



## Quantitative analysis of research on China's land transfer system

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### ABSTRACT

This paper analyzed the studied process of Chinese land transfer system (LTS) for getting a comprehensive understanding of the LTS research status. Our results showed the LTS research is a multidisciplinary study driven by national policy, and the structure based on different natural-social conditions provides a good foundation for future studies. However, LTS research lacks collaboration and comprehensiveness, and the research results are insufficiently innovative and practical. Therefore, there is an urgent need to enhance multidisciplinary research using a combination of theory and practice.

### 1. Introduction

The land transfer system (LTS), which has economic, legislative, and political features, is one of China's most important land systems (Liu, 2015a). In Chinese development processes involving new-style urbanization, industrialization, and agricultural modernization, the land transfer system subjectively reallocates land and labor resources, increases the land's economic efficiency as well as the incomes of those people who lose or acquire land, and objectively meets the requirements of agricultural modernization and sustainable development. Thus, it is the core solution to solve China's "three agricultural problems" (Liu, 2015b). Since 1978, the rural reforms in China have gradually deepened, the society and economy have been steadily developing under the premise of standing firmly by the joint contract responsibility system, and the country has been constantly (and reasonably) adjusting the macro-level land policies for rural areas. The first stage was 1984–2002, during which land transfer was legalized; the second stage was 2003–2007, during which standardization of farmland transfer was achieved; and the third stage, which began in 2008, is expected to see the marketization of farmland completed. Against the background of reasonable adjustments to national macro-level land policies, rural land transfers have been gradually standardized and marketized, and the scale of land transfer has continuously increased; this has greatly promoted the extension of rural land reform and the progress of agricultural modernization. However, the current Chinese LTS is still defective, and impedes the smooth execution of land transfer. The speech given by Chairman Xi at the 5th meeting of the central government's leading group on September 29, 2014 was in support of comprehensively deepening reform; he said that in order to

do so at the present stage, greater consideration should be given to the question of how to increase awareness of Chinese agricultural modernization problems. We can then solve rural land problems well into the future and ameliorate farmers' poverty. Under the premise of standing firmly by the collective ownership of rural land, we should promote the division between contracting rights and management rights so as to form a pattern where ownership, contracting rights, and management rights are separate, but management rights can be transferred. As we can see from this speech, LTS reform has already become a top priority in China land system reforms; thus, studying LTS-related literature is of great practical value and profound significance because it reflects macroeconomic policy from one specific perspective.

Research on the current LTS helps reflect the status quo in research, and illustrates the existing problems and the future reform orientation. However, the traditional qualitative literature review cannot systematically and comprehensively represent the entire status of one specific field. By statistically analyzing and summarizing a significant amount of literature in a certain study area, the analysis of quantitative literature refers to the method of forming a scientific understanding of facts through collecting, identifying, summarizing, and studying the relevant material. Thus, it is able to paint a picture of the entire development and varied processes in the area, and can further predict future development trends, make up for the disadvantages of analyses that lack systematization and accuracy, and provide a reference for future studies. At present, there are too few studies that have conducted quantitative analysis on literature in the area of land science. Only Zheng et al. (2008) have studied land reclamation, in which they collected domestic papers between 1985 and 2007 on this topic and performed a quantitative analysis in terms of year, author, research institution,

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journal, and research content. The study turned out to have a profound influence on recent Chinese land reclamation studies. As a result, this paper uses bibliometric methods and principles to study the LTS documents and the research status of the LTS studies, and provide references for future research.

## 2. Materials and methods

### Data source and research methods

The data studied in this paper are from the China Academic Journal Network Publishing Database of CNKI, which is a large and widely used database that collects important domestic and international studies in different research areas; more importantly, the database is updated five days a week and is able to ensure the integrity and accuracy of the original research data (Zheng et al., 2008). Because some researchers have specifically studied transfer systems of rural residential land and collective construction land, using “land transfer system” as the search term may result in overlooking these studies. Thus, this research used “transfer system” as the search term and searched literature collected before December 31, 2015 based on this topic; it eventually retrieved 2496 related papers. After manually deleting 172 papers that did not contain author information or were unrelated to land transfers, the remaining 2324 papers were used as the original data for this study. The Statistical Analysis Toolkit for Informetrics (SATI) was used to export each article’s information regarding title, publication year, author, journal, research institution, and key words, and this information was analyzed by using the methods of quantitative literature analysis.

## 3. Results

### 3.1. Analysis of research years

The theoretical curve of the number of papers available, to some extent reflects the research level and speed of development of the subject or study area (Yan, 2003). In the development of each subject, there are few research papers at the early stage. Then, the number rapidly increases in the early–middle stage and becomes stable in the late stage. From the annual distribution diagram of the LTS literature (Fig. 1), the following patterns can be seen.

- (1) Although LTS was explicitly stipulated in Chinese laws in 1984, (Wang et al., 1994) literature related to LTS studies did not appear until 1987 and the number of papers published per year prior to 1994 was fewer than ten. This is mainly because of the limitations in the way people thought about land at that time. Therefore, land

transfer practices were practically non-existent and studies in this area did not attract the attention of many researchers.

- (2) From 1994–2000, the number of LTS-related studies were relatively small and stable fluctuated in a stable fashion, suggesting that Chinese LTS studies during this period were in an early stage; from 2000 to 2009, the number of LTS-related studies increased, and reached 100 for the first time in 2007; between 2007 and 2009, the number increased almost vertically and reached its peak at over 200 in 2009; from 2010 to 2015, the number of LTS-related studies decreased compared to 2009, but remained at a relatively high level (more than 100 papers per year, with the exception of 2012) with little fluctuation. This indicated that Chinese LTS research had proceeded to the early–middle stage and was now shifting to the middle–late stage.
- (3) The number of LTS-related papers reached its peak in 2009, possibly because of the “Decisions on several major issues of promoting rural reform development” put forth during the Third Plenary Session of the 17th CPC Central Committee in 2008; this indicated a further deepening of Chinese rural reform and that rural LTS had become a sufficiently popular topic to attract the attention of researchers (Shi, 2009). Hence, it can be seen that the number of domestic LTS-related papers was affected by related national policy. Furthermore, before any new LTS-related policies are issued in the future, the number of LTS-related studies will fluctuate; when newly related policies appear, the number of related studies may sharply increase as it did in 2007–2009, then reach a new peak, and again turn to a state of stable fluctuation.

### 3.2. Author analysis

Studying and analyzing authors and their collaborations in a specific research field helps to understand the current research status quo and development trends of the entire research area. In this paper, 2324 papers were included, involving 3150 authors. The average number of authors per article was 1.56, suggesting collaborative studies among researchers in the LTS area. In this study, the number of authors for each article and the number of papers published by each author are summarized in Tables 1 and 2.

- (1) As Table 1 shows, 1430 papers were single-authored, accounting for 61.53% of the studies and 894 papers were multi-authored, primarily by two authors. The number of papers completed by two authors was 606, and accounted for 26.08% of the total. This suggests that although there are collaborative studies in the LTS area, the majority of current LTS studies were conducted independently. As Table 2 shows, among LTS-related papers between 1987 and

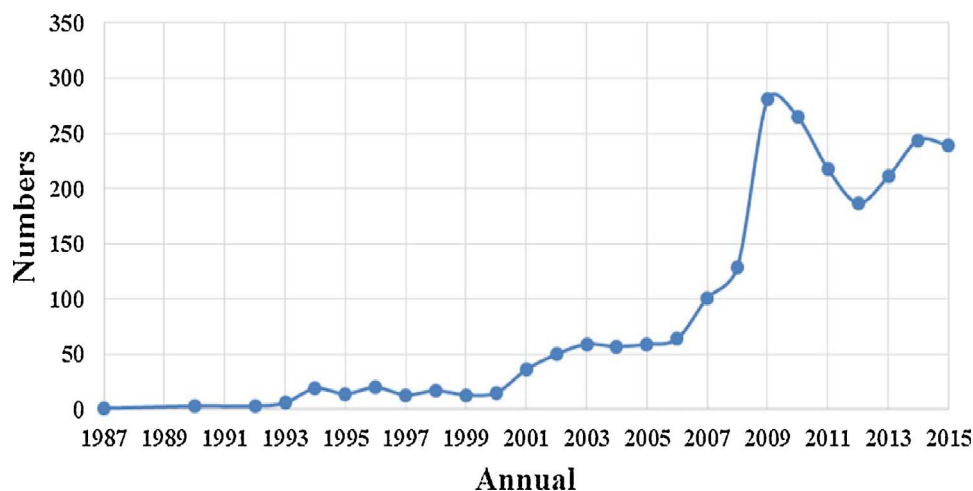


Fig. 1. Annual distribution of the number of LTS-related papers.

**Table 1**  
Statistics regarding authors (number of authors per paper).

Number of authors per study	1	2	3	> 3
Number of studies	1430	606	216	73

**Table 2**  
Statistics regarding authors (number of papers published by each author).

Number of studies	1	2	3	4	> 4
Number of authors	2793	275	55	18	9

2015, 88.67% of authors were transient and had only published one related paper, 11.33% of authors had published two or more LTS-related papers, and only nine authors had published five or more LTS-related papers; this distribution indicates that authors who had published LTS-related papers were relatively scattered. The top four authors were Prof. Ligen Chen (Vice-President of Nanjing Agricultural University), Prof. Changjian Li (Vice-Dean of the School of Humanity and Law, Huazhong Agricultural University), Prof. Liyan Zhang (School of Public Administration and Law, Liaoning Technical University), and Prof. Xiaoxia Liu (Dean of the School of Civil Commercial and Economic Law, Gansu Institute of Political Science and Law). These four scholars are mainly involved in teaching and research in land administration and law, land systems and policy, and rural development. It can thus be seen that researchers of the LTS work in areas such as land systems, policy, and law, while these four scholars are from research institutions located in Northern, Southern, Central, and Western China, respectively. This suggests that LTS research in China has progressed to the development of different interests according to different natural, social, and economic backgrounds.

(2) In order to further understand the research collaborations of LTS studies, the ratios of collaborative papers each year from 1987 to 2015 were calculated (Fig. 2). As Fig. 2 shows, prior to 2000, the ratios of annual collaborative papers fluctuated greatly. This was directly associated with the small number of papers published prior to 2000. After 2000, the ratio was relatively stable at around 40%. This indicated the formation of collaborative patterns in the area of LTS research.

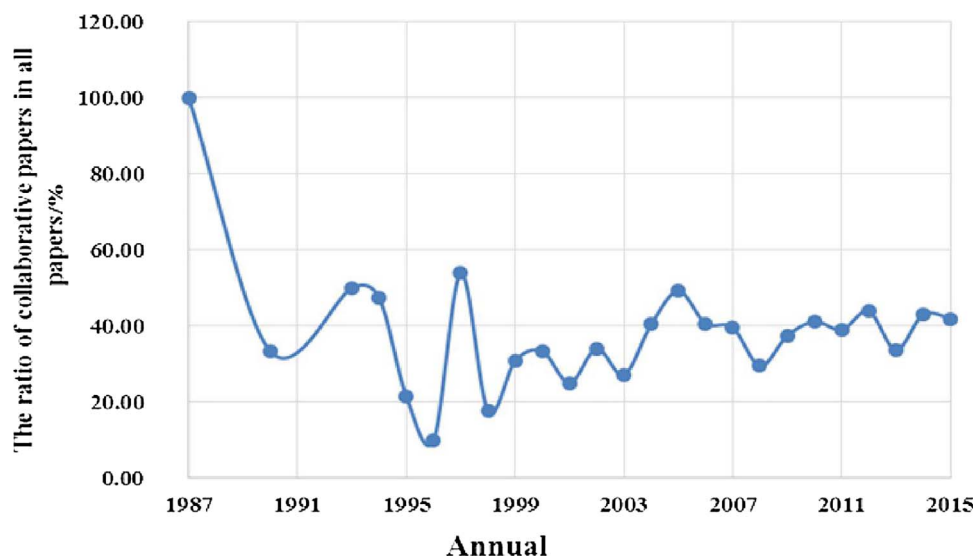


Fig. 2. The annual ratio of collaborative papers(the collaborative paper refers to an article with more than two authors).

**Table 3**  
Numbers of papers published by different types of research institutions.

Type of institution	Papers published	Percentage of papers (%)
Colleges and universities	1557	69.73
Research institutes	84	3.76
Government agencies	444	19.88
Enterprises	24	0.01
Colleges and universities, research institutes	40	1.79
Colleges and universities, government agencies	58	2.60
Colleges and universities, enterprises	15	0.67
Research institutes, government agencies	4	0.17
Government agencies, enterprises	4	0.17
Colleges and universities, research institutes, and government agencies	3	0.13

### 3.3. Analysis of research institutions

Analyzing the research institutions helps to analyze the focus of researchers and the initiative of research units. Except for 91 papers with unknown research affiliation, authors of the remaining 2233 published papers are from four types of research units: colleges and universities, research institutes, government agencies, and non-governmental enterprises, with a total number of 1164. Based on the statistics of the published papers from the different types of research institutions (Table 3), a pie chart of published papers from the different types of research institutions (Fig. 3), and a list of the top 22 institutions where the most published papers (Table 4) are generated, we found that:

- (1) Colleges and universities published the most papers (1673), accounting for 74.92% of the papers analyzed, followed by government agencies (513 or 22.97%); Of those collaboratively published by research institutions of different types, 124 papers accounted for 5.55% of the papers, the majority of which were distributed between colleges and universities, and government agencies. This suggests that colleges, universities, and government agencies are the primary forces behind LTS research with relatively high research capabilities and research levels.
- (2) From the pie chart depicting the number of different institutions, we can see that 70.27% of institutions only published one related

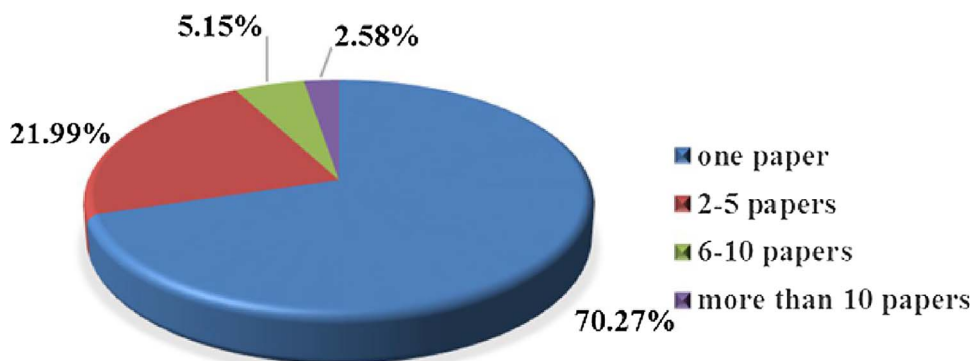


Fig. 3. The number of published papers from different institutions.

study, 29.73% of institutions published two or more related studies, and 2.58% of institutions published more than ten studies. This means that the authors who have conducted LTS-related studies are relatively scattered.

- (3) From the list of the top 22 institutions with the most published papers, we can see that 20 of the 22 institutions are colleges or universities, and are mainly agricultural universities, universities specializing in finance and economics, and political and law colleges. Therefore, we can indirectly infer that LTS studies were mainly conducted with aspects of agricultural effects, economic benefits, and legal norms and protections. The top five colleges or universities with over 30 published papers are as follows: Nanjing Agricultural University, Zhongnan University of Economics and Law, Sichuan University, Huazhong Agricultural University, and Renmin University of China. These five universities published 192 papers in total accounting for 8.60% of the papers published by known research institutions and 0.43% of all included research institutions. According to Bradford’s Law, these five research institutions constitute the core institutions for LTS research.

### 3.4. Analysis of the publishing journals

Analyzing the distribution of the journals in a certain area can determine the core journals for this area, provide a basis for literature collection and management, guide readers, and help understand journal characteristics. According to the statistical analysis of the journals, 2324 papers were published in 884 journals, an equivalent of 2.63 papers per journal (Tables 5 and 6).

- (1) As Table 5 shows, 474 journals published one paper, accounting for 53.62% of the total; 410 journals published more than one paper, accounting for 46.38% of the total, the majority of which published 2–5 related papers; 78 journals published more than five related papers, accounting for 8.82% of the total; and 27 journals published more than ten related papers, accounting for 3.05% of the total.

Table 4  
The top 22 institutions with the most published papers.

Rank	Name of institution	Number of published papers	Rank	Name of institution	Number of published papers
1	Nanjing Agricultural University	48	11	Central China Normal University	18
2	Zhongnan University of Economics and Law	42	11	Fujian Normal University	18
3	Sichuan University	37	14	Chongqing University	17
4	Huazhong Agricultural University	33	14	The People’s Bank of China	17
5	Renmin University of China	32	16	Zhejiang University	16
6	Wuhan University	26	16	Henan Normal University	16
7	Southwest University of Political Science & Law	24	18	Chinese Academy of Social Sciences	14
8	Southwest University	22	18	Northwest A & F University	14
9	South China Agricultural University	20	18	Nankai University	14
9	Hunan Agricultural University	20	18	Liaoning University	14
11	Southwestern University of Finance and Economics	18	18	Northeast Agricultural University	14

Table 5  
Publication frequency of the published papers in different journals.

Number of papers published	Number of journals	Percentage (%)
1	474	53.62
2–5	332	37.56
5–10	51	5.77
> 10	27	3.05

This means that although journals that published LTS-related papers were relatively scattered, core journals in this area have already been established.

- (2) As Table 6 shows, journals that published LTS papers were focused mainly on economics, agricultural science, land science, and law. This indicates that LTS studies were interdisciplinary. “Legal Systems and Society,” “Journal of Anhui Agricultural Sciences,” “Agricultural Economy,” and “Rural Economy” are the four journals with the most published papers. These four journals only account for 0.45% of all journals included, yet their published papers account for 8.48% of all retrieved papers. Thus, according to Bradford’s Law, these four journals constitute the core journals for LTS research.

### 3.5. Analyses of downloads and citations

The number of cited papers reflects the level of published papers in this area and their influence on subsequent research. In this study, there were 2047 papers where it was known how many times each article was cited out of the total of 2324, and these were statistically analyzed (Figs. 4 and 5). According to Fig. 4, among all papers included for analysis, 64.39% of the papers were cited no more than twice, including 18.56% of papers that were published but were not cited; 78.26% papers were cited more than twice; and only 2.64% papers were cited more than 50 times. As Fig. 5 shows, the citation rate – the ratio between the number of citations and the number of downloads – for most

**Table 6**  
Number of papers published in the core journals for LTS research.

Journal name	Number of papers published	Journal name	Number of papers published
Legal System and Society	59	China Collective Economy	22
Journal of Anhui Agricultural Sciences	50	Manager's Journal	21
Agricultural Economy	44	Issues in Agricultural Economy	19
Rural Economy	44	Farmers' Friendly Advisor of Wealth	18
Economic Research Guide	28	Rural Economy and Science-Technology	17

of the papers was no higher than 5%; such papers account for 84.41% of the total number included, while only 3.71% of studies had a citation rate greater than 10%, suggesting an overall low citation rate of the studies included. According to Figs. 4 and 5, we see that the overall number of citations and the citation rate were low, but there were also a small number of papers with high numbers of citations and citation rates, suggesting that the overall quality of the papers published in the LTS area was relatively low; at the same time, there was a significant polarization in the levels of the published papers. It is possible that some papers simply integrated the content of existing papers, which merely repeated other research with no reference value for subsequent research. This would suggest that increasing the quality of domestic LTS research is urgently needed.

Among the 2047 papers analyzed, the three most cited papers were “Establishing land transfer system to promote large-scale operation of regional agricultural production (Ma and Cui, 2002).” “Analysis of family farms: features, mechanisms and effects (Gao et al., 2013).” and “Real rights reconstructing and regulation drafting for countryside homesteads (Liu, 2007).” which were cited 298, 180, and 155 times, respectively. From the research content of these three papers, we can see that studies on LTS and large-scale agriculture, land transfer and contracted production, and the transfer of usufructs for the rural residence base have a certain practical value and may form the key research direction for future LTS research.

### 3.6. Analysis of key words

The key words provide a highly general summary of the research content, objects, and methods of the paper; thus, statistically analyzing the key words will help us quickly identify the main focus of the paper while statistically analyzing key words at different times will reveal the focus points of research at these different times to determine research trends. The 2324 studies analyzed have a total of 3640 key words that appeared 10,378 times; the average number of key words per paper was 4.62. Statistics pertaining to the key words for the entire study period are shown in Table 7.

As shown in Fig. 7, key words containing “transfer” appear 2020 times, which is 86.92% of the total number of studies, indicating the analyzed studies were all related to the transfer system. The number of key words containing “rural” is ten times larger than key words

containing “urban,” suggesting domestic LTS studies primarily focused on rural LTS, of which rural farmland, rural homesteads, and collective construction land (including rural construction land) are the main land use types studied. Papers focusing on the LTS for these three land use types accounted for 35.15% of all the studies included. LTS-related studies mainly focused on the existing problems, solutions and countermeasures, reforms, and innovations of the LTS, and papers focusing on these aspects accounted for 28.49% of the total number of papers.

In order to learn about the development trends in LTS research, the period studied was divided into four stages, namely, 1987–2000, 2001–2005, 2006–2010, and 2011–2015. The research objects and content in these four stages were statistically analyzed based on the key words. The analysis of the research objects targeted rural lands, which were divided into three types: farmland, rural homesteads, and collective (rural) construction land. The numbers of key words for the three rural land use types in the four stages were analyzed and the percentages of the total number of studies at each stage were calculated. The analysis of the research content included studies on the present situation (referring to analyses of existing problems in the LTS), efficiency studies (referring to studies on measures and countermeasures in the LTS), and reform studies (referring to LTS reform and innovation studies). The numbers of key words of the three study types in the four stages were analyzed and the percentages of the total number of studies in each stage were calculated (Figs. 6 and 7).

As Fig. 6 shows, between 1987 and 2000, LTS studies mainly focused on farmland; however, the percentage of farmland transfer system studies out of all of the studies decreased with time. During 2000–2005, LTS studies on rural homesteads and collective construction lands started to appear. In the first three stages, farmland transfer system studies were in the dominant position out of the rural LTS studies; however, in the fourth stage, homestead transfer system studies outnumbered farmland transfer system studies and became particularly popular in rural LTS studies. Therefore, the decreasing number of farmland transfer system studies and increasing number of rural homestead transfer system studies will form the development trend for rural LTS studies. Moreover, in the first two stages (1987–2000 and 2001–2005), the number of studies focusing on the three rural land use types accounted for about 35% of all studies included, suggesting that rural LTS studies were still the focus of the majority of LTS studies.

As Fig. 7 shows, in all four stages, LTS reform studies of present

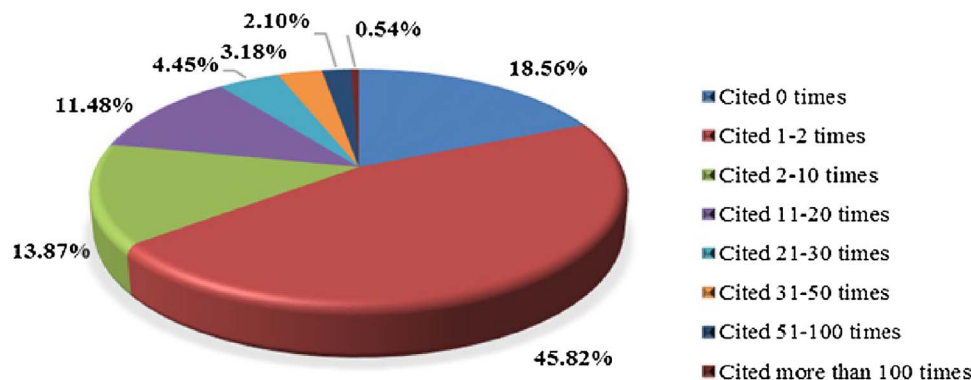


Fig. 4. The referenced ratio of LTS-related papers classed by referenced times.

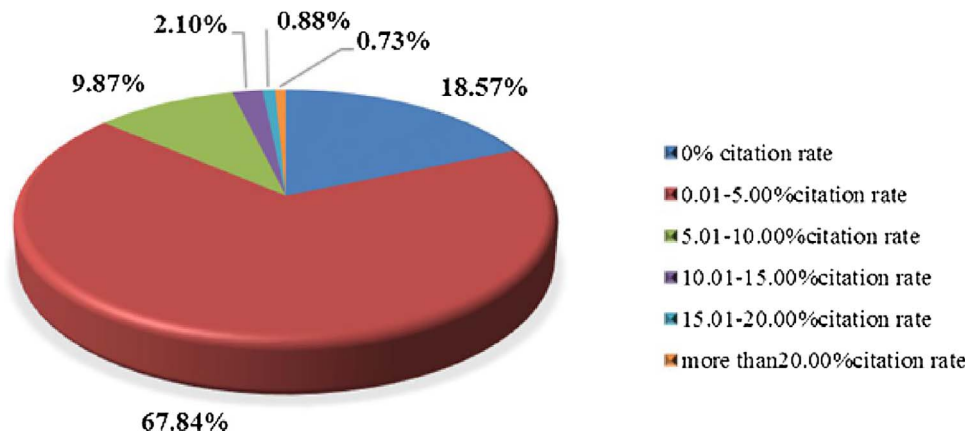


Fig. 5. The ratio of LTS-related papers classed by citation rate.

situation were more than reform studies and efficiency studies, indicating that the original Chinese LTS could not fundamentally meet the requirements of socioeconomic development and thus needed to be fundamentally reformed. Meanwhile, the percentage of reform studies out of all studies gradually decreased and tended toward stability, indicating that the development of Chinese LTS has gradually been improved and perfected over the past 30 years. The percentages of present situation studies and efficiency studies have not changed significantly. The first stage has the fewest related studies while the second stage has the most. Although the percentages of these two types of studies out of all the studies included were equivalent, this suggests that studies addressing these two aspects were certainly related. The percentages of the three types of studies in the third stage and fourth stage barely changed, suggesting that the patterns of LTS research content have already been established.

4. Conclusions

In this study, the China Academic Journal Network Publishing Database of CNKI was used as the search database to analyze detailed information from the period of 1987–2015. The following conclusions were drawn:

- (1) The LTS research in China is driven by national policy, which lags behind practical demand for lengthy periods. This is the basic reason behind the impediments to reform of the LTS. Therefore, it is urgent to improve the pioneering research in this field.
- (2) Research on the LTS is multidisciplinary and includes economics, agriculture, land science, law, etc. However, current research is mainly based on independent research, which means the research results are not comprehensive and have relatively low practical and theoretical value. Therefore, collaborative and comprehensive research should be strengthened.
- (3) At this stage, the patterns of LTS research with their different backgrounds in nature, society and the economy have been formed,

and they have laid a strong foundation for future study. However, the lack of comparative study of land use in different regions and land demand changes is not conducive to the development of a unified LTS.

- (4) There are a good proportion of hot points in the LTS research that are shifting very quickly; but the research on their intrinsic quality is insufficient. Therefore, it is not beneficial to address the existing problems in the reform of the land transfer system in China. Therefore, research on the mechanisms should be further developed.
- (5) Universities and scientific research institutions are the main forces considering China’s land transfer system at this stage. Most researchers are not land experts, or do not understand the practical problems existing in the LTS reform process. Therefore, the research on the LTS should be both theoretical and practical, and strengthen the combination of theory and practice.

5. Discussion

As a tool of macro-level control, land policy has a great impact on the economy, politics, and society. In today’s China, the LTS positively enhances the alleviation of an urban-rural dual structure, the effective utility of rural land, and it prevents overheating of the urban economy (Deng, 2016; Feng and Kong, 2003). According to the results, in the recent decade the focus of the LTS is rural homestead’s usufruct, collective land transfer, land approval registration, etc., but there have been a good proportion of flaws in the policy implementation. The following key points should be taken into account in policy-making.

- (1) At first, some kinds of policy occurred repeatedly. For example, it was indicated in 1999 that the total supply of construction land should be strictly controlled. This was repeatedly emphasized in the annual national plan outline (Wang, 2011). It reflects the fact that the implementation was not performing well and administrative efficiency was low. Second, many policies are primarily temporary

Table 7 High-frequency keys words in LTS papers.

Key words	Frequency	Percentage(%)	Key words	Frequency	Percentage(%)
Transfer	2020	86.92	Rural construction land	8	0.34
Urban	81	3.49	Collective construction land	130	5.59
Rural	872	37.52	Problem	141	6.07
Rural land	254	10.93	Countermeasure	125	5.38
Forest land	52	2.24	Measure	25	1.08
Farmland	388	16.70	Reform	235	10.11
Homestead	291	12.52	Innovation	136	5.85
Construction land	234	10.07			

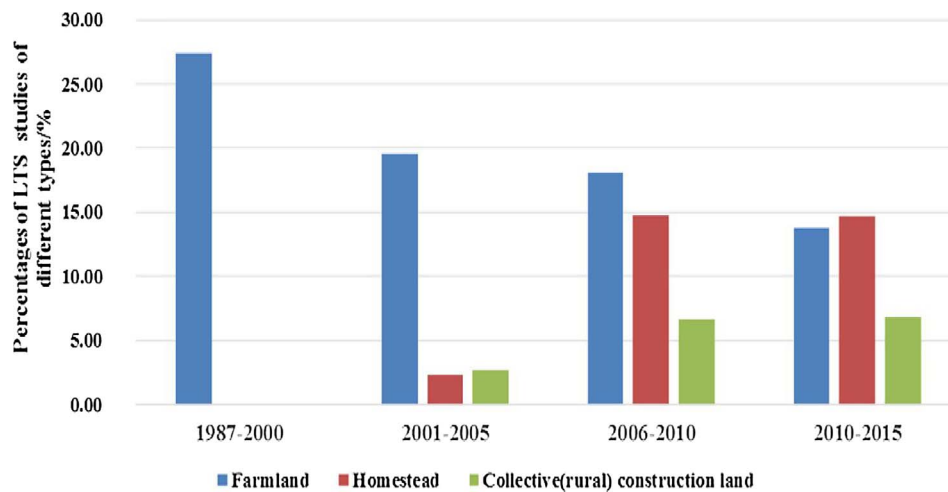


Fig. 6. Rural LTS research objects at different stages.

regional measures, which cannot acquire scientific and long-time experience reference. Third, the time-lag effect is significant and cannot reflect residential demands in real time.

- (2) During the homestead exit of the homestead transfer system, the farmers could not participate and decide on the income model of the construction land index and distribution mechanism (Song, 2017); thus, legal rights and interests were damaged. How to protect farmer’s rights while improving the efficiency of urban-rural land resource allocation is a matter that has to be settled urgently.
- (3) Legal protection and market rules are lacking. Until now, only regional management rules of collective land transfer made by the provinces or in pilot areas, exist (He, 2016). This falls short of being comprehensive and functioning as a scientific national legal system, which causes disunity in compensation standards and inefficient implementation. The invisible market in collective construction land is very widespread because of the lack of legal market rules.
- (4) Currently, cadastral management in the rural areas is in chaos. The registration of large-scale land and real estate in rural areas is an urgent task for the reform of the rural property rights system. Only by rationalizing the existing rural property rights relationship can we establish a complete system of rural equity rights, and lay a solid foundation for revitalizing the rural labor force, and the subsequent reform of rural property rights.

Based on the research results, combined with the existing problems

of rural land policy, this paper can offer some suggestions on the reform of the LTS.

- (1) The implementation of concrete measures in the LTS should be creative and suitable for the local conditions. Because the land transfer market is regional and an imbalance of socioeconomic development exists among different parts of China, it is suggested that they be as resilient as possible to suit different markets or regions (Liang, 2014). For example, in the coastal provinces where the transference reform of rural homestead usufruct is implemented well, the government should give a free hand to administrative restrictions and explore a variety of transfer modes to meet the needs of the economy.
- (2) During the transference of rural homestead usufruct, the same rights and prices should be attained for both rural and urban targets (Hu, 2011). At present, the market scope of construction land after the homestead exit and land consolidation is very limited and its value as residential land is not high(He and Pan, 2015). Therefore, the project should balance the interests of the government, the collective, and the farmers, and allocate land reasonably; in doing so it would achieve the protection of farmers’ rights and interests in exiting the homestead at the same time as achieving the optimal allocation of urban and rural land resources.
- (3) Local governments should strengthen their sense of service when land policy is implemented. The actual process of collective land

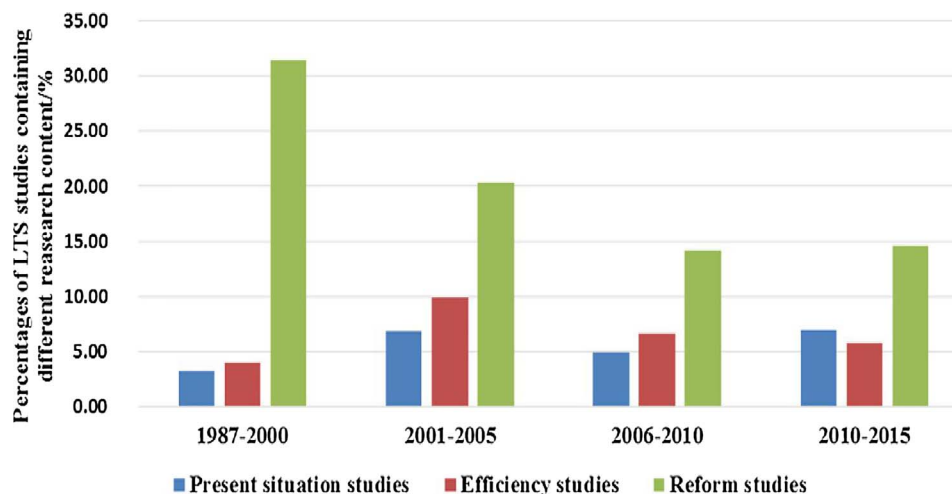


Fig. 7. Rural LTS research content at different stages.

transfer, the local government's monopoly of the land supply, and greedy economic interests seriously violate the farmers' rights (Liang, 2015). Thus, local government should shift to roles that make general policy, arrange the land supply, provide public services to farmers, supervise the land market, and positively improve the administrative structure of rural grassroots organizations to better protect farmers' rights.

- (4) The government should quicken the pace of building a land-register information platform (Liu, 2010). The establishment of such a platform could make all types of land registration data available for real-time sharing, and eliminate false registration so that the data can be updated in real-time, be re-used, and add value. Land information can create different values among users in different fields and play a vital role in social construction. In the context of the big data age, the government has the responsibility to standardize, integrate, and open the land data resources, to enhance the level of public services, the transparency of administrative construction, and to promote the socialization of data (Ma, 2016). Academically, this would also improve interdisciplinary exchanges and the construction of a relevant theoretical system.

### Conflict of interest

The authors declare no conflicts of interest.

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