

Reflections of TDR Policy on Public Facilities in Taiwan

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ABSTRACT

TDR (Transfer of Development Rights) is one of the flexible tools for urban growth management. Since 1990, due to the government financial considerations of the government, the high population density, and requirements of public facilities, the government has used the concepts of TDR to deal with the issue of shortage of public facilities in Taiwan. However, could TDR deal with quantity and quality of public facilities at the same time? We simulated and examined the quality of public facilities behind the implement of TDR policy on public facilities in Taichung city. The outcomes showed that 1. TDR policy is not workable for each public facility, such as elementary schools, high schools, playgrounds, and so on. 2. TDR policy is workable for parking lots, especially in commercial districts. 3. TDR policy on public facilities should be considered more comprehensively.

Keywords: *Transfer of Development Rights (TDR); Urban Growth Management; Public Facilities.*

INTRODUCTION

Transfer of Development Rights (TDR) is one of the flexible tools that could be used in urban growth management. Since 1990, due to financial considerations, Taiwan government has adopted the mechanism of TDR from the United States to make use of the reserved lands for public facilities in urban planning. For the preservation of historic sites, "Regulations of Bulk Transfer for Historic Sites" were promulgated in 1998, together with the launch of "Regulations of Urban Building Capacity Transfer" in 1999, the mechanism of TDR was finally enforced by the law.

In developed countries where the idea of TDR originated, it was implemented mainly to deal with three land use issues: the first is to preserve historic sites and historical conservation areas (e.g. the Grand Central Terminal in New York), the second is to preserve sensitive areas (e.g. agricultural, forestry, fishing and grazing lands only allow limited development), and the third is to assist the execution of urban planning enterprises (e.g. urban renewal), sustainable development or growth management projects.

According to Taiwan's "Regulations of Bulk Transfer for Historic Sites" and "Regulations of Urban Building Capacity Transfer," presently, TDR could be applied to historic sites, private lands of buildings worthy of preservation, building areas that could be used as public spaces, and private reserved lands for public facilities in urban planning. Originally, TDR was used as a procedural scheme for property transfer instead of the pivotal mechanism when conducting urban planning. However, in Taiwan, its applicability is extended to solve the problem of failing to acquire reserved lands for public facilities. It has been an

obstacle in urban planning projects for a long time. Nevertheless, is it really a solution, or on the contrary, a poison, to urban sustainable development? If transferring building floor areas to reserved lands for public facilities or other building areas are allowed, undoubtedly, it will make the best use of reserved lands for public facilities. However whether the quality of services provided by these facilities will be improved still requires examination.

This study examined Taichung City, a central city of Taiwan, as a case analysis. Under the presupposition that transferring all qualified floor areas is feasible, Hansen Model was adopted to designate all qualified sending areas in Taichung City in various detailed plans. The service quality of public facilities was further derived from the estimation of population capacity based on transferable floor areas. By comparing the service quality before and after the transfer, it would be clear that whether TDR improves or impairs the service quality of public facilities. Whether applying TDR to reserved lands for public facilities would ameliorate or deteriorate the living quality in urban sustainable environment, it would also be revealed. The conclusion of the study can serve as an important reference to the improvement or implementation of TDR mechanism in the future.

DEFINITIONS

“Transfer of Development Rights (TDR)”

Regulations of Urban Building Capacity Transfer define TDR as “the transferring of development rights of a unit of floor areas from an area to another for the purpose of construction.”

“Service Quality of Public Facilities”

According to Article 33 of Taiwan Province’s Enforcement Rules of Urban Planning Law, For the reasonable development of lands in urban planning, floor areas must be regulated according to the following provisions in urban planning specifications: 1) in residential and commercial districts, an average floor area ratio (FAR) should be established according to target population capacity, residential density, floor areas per capita and service quality of public facilities. And FAR control should be differentiated according to the characteristics, locations, width of streets, deployment of public facilities in the neighbourhood, topographical and geological traits, current development and limitation of each specific plan.

Thus the service quality of public facilities should be estimated by considering the service capacity of parks, green lands, schools and other public facilities in a neighbourhood. It should be taken into consideration when defining the population cap in regional plans.

LITERATURE REVIEW

Transfer of Development Rights, or TDR, is a mechanism which originated in the US. The study will begin by reviewing TDR mechanisms in developed countries, and then illustrated how it worked in Taiwan through examining current regulations, in order to understand the operation of TDR mechanism in Taichung City.

TDR in America

The mechanism of TDR took its root in New York City, where it was used to preserve historic sites. Later, in order to control population growth and preserve open spaces, it was adopted in Vermont and in

Chicago City for the preservation of landmarks. In Maryland, it served as the major tool to implement the land use project and save open spaces across the state.

Table 1: Historic Review of Implementing TDR in the US

Year	Location	Purpose	Manner of Transfer
1961	New York City	Transfer floor area ratio	Transferring from lands that are adjacent, in the neighborhood or far away
1968	New York City	Preserve historic sites	Transferring from lands in the neighborhood
1970	Vermont (St. George)	Reserve open spaces, control population growth	Constructors buy lands from the government, as well as development rights of neighboring lands to develop the whole area
1972	Chicago	Preserve historic sites	Limited transferring in the same historical conservation areas (not implemented)
1972	Maryland	Reserve open spaces	Owners of lands within development areas buy development rights from owners of reserved areas
1972	New Jersey	Reserve open spaces	Owners of lands within development areas buy development rights from owners of reserved areas
1974	Washington D. C.	Preserve historic sites	
1974	Puerto Rico (integrated plan)	Protect specific geological areas	Transferring from the conservation area to the urban area, which are two places far away from each other
1975	Virginia	Re-map "zoning" to control population growth	Decided by the free market mechanism

Source: Mechanism of Floor Area Bonus and Transferring in Urban Construction.

TDR in Taiwan

The Urban Planning Act has secured the legal status of TDR in the current legislation. But it still needs to be matched up by other corresponding measures to establish a comprehensive TDR system. In addition to "Regulations of Urban Building Capacity Transfer" by which most TDR of reserved lands for public facilities are based on, Taichung City has also enacted "Operation Directions and Assessment of TDR on Taichung City Urban Planning" to regulate TDR operations.

I. Urban Planning Act

The added Article 83-1 of the Amendment to Urban Planning Act in 2002 allows conditional transferring of floor areas.

II. Regulations of Urban Building Capacity Transfer

The Amendment to "Regulations of Urban Building Capacity Transfer" on June 30, 2004 regulates TDR in various aspects.

A. Applicability: TDR is only applicable in urban planning areas.

B. Sending floor areas are:

- Private lands no smaller than 500 square meters with an even terrain, and are designated to be reserved in urban planning, or the buildings therein are considered worthy of preservation by authorities.
- Building areas no smaller than 500 square meters with an even terrain, and are served as public open spaces in order to improve urban environment or landscape.
- Private reserved lands for public facilities in urban planning.

- Lands whose development rights could only be transferred to other building areas in the same zone designated in the master plan.
- C. Volume of Floor Areas Acceptable for Receiving Area. The volume of floor area that is allowed to be transferred to a receiving area is calculated based on the ratio of the announced current land values of the sending and receiving areas at the time of application.
- D. Manner. The transfer could be conducted by phases, unless the sending area is designated to be reserved in urban planning or the buildings therein are considered worthy of preservation by authorities. The receiving area could take floor areas transferred from different sending areas by phases. If the transferred floor area is not exhausted, the receiving area could, for once only, transfer the remaining to other building areas.
- E. Scope. The transfer is only allowed among building areas in the same region in the master plan.
- F. Limits. Floor areas transferred should not exceed 30% of the original floor areas, with 40% as the cap.

CASE ANALYSIS

According to “Regulations of Urban Building Capacity Transfer,” development rights should be transferred only between building areas in the same region in the master plan. Therefore, this study will focused on the regions covered in “Master Plan of Taichung Urban Planning” (excluding Daken Scenic Area) as a case analysis.

Floor Areas Transferred from Qualified Sending Areas

I. Analysis of Floor Areas Transferred from Qualified Sending Areas

The Third Overall Review of the Master Plan (excluding Daken Scenic Area) has revealed that reserved lands for public facilities qualified as sending areas amount to 8,815,417.6 square meters. From the approval letters collected from 24 TDR cases, it could be inferred that the ratio of floor area transferred from the sending area and that allowed to be added to the receiving area is 2.3731. Thus it is assumed that the total floor area that could be transferred from the sending area within the region covered by Master Plan of Taichung Urban Planning is 20,919,867.51 square meters.

II. Designation of Transferred Floor Areas from Sending Areas

This study utilizes Hansen Model to designate the total floor area transferred from a sending area in various detailed plans, with the same approach as how the model designates population.

- A. Hypothesis. The distribution of the augmented population is mainly affected by the carrying capacity of the land and job accessibility in the district.
- B. Variables in the Model. Assumes that the total floor area to be transferred from a region is ΔP , and then the distribution of ΔP in various regions could be expressed as eqn. (1) and (2).

$$\Delta P_i = \Delta P \times (A_i V_i / \sum_i A_j V_j) \quad (1)$$

$$A_i = \sum_i (E_i / T_{ij}^x) \quad (2)$$

Details of other variables are listed as follows:

ij : districts

ΔP_i : floor area that has been designated to district “i”

V_i : vacant lands for further development in “i”

A_i : accessibility of “i”

E_i : employment opportunities or other pulling factors in “i”

T_{ij} : travelling time from district “i” to “j”

x : distance index derived from the estimation of travelling time

- C. Designation of Transferred Floor Areas from Sending Areas. The result of the model showed the designation of floor areas transferred from sending areas in Table 2. Because vacant lands for further development and employment opportunities in New City Center District were the best among the 36 districts, it received the most floor areas, followed by Jungong-Shuijing District. Industrial areas close to Zhongqing Road received no floor area because there were no residential or commercial districts.

Table 2: Distribution of Floor Areas to Be Transferred from Sending Areas

Districts	Vacant Lands for Further Development (hectare)	Employment Opportunity	Accessibility Index	Floor Areas Qualified as Sending Areas (m ²)
New City Center	248.98	200.93	32.74	9505985.96
Jungong-Shuijing District	152.31	16.06	7.90	1404002.89
Fuxing Road Neighborhood and Other Four Areas	105.28	17.44	19.06	539080.15
South of New City Center	26.52	6.73	11.07	342514.11
Old Town District	22.15	54.00	6.61	170891.73
West of New City Center	15.17	0.00	18.83	333250.33
Gan-cheng Commercial District and Other Ten Areas	279.18	105.23	91.78	2394053.78
Industrial Areas near Zhongqing Road	0.00	0.00	1.22	0.00
Unit One~Unit Fourteen	1004.87	56.64	132.30	6230088.56
Total	1854.46	457.03	264.86	20919867.51

Source: collected from this study.

Floor Areas Transferred to Qualified Receiving Areas

I. Analysis of Floor Areas Transferred to Qualified Receiving Areas

According to “Operation Directions and Assessment of TDR on Taichung City Urban Planning,” receiving areas cannot be agricultural, river, landscape, conservation areas; non-urban use lands; residential districts of the first category, and do not include planned roads adjacent to the areas or lanes no wider than 10 meters within the coverage of an assigned building line. The qualified receiving areas in residential and commercial districts in all districts are listed in Table 3.

According to “Regulations of Urban Building Capacity Transfer,” the cap of floor areas transferred to a receiving area cannot exceed 30% of the initial floor area. However, if the receiving area is in area of integrated development or urban renewal, facing permanent vacant lots, or designated by other urban plans, the floor areas to be received could be extended, with a maximum limit of 40% of the initial floor area.

From the size of qualified receiving areas, average floor area ratios in every district and the cap of transferred floor areas, the volume of lands that serve as qualified receiving areas in every district could be measured, and is listed in Table 3. Old Town District possessed the most qualified receiving areas.

Table 3: Floor Areas Could be Accepted in Qualified Receiving Areas

Districts	Lands for Further Development as Qualified Receiving Areas (m2)	Floor Areas could be Received as a Qualified Receiving Area (m2)	Floor Areas could be Transferred as a Qualified Sending Area (m2)
New City Center	221524.43	46383671.33	9505985.96
Jungong-Shuijing District	1523100.00	82329777.99	1404002.89
Fuxing Road Neighborhood and Other Four Areas	1052764.36	70674351.44	539080.15
South of New City Center	265197.89	17283083.62	342514.11
Old Town District	2489824.52	191650451.68	170891.73
West of New City Center	151737.59	11126347.83	333250.33
Gan-cheng Commercial District and Other Ten Areas	2791669.11	189294131.10	2394053.78
Industrial Areas near Zhongqing Road	0.00	0.00	0.00
Unit One~ Unit Fourteen	16278560.02	547692116.79	8700517.35
Total	18544289.38	1156433931.83	20919867.51

Source: collected from this study.

Comparison of Floor Areas that could be Received and Transferred

Table 3 revealed that floor areas that could be transferred were larger than that could be received in every district, so this study took the floor area that could be accepted, 20,919,867.5 square meters, as the basis to evaluate the service quality of public facilities.

Evaluation of Service Quality of Public Facilities

- I. Evaluation of “Master Plan of Taichung Urban Planning (excluding Daken Scenic Area)”
 - A. Projection of Population after TDR. Presuming that every 50 square meters received could support one more person to live, the 20,919,867.5 square meters to be transferred to this area indicated that after the TDR, there would be an increase of population by 418,394. According to the survey done in the “Third Overall Review of the Master Plan (excluding Daken Scenic Area),” the population of Taichung City was 1,300,000, thus it was expected to become 1,718,397 after the TDR.
 - B. Projection of Needs for Public Facilities after TDR. According to the review standard for public facilities in “Regulations for the Periodical Overall Review of Urban Planning,” lands that should be designated for public facilities after the TDR for 1,718,397 people are listed in Table 4. It revealed that lands needed were larger than lands planned to be designated, especially playgrounds for children. In the area covered in “Master Plan of Taichung Urban Planning (excluding Daken Scenic Area),” the insufficiency of lands for public facilities amounted to 286.9965 hectares.

Table 4: Projection of needs for public facilities after TDR is conducted in areas covered by “Master Plan of Taichung Urban Planning (excluding Daken Scenic Area)”

Category	Lands Designated (hectare)	Lands Needed (hectare)	Insufficient(-) or Surplus(+)	Notes
Lands for Elementary Schools	213.534	249.5756	-36.0416	
Lands for Junior High Schools	171.5896	243.0756	-71.4860	
Parks	373.8808	406.8493	-32.9685	
Playgrounds	56.6222	137.4718	-80.8496	Including 21.5375 hectares of park lands that were considered as playgrounds
Athletic Fields	54.6376	120.2878	-65.6502	Including 6.5166 hectares of park lands that were considered athletic fields
Total	870.2642	1157.2600	-286.9958	

Source: collected from this study.

- II. Evaluation of Individual Districts Covered in “Master Plan of Taichung Urban Planning (excluding Daken Scenic Area)”
- A. Projection of Population after TDR. The population was assumed to increase by one person per 50 square meters received. Table 5 shows the amount of population that could be supported in each district after TDR. New City Center would have the largest population capacity.

Table 5: Projection of Population after TDR in Each District

Districts	Amount of Population that will Increase	Original Population	Population after TDR
New City Center	190120	13000	203120
Jungong-Shuijing District	28080	53500	81580
Fuxing Road Neighborhood and Other Four Areas	10781	87027	97808
South of New City Center	6850	29000	35850
Old Town District	3418	710000	713418
West of New City Center	6665	14000	20665
Gan-cheng Commercial District and Other Ten Areas	47882	379200	427082
Industrial Areas near Zhongqing Road	0	0	0
Unit Three	2140	7600	9740
Unit Fourteen	8640	10000	18640

Source: collected from this study.

- B. Projection of Needs for Public Facilities after TDR. According to the requirements of lands for public facilities in “Regulations for the Periodical Overall Review of Urban Planning,” with the projected population growth after TDR, the lands needed for public facilities are shown in Table 6. The projection revealed that, as a whole, the lands for public facilities were most insufficient in New City Center and Old Town District. New City Center lacked the most lands for elementary schools, while Old Town District wanted lands for junior high schools, parks, playgrounds and athletic fields the most.

SUGGESTIONS ON TDR OF RESERVED LANDS FOR PUBLIC FACILITIES

From the case analysis, it is revealed that the amount of population that “Master Plan of Taichung Urban Planning (excluding Daken Scenic Area)” was expected to accommodate was 1,300,000. If the TDR of all the reserved lands qualified as sending areas were feasible, the increased floor area would be able to accommodate another 418,397 people, plus the original 1,044,896 people in Taichung City until January 2007, the total population after the implementation of TDR would exceed the capacity of the master plan. In addition, the needs for more lands for public facilities derived from the increased population would amount to 286.9958 hectares, including insufficiencies in lands for elementary schools and junior high schools, parks, playgrounds, and athletic fields. TDR of reserved lands for public facilities were meant to improve the procurement of lands for public facilities. However, facing the huge amount of unexpected population and needs for public facilities, the authority should cautiously re-examine the criteria for qualifying lands as sending or receiving areas.

In addition, the examination of needs for public facilities with the increased population after TDR illustrated that New City Centre and Old Town District were the most insufficient among all the other districts in the survey. New City Centre would serve a special function: a sub-urban centre. Thus, comparing with other districts, the land use plan for this district adopted the approach of lower building coverage ratio and high FAR. However, no land in New City Centre District was designated as lands for elementary or junior high schools. The population of this district was expected to amount to 203,120 after TDR. The needs for education thus derived would have no choice but to rely on facilities in the surrounding districts, which would become an extra burden. Therefore, TDR of reserved lands for public facilities would increase the burden of public facilities in the areas surrounding the newly developed districts. Each district should set a limit on the sum of receiving floor areas to avoid surplus in one district.

The implementation of TDR of lands reserved for public facilities definitely increases the overall floor area of a city. It is against the principle of floor area control, and poses great challenges to land use control, to the supply of public facilities and the environment quality of receiving areas. Authorities of city or country governments responsible for urban planning in city or county governments should start doing research on TDR of reserved lands for public facilities, analyzing the population that is expected to increase and the needs for public facilities thus derived, and should also take these two concerns into consideration when conducting the overall review.

What’s more, according to the land use standard of public facilities in “Regulations for the Periodical Overall Review of Urban Planning,” parking lots have been taken as commercial areas without considering their floor areas. But if the development right of a commercial area is transferred, it will give rise to tremendous needs for parking lots. Therefore, a suggestion on the designating standard for parking lots: in addition to the square meters, the floor area ratio should also be taken into consideration.

Table 6: Projection of Needs for Public Facilities after TDR

Districts	Lands for Elementary Schools			Lands for Junior High Schools			Parks			Playgrounds			Athletic Fields		
	Lands Designated (hectare)	Lands needed (hectare)	Insufficient(-) or surplus(+)	Lands designated (hectare)	Lands needed (hectare)	Insufficient(-) or surplus(+)	Lands designated (hectare)	Lands needed (hectare)	Insufficient(-) or surplus(+)	Lands designated (hectare)	Lands needed (hectare)	Insufficient(-) or surplus(+)	Lands designated (hectare)	Lands needed (hectare)	Insufficient(-) or surplus(+)
New City Center	0.00	37.44	-37.44	0.00	30.94	-30.94	13.06	36.94	-23.88	0.00	16.25	-16.25	0.00	14.22	-14.22
Jungong-Shuijing District	8.75	15.68	-6.93	6.78	12.74	-5.96	7.10	13.03	-5.93	3.43	6.53	-3.10	0.00	0.00	0.00
Fuxing Road Neighborhood and Other Four Areas	18.97	19.56	-0.59	9.45	15.66	-6.21	27.04	14.67	12.36	4.25	7.82	-3.57	0.00	0.00	0.00
South of New City Center	4.37	7.17	-2.80	4.20	5.74	-1.53	4.96	5.38	-0.42	0.00	2.87	-2.87	8.85	0.00	8.85
Old Town District	90.85	108.88	-18.03	54.94	102.38	-47.44	115.91	155.60	-39.70	16.17	57.07	-40.90	3.67	49.94	-46.27
West of New City Center	3.14	4.13	-0.99	3.22	3.31	-0.09	3.85	3.10	0.75	0.00	1.65	-1.65	0.00	0.00	0.00
Gan-cheng Commercial District and Other Ten Areas	50.57	82.74	32.17	39.89	66.98	-27.09	105.13	67.95	37.18	24.49	34.15	-9.66	17.39	8.52	8.87
Industrial Areas near Zhongqing Road	0.00	12.91	-12.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unit Three	2.40	1.95	0.45	5.45	1.56	3.89	0.00	1.46	-1.46	1.75	0.78	0.97	0.00	0.00	0.00
Unit Fourteen	0.00	3.73	-3.73	4.41	2.98	1.43	2.26	2.80	-0.54	1.19	1.49	-0.30	0.00	0.00	0.00

Source: collected from this study.

CONCLUSION

The intention of TDR mechanism is to compensate owners of lands that are deemed to be expropriated. In the US, TDR is not applicable to all the expropriations-to-be, whereas in Taiwan, its applicability is extended to include lands reserved for public facilities (which are regarded as expropriated-lands-to-be) for the land-lost compensation. It is also confirmed by the case analysis of Taichung City, where TDR was implemented mainly for the acquisition of private reserved lands for public facilities. This approach contradicted the original intention of the mechanism, which, in its original country, is mainly for the preservation of historic sites, historical conservation areas, sensitive areas, or for the assistance of urban renewal or growth management projects. In addition, some countries only allow the transfer of unworkable spare floor areas of a sending area to appointed areas that are permitted to receive extra floor areas. It is different from the approach in Taiwan, where lands reserved for public facilities can receive extra building floor areas, and these floor areas could be re-transferred to other receiving areas. In order to solve the problem of acquiring lands reserved for public facilities, TDR should not be the only solution. Taking into consideration the principle of TDR, the government should re-examine the suitability of TDR of lands reserved for public facilities.

The case analysis of Taichung City showed that the current TDR mechanism could not compensate the lost derived from TDR and revealed the effect of TDR on land values, and its implementation would increase the burden of the public facilities in the neighborhood of receiving areas. If the government decided to take TDR as a means to acquire lands reserved for public facilities for urban planning projects, it should be taken into consideration at the stage of drafting or overall review. A comprehensive TDR mechanism should include regional development plans and floor area volume control system, with

specified sending and receiving areas. In these areas, regional development priority and management system should be established, and the development of sending and receiving areas should reach a balance to ensure the economic value of TDR. In addition, the floor areas for public facilities needed in urban development should be on top of the list when incorporating TDR into the drafting or reviewing of the urban plan, so as to build the most residential-friendly city.

REFLECTIONS OF TDR POLICY ON PUBLIC FACILITIES IN TAIWAN

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