No. 202 (83-25)

AN EX POST FACTO EVALUATION OF A REGIONAL DEVELOPMENT PROJECT

A CASE STUDY OF THE KASHIMA DEVELOPMENT PROJECT

by

Masaaki Kataoka

November 1983

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1. Introduction

In Japan, a regional development project is a part of the industrial promotion policy of the national government, and also implemented with a view to improving the socio-economic welfare of the residents in a given region. For the region to be developed, it not only signifies that the region enjoys direct benefits of the development such as improved regional income or an increase in employment opportunities in the region, but also it requires the region to efficiently and effectively absorb positive spill-over from the implementation of a given project in the region. At the same time, it is important to avoid negative impacts in terms of environmental disruption caused by pollutions arising in the course of implementing the project, as well as to eschew adverse effects induced by the dislocation of the regional community. By such considerations, it becomes possible to fully enjoy the fruits of a given development project.

In case of Japanese large-scale project, a prefectural

government ordinarily assumes the responsibility of advocating the interest of a given region. A prefectural government selects type of core industries and induces enterprises to set up their plants in a given region in the capacity of a project manager through drawing up and, then, implementing a development plan. It also concerns itself with policies to guide local industries to fully absorb the effects of development. Further, it consolidates social overhead capital in order to cope with increased population and social changes in the local community. Finally, it involves itself with the removal of negative impacts such as pollution on the region. Problems involved in implementing such policies are the way to induce enterprises to set up their plants in the region in such a manner as to maximize the total benefits for the resident in a given region as well as the judgement on the amount and the timing of investment in social overhead capital. It is desirable that these decisions will be made in a well-balanced manner and in good timing with the residents of the region taking part in the decision-making process, after having sufficiently assessed the results of far-reached interactions which the policy implementation causes on the entire regional system.

Kashima area development program is a prototype of Japanese development program made for underdeveloped areas in rapid economic growth period. Kashima area, 80 kilometers east of Tokyo, was one of the least developed areas in Japan in the 1960s. Ibaraki prefecture planned to develop this area by constructing an industrial complex, which consists of steel and petroleum

plant. National government gave a full support to this program, for these industries were the key industries of national industrial promotion policy in these days. In the early 1970s, the construction of these plants are completed and their operation were started. Main objectives of this development program were accomplished. But, at the same time, some serious problems occured in this area, and local community were much confused at that time.

The problems were:

(1) Decline of agricultural industry and waste of farmland

(2) Urban sprawling and ineffective land use

(3) Temporary decrease in public service level caused by a delay of investment for social overhead capital

(4) Air pollution

These confusion gave a serious influence on the on-going and planned regional development programs in other region. The residents of developing areas began a stronger citizen movement against government which intended to carry on the programs, for fear of such confusions. In addition to this, Japanese economic environment was changed by an influence of oil shock. As a result, Japanese regional development policy were forced to change in the mid-1970s.

At this juncture, large-scale development projects which characterized the rapid economic growth period have been completed, and their fruits and problems have become clear. In the light of foregoing, it will bring beneficial policy implica-

tions to evaluate the validity of policies adopted in the process of development from a view of systems analysis, and to point out directions in which improvement can be made in implementing development policies.

The present study takes up a group of projects in terms of their contributions to the region in the form of anchoring of developmental effects through the implementation of regional industrial promotion policies and social overhead capital consolidation policies in the Kashima development plan. First, the study positively examines the effects of such policies. Second, a regional socio-economic model is constructed with a view to evaluate alternative policies. Finally, it aims at examining ways to absorb developmental impacts and anchoring of the developmental effects in the region through policy simulation.*1

2. The Kashima Development Project

The project comprises the main project and a number of subprojects. The former involves the construction of a dug-up type port and the creation of industrial complexes while the latter aims at promoting local industry and consolidating social overhead capital.

The main project aimed at creating a littoral industrial area envisaged a Y-letter-shaped dug-up port in three townships of Kashima, Kamisu, and Hasaki in the southeastern part of Ibaraki prefecture 80 kilometers distant from Tokyo and creation of industrial complexes with a total area of 3330 ha. It also envisaged to simultaneously construct industrial facilities such

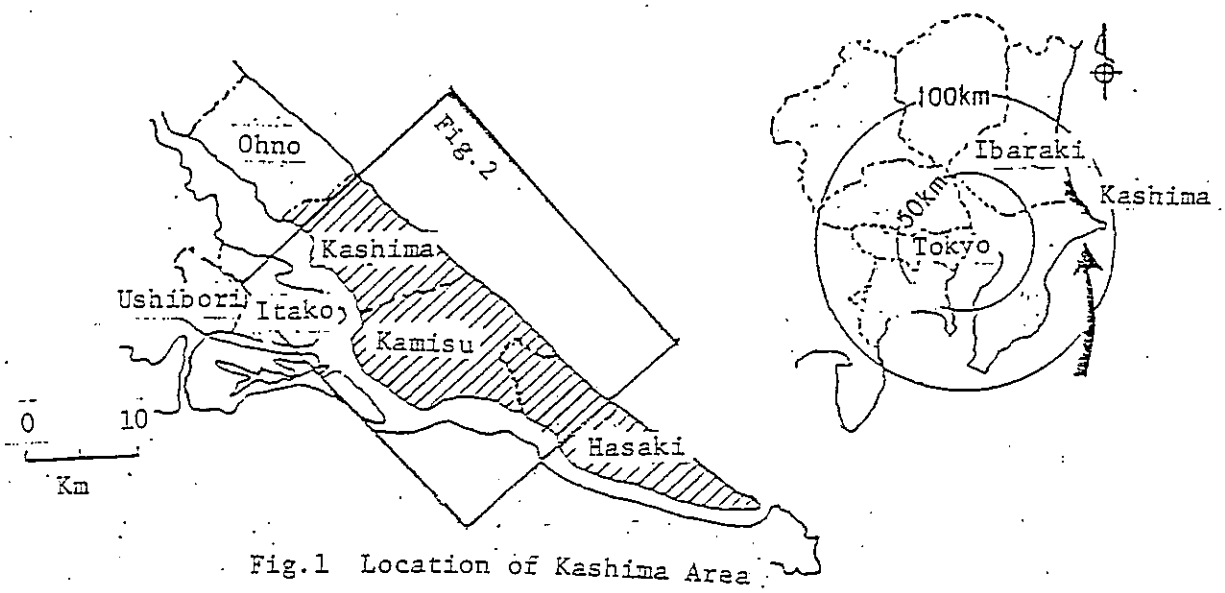
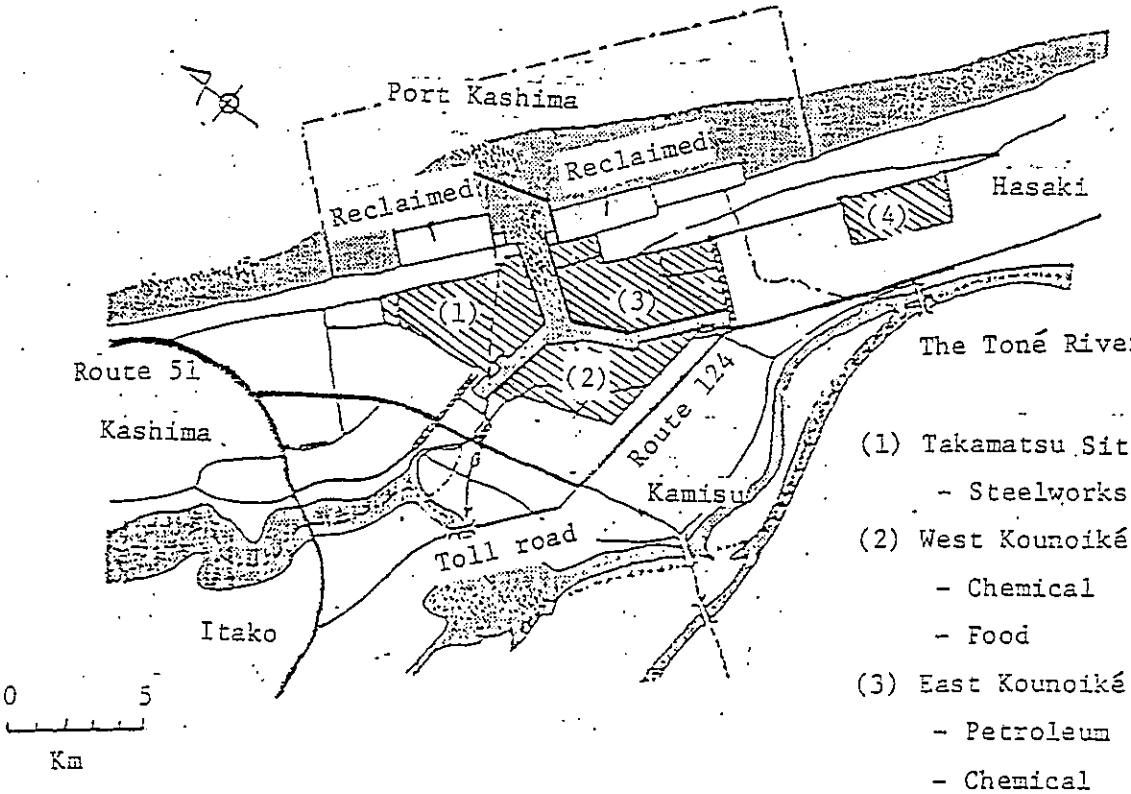


Fig.1 Location of Kashima Area



(1) Takamatsu Site
- Steelworks

(2) West Kounoiké Site
- Chemical
- Food

(3) East Kounoiké Site
- Petroleum
- Chemical

(4) Hasaki Site
- Chemical
- Pottery

Fig.2 Master Plan of Kashima Area Development

Source: Ibaraki Prefecture,
Actual Status of Development 1976

as road networks, railroads, and industrial waterworks as well as housing complexes to accomodate the employees of the enterprises to advance into the area in and around the core area. By such plans, it aimed at inducing raw material processing industries such as steel and petroleum industries to set up their plants in the region. As for the construction period, the first term started in 1963 and ended in 1967, during which period core portions were constructed. Since then up to 1975 was the second term, during which period it was planned to enhance facilities and to consolidate portions for related corpolate locations. Upon the completion of the plan, it was envisaged that an industrial city would emerge with a population of 300 thousand with port facilities to accomodate 100 thousand ton class vessels.*2

In parallel, sub-project cluster aimed at anchoring developmental effects and to absorb impacts included a series of measures for agriculture and commerce. The cluster also included measures for the agricultural sector planned as part and percel of measures to stabilize the livelihood of residents dislodged due to the construction of the industrial complexes. As a policy to consolidate social overhead capital, a program to improve the residents' living environment was decided upon in November, 1969.

The ideal behind a regional development policy is called "Full compatibility of agriculture with manufacturing industry". under this ideal, 40 percent of each farmer's land was purchased across the board in and around industrial complexes, and an attempt was made to improve the productivity of the remaining farmland by subsidizing facility costs, or by providing guidance

on management. These measures were taken to make for a fair burden-sharing and the stabilization of the livelihood of the dislodged farmers, thus, trying to make agriculture compatible with industry. In parallel, as measures for local commerce and industry, the anchoring of the spill-over in the region was aimed at, in addition to financing to farmers who had to change their trade and providing guidance on management, by improving the urban infrastructure and readjusting town lots in urban areas and by securing sites for related enterprises as well as by giving priority to local firms to serve as sub-contractors.The program to improve the livelihood of residents as a policy to improve social overhead capital anticipated the emergence of a city with a population of 300 thousand in the final target year of 1980. To cope with this emergence, a plan to improve public facilities related to the residents' livelihood based on a land use plan was worked out, and year-by-year implementation programs and fund allocation were planned.*3

3. An analysis of the effects of local industrial promotion policies

3-1. The effects of agrarian policies

Prior to the implementation of development program, farming in the Kashima area was in the process of groping for a suburban type farming owing to the decline in the commercial value of sweet potatoes grown there to extract starch. Green-peppers,

other vegetables, and hogs were newly introduced products to replace sweet potatoes, and the agrarian policies of the prefectural government aimed at increasing land-productivity by positively promoting this orientation toward suburban farming. The agrarian policies of prefectural government consisted of the following two points:

(1) Creation of alternative farmland for farmers whose farmland was purchased for the sake of creating industrial complexes to guarantee that they can continue farming

(2) Managerial assistance and guidance with a view to improving agricultural productivity.

Through these measures, the farming in the Kashima area rapidly transformed itself into a green-pepper-centered suburban farming which is facility-intensive and horticultural. In spite of this change, cultivated acrage decreased and wasteland increased; farming population decreased and farmers pursued other trades as side businesses with the progress of development. Thus, the farming in the area rapidly atrophied.

*

First, an analysis is made of the effects of the prefectural government's investment in the agricultural base. an attempt was made to estimate the production functions (Cobb-Douglas type production functions) of the area. Because of multicolinearity and wrong sign condition, no significant function could be estimated. Therefore, another attempt was made to directly measure the effects by regression analysis, and the following result

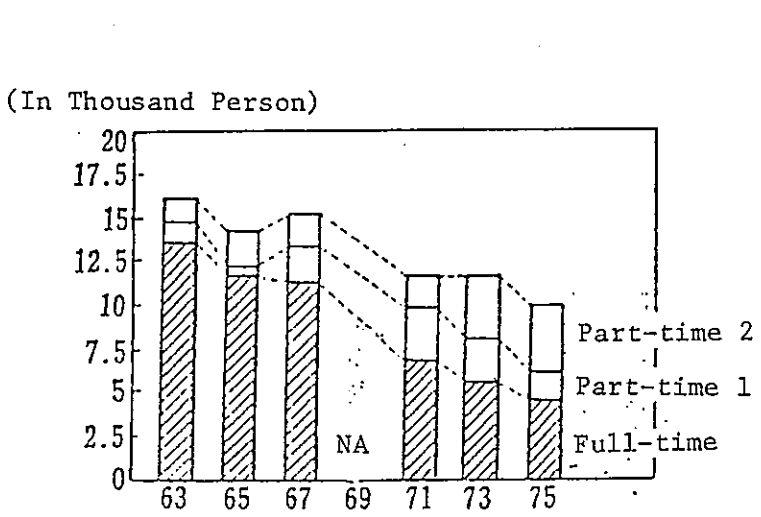


Fig.3 Agricultural Employment

Source: Ibaraki Prefecture, Statistical Yearbook of Ibaraki Prefecture
Note: In Japanese agricultural statistics, agricultural employment is classified into three categories, full-time employment, 1st. class part-time employment, and 2nd. class part-time employment.

The word "1st.class" means mainly farming, "2nd. class" means mainly doing other business.

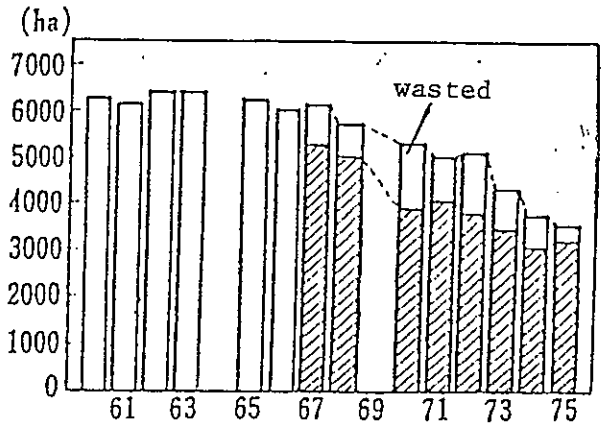


Fig.4 Land Area for Agriculture

Source: Ibaraki Prefecture, Statistical Yearbook of Ibaraki Prefecture
Note: This statistics includes the wasted farmland.
After 1967, the amount of wasted portion was shown in statistics.

is obtained.*4

$$Y_A/E_A = \underset{(12.1551)}{0.318262 \times 10^{-5}}\ K_A - \underset{(-8.52479)}{21.7150}\ D + \underset{(18.2241)}{23.016}$$

$$\bar{R}^2 = 0.9192 \qquad D.W. = 1.2358$$

Y_A/E_A : Agricultural productivity

K_A : Agricultural base capital stock by prefectural government

D : '69-'73 Dummy*5

With the result, the possibility that the prefectural government's investment in agriculture had a positive effect on improving agricultural productivity was statistically endorsed.

Despite of these positive effects of the agrarian measures, the farming in Kashima area atrophied. The cause of the decline could be sought in the productivity gap with other industries. As shown in Fig. 6, industries other than agriculture remarkably increased productivity after the start of operation of the plants set up in the region whereas agricultural productivity increased slowly, resulting in drastically widening productivity gaps between industries. In response to this widening disparity, agricultural labor decreased at a high rate of nearly ten per cent per annum. Here, it is possible to assume the presence of the Marshallian adjustment process, that is:

$$dS/dT = k(P_d(S) - P_s(S)) \quad , k<0.$$

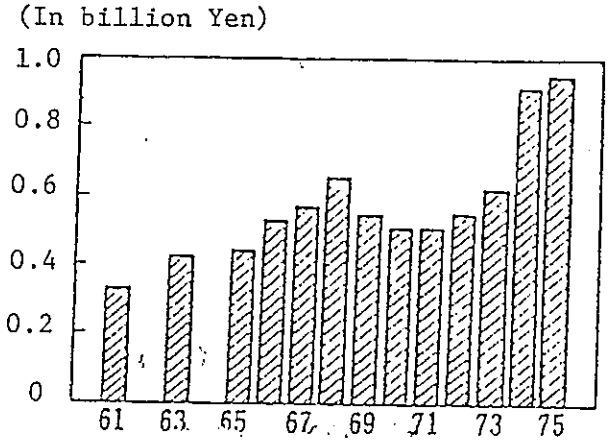


Fig.5 Gross Agricultural Product

Source: Ibaraki Prefecture, Statistics of Agricultural Income in Ibaraki Prefecture

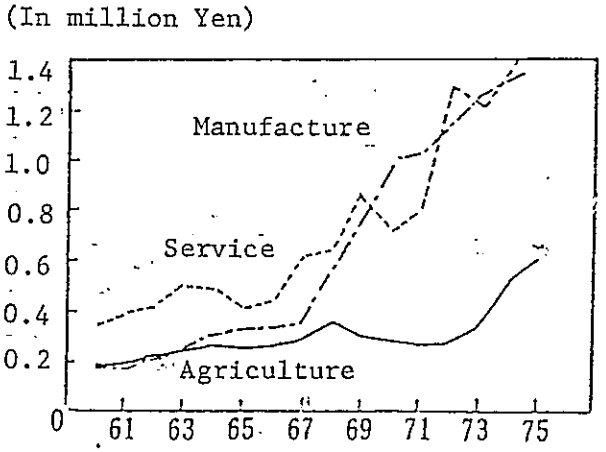


Fig.6 Productivity in Industries

To estimate the parameters of the decrease of agrarian population in the Kashima area;

$$\Delta E_A = \underset{(-2.69997)}{-0.743094} \times 10^{-3} \left(\frac{Y_2 + Y_3}{E_2 + E_3} - \frac{Ya}{Ea} \right)_{-1} + \underset{(3.19872)}{0.0961596}\, D_{66} - \underset{(-2.17064)}{0.0318220}$$

$$\bar{R}^2 = 0.6322 \qquad D.W. = 2.1721$$

ΔE_A : The rate of increase of the agrarian population

$\frac{Y_2 + Y_3}{E_2 + E_3} - \frac{Ya}{Ea}$: Productivity difference between agriculture and other industres

D_{66} : '66 Dummy *6

These parameters show that the productivity difference of 135 thousand yen per worker induced one percent decrease in the farming population.

Finally, the reason for laying wasted farmland is considered to the following three points:

(1) Loss of farmland through land speculation

(2) Labor shortage through the decline in agrarian labor

(3) Orientation toward labor-intensive agriculture

Regarding (1), a positive examination will be made in a different research. Here, (2) and (3) are examined. Regarding (3), the land-labor ratio around the start time of operation of

plants set up in the region was almost constant. Therefore, the contribution by labor-intensive farming to the emergence of wasteland was shown to be neutral in macroscopic terms. As for (2), it is clear in forgoing examination. Hence, the major causes for laying wasted farmland are suggested to be (2).

3-2. The effect of the policy for local commerce and manufacturing industries

The development of the regional economy follows a reciprocal process in which non-basic industries develop in keeping with the growth of basic industries.*7 Out of this process, new basic industries differenciate and emerge, and the growth will be continued. This process is due to the multiplier effect originating in basic industries. The local commerce and industries analyzed in this section are typical non-basic industries. The local commerce and industries are expected to play a role in absorbing and anchoring the effects of the main project in the Kashima development program.

The measures adopted by the prefectural government toward local commerce and industries may be roughly divided into the following three categories:

(1) Induction of related enterprises to the Hasaki industrial site

(2) Improvement in the urban infrastructure of the densely inhabited district in the Kashima area

(3) Provision of financing and managerial guidance to those farmers who opt for other jobs, or abandon farming.

Among these, what the prefectural government had the great expectations of was (1). However, raw-material-processing industries located there such as steel and petroleum industries were highly capital-intensive and insulated from the locality in terms of creating significant employment opportunities. Therefore, the spill-over in this regard was quite limited. According to the master plan, it was expected that the number of employees in the industrial complex would reach the 100 thousand mark as of 1975. But actually, the number was far below the mark --- less than 25 thousand, including sub-contractors' workers --- accounting for less than one quarter of the planned figure. This is related to the fact that there was practically no spill-over to machine industry and other related industries.

Rather, the spill-over was observed in the commercial and service sectors. The number of shops doubled, especially restaurants. The commercial income in nominal terms increased more than five fold in the five year period beginning in 1970.

The measures taken by the prefectural government for this sector were limited. Only discrete measures were taken for job convertors, in addition to adjusting town lots in the agglomerted part of the Kashima township in relation to transportation considerations. Thus, this sector is relatively neglected in policy management. As shown in Fig. 8, the commercial development of this area showed a pattern of small shopping districts, entering on daily necessities and foodstores as well as restaurants,

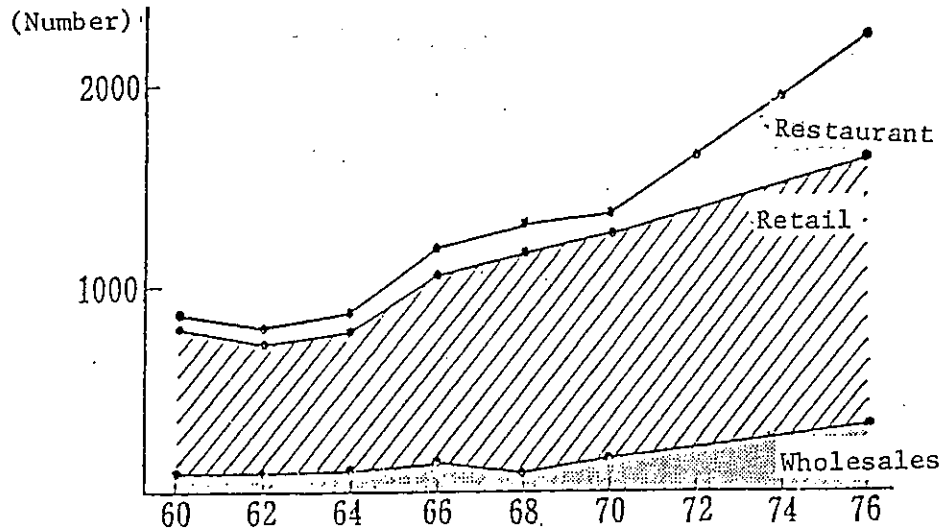


Fig.7 Number of Restaurants, Wholesales and Retail Stores

Source: Ibaraki Prefecture, Commercial Statistics in Ibaraki Prefecture

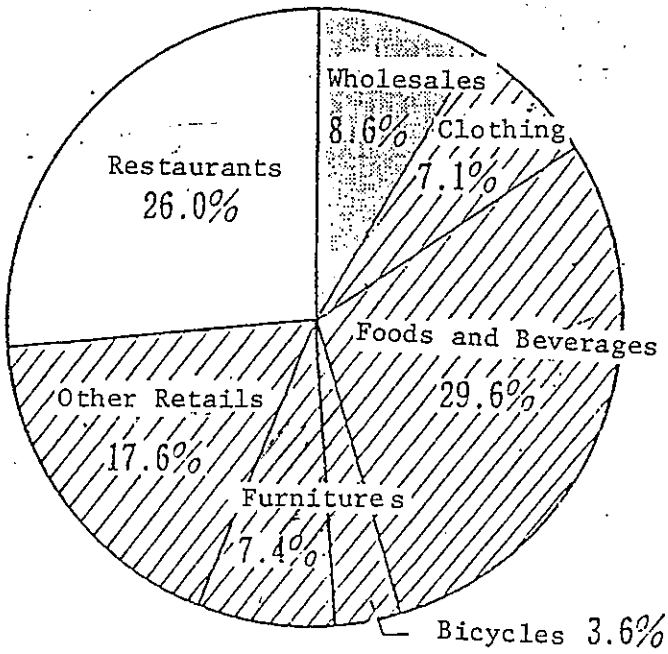


Fig.8 Percentage of Stores by Item (1976)

Source: Ibaraki Prefecture, Commercial Statistics in Ibaraki Prefecture

spreading autonomously and spontaneously along sprawling residential areas. Residents continued to rely on the existing trading areas of Sawara and Choushi because there was few agglomeration of wholesales functions and consumer durables in the area. In connection with this, it can be pointed out that it is inconvenient to buy consumer durables and that agglomerating process is lagging behind.*8

*

First, an analysis is made, on the basis of economic base theory, of the effect of the increased employment by basic industries had on non-basic industries in terms of creating employment opportunities.

In economic base theory, the relationship between the employment of basic industries and that of non-basic industries is:

$$E = E_B + E_{NB}$$

E : Total employment

E_B : Employment in basic industries

E_{NB} : Employment in non-basic industries

Then, if β is defined to E_{NB} / E_B, the equation is:

$$E = (1 + \beta) E_B$$

In this region, β will not become a stable value over time owing to the changes in the industrial structure; the

decline of agrarian labor was caused by the development of the manufacturing industry which is a basic industry. Therefore, should β be defined as a shock multiplier due to an increase in employment,

$$\Delta E = (1 + \beta') \Delta E_B$$

In this formula, $\beta' = 1.7815$ is obtained as the average value of six year period between 1969 to 1975. This value shows a relatively favorable situation.

The elasticity of the income of tertial industry for population is $\eta = 4.1634$.

This shows a very high elasticity. This also indicates that development exercises a very significant effect on the tertial industry.

In contrast, when the effects of the prefectural government's inplementation of the urban infrastructure improvement projects are determined by the production function of the tertiary industry, the following equation was obtained:

$$\log Y_3 = \underset{(2.933223)}{0.135326} \log K_T + \underset{(17.6038)}{1.28079} \log L_3 + \underset{(0.312645)}{0.0561532}$$

$$\bar{R}^2 = 0.9880 \qquad D.W. = 1.7200$$

Y_3 : The income of tertiary industry

K_T : The capital stock of urban infrastructure by prefectural government

L_3 : The number of employment in tertiary industry

This means that the capital stock of urban infrastructure is significant in the production function, and the contribution of the improvement of urban infrastructure to the tertiary industrial income was statistically corraborated.

Despite of the forgoing analysis, in reality, the development of the local commerce did not lead to the formation of new trading areas, and demand leaked to the existing commercial centers due to the small demographic agglomeration effect plus negative policy guidance. As for the orientation to be followed in improving the urban infrastructure the sprawling of residential areas have to be prevented, and, shopping districts have to be improved in a well-planned manner in order to heighten the degree of agglomeration of local commerce. At the same time, the commercial environment has to be renovated through improvement measures to redevelop the existing cores of trading areas and local commercial centers in a wide-ranging perspective. It is considered that by adopting the above-mensioned, better absorption of the spill-over should have become possible through anchoring consumer durables and wholesales functions.

4. A socio-econometric model for conprehensive evaluation of development policies

An attempt is hereby made to construct a model to

comprehensively evaluate the Kashima development program in order to consider the question of the amount and the timing of investment in the social overhead capital and, at the same time, in order to examine problems involved in industrial policies pointed out above in more detail.

The objective of this model is to measure multifarious impacts the investment in the main project and the sub-project management by the prefectural government had on the regional socio-economic system. By this model, improvements will be proposed by examining the strategies to implement the regional development projects to make the positive effects of development fully absorb in the target region while preventing any confusion in the region.

In the model, the investment related to development and the investment in the private manufacturing industry are considered to be policy variables. By this formulation, it becomes possible to examine the influence of the development strategies of prefectural government, in paticular, those of the allocation of investment fund among sectors and over time, and the policy of inducing private investment had on the regional community.

The model is a recursive type model using econometric techniques, and it consist of 70 equations. Estimation method is OLS.

In the economic sector, the investment of manufacturing industry induced by the prefectural government increases the regional population by triggering the development of the regional economy, and brings spill-over to the tertiary industry. On the

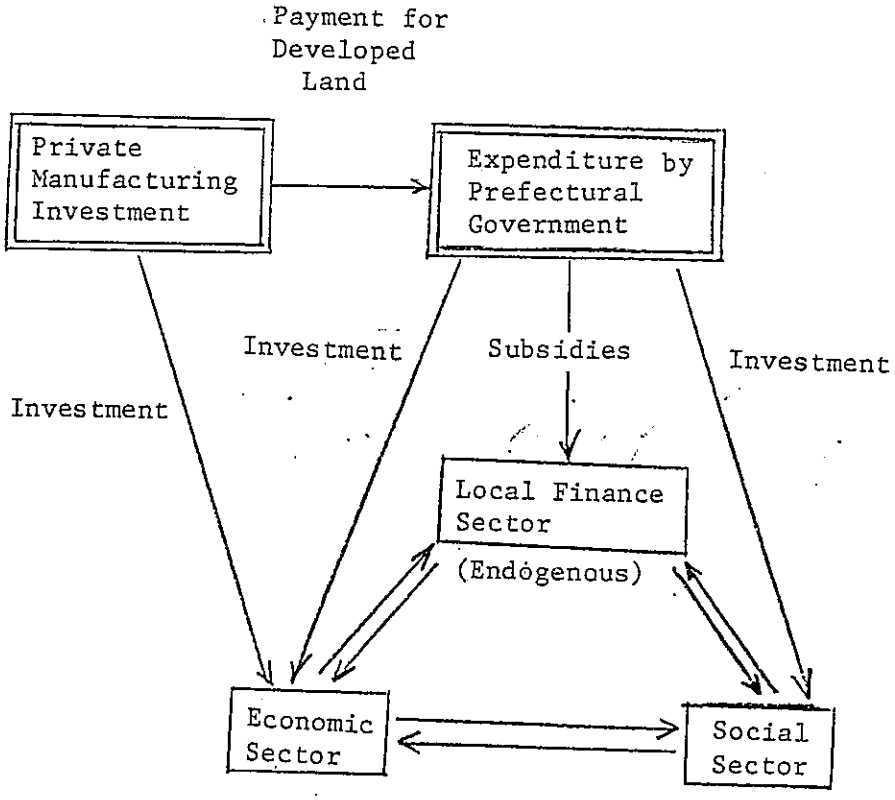


Fig. 9 Basic Structure of the Model

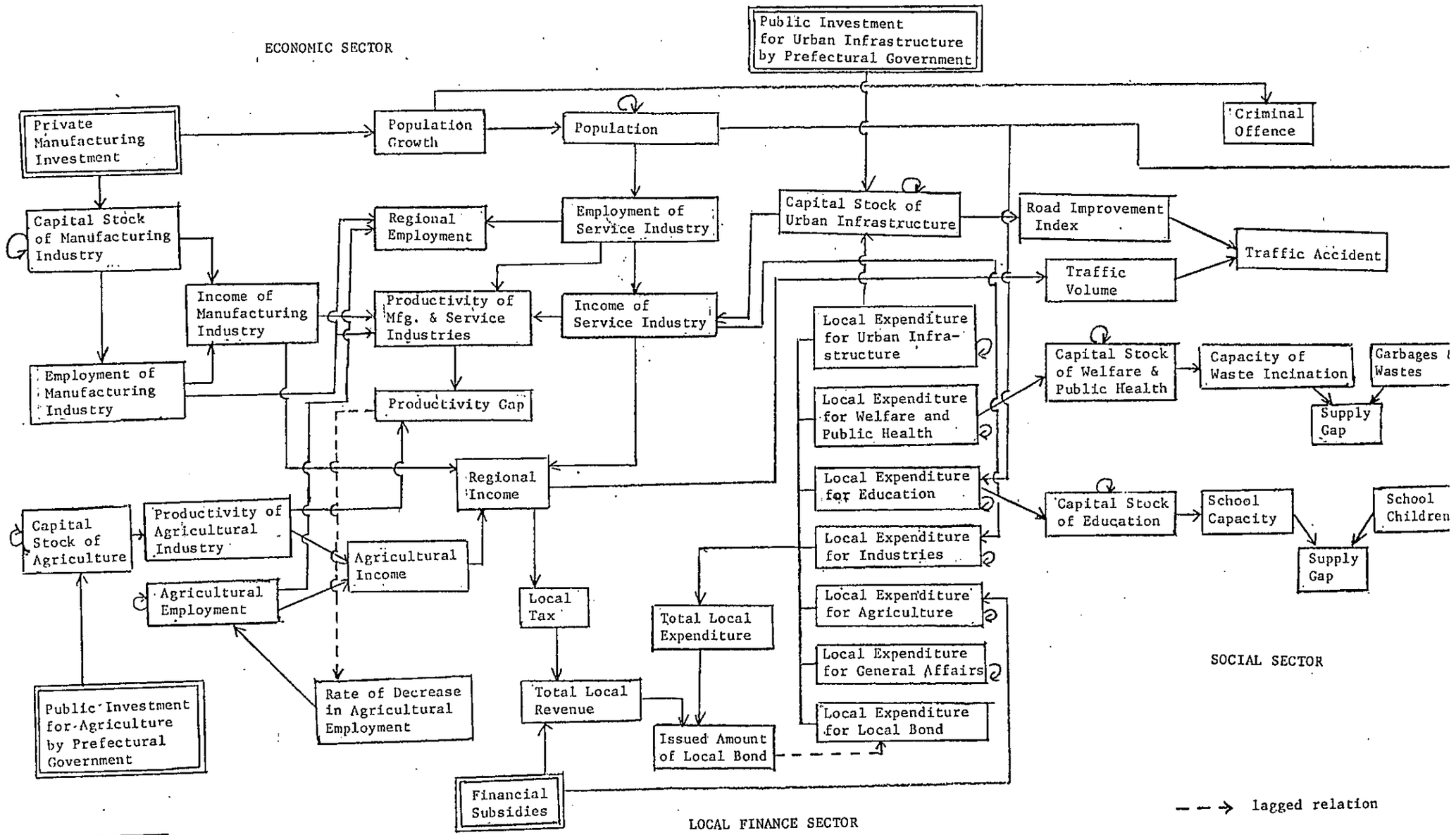


Fig. 10 Structure of Socio-Economic Model

other hand, it is possible to simulate agrarian policies by incorpolating productivity improvement through the agrarian investment by the prefectural government and the mechanism of the decrease in farmers caused by the productivity difference.

In the fiscal sector, considering the institutional task-sharing among the prefecture and township, the township finance is considered to be completely endogenous. The revenue is decided by the achievements of the economic activities of the three townships and prefectural subsidies. As for the expenditure, it is possible to examine changes of the fiscal situation of the three townships over the years by reflecting changes in fiscal demand caused by the changes in the socio-economic environment of the three townships.

The social sector consists of a group of social indicators covering areas ranging from public health, to traffic, from education, to safety. The facility installation level and the public service level are determined by the public capital stock or flow formed by fiscal activities. On the other hand, the required quantity of services are figured out from population and regional income level. The appropriateness of a given policy is judged by the difference between the two.

By constructing this model, an attempt is made hereunder to forcast policy outcomes which the changes in the prefectural investment policy brings about to a variety of aspects of the region as a result of interactions.

5. Policy simulation

5-1. Establishment of policy tasks

The following three points will be taken up as tasks for policy simulation in this model.

(1) Effect of inprovement of agrarian measures
(2) Comparison between the effects of agrarian measure and those of commercial measures as policies to guide local industries
(3) Effect of improvement of the implementation schedule of the development projects, especially, to avoid the lop-sided implementation between main project and sub-projects

Regarding the first point, an analysis is made of the effect of policy improvement in case agrarian measures which were lagging behind were given priority and emphasis to prior to the start of operation of the plants set up in the region with a view to make the prefectural agrarian investment more effective for the farming in the Kashima area. Regarding the second point, an examination is made of merits of agrarian and commercial measures by comparing the effects of advancing investment in projects between agrarian investment and macroscopic commercial measures centering on investment of urban infrastructure. Regarding the third point, an analysis is made of policy improvement effect in

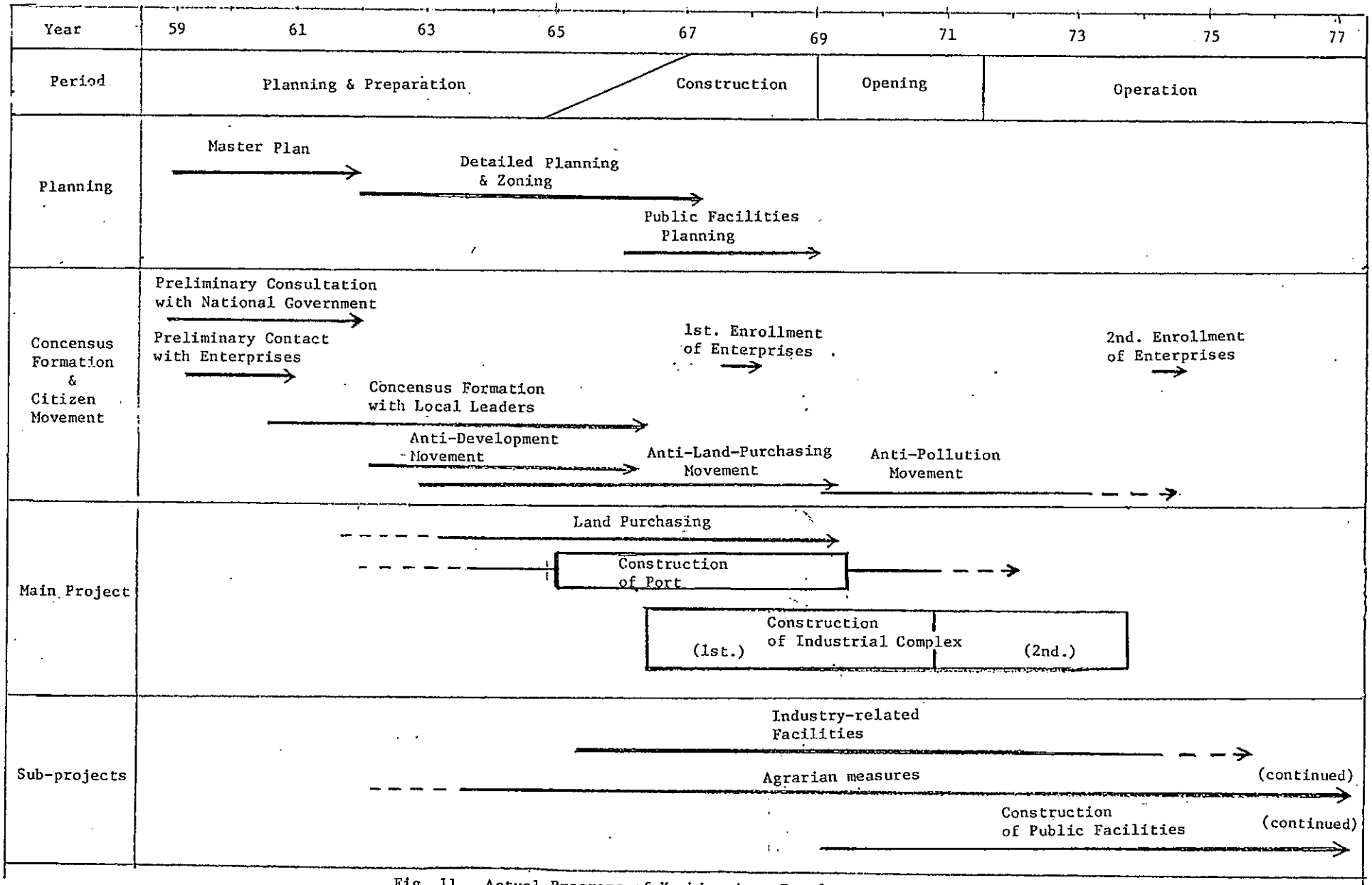


Fig. 11 Actual Progress of Kashima Area Development

case the lop-sided progress of the development project implementation is optimized. This includes the improvement of the implementation of the main project in terms of dispersion of the timing of the start of operation of the plants set up in the region and an even distribution of investment.

In making these analyses, changes in time allocation and inter-project fund allocation will be taken up exclusively, unless otherwise stated, by assuming the fund of total project to be constant through pooling the fund of projects up to 1975 in order to secure the feasibility of improving the plan.

5-2 Policy simulation results

5-2-1 Improvement of agrarian measure

Two alternative cases are prepared for agrarian policy simulation. In Case 1, the total amount of the investment of measures for agliculture since 1971 is earmarked to the period prior to the construction of industrial complexes between 1961 and 1967. In Case 2, three fifth of the same is earmarked to the same period, and the remainder is evenly distributed for the period including and after 1971.

The results are shown in Fig. 12. The agrarian income as of 1975 is 1.16 fold of the actual level in Case 1. In Case 2, it increases 1.17 fold. Thus, advancing of investment in agrarian measures shows favorable effects. As for agrarian population, it is impossible to halt the decrease caused by productivity difference. Although the actual decrease rate for the ten-year period

(In billion Yen)

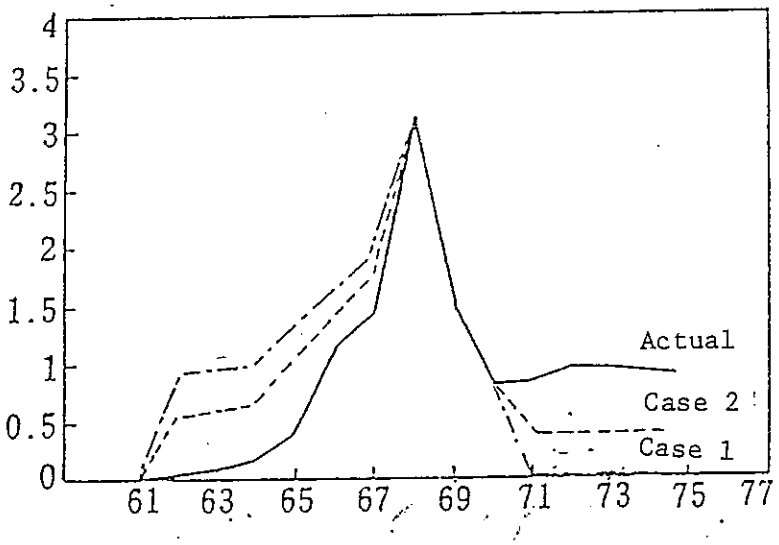


Fig.12 Agricultural Investment
(Exogenous Variable)

(In million Yen)

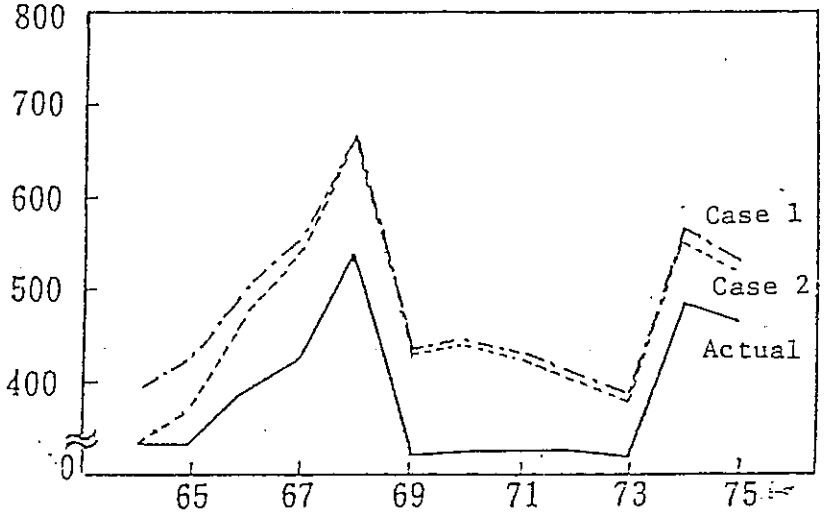


Fig.13 Agricultural Income

(In thousand Person)

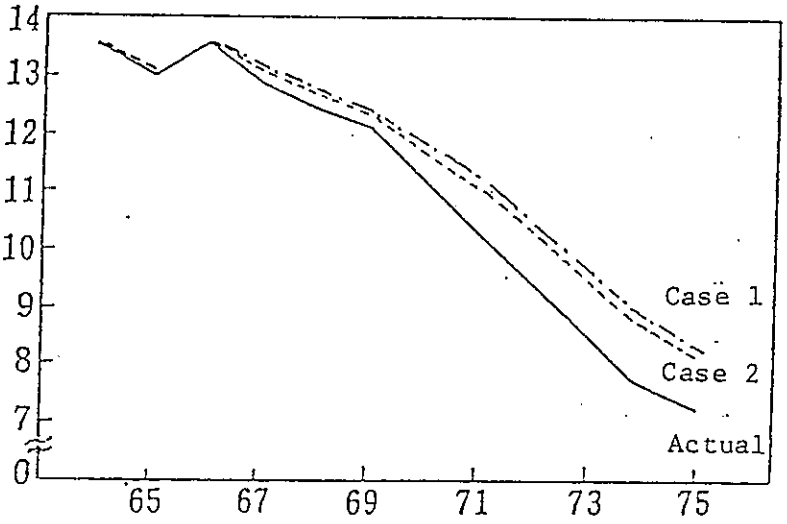


Fig.14 Agricultural Employment

beginning in 1966 is 47.6%, in Case 1, the corresponding percentage is 29.9%; in Case 2, 39.4%. In each case the rate is moderated. Therefore, an early implementation of agrarian measures makes for the stabilization of farming through advanced investment. It is also made clear that the early implementation of agrarian measures can moderate the drastic decline of agriculture caused by the start of operation of the plants set up in the region.

5-2-2 Comparison of the effect of agrarian measures with those of commercial measures

As in the case of agriculture, advancing of investment is assumed in urban infrastructure which is related to macroscopic commercial measures. In the light of its nature, it is not necessary to complete investing in urban infrastructure prior to the start of operation of the plants set up in the region. Therefore, a test is conducted in a case which corresponds to Case 2 in agriculture.

As a result, as of 1969, a slight improvement of 1.Ø7 fold of the actual level is observed in terms of the tertiary industrial income. When seen in terms of regional income, the effect is greater in the case of agriculture. In the nature of the structure of the model, the spill-over from investing in manufacturing industry is more influential in determining the income level than the influence of the stock of urban infrastructure on the tertiary income. Also, with the rise in the income level, the

(In billion Yen)

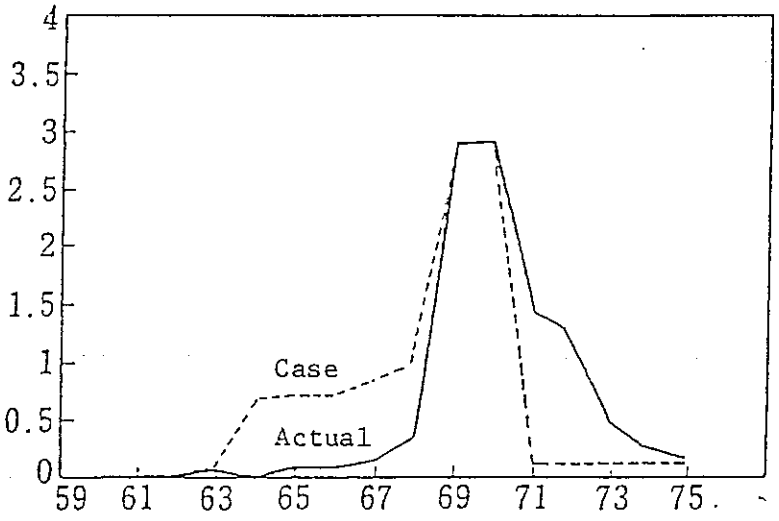


Fig.15 Public Investment for Social Overhead Capital (Exogenous Variable)

(In billion Yen)

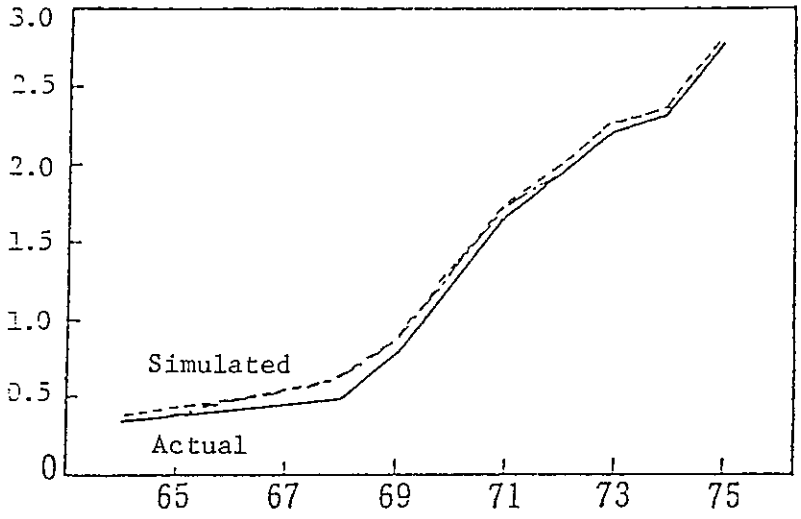


Fig.16 Income of Service Industry

(In Number)

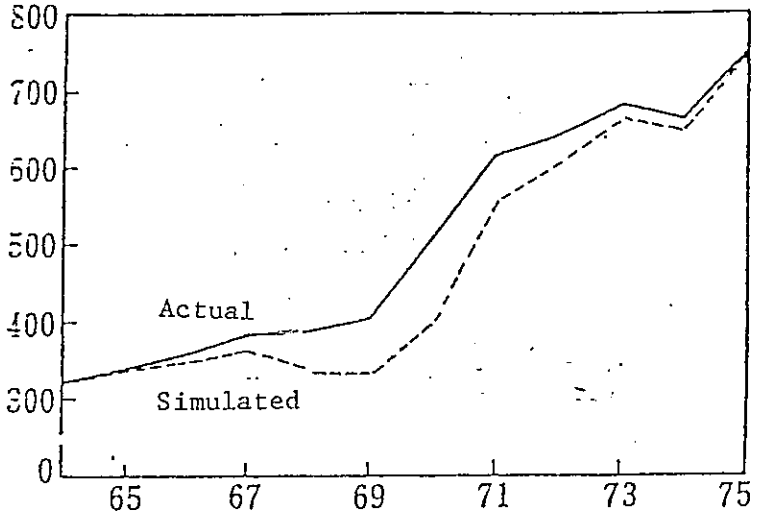


Fig.17 Number of Traffic Accident

income disparity with the agricultural sector widens further, and the agrarian income further decreases with the decrease in farming population.

However, the improvement of urban infrastructure contributes to the reduction of traffic accidents at the time of the start of operation of the plants set up in the region through the betterment of road traffic conditions. As of 1969, 16 percent of total traffic accidents are prevented. Thus, social indicators in terms of improving the residents' living environment are improved.

5-3 The improvement of implementation schedule of development programs

The lop-sided project implementation in developing the Kashima area is seen not only in the field of industrial promotion policy tested above. Rather, the lop-sidedness is far-reaching and affects the entire spectrum of the improvement of social overhead capital. The finance of the three townships in the Kashima area which were mainly responsible for improving social overhead capital in the area improved dramatically by securing untied funds obtained from the start of operation of the plants set up in the region. Nevertheless, in terms of expenditure, a major portion of the budgetary allocation for construction projects was earmarked to the construction of educational facilities due to a rapid population increase. It was only after 1974 that investment could be made in the livelihood-related facilities, when the rapid increase in the population was halted. Thus, temporary deterioration of the residents' living environ-

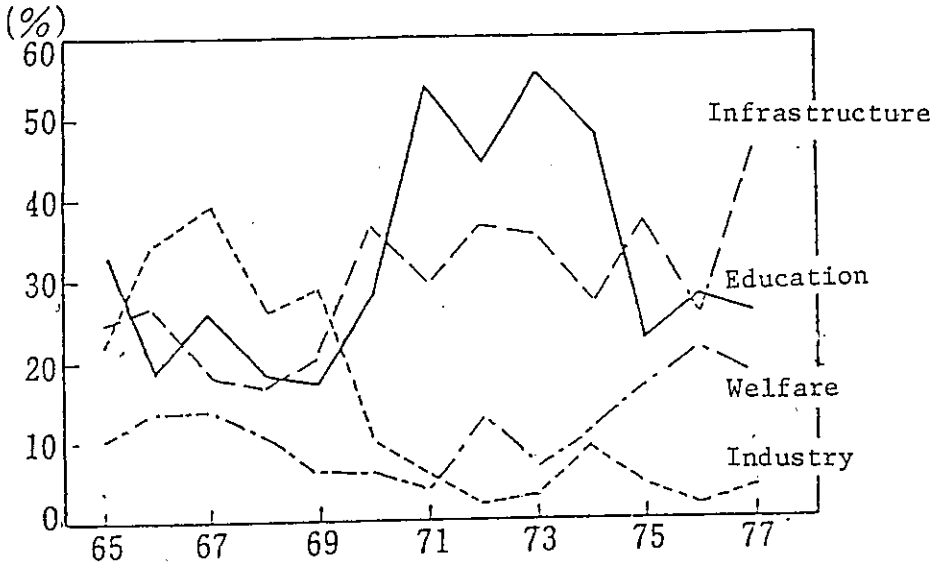


Fig. 18 Percentage Distribution of Local Public Expenditure for Construction in the Kashima Area

Source: Office of Kashima Township, Financial Report (unpublished)
Office of Kamisu Township, Financial Report (unpublished)
Office of Hasaki Township, Financial Report (unpublished)

(In billion Yen)

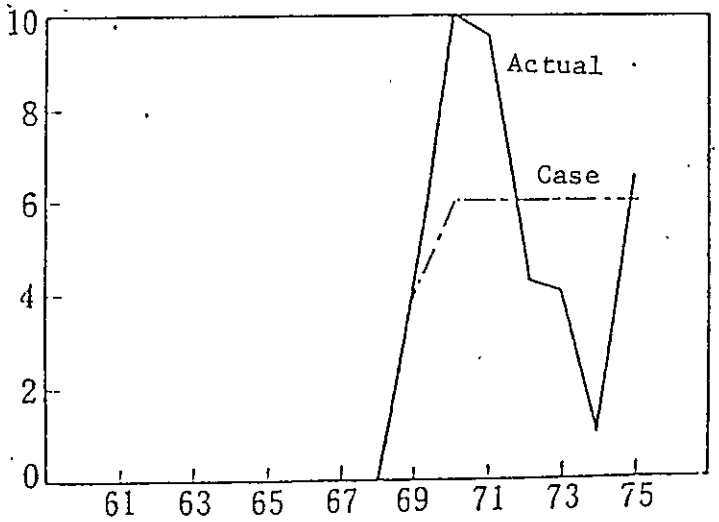


Fig. 19 Private Manufacturing Investment (Exogenous Variable)

(In billion Yen)

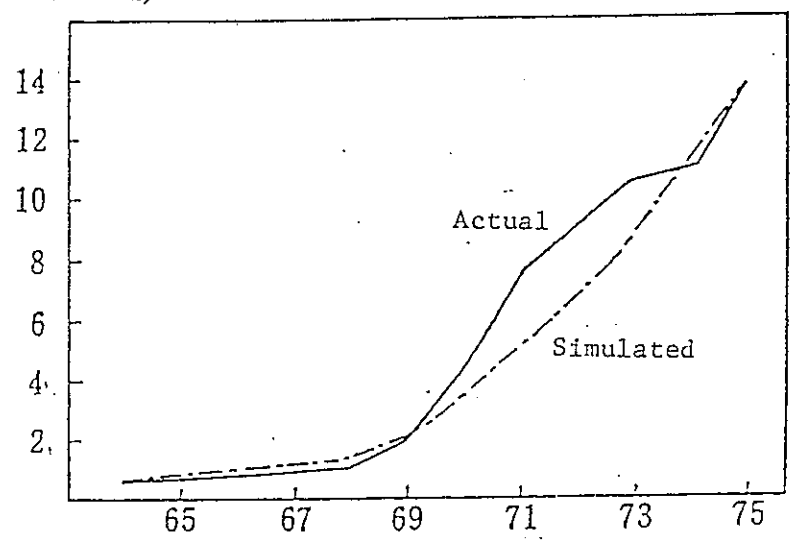


Fig. 20 Regional Income

(In million Yen)

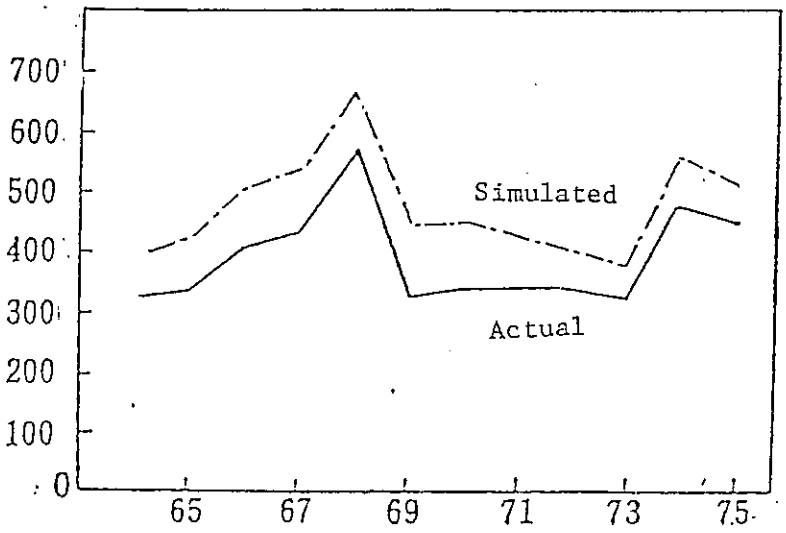


Fig. 21 Agricultural Income

ment was observed. In order to moderate this rapid increase in population, a test is conducted for a hypothetical case in which the main project management under which all the plants set up in the region started operating in the three year period is modified to a consecutive start of their operation over a six year period, and investment in private manufacturing industry is evenly distributed over the years. Incidentally, it is assumed in this case that investment in agriculture and urban infrastructure is advanced.

In terms of the effect of regional industrial promotion policy, the more evenly distributed over the years investment in manufacturing is, the lesser the regional income. A similar trend is observed regarding the tertiary industry. Advancing of investment in agriculture brings about a favorable effect, and mitigates its decline. In terms of the finance of the townships, a little over 2.7 billion yen in tax revenues will be lost as a result of a tardy advance of the plants into the area. However, at the same time, the expenditure will be reduced by about 10 percent. In paticular, spending for education will be reduced by 20 percent at the peak period due to the moderation of the rapid population increase. Thus, a well-balanced financial management becomes possible.

In terms of social indicators, a temporary lowering of standards will be prevented at the start of the operation of the plants set up in the region, specifically, in terms of indicators related to the livelihood-related facilities, for example, for public health, and the maintainance of a constant service level

becomes possible. Traffic accidents will increase gradually with the breakdown of the pattern of a drastic increase during the same period. The crime rate will not peak as much as it did due to the rapid population increase.

In terms of over-all effects, it become clear that adverse effects to the regional community can be prevented to a considerable degree by serially and evenly distrbuting the start of operaton of the cluster of plants and by preventing a lop-sided progress of project implementation.

6. Conclusion

As a result of the present study, the following can be pointed out regarding the management of regional development projects from the standpoint of anchoring the effects of development and preventing adverse effects in the regional community.

6-1 Regional industrial promotion policy

As symbolized by the phrase "the full compatibility of agriculture with manufacturing industry", the development project under study adopted an agrarian policy with a main objective of dealing with the residents relocated in the locality as well as a local industrial promotion policy with a main emphasis of absorbing spill-over effects of the process industry. Agricultural measure had a direct effect in terms of income. However, with the widening of productivity difference, it was not possible to

prevent the decline of the agricultural industry of the area. Therefore, an examination of the measures for the agriculture should be made in terms of the stabilization effect for the regional community through preventing more drastic changes in the regional industrial and social structures brought about by the development. Direct effect of the development for the regional employment and spill-over to the related industries the process industry exercised are not substantial. Rather, the orientation of absorbing the effects of the regional development should be sought in the tertiary industry centering on commerce and service industry. For such absorption, it is necessary to formulate the relevant land use plan in order to heighten the agglomeration effect and to improve the urban infrastructure in a wide ranging perspective.

6-2 The implementation schedule of the projects

In carrying out the development project, a lop-sided progress was observed between the main project and sub-projects as an exclusive emphasis was laid on the project against the backdrop of the retardation in purchasing necessary tracts of land. In this connection, it should be pointed out that sub-projects aim at absorbing the effects of development in the regional community and at preventing negative impacts. This lop-sidedness brought about a variety of social problems in the regional community at the time of the start of operation of the plants set up in the region. By deploying sub-projects as early as possible, a geater

effect can be expected in preventing the adverse effects concomitant to the progress of development, even if the sum invested remains the same. In controlling the progress of project implementation, a rapid progress of the main project should be eschewed, and sub-projects should be implemented early. When projects are implemented in this manner, a balance will be maintained between the two, and it is possible to prevent temporary confusions in the regional community which were seen in this paticular case.

The capability required to carry out policies in both fields requires a sense of balance between policies on the basis of an accurate prior grasping of the far-reaching effects of policies to the regional social system as well as a capability for flexible adjustment. In implementing regional development projects, it should be borne in mind to avoid lop-sidedness by co-ordinating policies in a wide-ranging policy perspective. It is essential to pay full attention to facilitate the anchoring of the effects of development while preventing confusions in the regional community.

NOTES

*1 Confer Kataoka<3> for the details of the present study.

*2 Ibaraki prefecture<1>.

*3 A comprehensive examination of problems involved in large-scale development projects, including the Kashima development project, is made in detail in Kawakami<4>.

*4 The data used are time-series data between 1960 and 1975.

*5 This dummy variable is inserted on the basis of the author's hearing at the Office of Kamisu Township. In this township, the possibility of a social confusion at the time of the start of operation of the plants set up there and the possibility of the labor decrease not reflected in statistics were pointed out.

*6 In this year, a survey on the actual conditions was conducted to work out agrarian measures. as there is a possibility that the farming population was exaggerated, a dummy variable was inserted.

*7 Jacobs<2>.

*8 Kawakami op. cit.

REFERENCES

<1> Ibaraki prefecture, "Kaihatsu no Genkyou 1976" (The Current Status of the Development 1976) 1977.

<2> Jacobs, Jane., "The Economies of Cities" Random House, New York, 1969.

<3> Kataoka, Masaaki., "Chiiki Kaihatsu ni okeru Shuuhen Shakai Taisaku no Kenkyu --- Kashima Kaihatsu no Jirei Kenkyu ---" (A Study of Measures for Peripheral Areas in Regional Development --- A Case Study of the Kashima Area Development Project) unpublished master thesis at the University of Tsukuba, 1979.

<4> Kawakami, Hidemitsu., 'Daikibo Kaihatsu no Chiiki Shakai ni ataeru Shomondai' (The Large-scale Development Projects and the Problems that it poses for Regional Communities), "Chiiki Kaihatsu" (Regional Development) Jan., 1975.

<5> The Research Institute of Regional Development, the Ibaraki University., "Kashima Kaihatsu" (The Development of the Kashima Area), Kokin Shoin, Tokyo, 1974.