Figure 6.6.11 (1) Changes of Trip Generation/Attraction under Case-3A (as compared with present situation)

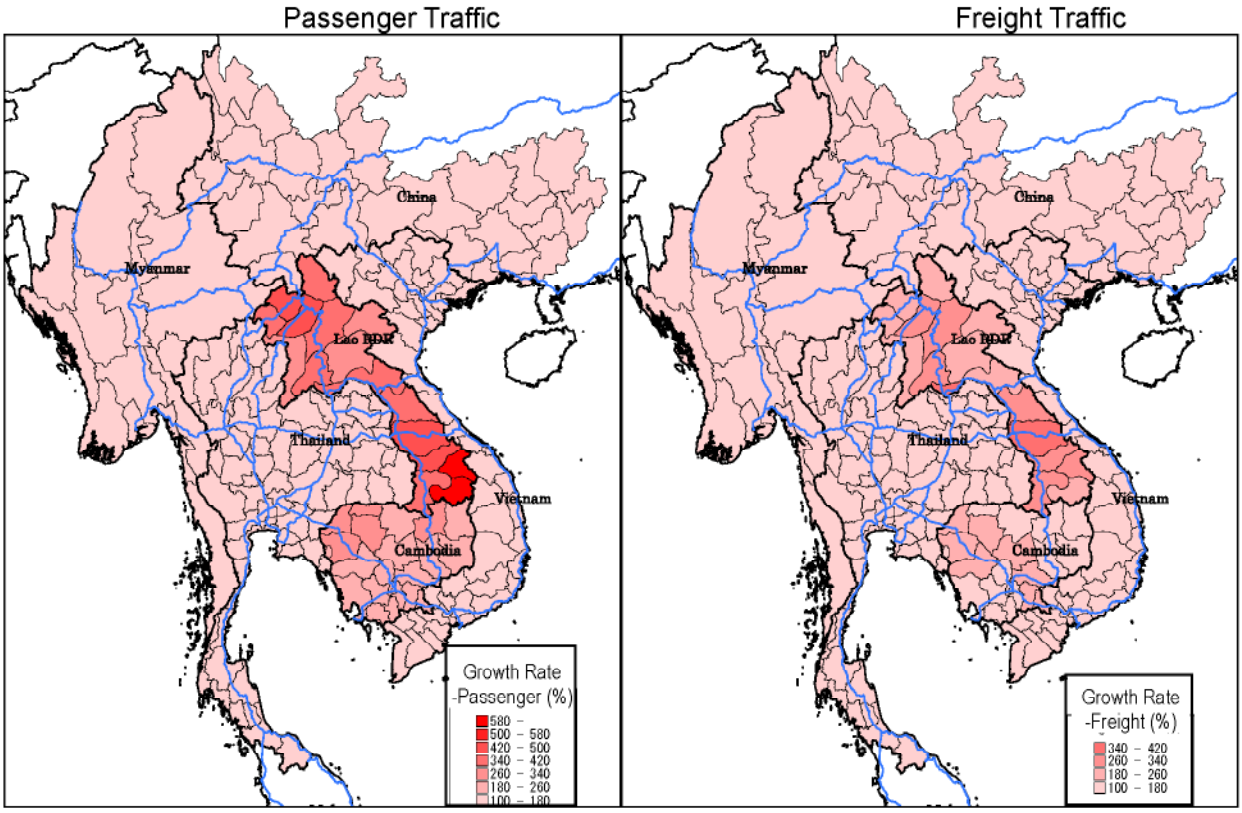


Figure 6.6.12 (2) Changes of Trip Generation/Attraction under Case-3B (as compared with present situation)

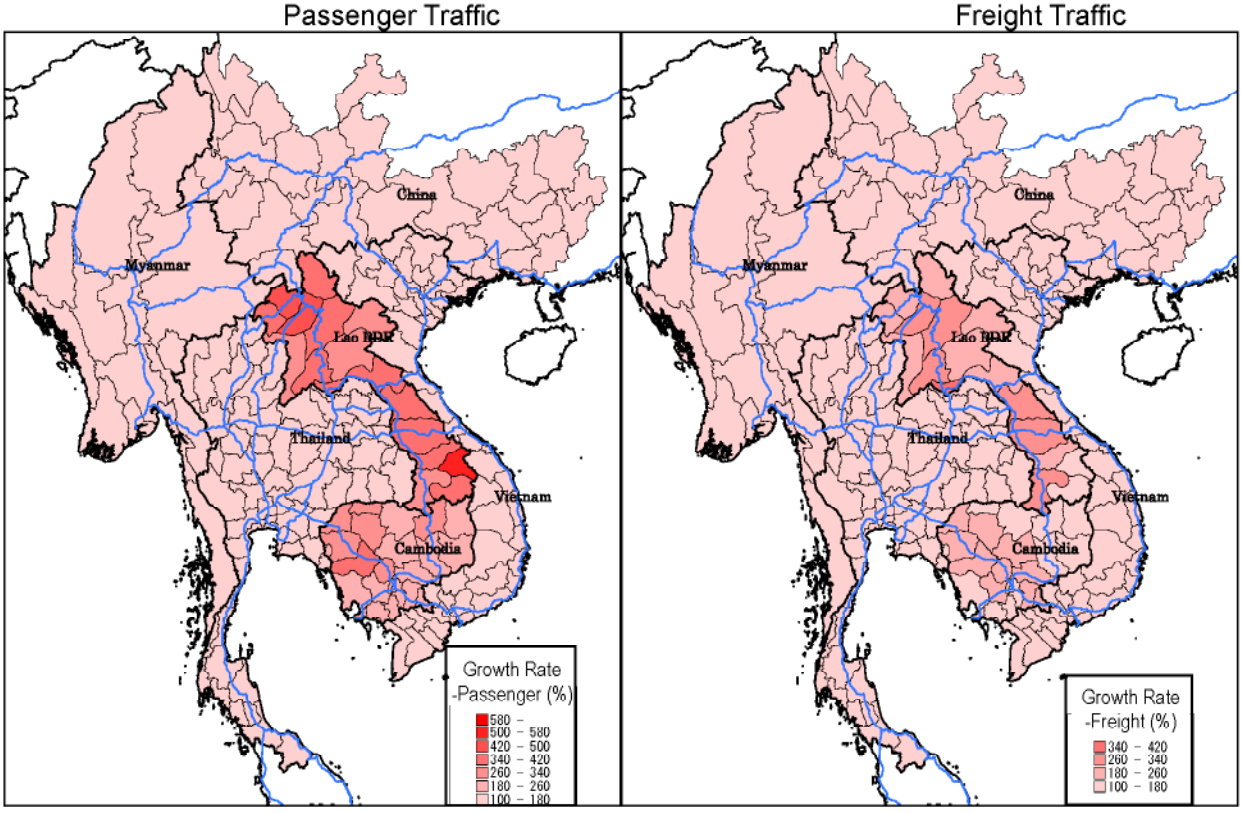


Figure 6.6.12 (3) Changes of Trip Generation/Attraction under Case-3C (as compared with present situation)

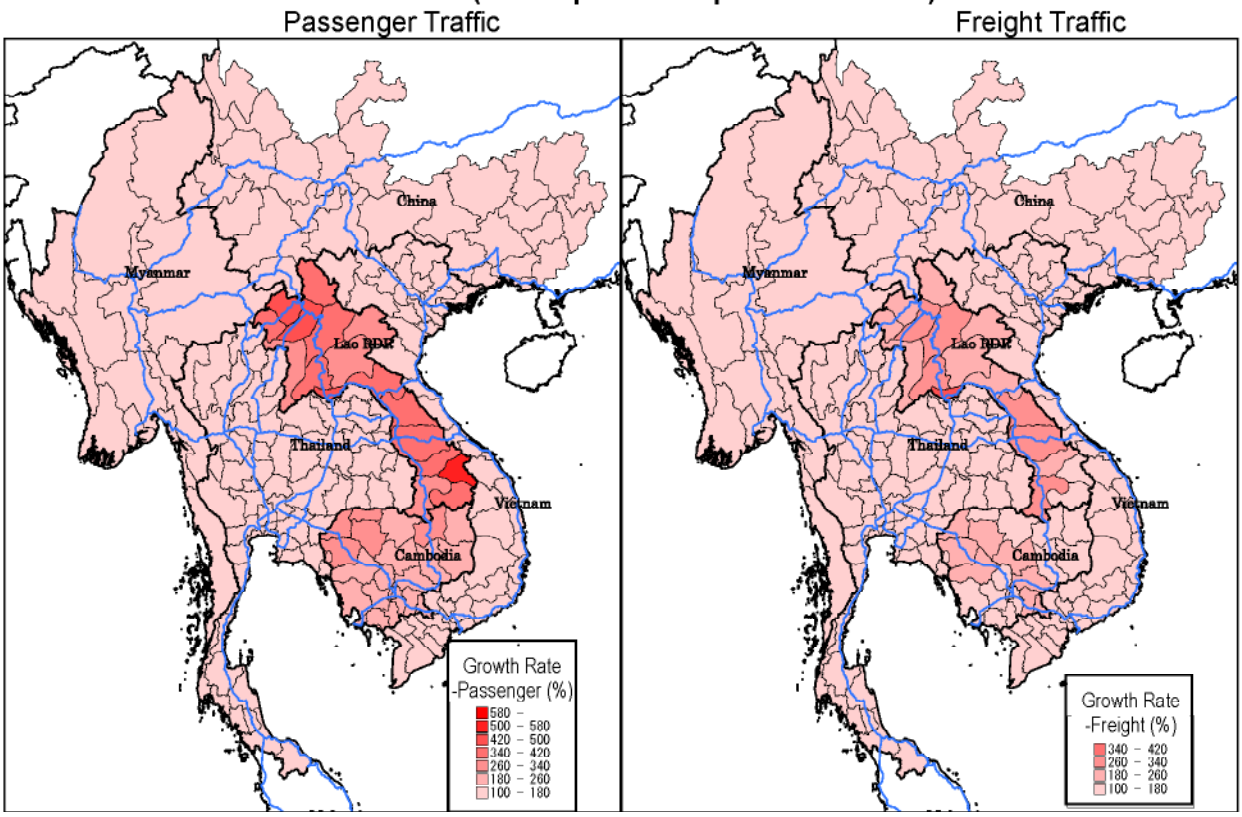


Figure 6.6.12 (4) Changes of Trip Generation/Attraction under Case-3D (as compared with present situation)

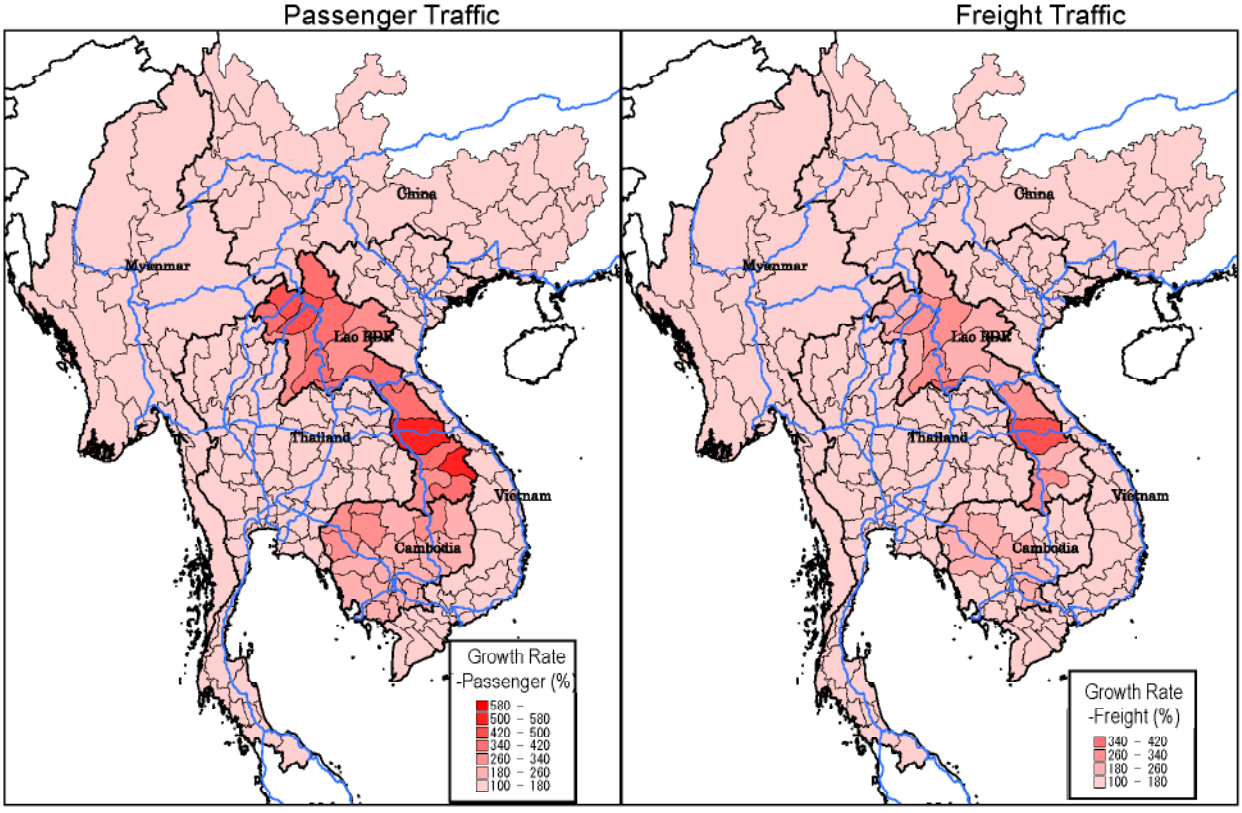
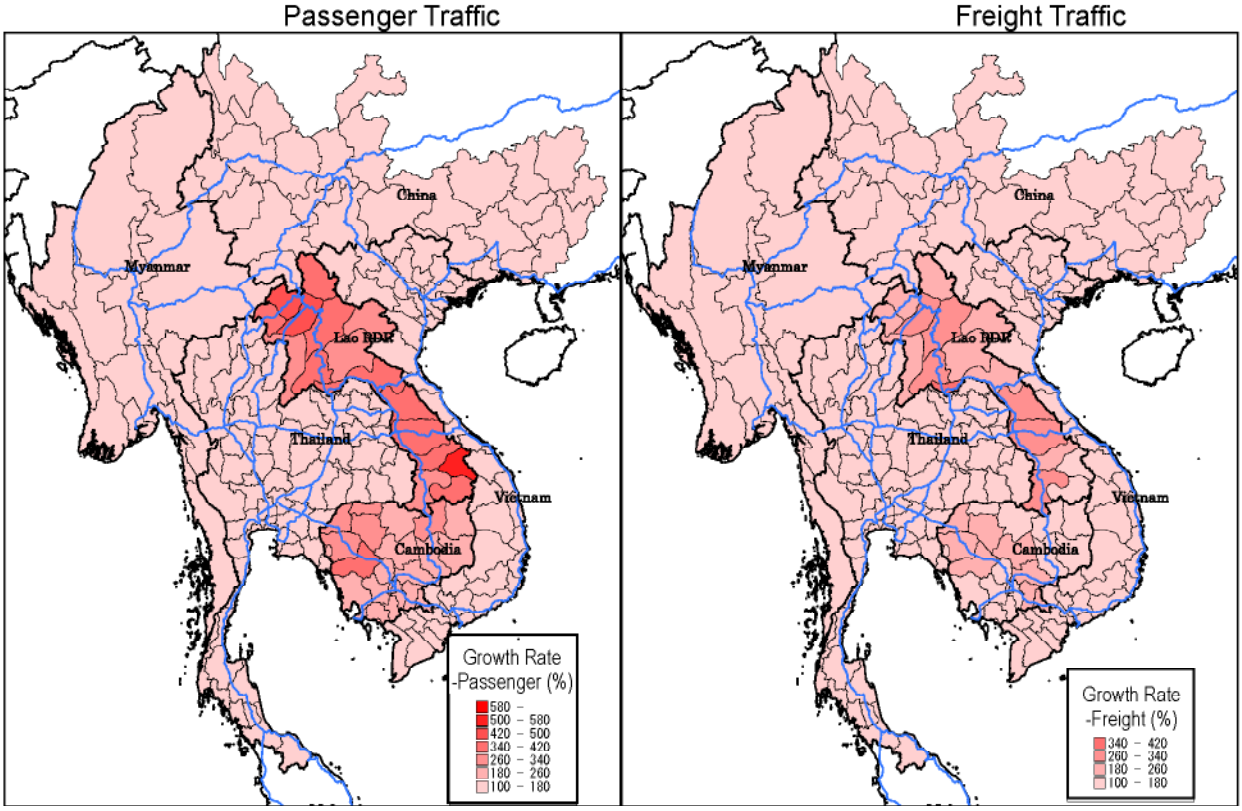


Figure 6.6.12 (5) Changes of Trip Generation/Attraction under Case-3E (as compared with present situation)



Changes in Traffic Flow

(a) Influence of FDI and CBTI Development

As previously described, the GRDP and trip generation/attraction showed remarkable growth if the investments and CBTI developments are implemented in the same area. With the comparisons made between "CBTI/CBTA development only" cases and "CBTI/CBTA development plus investment" cases, the importance of investment integrated with CBTI/CBTA development has become clear.

Figures 6.6.12 (1) and 6.6.12 (2) show the changes in traffic flow under different assumptions on CBTI/CBTA development for Case-A (Lao PDR) and Case-B (Cambodia), respectively. The comparison of Case-1A and Case-2A, for instance, shows that Case-1A is more effective in terms of economic activities (traffic flow) than Case-2A because of the appropriate location of CBTI developments.

In the same manner the comparison of Case-1B and Case-2B, shows that the latter is more effective in terms of economic activities (traffic flow) than the former, again because of the synergy between investment and CBTI development.

Figure 6.6.12 Changes of Traffic Flows under Case-1A and Case-2A

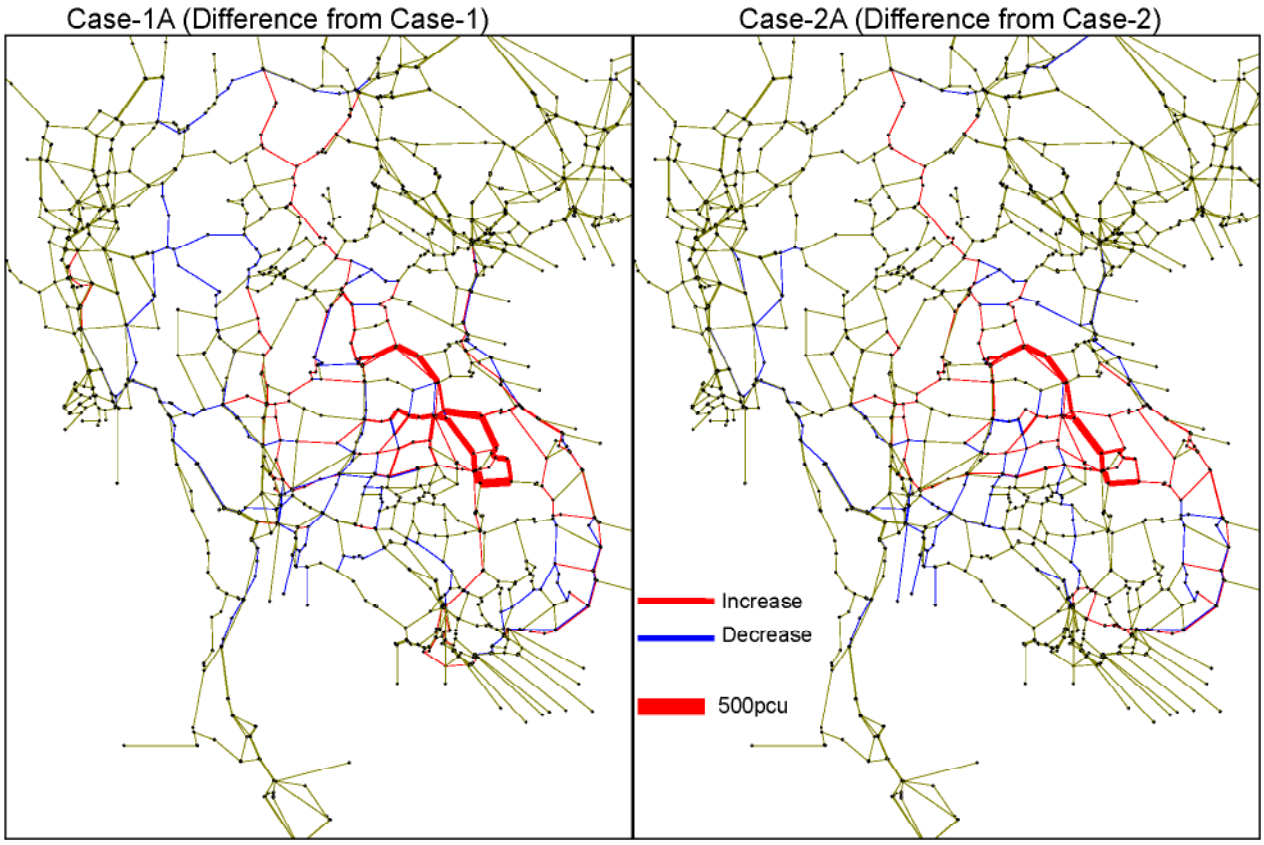
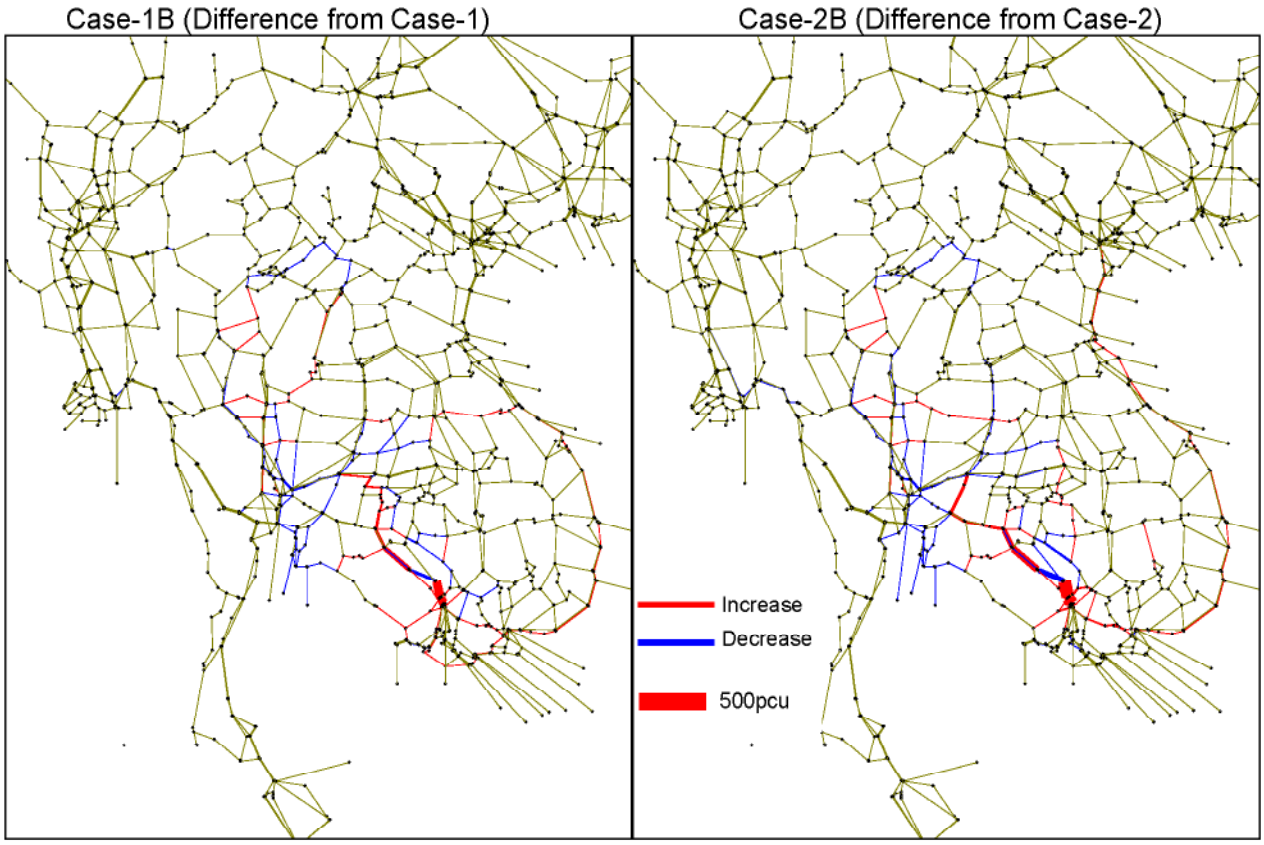


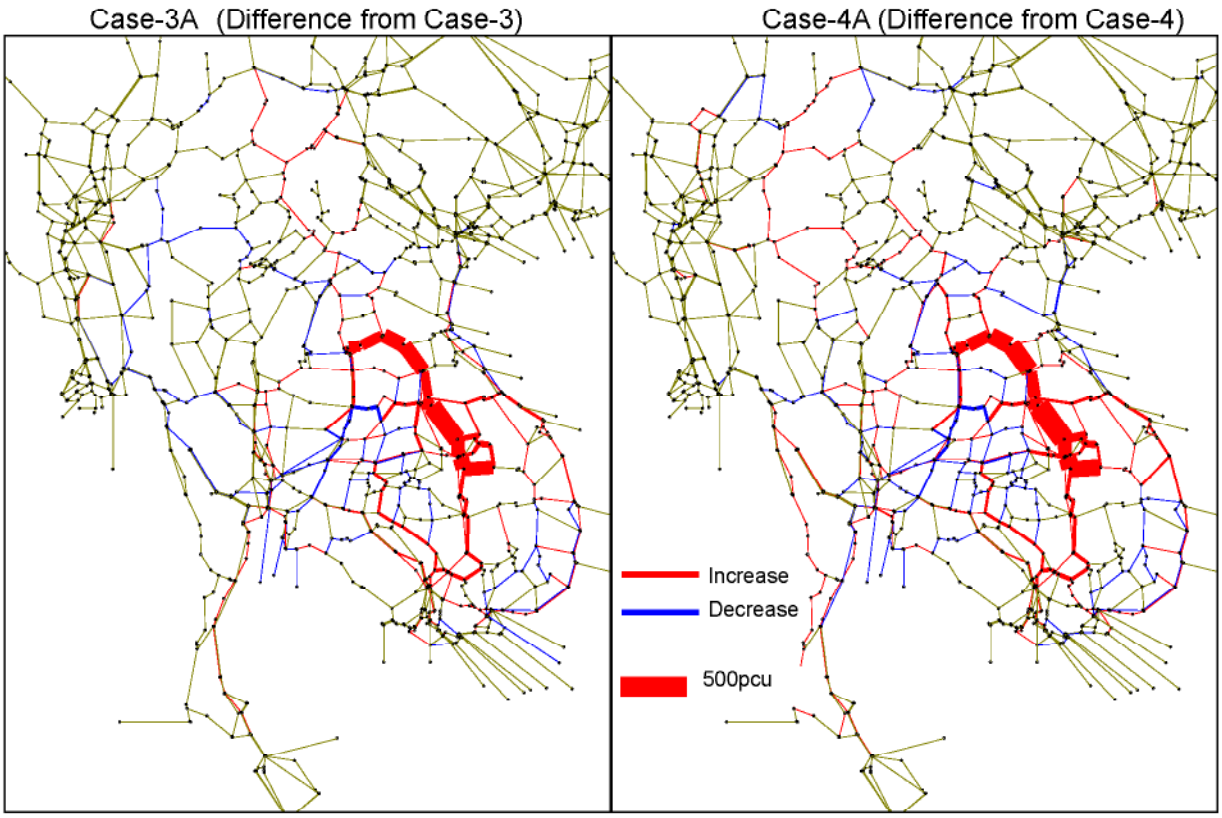
Figure 6.6.12 (2) Changes of Traffic Flows under Case-1B and Case-2B

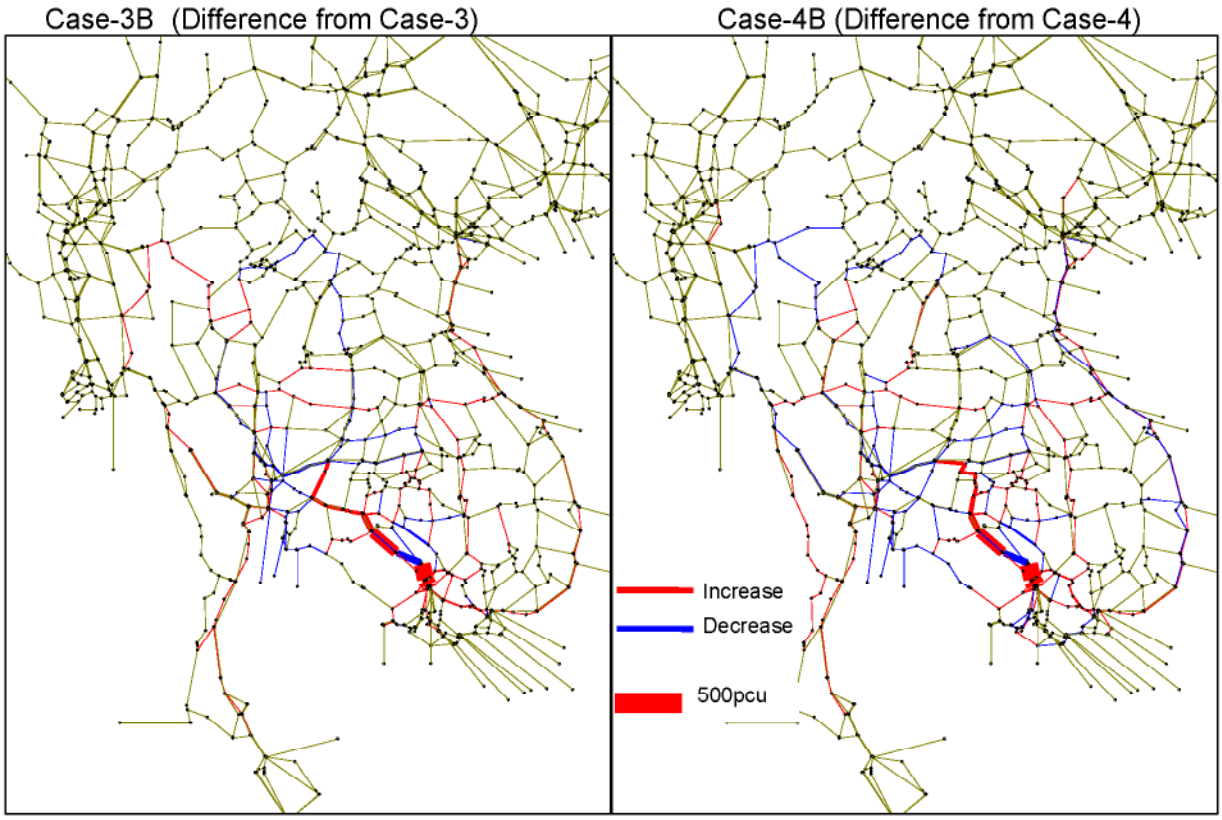


(b) Differences between CBTI+Investment and CBTA+Investment

The traffic volume of Case-3 (CBTI development along the east-west and the north-south corridors) and Case-4 (free traffic at all cross-border points) were compared under different investment scenarios: Case-A (Lao PDR) and Case-B (Cambodia). The results, presented in Figure 6.6.13, show that the effectiveness of CBTI and CBTA development is almost comparable. It may be concluded that both CBTI and CBTA are essential for the economic growth of the region.

Figure 6.6.13 Changes of Traffic Flows under CBTI+Investment and CBTA+Investment





(c) Differences by Investment Area

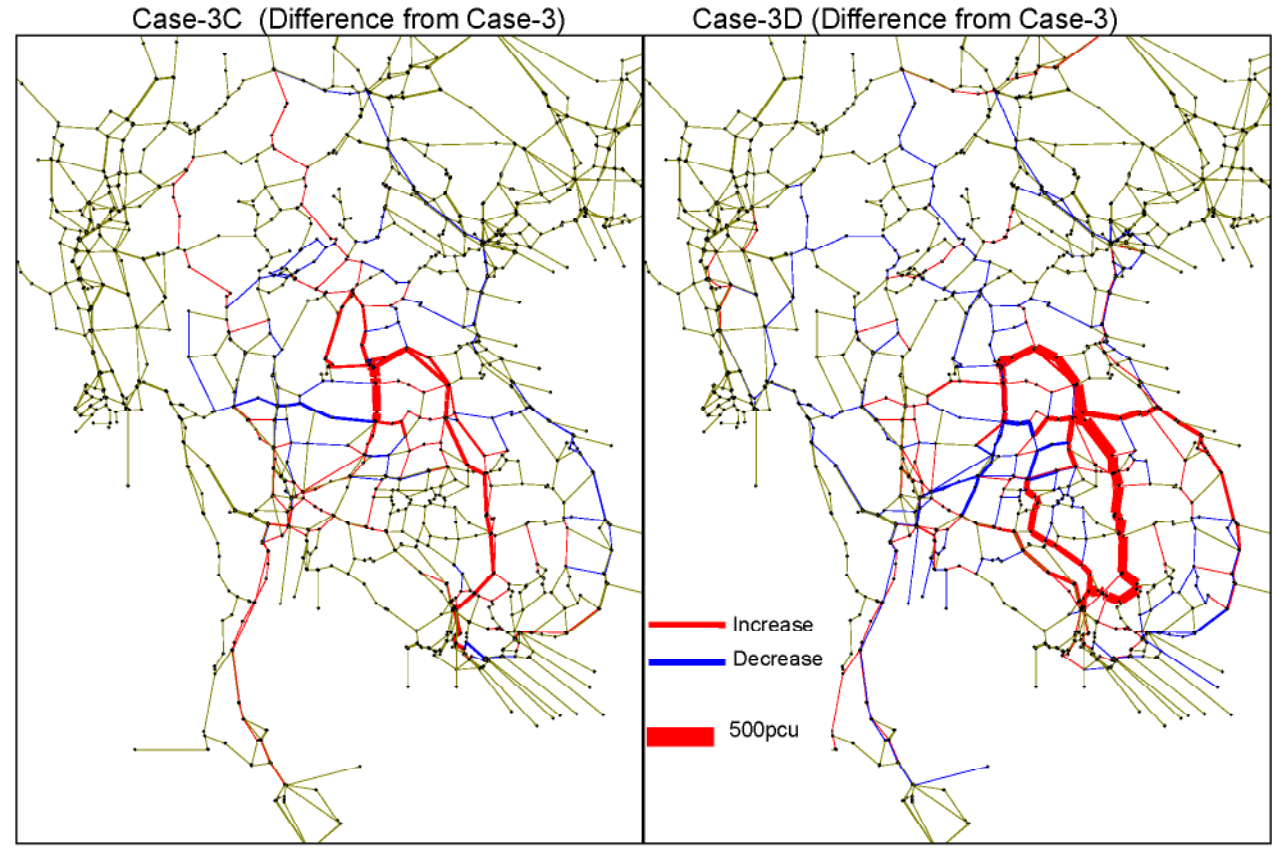
The estimated traffic flows under Case 3C and Case 3D were compared with that of Case-3 which assumed CBTI development along the east-west and the north-south corridors. Case–C, Case-D, and Case-E assumed a similar investment amount for the bio-fuel industry, but in different places. The results are presented in Figure 6.6.14.

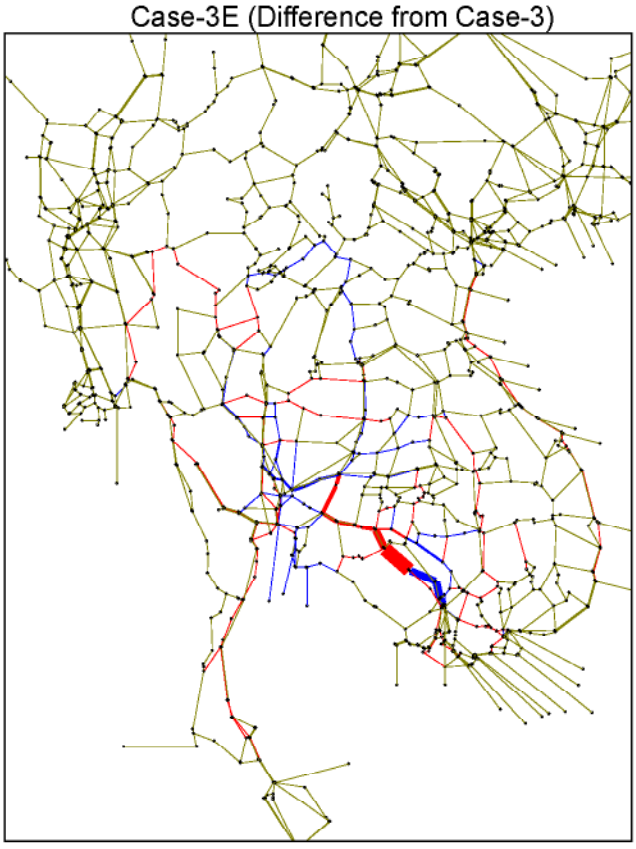
Under Case-3C, which assumed an investment in Vientiane, traffic increased around Vientiane and in the north-south direction toward Cambodia.

Under Case-3D, which assumed an investment in Savannakhet, traffic increased between Vientiane and Phnom Penh, and toward the east coast of Vietnam.

Under Case-3E, which assumed an investment in Pursat, traffic grew toward Bangkok and along the south corridor. Traffic moving toward Phnom Penh decreased. Although the reason for this cannot be clearly explained, the change in traffic flow is limited as compared to other cases.

Figure 6.6.14 Changes of Traffic Flow Due to Bio-Fuel Project (Case-3)





3) **Observations and Recommendations about the Current Database**

In the course of the trial calculations, problems and issues were identified in relation to the current database. Below are the observations or recommendations.

(1) Verification of existing transport network data

- For some links, travel speed is set at 100 km/h or more.
- For many links, toll is set, which seems to be unrealistic.
- The relationship between representative mode (OD table) and passable network is unclear (e.g. between road and inland waterway). Particularly for freight, the use of item-wise OD tables should be taken into account.
- It is necessary to investigate how to quantify the institutional cross-border impedance.

(2) Accuracy enhancement of existing OD tables

- Interrelationship between OD tables and socioeconomic indicators should be clear.
- The determinant factors of trip distribution should be clarified.
- Investigation is needed for goods classification; interrelationship between weight and value; time value (cost); and so on.
- Trade OD by shipping should be surveyed.

(3) Uncertain socioeconomic indicators

- The indicators related to trip generation should be surveyed in addition to the existing population and GDP/GRDP.
- Development status of the transport network should be investigated in a time series.
- Characteristics by province (zone) should be identified.
- Suitable regional development including the industries which are likely to grow in the future should be identified.
- Construction of industrial input-output table by province is required.

7. Further Research Issues and Recommendations

7.1 Further Research Issues

1) Building Strategic Cross-border Transport Planning Model

A strategic cross-border transport planning model is an essential tool for planning and evaluating infrastructure development projects (including not only transport infrastructure such as road, railway, and port but also facilities and equipment required for border crossing procedures and control such as customs) and regional development projects related to cross-border transport. Strategic models can improve effectiveness and efficiency of investment, as well as promote consensus building among stakeholders.

Nowadays, a number of researches on this issue have been done. A trial analysis was also done in this study, as described in Chapter 6. However, there are still many constraints to overcome, which include difficulties in modeling and accuracy of data.

Difficulties in Modeling: This study concludes that a strategic cross-border transport planning model should integrate the transport model and the regional economy model. Since both models are already available, a theoretical breakthrough is not required to formulate strategic cross-border transport planning model. The issue is more on how to integrate both models giving due consideration to the types and the coverage of available data and how to improve the strategic model's practicability[1)]. While this issue can be solved in the short term, a serious bottleneck is the availability of existing data, as described below.

Accuracy of Data: Various data in the GMS countries have been collected during the course of this study, but these are not sufficient to develop a model. Particularly, serious constraints are found in socio-economic indicators by province (such as GRDP), current conditions of infrastructure (such as road, railway, port, etc.), traffic volume data by section, OD table, and industrial input-output tables. These data are not available in most countries, or even if available, they are unreliable[2)]. Collecting or constructing these data with satisfactory accuracy would entail huge costs and a long time, all the more for time-series data. It is therefore recommended that JICA cooperation should concentrate on selected routes, and to collect data efficiently along these routes.

2) Detailed Analysis and Evaluation of Good Practice

Applicability to other countries was examined in Chapter 5. In these countries systematic and exhaustive guidelines have not yet been formulated partly due to the data constraints mentioned above. More fundamentally, it is because cross-border transport and CBTI development are rather new and there is little evaluation of their impacts. Although cross-border traffic or trade has long been active among the GMS countries, a strategic policy to promote cross-border transport along with regionalization and globalization has been crafted only in the last 10 years. In order to apply the results of this study on cross-border transport, specialization and generalization may be required. Specialization will evaluate each CBTI development project and regional development project in detail through a before and after monitoring survey. Generalization will aim to extract lessons learned from the results of evaluation. Although it may be difficult to evaluate CBTI

[1] Practicability means that how it can demonstrate the current conditions and how can be applied in future.
[2] For example, there is no GRDP by province in Myanmar, Lao PDR and Cambodia.

development and extract lessons learned in the Greater Mekong Subregion, a detailed analysis of selected projects to find out good practices can be done. It is expected that necessary information will be collected systematically by focusing on selected model routes recommended below.

7.2 Recommendations of the Study

1) **Public Information and Coordination with GMS Countries and International Donors**

It is recommended that the results of this study be shared with the GMS countries and international donors, such as the ADB, and to disseminate the future direction of JICA cooperation to them. It will further improve organic linkages and international cooperation.

2) **Focus on Human Resource Development and Institution Building**

The long-term development framework for the Greater Mekong Subregion has been formulated with the ADB's initiative, which includes CBTI development projects and soft infrastructure projects to facilitate cross-border transport. What remains to be done is its implementation. Particularly, CBTA implementation will require a huge effort on human resource development and institution building in each country. JICA is expected to conduct technical cooperation focusing on human resource development and institution building with its existing schemes and technology. Cooperation and coordination with international donors, such as the ADB, are also essential.

3) **Model Route Development in Lao PDR and Cambodia**

It is recommended that two model routes be selected, namely Thailand-Lao PDR-Vietnam and Thailand-Cambodia-Vietnam, and to focus on promoting regional development of intermediate countries, i.e. Lao PDR and Cambodia. A set of projects can be conducted. A policy to focus on Lao PDR and Cambodia is consistent with Japan's Basic Cooperation Strategy with ASEAN, i.e. reduction of disparities among GMS countries. Since JICA has good resources of knowledge on regional infrastructure policy, it is expected to provide technical assistance for the construction of a strategic transport planning model and the formulation of a regional development plan.

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