers because time and investment in both money and intelligence are requirements to adapt to new conditions (PHAM & PHAN, 2020).

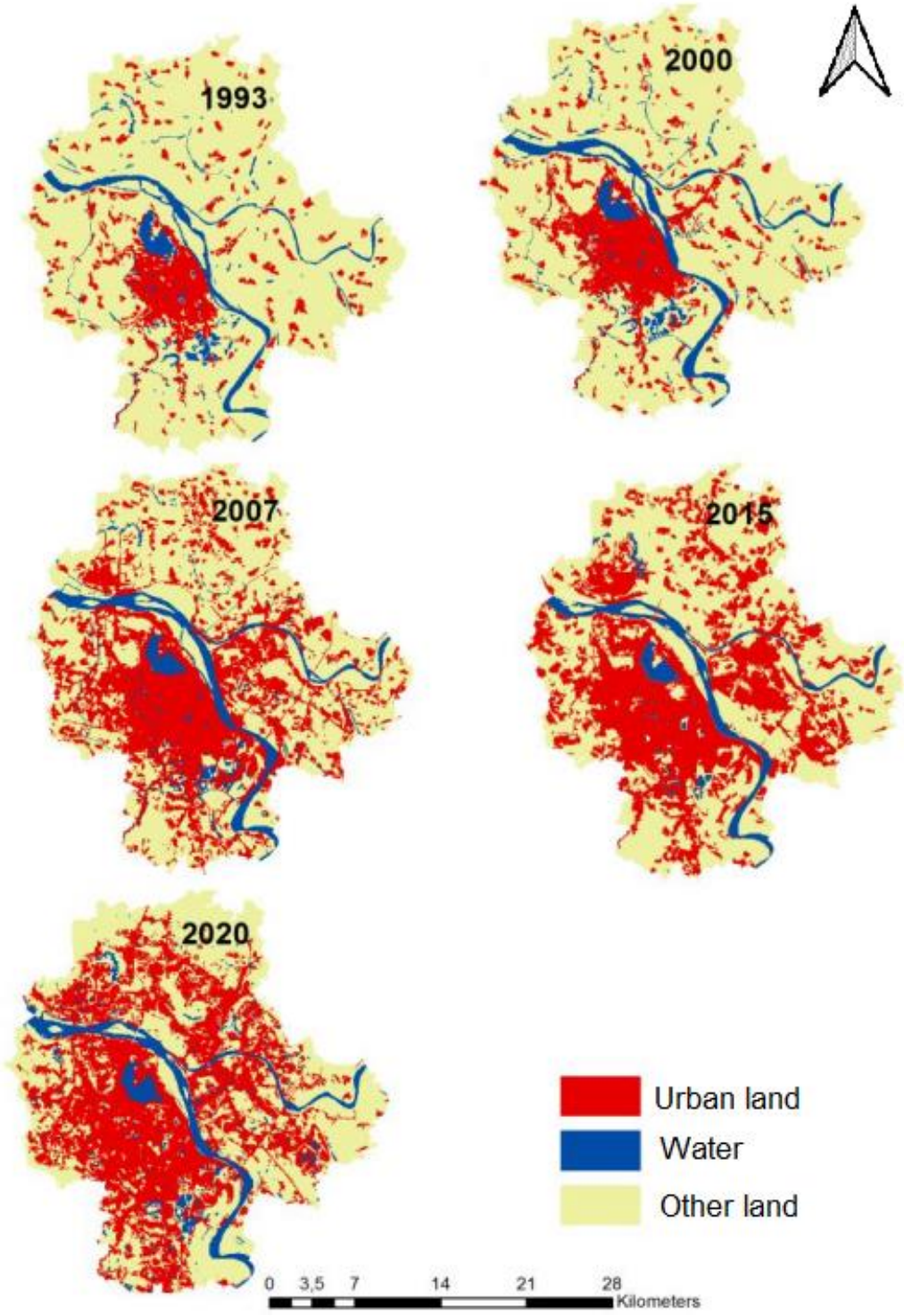


Fig. 4. Urban expansion of Ha Noi during 1993-2020 period (source: Phuong et al., 2021)

According to SETO ET AL. (2012), if current trends in population density and all areas with high urban expansion continue to change, urban land cover will increase by 1.2 million km² by 2030 which is three times the amount of the global urban land area in 2000. Consequently, cropland loss will be recorded as 1.8–2.4%, 80% of which will be conducted in Asia and Africa. Notably, much of the cropland loss is more than twice as productive as national averages. The loss of cropland in terms of area will be highest in Asia, whereas African countries will undergo the highest loss in terms of proportion to the total land area.

Converting agricultural land to non-agricultural purposes is an inevitable trend in the context of urbanization. This issue has been studied in many countries around the world. In China, research by WANG ET AL. (2016) showed that urbanization always goes hand in hand with the development of urban areas and industrial zones, handicrafts and technical infrastructure, and the agricultural area (WANG ET AL., 2016). The determined rate of arable land lost in the eastern region of China was 7% and 29.2% for the period 1995–2000 and the period 2000–2008, respectively (DENG ET AL., 2015). During the period 1978–1995, the arable land area decreased by 4.42 hectares, from 99.39 million hectares to 94.97 million hectares (LIN & HO, 2003). In Thailand, the urbanization rate increased from 31.39% in 2000 to 51.40% in 2020. Urbanization also caused the sharp decline of forest land and arable land, while the area of grassland, wetland and residential land increased in the 2000–2007 period. The decrease in forest land mainly occurred in the northern region. Meanwhile in the central, eastern, and southern regions, cultivated land decreased (WIRIYANUWATKUL ET AL., 2013). DURINA ET AL. (2012) investigated land use change in Bangkok and found that the ratio of urban built-up area increased by 16.5%, 28.2%, and 35.4% in 1994, 2000, and 2009, respectively. In contrast, agricultural area and vegetation continuously decreased by 71.4%, 56.1%, and 43.3%, respectively (NAGASAWA & PATANAKANO, 2013).

Urbanization promotes economic growth and social development, creating various kinds of jobs through the development of non-agricultural activities such as industry, handicrafts, trade, and services. These activities will attract a local labour force and migrant workers from rural areas, create jobs for peri-urban residents and rural areas, and widen farmers' visions for market economic activities. This situation leads to abandoned agricultural land in many places which means a waste of land potential. For example, Ha Nam province had just over 100 hectares of abandoned agricultural land areas in 2017 which has increased to 310 hectares currently. In 2019, Vinh Phuc province had more than 1,000 hectares of abandoned agricultural land during the crop season and in the winter, the cultivated area decreased to 6,000 hectares. Thanh Hoa province had more than 110 hectares of abandoned areas in 2019. Thai Binh province had more than 1,200 hectares of abandoned agricultural land (THANG, 2020). In recent years, under the trend of urbanization, there are 5,000 hectares of small agricultural land in residential areas, or non-agricultural land, to be abandoned due to infrastructure failure in production requirements. This issue wastes land resources and significantly affects the general development plan of the agricultural sector (HUU, 2022). In the world, some scholars also confirm that urbanization leads to an increased scale of agricultural land abandonment (ROJAS ET AL., 2013; GRĂDINARU ET AL., 2015).

A number of studies suggested the reasons leading to the situation of agricultural land abandonment in the context of urbanization. In rapid urbanization, urban spaces re-adapt to maximize profitability and combine economically viable land-use practices that could spread to nearby agricultural areas. As a result, agricultural land near urban areas often becomes fragmented and less profitable, and becoming abandoned. In addition, the migration of people from rural areas to urban areas is one of the primary reasons for the decreased intensity of agricultural land use or abandonment of nearby settlements (GRĂDINARU ET AL., 2015). In contrast, some other studies have shown that agricultural plots located far from the urban fringe will have a higher abandon rate (MEYFROIDT, 2016). The increasing transportation costs, lower land rent demand, and low yields in the backcountry may result in lower profit margins and further farmland abandonment (ZHANG & SONG, 2014). These are suitable explanations for the agricultural land abandonment in Vietnam. The policy of allocating agricultural land without collecting land use fees and exempting them from agricultural land tax is another reason for agricultural land abandonment.

In short, urbanization affects all walks of life and society regarding reduced agricultural area, abandoned agricultural land, and land pollution. The state and local governing bodies have taken specific measures and solutions to increase the value of agricultural production and minimize the impact on the environment such as implementing land consolidation and the exchange of plots, changing crop structure, applying

safe vegetable production models, mechanization in agriculture, linking production and consumption, and reducing price of products (BACH, 2003), application of high-tech agricultural models (YEN, 2022), and application of farm models that combine agriculture and tourism (NHAM & DIEP, 2020).

3.4. Some directions for agricultural land use in the context of urbanization

It is necessary to complete land laws to build concentrated, large-scale commodity production agriculture. Land laws have been gradually improved for socioeconomic development, ensuring national defense and security, which includes the development of agriculture, rural areas, and farmers. Under the current land law of Vietnam, households and individuals directly engaged in agriculture production, forestry, aquaculture, or salt making, who are allocated agricultural land without a land use levy, will have the quota for the acquisition of land use rights not exceed 10 times the value of the allocation quota for agricultural land for households or individuals. Agricultural cooperatives are exempted from land rent for building head offices, drying yards and warehouses, service facilities directly serving agriculture, forestry, aquaculture or salt production (THE NATIONAL ASSEMBLY OF VIET NAM, 2013; PHAN ET AL., 2020; PHAN ET AL., 2021). The above provisions are important legislation for land users to consolidate and concentrate on the use of land to avoi wasting of resources. However, the limitation of quotas and recipients in the case of land use rights transfers also affects the land use needs of households who are able to expand production and apply advanced technologies. Therefore, the land law should remove the quota for households and individuals when receiving the transfer of agricultural land use rights, and tax at a high rate for abandoned and inefficient agricultural land. At the same time, the State recovers strictly fallow land as well as inefficient land use in two consecutive years, and thenallocating these to those who need it. Land users must transfer the temporary land use rights under the land lease contracts in the situation of its inefficient use and/or temporary cessation of agricultural production.

Completing land use planning and agricultural production planning towards specialized cultivation with a stable term to ensure profitable investment is a critical direction for Vietnam. It is necessary to calculate the efficiency of the land use in order to choose the most effective plan, to ensure advantages in applying agricultural mechanization and automation. The land use planning must be consistent with other plans, and the planning period must also be equal to the term for agricultural land allocation or land lease. Land use planning must be suitable for each region with stable terms of 10 years, 20 years, 30 years, and 50 years so that land users can make appropriate investment plans. Simultaneously, it is essential to improve the quality of planning and more accurate forecasting for the needs of agricultural land conversion. Land use plans should be published on the internet and at the local government offices so that people can search for information as well as monitor the implementation of land use planning.

It is also necessary to promote the restructuring of the agricultural sector by key product groups associated with the strengths of each region, that is, focusing on cultivating according to the cultivation process of key crops in each region to ensure productivity and appropriate use of land. Furthermore, it is necessary to promote the application of high-tech agriculture and give a high priority to developing new plant varieties and livestock with high yields, good quality, and adaptability to the conditions of each ecological region to improve agricultural production as well as to reduce carbon emissions. At COP26, Vietnam made a commitment to reach its net-zero carbon emission target by 2050, and to participate in the initiative "Reducing global methane emissions" and made a commitment to implement the "Glasgow Declaration on Forests and Land Use" (KHOI, 2022). The goal of reducing carbon emissions plays a vital role in increasing the value of agricultural products and reducing environmental pollution. To achieve this goal, the State needs to develop effective financial mechanisms to encourage the transition of low-carbon farming practices and to develop crucial methodologies of Measurement, Reporting, and Verification (MRV). Currently, a number of cooperatives apply farming models to reducing carbon emissions such as Ia Mo Nong Cooperative of agricultural production, trade and tourism services (Gia Lai province), the model of commercial rice cultivation in My Dong 2 Cooperative (Dong Thap province), Tan Long Clean Rice Cooperative (Hau Giang province)... (HUYEN ET AL., 2022). Moreover, many private enterprises participated in green production, low-carbon agricultural products such as IDH (The Sustainable Trade Initiative) joining forces for sustainable coffee production in the central highlands provinces; Loc Troi Group producing SRP (Sustainable Rice Platform) rice; Oxfam, IRRI (International Rice

Research Institute) focusing on reducing the carbon emissions of rice production; using Biofloc technology for super-intensive shrimp production, and use of LED lighting systems for offshore fishing, etc. (KHOI, 2022). These are favourable conditions for Vietnam to fulfill its commitment to reach 'zero' net emissions by 2050.

Developing a collective economy and cooperatives in agriculture aim to build the areas of concentration for production, large sample fields, and raw material areas. To solve the disadvantages of the household economic model, the state should apply advanced scientific measures in production and standardize product quality for products with a large volume of goods to meet market requirements.

The state needs to build policies for consumption and agricultural production processes in supporting, forecasting, and searching markets for reasonable, sustainable, and economic land use. The state should also provide capital support and training for the high labour resource in agriculture. Finally, it is essential to reform rural vocational training to meet the needs of the labour market and develop social insurance for farmers with agricultural land loss in rural and urban areas.

Building a transparent land use rights market is helpful for households, individuals, and enterprises in accessing land. For this reason, it is necessary to build, update, and publicize the database on land prices while simplifying administrative procedures in restructuring crops and livestock on agricultural land.

4. Conclusions

Nowadays, urbanization is an inevitable part of the socioeconomic development of countries around the world, including Vietnam. Many investment projects using land are approved to develop urban areas; technical and social infrastructure leads to decreasing agricultural land by conversion into non-agricultural land as well as abandoned agricultural land and land pollution. Therefore, many countries are faced with the urgent issue of solving the coexistent demands of using land for urban and industrial development as well as ensuring food security through using land through agriculture. Presently, the urbanization rate of Vietnam was found to be over 41%, and it is projected that in 2025, the urbanization rate will reach about 45% and it will grow to over 50% by 2030. Studies have shown that rapid urbanization is accelerating the loss of agricultural land all over the country. The conversion of a large part of agricultural land to urban residential land, land for non-agricultural use, and land for public purposes leads to the loss of the main livelihood of peasants, forcing them to switch to other non-agricultural activities. This is a big challenge for farmers, especially the poor farmers because time and investment in both money and upskilling are requirements to adapt to new conditions. Thus, the proposal of rational agricultural land use orientation in the context of urbanization plays an important role in contributing to the country's socioeconomic development. Proposals to implement this include: completing land laws towards building concentrated, large-scale commodity production agriculture; completing land use planning, agricultural production planning towards specialized cultivation with a stable term to ensure profitable investment; promoting the restructuring of the agricultural sector by key product groups associated with the strengths of each region; build policies for consumption and agricultural production processes in supporting, forecasting, and searching markets for reasonable, sustainable, and economic land use; building policies for consumption and agricultural production processes; and building a transparent land use rights market.

Author contribution:

Phan Thi Thanh Huyen and Pham Quy Giang together contribute to: Conceptualization, writing – original draft, Formal analysis, Methodology, Data curation, Visualization, Review and editing. The authors contributed equally to this study.

References

Anh V.V., Trang N.T.T. 2020. The impacts of urbanization on fluctuation of urban land use in Thai Nguyen province. *TNU Journal of Science and Technology,* 225, 7: 498–504.

Bach T. 2023. *Prevent the situation of agriculture land abandonment.* https://hanoimoi.com.vn/tin-tuc/Nong-nghiep/1057660/ngan-chan-tinh-trang-dat-nong-nghiep-bo-hoang

Bren d'Amour C., Reitsma F., Baiocchi G., Barthel S., Güneralp B., Erb K.H, Haberl H., Creutzig F., Seto K.C. 2017. Future urban land expansion and implications for global croplands. *Proceedings of the National Academy of Sciences,* 114: 8939–8944.

Burke I.C., Kittel T.G.F., Lauenroth W.K., et al. 1991. Regional Analysis of the Central Great Plains. *BioScience*, 41: 685–92.

Central Committee of the Communist Party of Vietnam. 2022. *Resolution No. 06-NQ/TW dated January 24, 2022 on planning, construction, management, and sustainable development of urban areas in Vietnam til 2030, with a vision toward 2045.* https://thuvienphapluat.vn/van-ban/EN/Xay-dung-Do-thi/Resolution-06-NQ-TW-2022-planning-and-construction-of-urban-areas-in-Vietnam-til-2030/513135/tieng-anh.aspx

Communist Party of Vietnam. 2021. *Documents of the 13th National Congress of Deputies - Volume 1*. Publishing House of National Politics - The Truth, Ha Noi, Vietnam.

Dao T.C. 2014. *Studying the current situation and proposing reform of the law on land acquisition, compensation, support and resettlement*. Thesis of doctor of Land Management. Vietnam National University of Agriculture, Hanoi.

Deng X., Huang J., Rozelle S., Zhang J., Li Z. 2015. Impact of urbanization on cultivated land changes in China. *Land Use Policy*, 45: 1–7.

Drebold H. 2017. *Food security and rapid urbanization: A case study of urban agriculture in Hanoi.* Södertörns University, Institution of Natural Science, Environmental Studies and Technology, Bachelor thesis, Flemingsberg.

General Statistics Office of Vietnam. 2017. *Results of the 2016 agricultural and rural census*. Statistical publishing House, Ha Noi, Vietnam.

General Statistics Office of Vietnam. 2010. *Statistical yearbook of Vietnam 2009*. Statistical publishing House, Ha Noi, Vietnam.

General Statistics Office of Vietnam. 2021. *Statistical yearbook of Vietnam 2020*. Statistical publishing House, Ha Noi, Vietnam.

General Statistics Office of Vietnam. 2022. *Report No. 331/BC-TCTK dated December 29, 2022 on the economic – Social situation in the fourth quarter and 2022.* Ha Noi, Vietnam.

General Statistics Office of Vietnam. 2023. *The impact of urbanization on the gap between rich and poor in Vietnam.* https://www.gso.gov.vn/du-lieu-va-so-lieu-thong-ke/2021/12/tac-dong-cua-do-thi-hoa-den-chenh-lech-giau-ngheo-o-viet-nam/

Grădinaru S.R., Iojă C.I., Onose D.A., Gavrilidis A.A., Pătru-Stupariu I., Kienast F., Hersperger A.M. 2015. Land abandonment as a precursor of built-up development at the sprawling periphery of former socialist cities. *Ecological Indicators*, 57: 305–313.

Government of Viet Nam. 2022. *Resolution No. 148-NQ/TW of Government of Viet Nam on implementation of the government's action program implemented Resolution No. 06-NQ/TW of the Ministry of Politics on planning, construction, management, and sustainable development of urban areas in Vietnam til 2030, with a vision toward 2045.* https://vanban.chinhphu.vn/?pageid=27160&docid=206848&classid=509

Heimlich R., Barnard C. 1992. Agricultural Adaptation to Urbanization: Farm Types in Northeast Metropolitan Areas. *Northeastern Journal of Agricultural and Resource Economics*, 21: 50–60.

Huu C. 2022. *Hanoi: Abandoned nearly 5,000 hectares of agricultural land*. https://laodong.vn/bat-dong-san/ha-noi-bo-hoang-gan-5000-hecta-dat-nong-nghiep-1096323.ldo

Huyen P.T.T., Tuan P.A., Hue N.T., Yen T.T. 2022. Some financial solutions on land supporting for collective and cooperative economic development. *Proceedings of International Conference Towards net zero emissions: policy and practice*; 5th October, 2022, Hanoi.

Khoi C. 2022. *Private enterprise is a key driver for green, low-emission agriculture. Economic life in Vietnam & the world*. https://vneconomy.vn/doanh-nghiep-tu-nhan-la-dong-luc-chinh-cho-nong-nghiep-xanh-phat-thai-thap.htm

Kim T.H. 1996. *Vietnam's economy - The road from 1945-1995 and prospects to 2020*. Statistical Publishing House, Ha Noi, Vietnam.

Le M.H., Carolyn T. 2021. Vietnam's agriculture: From local to global mindset. *VietnamNet News.* https://vietnamnet.vn/en/vietnams-agriculture-from-local-to-global-mindset-798163.html

Lin G.C.S., Ho S.P.S. 2003. China's land resources and land-use change: insights from the 1996 (land survey. *Land Use Policy*, 20: 87–107.

McKenzie F., Williams J. 2015. Sustainable food production: constraints, challenges and choices by 2050. *Food Security*, 7: 221–33.

Meyfroidt P., Schierhorn F., Prishchepov A.V., Muller D., Kuemmerle T. 2016. Drivers, constraints and trade-offs associated with recultivating abandoned cropland in Russia, Ukraine and Kazakhstan. *Global Environmental Change*, 37: 1–15.

Ministry of natural resources and environment. 2005. *Report on the situation of using agricultural land for construction of industrial zones and working life of people whose land is acquired*. Ha Noi, Vietnam.

Morton L.W. 2020. Working toward sustainable agricultural intensification in the Red River Delta of Vietnam. *Journal of Soil and Water Conservation*, 75, 109A–116A.

Nagasawa R., Patanakano B. 2013. Urbanization and its Influences on the Suburban Landscape Changes in Bangkok Metropolitan Region, Thailand. *Journal of JASS*, 29, 2: 29–39.

Ngu N.H., Tan T.T., Tham D.T. 2015. Research on the effects of urbanization on the convert of agricultural land to non-agricultural land in Dong Hoi city, Quang Binh province. *Hue University Journal of Science*, 2015, 4: 121–132.

Nham P.T., Diep N.T.H. 2020. Some development models of suburban areas of major cities in Vietnam. *Journal of Construction Science*, 103+104: 56–61.

Otsuka K. 2013. Food insecurity, income inequality, and the changing comparative advantage in world agriculture. *Agricultural Economics*, 44: 7–18.

Party Central Committee of Vietnam. 2022. *Resolution No. 29-NQ/TW dated November 17, 2022 of the Sixth Conference of the 13th Party Central Committee on continuing to accelerate the country's industrialization and modernization to 2030, with a vision to 2045.* Ha Noi, Vietnam.

Pham T.N., Phan T.V.A. 2020. Overview of peri-urban areas of major cities in the process of rapid urbanization. *Journal of Construction Science*, 103+104: 20–25.

Phuong N.T.H. 2017. The process of urbanization affects the restructuring of land use in Binh Duong province in the period 2000-2015. *Ho Chi Minh City University of Education Journal of Science,* 14, 5: 120–125.

Phan T.T.H., Pham P. N., Ngo T.H. 2020. *Land allocation, land lease*. Publishing House of Vietnam National University of Agriculture, Ha Noi, Vietnam.

Phan T.T.H., Pham P.N., Tran T.P., Phan D.B., Nguyen V.Q., Truong Q.N., Nguyen T.Q., Nguyen D. T., Vu T.B., Tran T.Y., Bui N.H. 2021. *Land management in Vietnam - Theoretical and practice*. Publishing House of Hanoi National University, Ha Noi, Vietnam.

Phuong L.T.M., Anh V.L., Quang N.H. 2021. Research on Urban Land Use Change in Ha Noi, Viet Nam Using Remote Sensing and GIS for Planning Oriented Work. *International Journal of Sustainable Construction Engineering and Technology,* 12, 3: 24–34.

Plieninger T., Draux H., Fagerholm N., Bieling C., Bürgi M., Kizos T., Kuemmerle T. 2016. The driving forces of landscape change in Europe: A systematic review of the evidence. *Land Use Policy*, 57: 204-214.

Prime Minister of Vietnam. 2012. *Decision 1659/QD-TTg of Prime Minister on November 07, 2012 on approving the national program on urban development in 2012-2020 period*. https://chinhphu.vn/default.aspx?pageid=27160&docid=164387

Prime Minister of Vietnam. 2018. *Decision 950/QD-TTg of Prime Minister on August 01, 2018 on approving scheme for development of smart sustainable cities in Vietnam in the 2018–2025 period with orientations by 2030*. https://vanban.chinhphu.vn/default.aspx?pageid=27160&docid=194337

Prime Minister of Vietnam. 2018. *Decision 84/QD-TTg of Prime Minister dated January 19, 2018 on approving the Vietnam Green Growth Urban Development Plan*. https://thuvienphapluat.vn/van-ban/Xay-dung-Do-thi/Quyet-dinh-84-QD-TTg-2018-phe-duyet-Ke-hoach-phat-trien-do-thi-tang-truong-xanh-Viet-Nam-374062.aspx

Qiao Z., Tian G., Xiao L. 2013. Diurnal and seasonal impacts of urbanization on the urban thermal environment: A case study of Beijing using MODIS data. *ISPRS Journal of Photogrammetry and Remote Sensing*: 85: 93–101.

Rojas C., Pino J., Basnou C., Vivanco M. 2013. Assessing land-use and-cover changes in relation to geographic factors and urban planning in the metropolitan area of Concepción (Chile). Implications for biodiversity conservation. *Applied Geography*, 39: 93–103.

Seto K.C., Guneralp B., Hutyra L.R. 2012. Global Forecasts of Urban Expansion to 2030 and Direct Impacts on Biodiversity and Carbon Pools. *Proceedings of National Academy of Science*, 109, 40: 16083–16088.

Statistica. 2023. *Vietnam: Urbanization from 2011 to 2021*. https://www.statista.com/statistics/444882/urbanization-in-vietnam/

Stoate C., Báldi A., Beja P. Boatman N.D., Herzon I., van Doorn A., de Snoo G.R., Rakosy L., Ramwell C. 2009. Ecological impacts of early 21st century agricultural change in Europe – A review. *Journal of Environmental Management*, 91: 22–46.

Thang M. 2020. *Farmers leave their fields - why?* https://www.qdnd.vn. 2020. https://www.qdnd.vn/ban-doc/thu-ban-doc/nong-dan-bo-ruong-vi-sao-618100.

The Prime Minister of Viet Nam. 1998. *Decision No. 10/1998/QD-TTg dated on January 23, 1998 to approve the orientations of the master plan for the development of Vietnam's urban centers till 2020*. https://vietlaw.quochoi.vn/Pages/vbpq-toan-van.aspx?ItemID=5405.

The National Assembly of Viet Nam. 2013. *Land Law (Law 45/2013.QH13)*.

Thu T.T.H. 2015. *Study on Impact of Urbanization on Agricultural Land Use Structure in Dong Anh Region - Ha Noi.* Thesis of doctor of Geodesy - Mapping. Hanoi Universy of Mining and Geology, Ha Noi, Vietnam.

Tran T.Y., Nguyen B.L., Nguyen T.H., Pham P.N., Phan T.T.H. 2023. Overview of the impact of urbanization on the land use and management. *Journal of Forestry Science and Technology*, 2: 1–9.

Tsubota K. 2006. *Urban agriculture in Asia: lessons from Japanese experience.* ASPAC Food and Fertilizer Technology Center, Taipei, Taiwan.

Tuan N.T. 2022. Urbanization and land use change: A study in Vietnam. *Environmental & Socio-economic Studies*, 10, 2: 19–29.

United Nations. 2012. *World Urbanization Prospects, the 2011 Revision*. https://www.un.org/en/development/desa/publications/world-urbanization-prospects-the-2011-revision.html.

Urban Solutions. 2011. *Vietnam Urbanization Review.* Technical Assistance Report, World Bank.

Wang C., Gao Q., Wang X., Yu M. 2016. Spatially differentiated trends in urbanization, agricultural land abandonment and reclamation, and woodland recovery in Northern China. *Scientific Report*, 6: 37658.

Wegren S., Elvestad C. 2018. Russia's food self-sufficiency and food security: An assessment. *Post-Communist Economies*, 30: 565–587.

Wijitkosum S. 2016. The impact of land use and spatial changes on desertification risk in degraded areas in Thailand. *Sustainable Environment Research*, 26: 84–92.

Wiriyanuwatkul S., Chidthaisong A., Tripetchkul S., Silpathong C. 2013. Quantifying Land Use Changes for Greenhouse Gas Inventory Purpose in Thailand between 2000 and 2007. *Journal of Sustainable Energy & Environment,* 4: 143–151.

World Bank. 2022. *Urban population (% of total population).* https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS

Yen N.T.H. 2017. *Urbanization and urban land use in Bac Ninh province in the period 2005–2015*. Thesis of doctor of Geography. Ha Noi National University of Education, Ha Noi, Vietnam.

Yen T.T. 2022. *Study the impact of urbanization on land management and utility, life and employment of people in Vinh city, Nghe An province*. Thesis of doctor of Lan Management. Vietnam National University of Agriculture, Ha Noi, Vietnam.

Yuen K.W., Hanh T.T., Quynh V.D., Switzer A.D., Teng P., Lee J.S.H. 2021. Interacting effects of land-use change and natural hazards on rice agriculture in the Mekong and Red River deltas in Vietnam. *Natural Hazards and Earth System Sciences*, 21: 1473–1493.

Zhang Y., Li X., Song W. 2014. Determinants of cropland abandonment at the parcel, household and village levels in mountain areas of China: A multi-level analysis. *Land Use Policy*, 41: 186–192.

Zhou T., Koomen E., Ke X. 2020. Determinants of Farmland Abandonment on the Urban–Rural Fringe. *Environmental Management*, 65: 369–384.