

# Analyzing the Uncertainty of Toll Road Land Acquisition Using Program Uncertainty Management

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**Abstract**— Land acquisition is one of the most important activities in construction, particularly in toll road development. Many toll road projects in Indonesia have not been completed and many investors have become bankrupt because of unresolved land acquisition issues. The problem of land acquisition in Indonesia is due to uncertainty and very complex issues. In fact, land prices can be 10 times until 20 times higher, and construction costs can far exceed the original costs. Therefore, this paper aims to create a new value for stakeholders and organizations that handle negative uncertainties that can waste a large amount of investment in money using program uncertainty management. The results of this paper detail the process and analysis of program uncertainty management for land acquisition uncertainty in the case of Indonesian toll roads.

**Keywords:** *land acquisition; program uncertainty management; toll road*

## I. INTRODUCTION

The planning of infrastructure development, especially toll roads, is as a backbone of the economy into national strategic plans, but the planning may not align with the land acquisition plan. Land acquisition for toll road infrastructure development is very slow, which results in many toll roads that are already planned or in progress and ultimately not completed. Thus, there is a gap between toll road development plans and land acquisition executions.

Land acquisitions are intended for public and company purposes. This study focuses more on land acquisition for public purposes, i.e. toll roads as public roads. In principle, when land acquisition is for a public purpose, then its development schemes are sponsored by the government for either the planning or funding [1,2].

In Indonesia, the need for toll road land acquisition funds in 2019 was Rp41.74 trillion. It was estimated that the need for toll road land acquisition funds in 2016 was Rp16 trillion. However, the state budget only allocated land acquisition

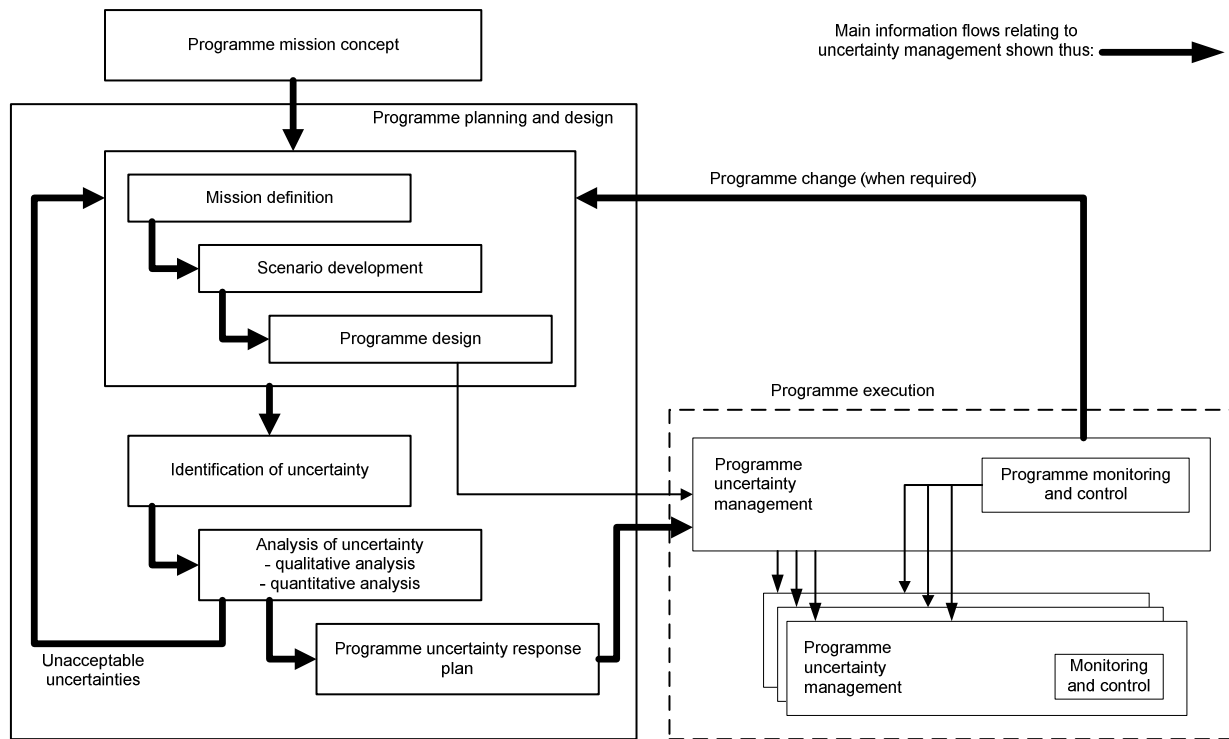
funds in 2016 of Rp1.4 trillion. Thus, the lack of funds for land acquisition was Rp14.6 trillion [3]. Meanwhile, in the process of toll road concession agreements between the government and project companies, of the 25 toll road sections which have been signed, only one section is in full operation. The other sections are still in the construction and land acquisitions stages [4].

Based on the facts, there was a gap between the need and realization of land acquisition; therefore, there was an uncertainty in the process of land acquisition, especially in toll road development. This research attempts to offer a plan to create a new value for stakeholders and organizations to manage negative uncertainties that can waste a large amount of investments in money using program uncertainty management.

## II. PROGRAM UNCERTAINTY MANAGEMENT FOR LAND ACQUISITION UNCERTAINTY IN THE CASE OF INDONESIAN TOLL ROADS

According to Nadia [5], the highest risk in the construction of toll roads in Indonesia is for land acquisition. The causes of that are the government guarantees to reduce the risks are minimal; ‘there is a lack of coordination between the central government and local government as well as with the land owners; it depends on the laws that are applicable in every province (local government); and as the legitimate owner of the land they have the power to issue a land permit or not; and it requires a different policy and institutional approach to solve it’. Thus, the impact of the delay in land acquisition will negatively affect toll road development, and it will also negatively affect the toll road investors [6].

To analyze the uncertainty of toll road land acquisition, this paper uses the uncertainty management program, which was developed by Shimuzu [7]. The basic processes of uncertainty management in a program are illustrated in Figure 1.



Source: Shimizu (2016)

Figure 1. Basic processes of program uncertainty management

Based on the processes, in the mission definition stage, it defines the critical success factors (CSF) of land acquisition. The next step is to determine the execution scenario. In the case of toll road land acquisition, the first scenario is the government goes through the Ministry of Finance to provide authority for national asset management to finance land acquisition. In another scenario, if the land acquisition price is more than estimated, then the government uses land capping that is financed by the project company. It will be paid by the government if the funds for land acquisition from the state budget are available. In this process, program uncertainties are identified, while qualitative and quantitative analyses are made to confirm or improve the certainties.

In the design phase, the architecture of the program and its constituent projects is designed according to the scenario developed in the previous phase. In this stage, the certainty of the project and the total program is assessed. Unacceptable uncertainty elements are eliminated to improve the probability of the program's success. In the execution phase, the government executes land acquisition processes and then does control and monitoring. Therefore, basic process of program uncertainty that mentioned at figure 1 above, now it can be reconstructed for toll road land acquisition uncertainty management as shown at figure 2.

### III. CASE: TRANS SUMATERA TOLL ROAD

An application of this program can be examined for the Trans Sumatera Toll Road for the Bakauheni – Tebanggi Besar section. The length of the toll road is: 140.7 km; the

construction costs are: Rp12.22 trillion; and the land acquisition is: Rp1.19 trillion.

Based on Figure 2, the first phase is the program in the project strategic list. Then the program mission concept of a toll road land acquisition is made. Next, the mission of the land acquisition is clarified during the operation. Finally, the land can be leased. The scenario development of toll road land acquisition is the land can be executed more than the toll road width to reduce the land acquisition risks. For example, 150 m can be executed, where 50 m is for the toll road, and the remaining land is allocated for railway lines, high voltage lines, and other utility lines. Meanwhile, the program design of the toll road land acquisition is the Trans Sumatera toll road.

The second phase is an identification of the toll road land acquisition uncertainty. According to Latief [8], there are five highly critical success factors (CSFs) of a land lease, such as the quality of land lease data; the transformation of land lease rights involving government control, the design plan, and integrated location; the transparent negotiation of the investment agreement; and a negotiated agreement to protect private investors and the state.

The analysis of toll road land acquisition uncertainty uses a qualitative and quantitative analysis. A qualitative analysis is 'the process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact' [9]. A quantitative analysis is 'the process of numerically analyzing the effect of identified risks on the overall project objectives' [9].

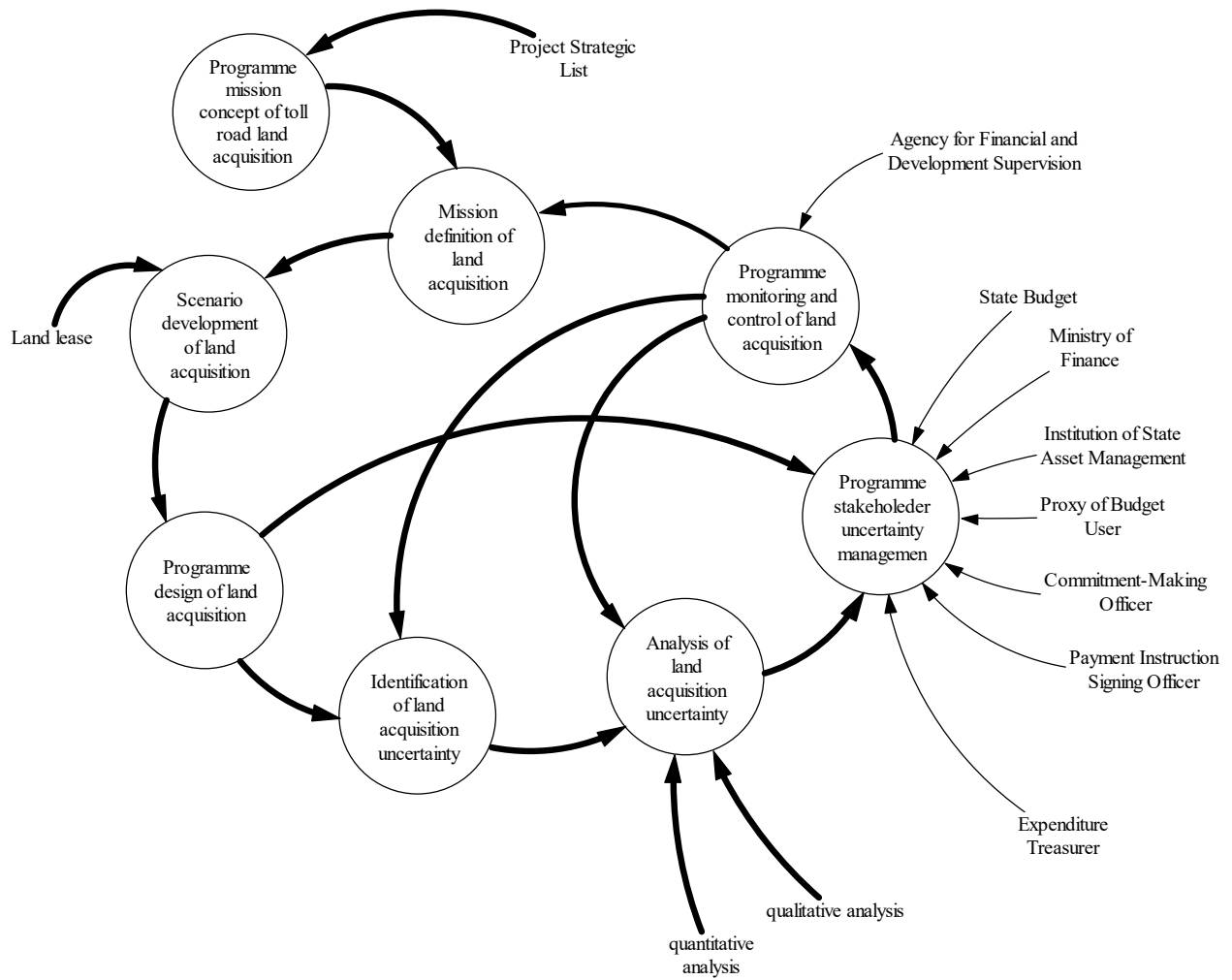


Figure 2. Processes of program toll road land acquisition uncertainty management

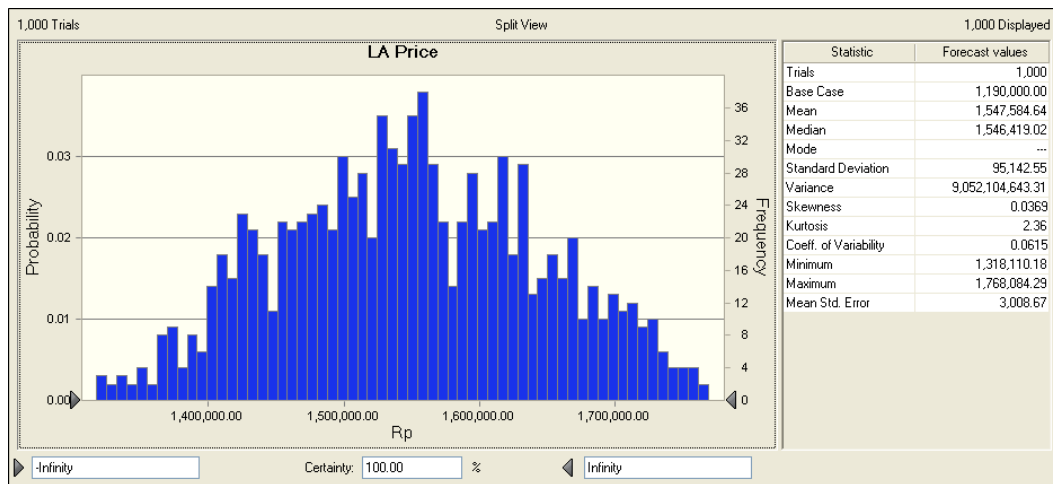


Figure 3. Results of uncertainty land acquisition

As mentioned in the identification above, the highest CSFs can be said quantitatively to have a lack of quality in land lease, a lack of coordination between the central government, local government, and land owners. By using a Crystal Ball instrument, it is assumed that the lowest impact cost is 10% of the planned land acquisition cost: Rp1,309,000 million, most likely 30% from the planned land acquisition cost: Rp1,547,000 million, and the highest is 50% from the planned land acquisition cost: Rp1,785,000 million. Then after using the Crystal Ball instrument, the land acquisition can be Rp1,547,584.64 million. So, there is a probable increase of 30.2%, as shown in Figure 3.

The next phase is an execution of the toll road land acquisition using land funds in the amount of Rp1,547,584.64 million. These funds are provided by the state budget. Then the government gives authority and responsibility to the Ministry of Finance for land acquisition financing for a strategic project. Then it is done by the State Asset Management Institution (*Lembaga Manajemen Aset Negara/LMAN*)[10].

According to the Ministry of Finance [10], the involvement of stakeholders for land acquisition expenditures are a proxy of the budget user (*Kuasa Pengguna Anggaran Umum Negara /KPA*): officials in the work units of each budget officer user, either at the head office or the regional office or work unit in the ministry/institution, commitment-making officer (*Pejabat Pembuat Komitmen/PPK*): an official exercising KPA authority to make decisions and/or actions that may result in expenditures at the expense of the state budget, payment instruction signing officer (*Pejabat Penanda Tangan Surat Perintah Membayar/ PPSPM*): an officer who is authorized by KPA to conduct tests on payment requests and issue payment orders, and the expenditure treasurer (*Bendahara Pengeluaran*).

At the execution phase, it can cause uncertainty management from the start of the state budget, to the Ministry of Finance, to LMAN, until the execution of land acquisition. In that case, the release of the land acquisition fund process must go through some officials such as from KPA to PPK to PPSPM, and then to the expenditure treasurer to distribute compensation money to the eligible parties. The number of bureaucrats (6 officials) that must be passed to spend the funds is one of uncertainty. This can happen if one of the officials is delayed; it will impact the delay in spending.

At the operational phase, land can be leased to the railway company, for high voltage, and for utilities. It is assumed that revenue from the railway company is 8% from the toll road revenue, revenue from the high voltage company is 0.5% from the toll road revenue, and revenue from the utility companies is 0.3% from the toll road revenue.

Based on the calculation, the total land acquisition which is caused by uncertainty can be paid by land leased as mentioned above, and the grace period in 2041 is shown in figure 4.

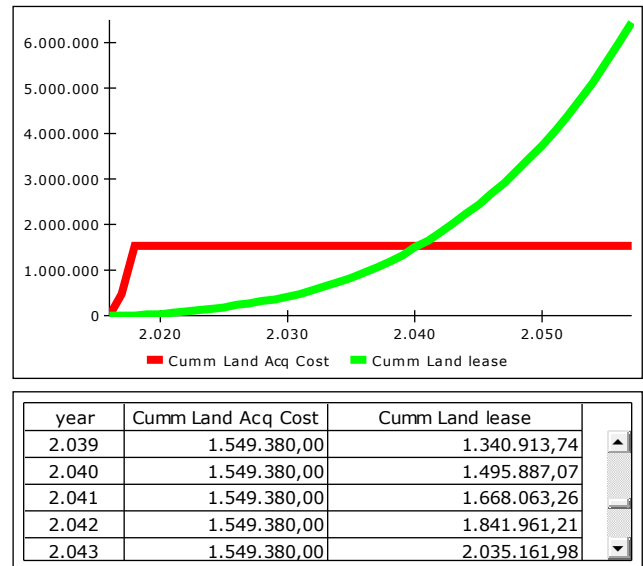


Figure 4. Grace period of land acquisition cost and land lease

As a whole analysis of the uncertainty of toll road land acquisition using program uncertainty management (Figure 2), the non-land lease and land lease can be compared, as shown in figure 5. So, an IRR non-land lease is 0.01, an IRR with a land lease is 0.015, and the difference is 0.5%.

year	Cumm NPV	mm NPV after Land Lease
2,051	-8,610,332.48	-8,494,403.08
2,052	-7,447,997.61	-7,322,808.46
2,053	-6,111,378.38	-5,987,110.51
2,054	-4,739,130.91	-4,623,783.23
2,055	-3,206,662.59	-3,112,616.75
2,056	-1,672,420.21	-1,607,623.13
2,057	37,737.74	57,983.15

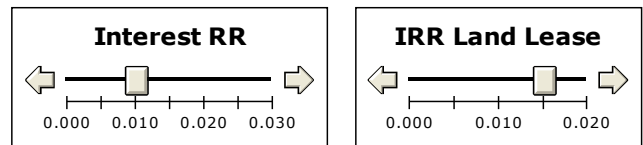
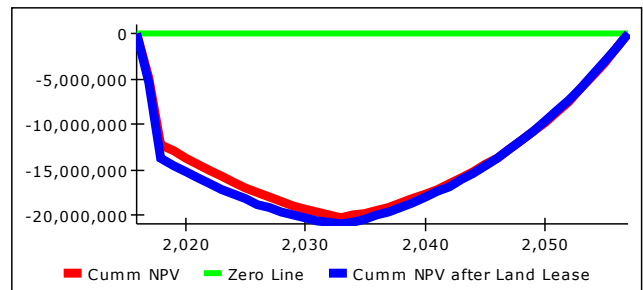


Figure 5. Interest rate of return for the Trans Sumatera Toll Road of Bakauheni – Tebanggi Besar section

At the monitoring phase, the supervision of land acquisition implementation is carried out by the Agency for Financial and Development Supervision. This agency has a role from the implementation stage until the determination of the land license replacement. Supervision is done based on a letter of request that is submitted by the chairperson of LMAN with copies to the Minister/Head or State Ownership Enterprise management.

The results of the supervision shall be in the form of recommendations that contain the following points:

- Suitability of Land Acquisition implementation to be used for National Strategic Project implementation;
- Compliance of Land Acquisition implementation for infrastructure development with a technical plan of infrastructure development; and
- Compliance with the stages of Land Acquisition implementation for infrastructure development with the provisions of legislation concerning Land Procurement for development for public interest.

At this supervision stage, uncertainty can also occur due to the emergence of various data that is not appropriate, so it can lead to a misappropriation of authority and result in a fear of

land procurement implementation. This may occur if a competent authority can be easily bribed, resulting in uncertainty at the time of supervision.

If from the beginning there is uncertainty of land acquisition for toll roads starting from the price of land that can rise up to 30%, there is stakeholder management uncertainty too such as bureaucracy of expenditures until monitoring. This can lead to delays in the land acquisition process.

#### IV. CONCLUSION

By using the process of program uncertainty management for toll road land acquisition, then the execution of toll road land acquisition in Indonesia can be well managed as shown in figure 2.

As result of the calculation, the impact of uncertainty of land acquisition, the land acquisition cost increase is 30.2% and IRR is 0.01. Meanwhile, if a land lease is used, the revenue from the land lease can be a grace period in 2041, an IRR of 0.015, and a difference of 0.5%.

This paper can still be further developed to obtain the CSF of land acquisition in order that the process can run, as well as this model can be developed to analyze the qualitative and quantitative methods based on these processes.

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