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Factors affecting the management of public agricultural land fund in Gia Lam District, Hanoi City, Vietnam

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ABSTRACT

The study aims to identify the influencing factors and their impact level on the public agricultural land management. The results show that the policy group is the most influential with an impact level of 38.06 %, followed by the financial group with an impact level of 36.17 %, the management factor with an impact level of 25.77 %. In order to improve the efficiency of the management of public agricultural land fund, it is necessary to amend and supplement a number of policies and laws, such as setting the maximum lease time of public agricultural land fund to be equal to the duration of district-level land use planning; strengthening the propagation and dissemination of land law; rational use of fragmented and scattered land parcels; settling encroached or occupied land plots through conversion of land use purposes into residential or public purposes of the commune.

1. Introduction

In Vietnam, the public agricultural land fund is the land area not exceeding 5% of the total land area for annual crops, land for perennial crops and aquaculture land of a commune. In addition to supplementing the public agricultural land fund, there are other sources such as agricultural land returned by organizations, households and individuals or donated with the right to use to the State, reclaimed land, recovered agricultural land. It is the source to form or supplement the agricultural land fund used for public purposes of the commune. The fund of public agricultural land managed and used by the commune is to meet the needs of constructing cultural, physical training and sport facilities, health care, public entertainment, cemeteries and other works of the commune and for rent when not in use to collect land rental for public purposes of the commune.

According to Vietnam's land law, land is owned by the people and is uniformly managed by the State. People do not have the right to own land, can only use the land and transfer the land use right when needed. Land management in general, and management of public agricultural land fund in particular is the State's purposeful impact on land in order to use land efficiently and sustainably in association with environmental protection (Pham Phuong Nam and Nguyen Van Quan, 2014). The National Assembly manages land through the promulgation of land legislation, decisions on land use planning and plans throughout the country, and exercises the supreme supervision over land management and use. The Government uniformly manages land, including land funds nationwide. The commune-level People's Committee directly manages and leases public agricultural land fund for a period not exceeding 5 years.

So far there have been a number of studies on different aspects of land management in general and public agricultural land in particular. The study of Le Thi Thanh Xuan et al. (2015) has pointed out some limitations in the management of public agricultural land such as leasing land to wrong subjects, illegally transferring public land, using land for improper purposes, encroaching and occupying public agricultural land; Public land management records are not regularly updated. According to Nguyen Huu Ngu et al. (2017), public agricultural land fund is still scattered, small plot land area; rental of public land without contracts should affect the efficiency of managing public agricultural land, causing rent losses.

Research by Pham Phuong Nam and Nguyen Van Quan (2014) focused on assessing the status of land management and use, including public agricultural land and pointed out some limitations in land management such as the area of land plots is small, scattered in residential areas, difficult to cultivate, encroached or occupied; leasing land not to the right subjects, leasing time in excess of the prescribed term… According to Tran Trong Tan et al. (2015), the percentage of public agricultural land fund in the study area is lower than the regulation, the

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management level of officials and public employees is not high and has proposed some solutions to use land for public agricultural land more effectively. Research by Ngo Tuan Ngoc (2016) has shown the advantages and limitations in managing public agricultural land fund such as using the land for improper purposes, encroaching on land, or not to be used public agricultural land in residential areas.

According to the research of Gana's land management model by Kasim Kasanga and Nii Ashies Kotey (2001), it is necessary to build a modern land management system with the traditional characteristics of each area. Tran and Vu's study (2019) focused on assessing the impact of land dispersion on agricultural production efficiency. The research of O'Sullivan et al. (2018) focused on providing integrated land management policies to improve land use efficiency based on the theory of functional land management. Bazame et al. (2019)' research on land use and land management using regression analysis has shown that changes in agricultural land use are influenced by social factors such as population density, added value from land. Land types and policy and legal factors can also affect land management.

Long and Qu's research found that factor affecting land management is land use conversion (Long and Qu, 2018). According to Behera (2019) land laws have an impact on tribal land management and especially on people's livelihoods. Therefore, modern land laws need to have appropriate regulations to protect tribal livelihoods. According to Rasch and McCaffrey (2019) land management is affected by the interests of land user groups, so in order to balance the interests of the parties, a public land policy should be in line with their interests. Keiter and McKinney (2019)' reseach pointed out managing public land in the western United States in the 21 st century faces challenges and changes, so that in order to manage public land effectively, it is necessary to renovate policies and laws on public land management.

Gao (2019)'s research focused on and the impact of public land rent on socio-economic development. According to Boudet et al. (2020) rural urbanization has a strong influence on agricultural land use. Specifically, agricultural land area has been reduced and land use was ineffective in Global South. Kilgore and Snyder (2016)'research pointed a number of constraints on public land management, such as increased conflict in public land, reduced access to public land, increased demand and costs of public land management. Miller and Nadeau (2020) argue that there are different economic and social conditions in the two different provinces, but in order to better manage public land, it is necessary to complete the policy of public land management with the participation of the community. (Ekpodessi and Nakamura (2018) studied the impact of the 2013−01 Land Law on land management and pointed out a number of factors affecting land management in the Benin Republic such as limited legal knowledge, land registration, land information. For good land management, adequate land registration and cadastral records are required (Polat and Alkan, 2020). According to Griewald (2018) agricultural land management is directly influenced by the State in Russia. According to Khorchani et al. (2020) one of the factors affecting land management is the conversion of planned land use at the Central Spanish Pyrenees. According to research by Park et al. (2019) land use tax reduction, cadastral mapping for effective land management are also needed. Other research on the role of certification for land use efficiency has shown that certification is only a means to manage land, and to use land effectively requires multi-faceted research and the concentration of the government (Saint-Macary et al., 2010). Sikor (20060 pointed land registration is particularly important because it guarantees the legal rights and interests of land users, avoiding land disputes. According to research by Klimach et al. (2018) effective land management requires a modern, multi-goal land information system.

The above studies focused on assessing one or a number of factors affecting the management of public land fund individually as a basis for proposing solutions to enhance public land management but have not studied in depth all the influencing factors to manage public agricultural land. Therefore, the study proposes a method for evaluating factors affecting public agricultural land as a basis for proposing improvements in policies and laws on public agricultural land management.

2. Material and methods

2.1. Study area

The study selected Gia Lam district, Hanoi city as the research site to apply a pilot model to evaluate factors affecting the management of public agricultural land fund because Gia Lam district has a large public agricultural land fund, which is subject to be affected by many impact factors. Gia Lam is a district of Hanoi city, Vietnam. Gia Lam has a population of 250,647 people, a natural area of 11,671.28 ha, of which public agricultural land accounts for 270.31 ha (Fig. 1).

2.2. Data collection

Secondary data was collected in the period of 2015−2019. Primary data related to the management of public agricultural land fund in Gia Lam district, Hanoi city was collected from January to February 2020. Collecting data on Natural and socio-economic conditions at Gia Lam District Statistical Office, Hanoi City. Data on the status of public land fund management and management was collected at the Department of Natural Resources and Environment of Gia Lam district.

Primary data was collected in two steps. As a first step, investigating randomly with a statistically significant minimum sample size (30 land management experts and 30 households renting public land to determine the factors influencing the management of public land fund). The questionnaire content included the name of the respondent, the address and the factors that may affect the management of public land (according to the assumption of the investigator) for the respondent to choose. In addition, respondents could add other factors. The survey results in the first step showed that there were 10 influencing factors in the opinion of more than 50 % of the total number of assessors and are divided into 3 groups (policy factor group, financial factor group, management factor group) according to the characteristics of the factors (Table 1).

The multivariate linear regression model determining the influence of factors on public land fund management in Gia Lam district has the following form:

$$Y = \beta 1 * PF + \beta 2 * FF + \beta 3 * MF + \beta o$$

Where Y is dependent variable representing the influence of public land fund management; β1, β2, β3: Regression coefficients of the corresponding variables are law, finance, management; βo is constant; PF, FF, MF: the independent variables, respectively are the elements: law, finance, management.

The second step investigates factors' influence levels on the public land fund management according to the Likert scale (Likert, 1932). Influence levels are calculated (Very influential - 5 points, Fairly influential - 4 points, little influential - 3 points, very little influential - 2 points, not influential - 1 point). The number of samples was determined based on the requirements of Exploratory Factor Analysis (EFA) and multivariate regression with at least 5 observations for 1 measurement variable (Hoang Trong and Chu Nguyen Mong Ngoc, 2008). Therefore, with 10 variables measuring the number of samples is 50. For multivariate regression analysis, the minimum sample size to achieve is $50 + 8 * p$ (p is the number of variables - $p = 5$) (Tabachnick & Fidell, 1996), so the minimum number of samples to be surveyed is $50 + 8 * 3 = 74$. In order to ensure both the minimum requirement of exploratory factor analysis and multivariate regression analysis, the survey investigated 80 samples.

2.3. Statistical analysis

Survey data on influencing factors and their influence were

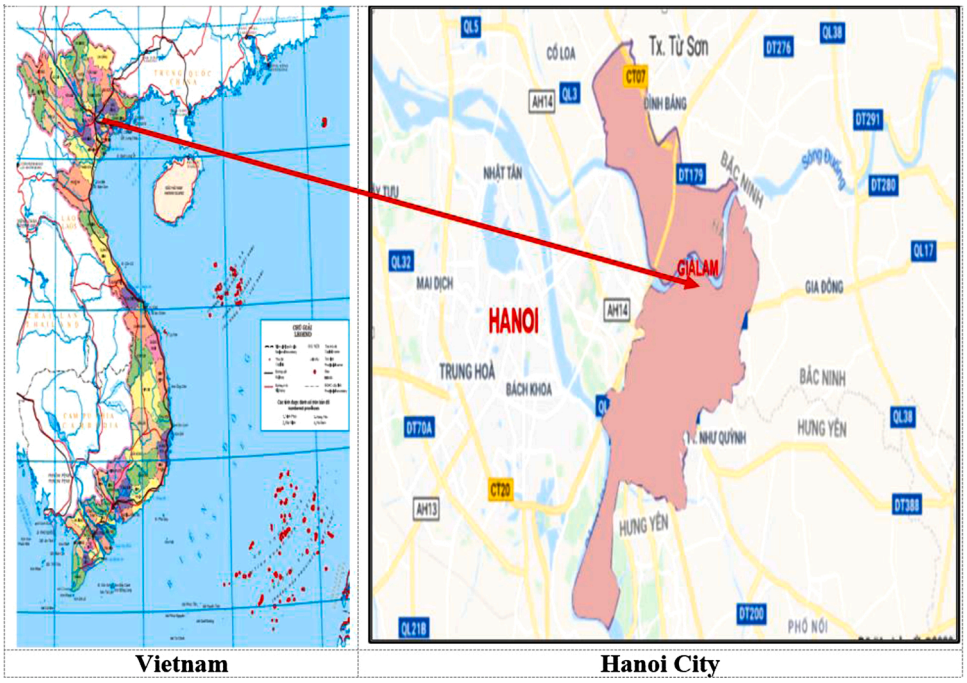

Fig. 1. Geographical location map of Gia Lam district, Hanoi city.

Table 1
Factor groups affecting public land fund management.

Factor groups
1. Policy and legal factor group (PF)
Legal regulation on public agricultural land fund (PF1)
Dissemination of the law on public agricultural land fund (PF2)
Understanding the laws of public agricultural land fund management (PF3)
Observance of the law on management of public agricultural land funds (PF4)
2. Financial factor group (FF)
Starting price of land lease auction (FF1)
Procedures for participation in land auction (FF2)
Collection and payment of land rent (FF3)
3. Management factor group (MF)
Inspection and management of public agricultural land fund (MF1)
Settlement of complaints and grievances (MF2)
Penalties for violations of land laws (MF3)

processed by SPSS 20.0 software. The reliability of the scale was verified by Cronbach's Alpha coefficient. Data ensure reliability when Cronbach's Alpha coefficients were in the range [0.6−0.95] (Hair et al., 1998), total correlation coefficient> 0.3 (Hair et al., 1998). Exploratory factor analysis (EFA) was used to shorten many measurement variables into a set of variables (factors) to make them more meaningful but still contain most of the information of the original set of variables (Hair et al., 1998). EFA was assessed through KMO appropriate coefficient, Bartlett test, Eigenvalues coefficient, total explanatory variance and load factor. Variables are only accepted when KMO is in the range [0.5–1] and its own weight factors in other factors are less than 0.35 (Igbaria et al., 1995) or the distance between two load weights. (Factor loading) the same variable in 2 different factors greater than 0.3. According to Hair et al. (1998), with a sample size of about 100, weights of 0.55 should be chosen, so for sample size 80, in this study, we will choose a load weight greater than 0.55. Besides, the scale is only accepted when the total variance explained (Total variance explained) is greater than 50 %; Barlett's coefficient with Sig significance level less than 0.05 to ensure the factors are correlated with each other; Eigenvalue coefficients are valued from 1 to ensure the groups of factors are different.

3. Results

By the end of 2019, most of the public agricultural land fund in Gia Lam district is leased on time (not more than 5 years), the rest is small (4.85 % of the total public land area, 10.49 ha) is leased over 5 years. The area of rented land from 3 to 5 years accounts for the largest proportion (64.62 %), followed by the leased land area from 1 to 3 years and less than 1 year. The total number of households renting a land plot is 845. The area of land rented for more than 5 years is 2.39 times the average of the land plot leased over 3 years to 5 years (Fig. 2) (Table 2).

The results of assessing the reliability of the scale through Cronbach's Alpha coefficients for 5 groups of factors show that, Cronbach's Alpha coefficients range from 0.829 to 0.883, the correlation coefficient of the total variable is greater than 0.3 (Table 3). Thus, the scale used to evaluate the factors affecting the winning price is reliable and suitable for subsequent analysis.

EFA's suitability test is done through KMO appropriate coefficient. The research results have determined that KMO = 0.841 and satisfy the condition of 0.5 < KMO <1, so analyzing the discovery factor is suitable with actual data. Besides, Barlett test results give Sig values. equal to 0.00 and less than 0.05 (Table 4). This proves that the measurement variables are linearly correlated with the representative factor. The

Fig. 2. Land for perennial crops belongs to the public agricultural land fund in Gia Lam district.

Table 2
Rent of public agricultural land fund by lease time in 2019.

Criteria	Unit	Rental period				Total/average
		Less than 1 year	From 1−3 years	More than 3−5 years	More than 5 years	
Area	ha	21.03	45.01	139.78	10.49	216.31
Area percentage	%	9.72	20.81	64.62	4.85	100.00
Number of parcels	plot	230	421	796	25	1472
Plot ratio	%	15.63	28.60	54.08	1.70	100.00
Average area	ha/plot	0.0914	0.1069	0.1756	0.4196	0.1470

(Source: Division of Natural Resources and Environment of Gia Lam district, 2020)

Table 3
Results of reliability analysis of the scale.

Symbol	Element and measurement variables	Correlated total variable
	1. Policy and Law Factor Group (PF- Alpha = 0.865)	
PF1	- Legal provisions on the management of public agricultural land fund	0.831
PF2	- Dissemination of laws on public agricultural land fund management	0.822
PF3	- Legal knowledge of public agricultural land fund management level	0.795
PF4	- Consciousness to comply with the law on public agricultural land fund management	0.784
	2. Financial Factor Group (FF - Alpha = 0.883)	
FF1	- Starting price of land auction	0.798
FF2	- Procedure for participating in land auction	0.853
FF3	- Payment of land rent	0.767
	3. Management Factor Group (MF - Alpha = 0.829)	
MF1	- Supervising and inspecting the observance of the law on management of public agricultural land fund	0.838
MF2	- Settlement of complaints and grievances about public agricultural land fund management	0.823
MF3	- Sanctioning violations of the law on management of public agricultural land fund	0.816

Table 4
KMO and Bartlett's Test results.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.841
Bartlett's Test of Sphericity	Approx. Chi-Square	1.727
	df	196
	Sig.	0.000

factor load factor of the components is greater than 0.60 (Table 5), so EFA analysis has practical significance, independent variables ensure the accuracy included in the regression analysis model to determine the extent influence of factors on public agricultural land fund management.

The results of multivariate regression analysis in Table 6 show that Sig coefficient equals 0.00 less than the significance level of $\alpha = 1\%$, so the regression model is significant, the independent variables affect the dependent variable Y. The adjusted R^2 value equal to 0.864 shows the

Table 5
Weight of rotation matrix.

Measurement variable	Group of influencing factors		
	1	2	3
PF2	0,852		
PF4	0,848		
PF1	0,814		
PF3	0,805		
FF2		0.845	
FF3		0.821	
FF1		0.834	
MF2			0.847
MF1			0.824
MF3			0.816

Table 6
Results of linear regression analysis.

Group of factors	Regression coefficient	t	Multicollinearity statistics		Impact ratio (%)	Order of influence
			Error (Sig.)	VIF		
Constant	−4.629					
PF	0.762	5.103	0	1.237	38.06	1
FF	0.724	4.534	0	1.558	36.17	2
MF	0,.516	5.437	0	1.453	25.77	3
Sig. F = 0,000						
Coefficient $R^2 = 0.887$						
Corrected R^2 coefficient = 0.864						
Durbin-Watson = 1.957						

independent variables included. Regression run affects 86.4 % of the change of the dependent variable, the remaining 13.6 % is due to non-model variables and random errors. In addition, the Durbin Watson coefficient has a value of 1.957, ranging from 1.5 to 2.5, so no first-order correlation occurs. The variance magnification (VIF) of all variables included in the model is less than 2, so the research model does not have multi-collinear phenomena. In addition, the variables included in the study are statistically significant (Sig. Equals 0 and is less than 0.05). From the standardized regression coefficient, the regression equation has been determined as follows:

$$Y = 0.762*PF + 0.724*FF ++ 0.516*MF - 4.629$$

4. Discussion

The factors included in the research model all affect the management of public agricultural land fund with different influence rates. The group of policy and legal factors is the most influential at 38.06 %, then followed by the financial element with the rate of 36.17 %, the management factor with the rate of 25.77 % (Table 6). Specifically, the land lease term affects investment in land because modern technology investment to reduce product costs, improve product quality requires a land lease time greater than the current legal period. In addition, a part of the people's awareness of observing the land law is not as good as not returning the land when the land lease term expires or encroaching on the land of public agricultural land. Some civil servants who lease land are not in accordance with their authority, not in compliance with the regulations, such as having to go through land use right auction but in many cases, leasing is not through auction. In terms of financial factors, determining the land rent in many cases is not competitive when determining the land rent, but mainly under the agreement of the commune or village People's Committee with the land lessee. The form of land lease contract is also not in compliance with the regulations, making it difficult for the process of defining and fulfilling financial obligations. Participants in land auctions need to submit documents and attend live auctions that have not organized online auction, thus causing loss of time, effort and finance for land participants. Management factors such as monitoring and checking the use of public agricultural land fund

in some communes have not been regularly and timely sanctioned, thus affecting the efficiency of public agricultural land fund management.

In order to improve the efficiency of public agricultural land fund management, it is necessary to set the lease term of the public agricultural land fund to be equal to the duration of district-level land use plannings and prioritize the extension of the subjects being leased to the subjects. In addition, it is necessary to enhance the propagation and dissemination of laws so that land tenants understand and strictly abide in parallel with the work of inspection, examination and strict punishment of violations of land law. Auction of land use rights when leasing public agricultural land funds in accordance with the current land law to ensure competition in land access to increase state budget revenues from land. For encroached or appropriated public land plots, they must be recovered for lease or used for public purposes of the commune or town or to request competent authorities to change the use purpose into residential land for auction. In addition, it is necessary to penalize land tenants who intentionally encroach on or occupy land according to the provisions of law. For the land area belonging to the public agricultural land fund that has been illegally transferred, the District People's Committee assigns the Division of Natural Resources and Environment together with other relevant functional departments and People's Committees of communes consider each case for settlement. Specifically, if on the land, construction works were built in accordance with construction plannings, without affecting other constructions, such land areas will be considered for granting certificates and collecting land use levies according to the law. On the contrary, it is necessary to force the land users to dismantle the buildings to return the site to the place they were before transferring and sanctioning land violations according to law provisions

5. Conclusion

All 10 factors belonging to 3 groups of factors included in the research model all affect the management of public agricultural land fund with different influence rates. The policy group is the most influential at rate of 38.06 %, then followed by the financial group at rate of 36.17 %, the management group at rate of 25.77 %. In order to improve the efficiency of the management of public agricultural land fund, the competent state agencies need to amend and add a number of land policies and laws, such as setting the maximum lease time of public agricultural land fund to be equal to the duration of district-level land use planning; strengthening the propagation and dissemination of land law; rational use of fragmented and scattered land parcels; settling encroached or occupied land plots through conversion of land use purposes into residential or public purposes of the commune.

Author statement

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References

Bazame, R., Tanrıvermis, H., Kapusuz, Y.E., 2019. Land management and sustainable use of land resources in the case of Burkina Faso. Land Degrad. Dev. 30, 608–621. https://doi.org/10.1002/ldr.3247.

Behera, H.C., 2019. Land, property rights and management issues in tribal areas of Jharkhand: an overview. Shifting Perspectives in Tribal Studies. Springer, pp. 251–271.

Boudet, F., MacDonald, G.K., Robinson, B.E., Samberg, L.H., 2020. Rural-urban connectivity and agricultural land management across the Global South. Glob. Environ. Change 60, 101982.

Ekpodessi, S.G.N., Nakamura, H., 2018. Land use and management in Benin Republic: an evaluation of the effectiveness of Land Law 2013-01. Land Use Policy 78, 61–69. https://doi.org/10.1016/j.landusepol.2018.06.025.

Gao, H., 2019. Public land leasing, public productive spending and economic growth in Chinese cities. Land Use Policy 88, 104076.

Griewald, Y., 2018. The art of the state to intervene: insights into agricultural land management in Russia. Ecol. Econ. 151, 1–9. https://doi.org/10.1016/j.ecolecon.2018.04.026.

Hair Jr., J.F., Anderson, R.E., Tatham, R.L., Black, W.C., 1998. Multivariate Data Analysis, 5th ed. Macmillan Publishing Company, New York.

Hoang Trong Chu, Nguyen Mong Ngoc, 2008. Analyze Research Data With SPSS. Hong Duc Publishing House, Ho Chi Minh City.

Igbaria, M., Livari, J., Maragahh, H., 1995. Why do individuals use computer technology? A finish case study. Inf. Manag. 29, 227–238.

Kasim Kasanga, Nii Ashies Kotey, 2001. Land Management in Ghana: Building on Tradition and Modernity. International Institute for Environment and Development London.

Keiter, R.B., McKinney, M., 2019. Public land and resources law in the american west. Environ. Law 49, 1–72.

Khorchani, M., Nadal-Romero, E., Tague, C., Lasanta, T., Zabalza, J., Lana-Renault, N., Domínguez-Castro, F., Choate, J., 2020. Effects of active and passive land use management after cropland abandonment on water and vegetation dynamics in the Central Spanish Pyrenees. Sci. Total Environ. 717, 137160 https://doi.org/10.1016/j.scitotenv.2020.137160.

Kilgore, M.A., Snyder, S.A., 2016. Lake States natural resource managers' perspectives on forest land parcelization and its implications for public land management. Land Use Policy 59, 320–328. https://doi.org/10.1016/j.landusepol.2016.07.035.

Klimach, A., Dawidowicz, A., Źróbek, R., 2018. The Polish land administration system supporting good governance. Land Use Policy 79, 547–555. https://doi.org/10.1016/j.landusepol.2018.09.003.

Le Thi Thanh Xuan, Lan, Bach Song, Tho, Nguyen Thi Oanh, Then, Bui Thi, 2015. The solution to improve the efficiency of land use management is directly managed and used by the communal People's Committee. J. Soil Sci. (45/2015) pp 168-164.

Likert, R.A., 1932. A technique for measurements a attitudes. Arch. Psychol. 140, 55.

Long, H., Qu, Y., 2018. Land use transitions and land management: a mutual feedback perspective. Land Use Policy 74, 111–120.

Miller, L., Nadeau, S., 2020. Perceptions of public land governance from two Canadian provinces: How is the social agenda being met through sustainable forest management? Land Use Policy 91, 102485. https://doi.org/10.1016/j.landusepol.2016.10.041.

Ngo Tuan Ngoc, 2016. Managing Public Fund in Long Bien District, Hanoi City. Masters Thesis. University of Economics, Vietnam National University, Hanoi.

Nguyen Huu Ngu, Duong Quoc Non, Nguyen Thi Nhat Linh, Dang Huu Binh, 2017. Study on the situation of management of agricultural land used for public purposes in an Nhon town, Binh Dinh province. J. Agric. Rural. Dev. (1/2017), 21–29.

O'Sullivan, L., Wall, D., Creamer, R., Bampa, F., Schulte, R.P.O., 2018. Functional Land Management: bridging the Think-Do-Gap using a multi-stakeholder science policy interface. Ambio 47, 216–230. https://doi.org/10.1007/s13280-017-0983-x.

Park, J.H., Park, S.H., Kim, K.A., 2019. Disaster management and land administration in South Korea: earthquakes and the real estate market. Land Use Policy 85, 52–62. https://doi.org/10.1016/j.landusepol.2019.03.040.

Pham Phuong Nam, Nguyen Van Quan, 2014. Solutions to improve the effectiveness and efficiency of land management and use in the period of industrialization and modernization of the country. In: Proceedings of Scientific Conference "Improving the Efficiency of Land Management and Use in the Economy" Socialist-Oriented Market Economy. Hanoi, August 1, 2014.

Polat, Z.A., Alkan, M., 2020. The role of government in land registry and cadastre service in Turkey: towards a government 3.0 perspective. Land Use Policy 92, 104500. https://doi.org/10.1016/j.landusepol.2020.104500.

Rasch, R., McCaffrey, S., 2019. Local Public Priorities and Preferences for Public Land Management in the Northern Region. Gen Tech Rep RMRS-GTR-400 Fort Collins CO US Dep. Agric. For. Serv. Rocky Mt. Res. Stn., p. 400, 96.

Saint-Macary, C., Keil, A., Zeller, M., Heidhues, F., Dung, P.T.M., 2010. Land titling policy and soil conservation in the northern uplands of Vietnam. Land Use Policy, Forest transitions 27, 617–627. https://doi.org/10.1016/j.landusepol.2009.08.004.

Sikor, T., 2006. Politics of rural land registration in post-socialist societies: contested titling in villages of Northwest Vietnam. Land Use Policy 23, 617–628. https://doi.org/10.1016/j.landusepol.2005.05.006.

Tabachnick, B.G., Fidell, L.S., 1996. Using Multivariate Statistics.

Tran, T.Q., Vu, H.V., 2019. Land fragmentation and household income: first evidence from rural Vietnam. Land Use Policy 89, 104247. https://doi.org/10.1016/j.landusepol.2019.104247.

Tran Trong Tan, Nguyen Huu Ngu, Ho Viet Hoang, 2015. Study on situation of management and use of public land fund in Duc Tho district, Ha Tinh province. Journal of Natural Science 112 (13.8).