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Development of urban infrastructure through land-based financing: A case of Bharatpur metropolitan city (Residential area)

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Abstract

Municipalities in Nepal has been seen as a driving force for development, especially after the federal restructuring of the country. Constitution of Nepal, 2015 and the Local Government Operation Act, 2017 have authorized the local government to increase their revenue base from a wide range of sources including the urban land resources to make them financially resourceful for the urban development financing. In this context, land-based financing is seen as a potential source for financing urban infrastructure development in residential areas which lack adequate and decent physical infrastructure. The advantages of infrastructure projects are capitalized on land values which contributes to the land-based finance instruments to pay for infrastructural development. The purpose of this research was to explore how Bharatpur Metropolitan City might fund the construction of urban infrastructure through land-based financing in the residential area lacking adequate and decent infrastructure. Both qualitative and quantitative approaches were used to collect and analysis of existing municipal land-based revenue, land valuation, property registration fees of the case study area, Krishnapur Land Pooling project area, of Ward no 7 of Bharatpur metropolitan city. Building upon the analysis of the capital gain from land value increment and residents' willingness to pay land-based taxes and users fees in the case study area, the study finds land-based-tax system was limitedly integrated into the land-use zoning and the land value increment. This has resulted in the disparities of tax rates and tax coverages. This study recommends further study to to replace the Housing and Land Tax with Integrated Property Tax system and reform policies related to "property valuation" based on added calculations according to land-use zoning, land use and resident's willingness to pay as a means to reinforce municipal revenue to increase infrastructure financing in residential areas.

1. Introduction and Background

Nepal is one of the world's 10 least developed nations. It is, nonetheless, one of the top 10 countries in terms of urbanization. With a population of 5,130,000 people and an urbanization rate of 3%, the degree of urbanization in 2014 was 18.22% [1]. The pace of urbanization is rapid in our country, especially after the new federalization in Nepal. The main reason for such urbanization is rural to urban migration as well as the newly formed municipalities throughout the country. There is much evidence of the transformation of rural areas into municipalities that still lacks the proper urban infrastructures. In the Tarai, three other intermediate cities have seen year-on-year urban growth of over 4%. This comprises the Central Tarai's Bharatpur, the Western Tarai's Butwal, and the Far Western Tarai's Dhangadhi (Muzzini Apericio, 2013: p.28) [2]. Urban growth is mostly characterized by:

(i) increasing municipalities

(ii) increasing urban development

(iii) increasing the number of designated urban areas in the first years

(iv) population explosion in recent years

Infrastructure is widely regarded as a critical component in promoting economic growth and alleviating poverty and inequality across the world. [4]. World Bank (2014) emphasizes the importance of three "I" s – Investment,

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Infrastructure, and Inclusion- for the development of Nepal [5].

Many cities' biggest untapped sources of municipal revenue are land and property taxes. As cities expand, the wealth they generate is capitalized in the city's growing land values [6]. The main sources of their own-source revenue are property tax, small business tax, rental tax, and building permit fees [7]. The paper aims to examine the prospect of land-based financing for the development of urban infrastructure in the residential area of Bharatpur Metropolitan City.

2. Methodology

The Krishnapur Land Pooling project, located in ward no 7 of Bharatpur Metropolitan City was chosen as a case study as this served as a typical residential area development project. Th study used both qualitative and quantitative data. Data related to municipal land-based revenue, land valuation, property registration fees were collected from secondary sources. Similarly, a primary

household survey was carried out (20 % sample) among the resident of the case-study area to assess the resident's willingness to pay land-based taxes and users fees. The analysis of land-based revenue, land valuation, property registration fees, and capital gain from land value increment in the case study area was carried out. Building upon the analysis of residents' willingness to pay land-based taxes and users fees and the findings from the literature, the recommendations were made.

Understanding land-based finance:

Table 1: Land-based financing instruments [3]

Land-Based Finance Instruments	Definition
Recurring Taxes on	Tax on land and often, an immovable improvement on land at regular intervals.
Recurring Taxes on Land and Building	The local government levies a tax on the value of the property (which might include land). In some cases, such as if the property is located in a business improvement district, a fee may be imposed.
Betterment Charges and Special Assessments	One-time tax on land and property for specific infrastructure improvements One-time tax on land and property for specific infrastructure improvements
Developer Exactions	One-time, standardized charges assessed by local governments to the developers or landowners seeking approval for the development or redevelopment of land within the jurisdiction These fees might be used to support infrastructure that isn't directly related to the construction of the property. The fees are calculated using a formula, allowing them to be administered similarly across all property projects.
Land Value Increment Taxes	One-time tax on the increased value of land by the development of infrastructure. They differ from developer exactions or betterment charges in that they go beyond recovering the cost of specific infrastructure or service improvements.
Sale of Development Rights	Payments are made in return for the right to develop or redevelop the property with a higher density or different land use. The rights might be sold at auction or for a set fee. Rights may be resold or transferred to other areas.
Land Lease and Sale of Public Lands	The payment was made in return for the right to inhabit and use public land. The sale of public-owned, preferably city-owned, land, with the money being used to fund urban infrastructure.
Transfer Taxes and Stamp Duties	When property rights to land and structures are transferred to another party, transfer taxes are charged, and they can be either a set fee or a percentage of the property's worth. The selling of the rights to convert rural property (agricultural) to urban use and develop at densities greater than those permitted by zoning laws or height limits.

2.1. Land based finance

Land-based financing tends to improve openness and accountability in local government, and it may function as a benefit tax because it compensates the local government for a wide range of services. Local people will be encouraged to engage in decision-making and g collected as income, which will eventually help to achieve transparency. Another benefit of land and property taxes is that they tend to have a lower dampening effect on private investment and economic activity than other types of taxes. As land-based taxes are generally collected annually and only a very small portion of land and property valuation is charged.

Land-based taxes are the fees, fines, dues, charges, levies, rates, and rents paid on land, either developed or undeveloped to governments for wealth redistribution and as a form of government control over land. It is the responsibility of landowners to pay taxes on them and a responsible government must collect taxes on land and its appurtenances as at when due. All states which can efficiently manage their resources will be viable [8].

Increased property rights or increased benefits from better infrastructure may also be used to generate funds via land-based finance instruments. Some of these tools are more successful in 'survival' or 'basic services' mode, while others become more effective as cities grow and have more complicated administrative systems in place to support them [9]. Any of the land-based finance tools can be used by highly developed cities.

2.1.1. Land-based financing instruments

According to Land Act, 2021, the Nepal government can sell land in two cases;

(a) if the land was procured by the government through land polling and for the development of infrastructure and

(b) and if the government has acquired that through ownership selling with or without compensation.

As a result, the Sale of Development Rights and Land Lease and Sale of Public Lands will have limited outcomes even if they are subjected to land-based financing instruments in case of Nepal.

2.1.2. Condition for land-based finance

The basic principle of land-based financing is that land value increases as a result of government action, such as investment or policy changes. As a result, any value gained as a result of government acts should be split between the landowner and the government. Decentralization is another important component of land-based finance implementation. Local governments should be assigned responsibility for revenue collection and mobilization, with federal assistance to improve administrative capability.

According to research performed by DFID-UKAIDS [10] several enabling circumstances allow land-based finance to contribute to income generation and infrastructure supply for local governments. Without these preconditions, the technologies mentioned above will struggle to function properly. These criteria are essential for establishing the foundation for land-based finance research, recognizing the instruments' limitations, and preventing their abuse or widespread application.

3. Study Area

The Narayani River runs through Bharatpur Metropolitan City, which is known for its historical, social, economic, cultural, and religious aspects. The Chitwan district's headquarters and commercial hub are both located here. Bharatpur was founded in the year 1979 A.D., was proclaimed a municipality in the year 1991 A.D., and was elevated to Metropolitan City on March 10, 2017. According to the 2011 population census, the population of Bharatpur Metropolitan city is presently 2,80,502. Bharatpur Metropolitan City, ward no. 7, Krishnapur was an agricultural area before 2000 A.D. most of the land was cultivated land. At present, it is transforming into a residential hub. Krishnapur is near from Narayangadh market, hospitals, Bharatpur Airport, Bus Park and schools, etc. The total area of Krishnapur is 4.14 sq. km. having population 10505 [11]

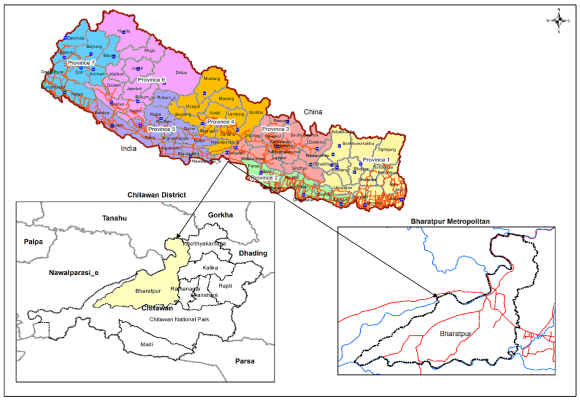

Figure 1: Location map of Bharatpur metropolitan city

3.1. Land use

Bharatpur Metropolitan City has been divided into two parts by East-West Highway. Major settlement areas are on the periphery of highways and agricultural and forest land is dominant in the southwest portion. Agricultural land is the most dominant land use in the metropoli-

tan city, most of the land is cultivated land. Except in city core areas such as Narayangadh, Bharatpur, Hakimchowk, Krishnapur all areas are prominently agricultural land. Bharatpur Metropolitan City has 53.16% of the land is cultivated, 5.78% of the land is covered by built-up, 35.73% of the land is covered by forest which includes community forest too, 2.23% of the land is covered by grassland, 0.09% of the land is covered by open space, 1.66% of the land is covered by water bodies, 1.35% of the land is covered by sand/gravel [12].

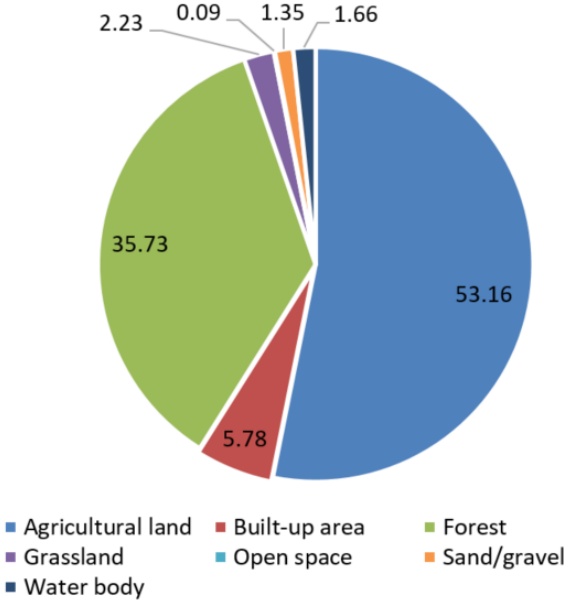

Figure 2: Land use in 2018 of Bharatpur metropolitan city

3.2. Krishnapur land pooling

The Krishnapur Land Pooling project is located about 500m southwest of BP Koirala Cancer Hospital in Ward No. 7, Krishnapur of Bharatpur Metropolitan City. There are a total of 260 no. of plots in the area of 36.37 Ha in which 59 % of plots have less than area 3 Katha of land and 10% of plots have an area greater than 10 Katha. The project had started in 2006 A.D. and was approved by the government in 06/20/2006. Project plan to complete at the end of 2011 A.D. But the project is still going on, about 95% of the project is completed. The Krishnapur Land Pooling Project was done under DUDBC (UEIP Project) with ADB support implemented by Bharatpur Metropolitan City/UEIP/PIU. At present, this project is solely implemented by Bharatpur Metropolitan city.

The proposed contribution is 8.9 Ha with a minimum of 17% to a maximum 41% contribution and the average land contribution is 29%. There would be a surplus

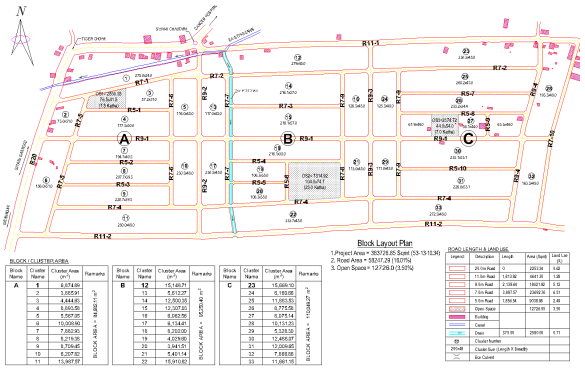

Figure 3: Proposed block layout plan of Krishnapur land pooling

of 0.08 Ha, which can be kept for contingency. The land had classified into class I to class V based on the contribution ratio of land. The proposed land use is almost similar in all three options with about 79.77% of the residential land, 17.18% of roads and drains, and 3.5% of open space. Roads and pavement (black-topped) with road network having a width of 22 m, 11 m, 9m, and 5 m. Drainage is an earthen drain with cross drainage work in which slab culvert with span 9 m, 7 m, and 5 m span. The total cost of the project is 68,771,997 and the average development cost is 64,033.52 per Katha (1 Ha = 29.53 Katha). The minimum proposed plot size is 10 Dhur. The market land value of the proposed area was 1 Lakh to 4 Lakh depending upon the access of road whereas municipal land value was 40 thousand to 2.5 Lakh per Katha. The land parcel was categorized based on the land contribution which is governed by the access of road and shape of plot in the Land Pooling project. The minimum benefit was 107% to maximum benefit 113% and the average return benefit obtained by the Krishnapur Land Pooling Project was 111%.

4. Data Collection and Analysis

4.1. Land revenue on Bharatpur metropolitan city

Nepal has been designated a federal country following the proclamation of its constitution. The local government has been given the authority to collect and mobilize tax revenue. Residents expect infrastructure development from local governments when authority was decentralized to them. It is also the responsibility of the Bharatpur Metropolitan City, as a local authority, to achieve the desired development goals with restricted resources. Housing and Land Tax (HALT) or Integrated Property Tax (IPT) has been used by metropolitan cities to collect property tax, which is a valuable resource. The fundamental differences between HALT and IPT

are:

(i) Land revenue is integrated with IPT but in HALT land revenue is levied separately

(ii) Basis of valuation of property are different

(iii) Rate of tax is different

(iv) Depreciation method of property is different

Annual Property Tax is based on the valuation of land by metropolitan city and according to the structure of the building. Annual Land Tax is based on a valuation by municipality Rental Tax is according to the built-up area of the building. Property valuation is done by metropolitan city which is chaired by Vice-Mayor, valuation is updated annually. For land valuation purposes land has been categorized in commercial, residential, and agricultural, the basis of categories is existing land use, size of the settlement, and road network.

Table 2: Land valuation system in BMC, ward no. 7 [Source: Bharatpur Metropolitan City]

Land used	Land adjoining to	Rate ('000/ Katha) municipality
Commercial	Metallic Road	5,096
	Metallic Road	4,550
Residential	Metallic Road	3,640
	Gravel Road	2,000
Agricultural	No road	910

Table 2, above shows the land valuation system in Bharatpur Metropolitan City. The property tax rate system of Bharatpur Metropolitan City in which the minimum property tax per annum is 250 for the property valuation up to 10 Lakh and maximum property tax per annum is 0.1% for the property valuation 60 Crore above. The land tax rate of Bharatpur Metropolitan City in which land was classified into 8 groups in accordance of land valuation per Katha. For Ka-class, the land valuation is maximum which is more than 1 Crore per Katha, land tax for such class land is 1,000 per Katha. For Ja-class, the land valuation is minimum which is below 3 Lakh per Katha, land tax for such class land is 30 per Katha. Table 3, below shows the property registration pass fee of Bharatpur Metropolitan City.

4.2. Condition for land-based financing- Bharatpur metropolitan city

According to the literature on land-based finance, land demand, land supply, effective and supportive local governments, and willing landowners are basic conditions for applying land-based financing. It is essential to implement land-based property financing demand. As the municipality is in the process of migration, demand for land in the municipality is increasing. The population estimate is 2 times higher than the present population in 2041 of a metropolitan city. The land of the house will be necessary to accommodate this population. Another important factor is demand for land since people preserve the land as an opportunity for investment. And land value speculation leads to an increase in land transactions. These activities will eventually lead to increased demand for land.

Table 3: Property registration pass fee of Bharatpur metropolitan city [Source: Bharatpur Metropolitan City]

S.N.	Valuation of property	Registration pass fee
1	Up to 5,000,000	1575
2	5,000,001- 7,500,000	1975
3	7,500,001- 10,000,000	2475
4	10,000,001- 50,000,000	2975
5	50,000,001 above	4975

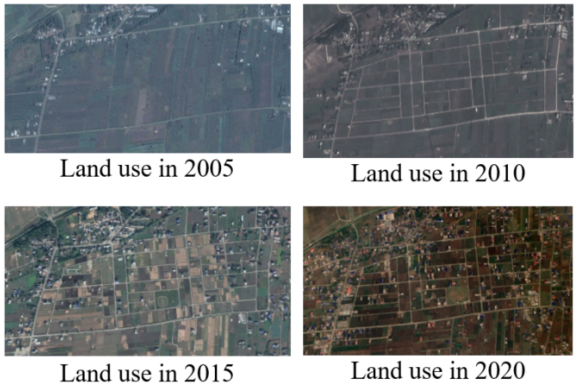

Figure 4: Change of land use with the access of infrastructure of Krishnapur land pooling

Metropolitan city data shows that 5.78% of the area is built up in the metropolitan city and 53.16% of the grown land. Figure 4, shows how agricultural land has been changing with the access of infrastructure such as road, transportation, water supply, etc. which is the example of patterns in the metropolitan city of conversion of agricultural land into housing plots in the case of Krishnapur Land Pooling area. Investment in mu-

nicipal development is essential for landowners. As these developments benefit, their property value should be increased, so that the government can also invest in infrastructure in other locations. The municipalities are challenged in implementing land-based finance with a greater willingness on landowners and developers. One of the factors to calculate should be the affordability of landowners is easier to implement.

5. Finding and Conclusion

5.1. Finding-gap on land-based revenue

In order to examine the current conditions of the Bharatpur Metropolitan City land-based revenue, it is necessary to discuss gaps in land-based conditions, fiscal coverage gaps, and gaps in land-based capture. As land-based revenue is an important internal source of income of municipality to maximize the potential of it.

5.1.1. Disparities on valuation system

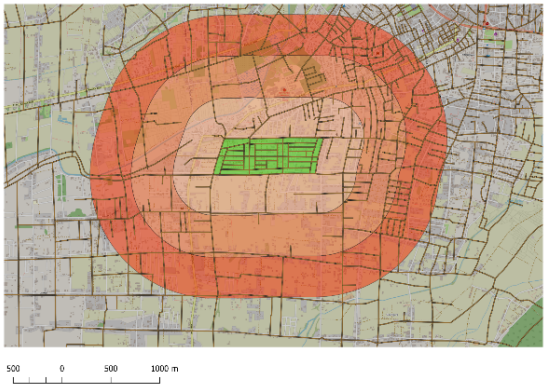

Figure 5: Showing disparities in the valuation system Krishnapur land pooling area

The municipal land valuation inside and outside is the same in the case of the Krishnapur Land Pooling Area which equals 36.4 Lakh per Katha. Since the investment in the development of physical infrastructure is higher in land pooling area than its' neighboring land area (adjacent land, first-tier land, second-tier land, and third-tier land) but municipal land valuation is the same.

5.1.2. The rate of tax of land doesn't depend on land use

By the metropolitan city's tax land division, the city has appreciated these standards following the residential area. However, land in the area has been used for various purposes such as agriculture, residential, commercial, manufacturing, etc. Figure 6, below shows the example of different types of land use in a residential area and paying the same rate of taxation. Plot A is commercially built, plot B includes a residential building, and plot C is used for agricultural purposes, to indicate that 3 plots were taken into account of different land use within the same residential area. All these plots pay a land tax of 250 rupees per Katha but land-use of individual plots are different purposes.

Figure 6: Land use in Bikash chowk ward no. 7

5.1.3. Metropolitan city has failed to capture increment in land value

In the case of the Krishnapur land pooling area, the cost market value of land is 120 Lakh per Katha at present and 10 Lakh per Katha in 2011. The discount rate is 6.30% from the calculation of inflation rate and fixed deposit rate from 2011 to 2021.

$$\begin{aligned} \text{Future value } (FV)_{2021} &= PV_{2011} \times (1 + DR\%)^T \\ (FV)_{2021} &= 1,000,000 \times (1 + 6.3\%)^{10} \\ &= 1,842,182.47 \end{aligned}$$

$$\begin{aligned} \text{Capital Gain (CG)} &= PV_{2021} - FV_{2021} \\ &= 12,000,000 - 1,842,182.47 \\ &= 10,157,817.53 \end{aligned}$$

Where,

$$\begin{aligned} FV &= \text{Future Value} \\ PV &= \text{Present Value} \\ DR &= \text{Discount Rate} \\ T &= \text{Time} \\ CG &= \text{Capital Gain} \end{aligned}$$

Hence, Capital gain by the land 1 Katha land is 10,157,817.53 in land pooling area.

Similarly, in the case of land plotting, cost of market value of land 90 Lakh per Katha at present and 50 Lakh

per Katha in 2016. then

$$\begin{aligned}\text{Future value } (FV)_{2021} &= PV_{2016} \times (1 + DR\%)^T \\ (FV)_{2021} &= 5,000,000 \times (1 + 6.3\%)^5 \\ &= 6,786,351.14\end{aligned}$$

$$\begin{aligned}\text{Capital Gain (CG)} &= PV_{2021} - FV_{2021} \\ &= 9,000,000 - 6,786,351.14 \\ &= 2,213,648.86\end{aligned}$$

Hence, Capital Gain by the land 1 Katha land is 2,213,648.86 in the land plotting area.

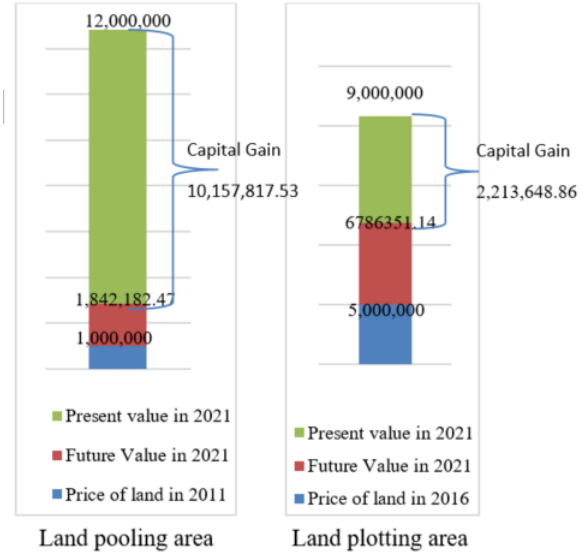

Figure 7: Capital gain

Due to the land pooling, the cost of the market value of adjacent land of land pooling area is the same as the cost of land pooling area and gradually decreasing in the cost of the market value of the first-tier land, second-tier land, and third-tier land but same value of land which is not near to the land pooling area, the cost market value of such land is lower than the adjacent and neighboring land of land pooling area.

6. Conclusion

Land-based finance can help local governments overcome some of the problems of infrastructure funding. Land-based finance includes a variety of mechanisms that may be used to meet the demands of local governments in various scenarios. Land-based finance can be used to complement local government's existing revenue stream, improve metropolitan authorities' ability to collect the urban dividend, and reap the benefits of urban expansion. The basic prerequisites for implementing land-based financing, i.e., land demand, supply of land, effective, supportive local government, and willing landowners and developers, have been examined by the literature metropolitan city. In the case of land-based financing for the residential area of Bharatpur metropolitan city, according to the literature, there are many land-based financing instruments to finance the metropolitan, but Land value Increment Tax (land value capture) is the best instrument for the residential area i.e., land pooling is the more self-sustained tool for the land-based financing which results in the sustainable development of the residential area, control the sprawl development and control haphazard land plotting.

The metropolis collects land taxes, but such taxes have not harnessed municipal potential. During this research, the integrated land zoning and land use metropolitan tax system was stabilized. Another serious need is to conduct creative local experiments with land-based funding tools for capturing land value. Land-based funding should be used for zoning growth control. Core urban infrastructure, social urban infrastructure, and revenue-generating urban infrastructure are the three types of metropolitan infrastructure. The assessment of this research showed that revenue-generating infrastructure in the municipality is least developed. As the city is dependent on grants and these subsidies concentrate more on urban center infrastructure. Further research is warranted for BMC to explore and opt for land-based financing of infrastructure.

Conflict of interest

No conflict of interest

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