

No. 224  
AN EX POST EVALUATION OF  
A REGIONAL DEVELOPMENT PROJECT

A CASE STUDY OF THE KASHIMA

DEVELOPMENT PROJECT

(Revised)

by

Masaaki Kataoka

May, 1984



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\*This paper is a summary of my Master thesis presented at The University of Tsukuba in 1979, and revised version of D.P. No.202.

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A CASE STUDY OF THE KASHIMA DEVELOPMENT PROJECT

MASAAKI KATAOKA

1. Introduction

In Japan, a regional development program is a part of the industrial promotion policy of the national government, and is also implemented with a view to improving the socio-economic welfare of the resident in a given region. Regional development not only signifies that the region enjoys direct benefits such as improved income or an increase in employment opportunities in the region, but requires as well, that the region efficiently and effectively absorb positive impact from the implementation of such a program. It is important to avoid environmental disruption caused by pollution arising during implementation as well as to avoid adverse effects resulting from dislocation of local residents. With such considerations taken into account, it becomes possible for a region to fully enjoy the benefit of a development program.

In Japanese large-scale development programs, a prefectural government ordinarily assumes the responsibility of advocating

the interests of a region in the capacity of project manager in both planning and implementation. The prefectural government selects the type of core industries and encourages private enterprises to set up their plants in the region. It also concerns itself with policies to guide local industries to fully enjoy the benefit of development. Furthermore, it consolidates social overhead capital in order to cope with increased population and social changes in the local community. Finally, it concerns itself with the prevention of negative impact, such as pollution, on the region. The problem involved in implementing such policies is to induce private enterprises to set up their plants in the region in such a manner as to maximize the total benefit for local residents and to decide on the amount and the timing of investment in social overhead capital. It is desirable that these decisions be made in a well-timed and well-balanced manner. A sufficient assessment should be made of the interrelated changes which the policy implementation will bring into the entire regional system, and the residents of the region should participate in the decision-making process.

The Kashima area development program was a prototype of Japanese development programs made for underdeveloped areas during the period of rapid economic growth. The Kashima area, which lies in the southeast part of Ibaraki prefecture 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, consisting of steel and petroleum plants. The National government gave full support to this

program, for these industries were the key industries of the national industrial promotion policy in these days. In the early 1970s, the construction of these plants was completed and their operation begun. The main objectives of the development program were accomplished. However, at the same time, some serious problems occurred in this area, and the local community was dissatisfied at that time.

The problems were:

- (1) Decline of agricultural industry and abandonment of farmland
- (2) Urban sprawl and ineffective land use
- (3) Temporary decrease in public services caused by a delay of investment in social overhead capital
- (4) Air pollution

This confusion had a serious influence on on-going and planned regional development programs in other regions. To avoid such problems, the residents of developing areas began strong citizen movement against the government carrying on such programs. In addition, The Japanese economic environment was changed by the influence of the oil shock. As a result, Japanese regional development policy was forced to change in the mid-1970s.

At this juncture, large-scale development projects which characterized the rapid economic growth period were completed, and their contributions and problems became apparent. The present study takes up a group of projects in terms of their contributions to the region in the form of stabilization of the effects

of development through the implementation of policies for regional industrial promotion and social overhead capital consolidation in the Kashima development program. First, the study positively examines the effects of such policies. Second, a regional socio-econometric model is constructed for evaluating alternative policies. Finally, policy simulations are conducted to examine the ways to absorb and stabilize the effects of development in the region. Through the above analyses, this paper aims at evaluating the validity of policies adopted in the process of the development, and giving some directions in improving development programs.

## 2. The Kashima Development Program

The Kashima development program consisted of a main project and a number of supportive projects. The former involved the construction of an excavated port and the creation of industrial complexes while the latter projects aimed at promoting local industry and consolidating social overhead capital.

The main project aimed at creating a littoral industrial area with a total area of 3330 ha and a Y-shaped excavated port in the three townships of Kashima, Kamisu, and Hasaki. It also envisaged the construction of industrial infrafacilities such as road networks, railroads, and industrial waterworks, as well as housing complexes to accommodate the employees of the newly located corporations. Through such plans, it aimed at inducing raw material processing industries, such as in steel and petroleum, to set up their plants in the region. As for the period of

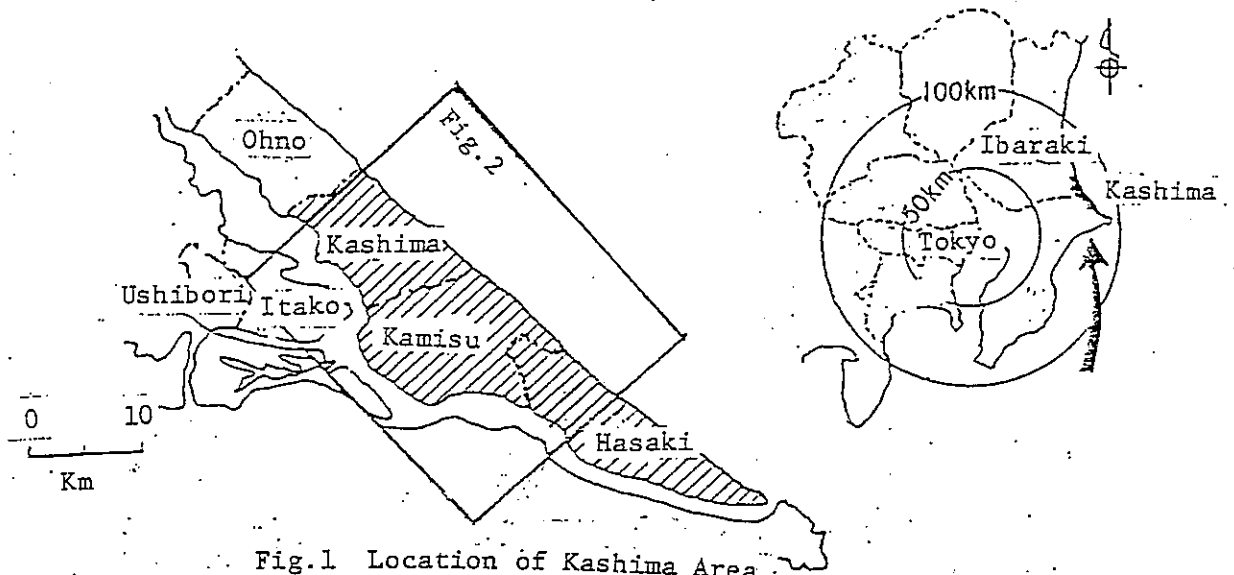


Fig. 1 Location of Kashima Area

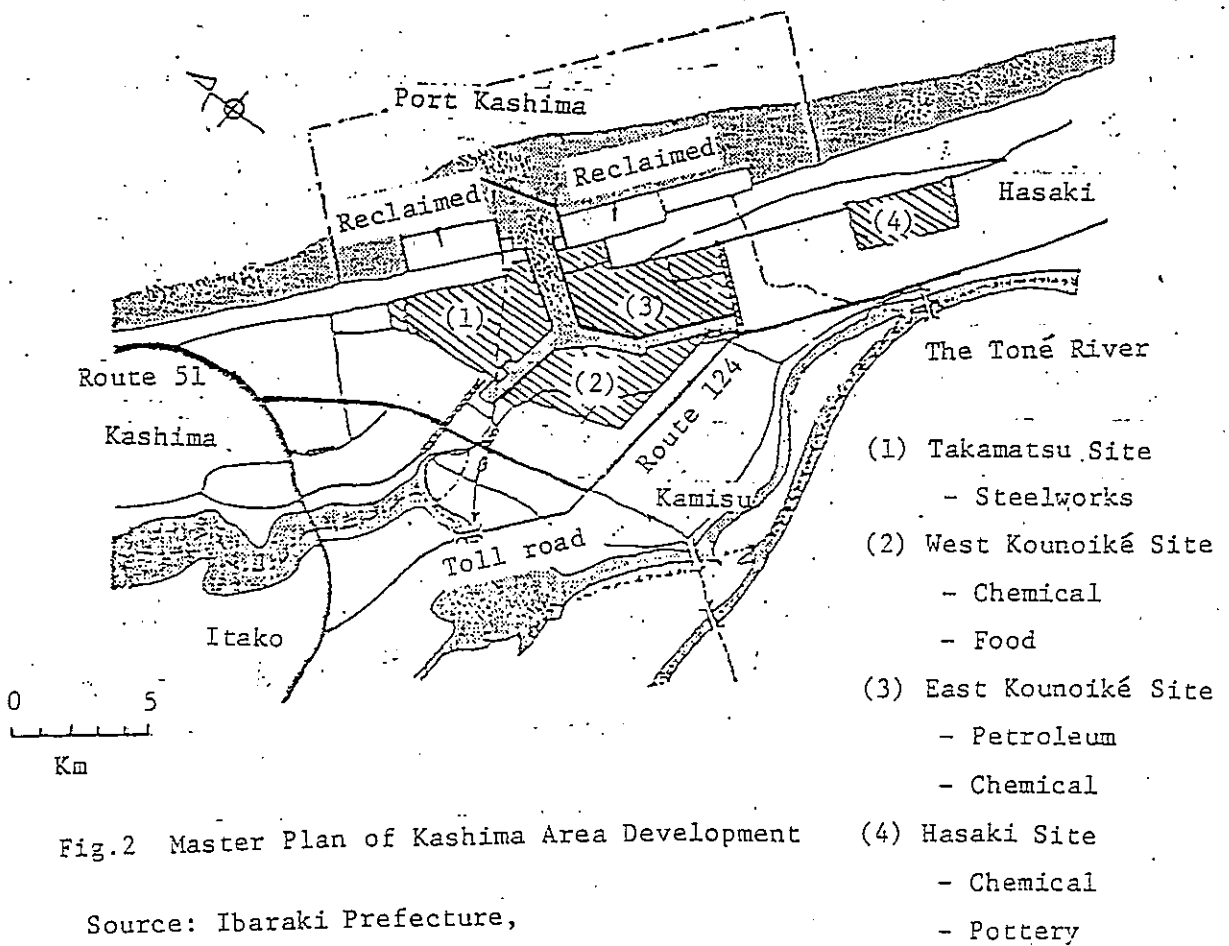


Fig. 2 Master Plan of Kashima Area Development

Source: Ibaraki Prefecture,  
Actual Status of Development 1976



of development through the implementation of policies for regional industrial promotion and social overhead capital consolidation in the Kashima development program. First, the study positively examines the effects of such policies. Second, a regional socio-econometric model is constructed for evaluating alternative policies. Finally, policy simulations are conducted to examine the ways to absorb and stabilize the effects of development in the region. Through the above analyses, this paper aims at evaluating the validity of policies adopted in the process of the development, and giving some directions in improving development programs.

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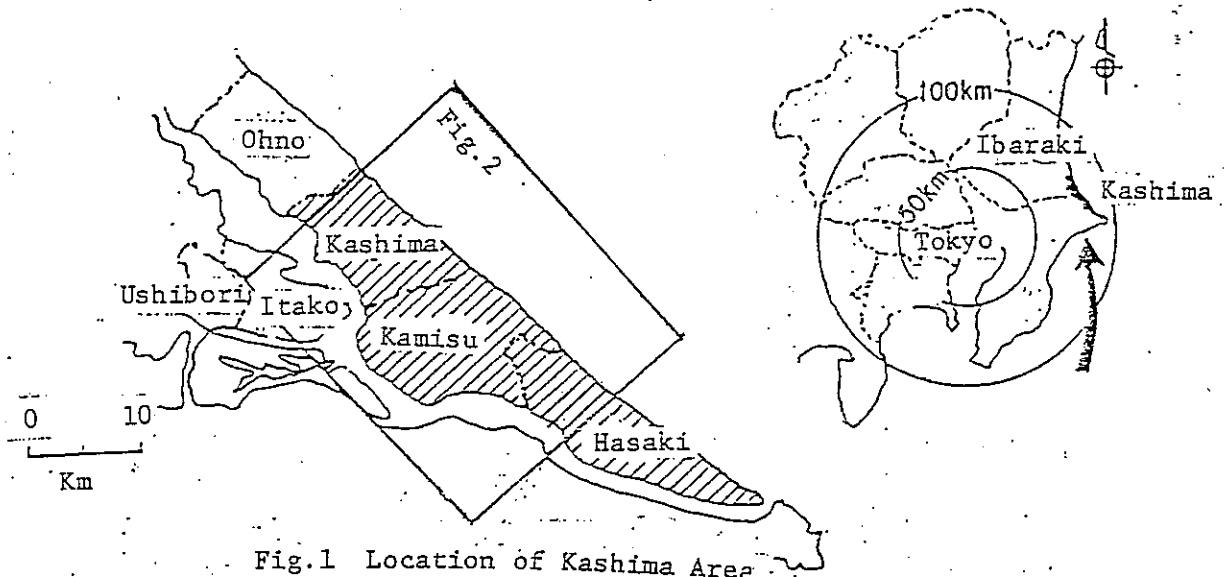


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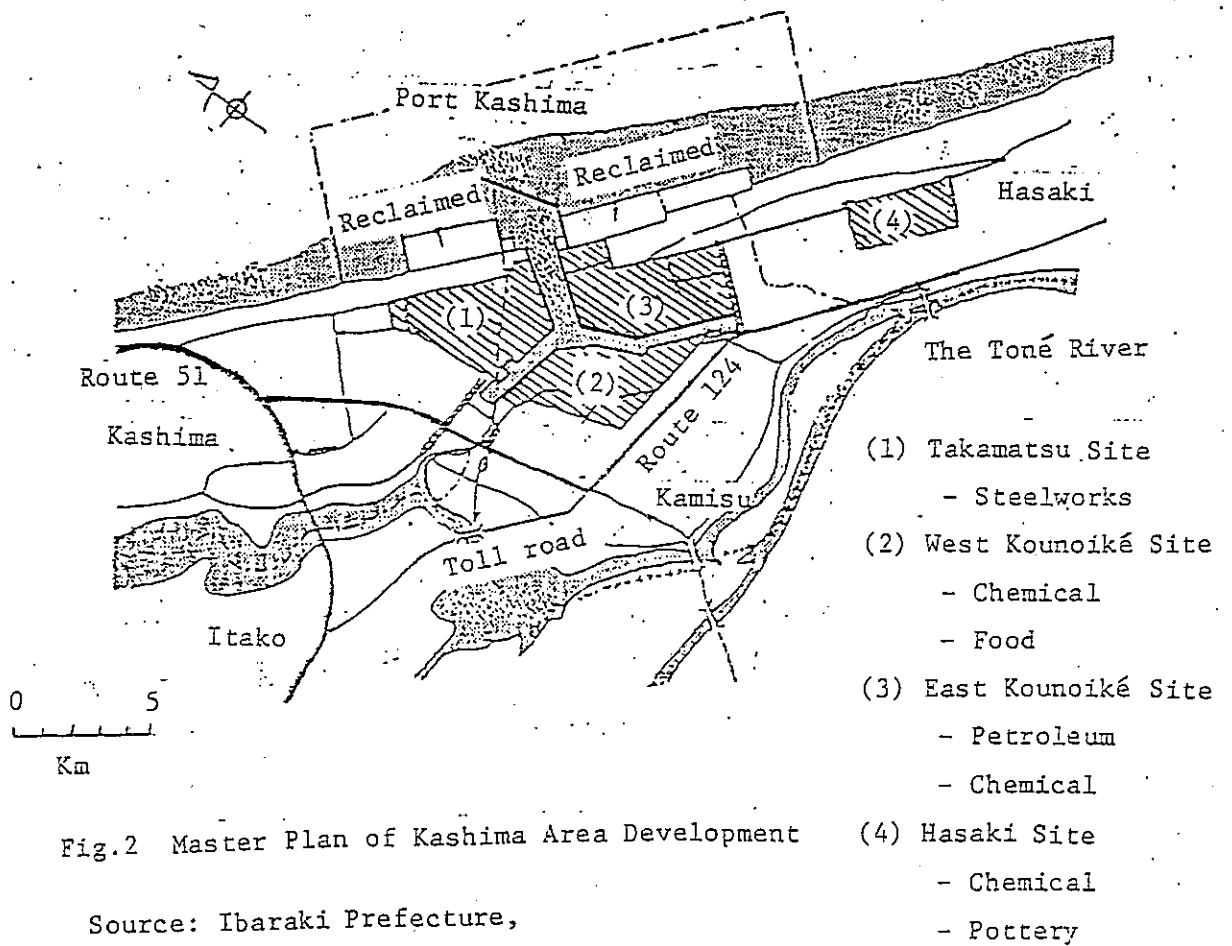


Fig. 2 Master Plan of Kashima Area Development

Source: Ibaraki Prefecture,  
Actual Status of Development 1976

construction, the first stage started in 1968 and ended in 1973, during which the core portions were constructed. The second stage was until 1975, during which it was planned to enhance the capacity of infrafacilities and to construct the Hasaki industrial site for the location of related corporations. Upon the completion of the program, it was envisaged that an industrial city would emerge with a population of 300 thousand and with port facilities to accommodate 100 thousand ton class vessels.\*2

Along with this, the cluster of supportive projects aimed at stabilizing and absorbing the effect of development through a series of measures directed towards agriculture and commerce. The cluster was also planned to stabilize the livelihood of residents dislodged due to the construction of the industrial complex. A policy to consolidate social overhead capital, which was decided upon in November 1969, aimed at improving the residents' living environment.

The principle behind the regional development policy was called "Full compatibility of agriculture with manufacturing industry". Under this principle, 40 percent of each farmer's land was purchased across the board in and around the industrial complex, 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 fair burden-sharing and the stabilization of the livelihood for the dislodged farmers, thus, trying to make agriculture compatible with manufacturing industry. Along with this, measures for local commerce and industry was aimed at, (1) financing and

providing guidance on management to farmers who had to abandon farming, (2) improving the urban infrastructure, (3) implementing land readjustment in urban areas, (4) securing sites for related corporations, and (5) giving priority to local firms to serve as sub-contractors. The project to consolidate 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 was developed to improve public facilities related to the residents' livelihood based on land use plan, and programs for year-by-year implementation and fund allocation were also planned.\*3

### 3. Analysis of the local industrial promotion policies

#### 3-1. Agricultural policies

Prior to the implementation of the development program, farming in the Kashima area was in the process of changing to a suburban type farming owing to the decline in the commercial value of sweet potatoes grown there to extract starch. Green-peppers, vegetables, and hogs were products newly introduced to replace sweet potatoes, and the agricultural policies of the prefectural government aimed at increasing land-productivity by positively promoting this change toward suburban farming. The agricultural policies of the prefectural government consisted of the following two points:

- (1) Creation of alternative farmland for farmers whose farmland had been purchased for the sake of creating industrial complexes, in order to guarantee that they could 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 into a green-pepper-centered suburban type which was facility-intensive and horticultural. In spite of this change, cultivated acreage decreased and abandoned farmland increased; farming population decreased and farmers pursued other trades as side businesses with the progress of development. the farming in the area rapidly declined.

\*

First, an analysis is made of the impact of the prefectural government's investment in the agricultural base. an attempt is made to estimate the production functions (Cobb-Douglas type production functions) of the area. Because of multicollinearity and wrong sign condition, no significant function can be estimated. Alternatively, analysis is made to directly measure the effects by regression analysis, and the following result is obtained.\*4

(In Thousand Person)

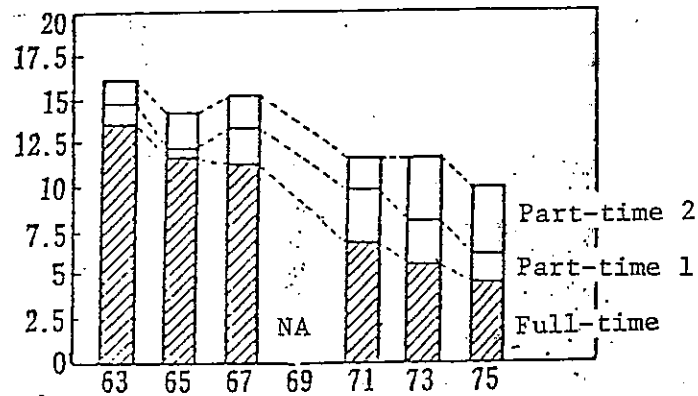


Fig.3 Agricultural Employment

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.

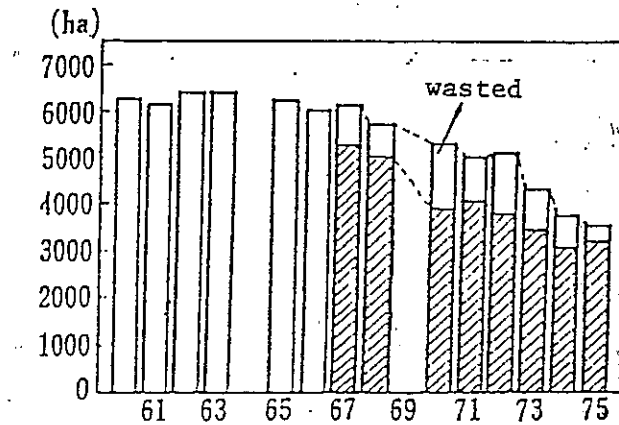


Fig.4 Land Area for Agriculture

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.

$$Y_A/E_A = 0.318262 \times 10^{-5} K_A - 21.7150 D + 23.016$$

(12.1551)                      (-8.52479)      (18.2241)

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

$Y_A/E_A$             : Agricultural productivity  
 $K_A$                 : Agricultural base capital  
    stock by prefectural  
    government  
 $D$                     : '69-'73 Dummy<sup>\*5</sup>

With the result, the possibility that the prefectural government's investment in agriculture made a positive impact on improving agricultural productivity is statistically supported.

Despite of the positive effects of the agricultural measures, farming in the Kashima area declined. The reason for the decline can be sought in the productivity gap with other industries. As shown in Fig. 6, the productivity of industries other than agriculture increases remarkably after the new plants start operations whereas agricultural productivity increases slowly, resulting in a drastically widening productivity gap between the two industries. In response to this widening disparity, agricultural labor decreases at a high rate of nearly ten per cent per annum. Here, the Marshallian adjustment process can be assumed. That is:

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

(In billion Yen)

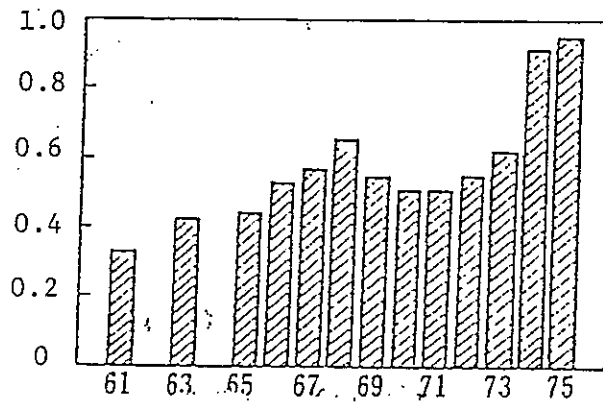


Fig.5 Gross Agricultural Product

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

(In million Yen)

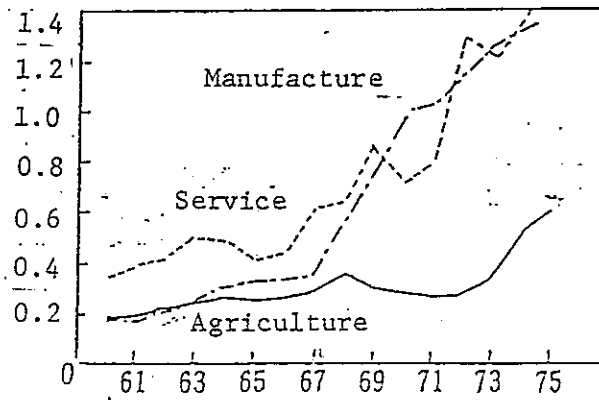


Fig.6 Productivity in Industries





almost constant. Therefore, the contribution by capital-intensive farming to the emergence of abandoned farmland is shown to be neutral in macroscopic terms. As for (2), it is clear in above examination. Hence, the major reason for the abandonment of farmland are suggested to be (2).

### 3-2. Policies for local commerce and manufacturing industries

The development of the regional economy is said to follow a reciprocal process in which non-basic industries develop in conjunction with the growth of basic industries.\*7 Out of this process, new basic industries differentiate and emerge, and growth is continued. This process is due to the multiplier effect originating in basic industries. The local commerce analyzed in this section are typical non-basic industries. The local industries were expected to play a role in absorbing and stabilizing the effects of the main project in the Kashima development program.

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

- (1) Induction of sub-contractors to the Hasaki industrial site
- (2) Improvement in the urban infrastructure of the agglomerated 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, it was (1) for which the prefectural government had the greatest expectations. 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 effects 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 workers employed by sub-contractors --- accounting for less than one quarter of the planned figure. This shortage was related to the fact that the prefectural government failed to induce machine and other related industries.

Rather, the greatest impact 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 in this sector were limited. Only discrete measures were taken for the residents who abandoned farming, and in land readjustment related to transportation considerations within the agglomerated part of the Kashima township. Thus, this sector was relatively neglected in the program. As shown in Fig. 8, the commercial districts of this area showed a pattern of small shopping districts, centering on daily necessities and food stuffs, as well as restaurants,

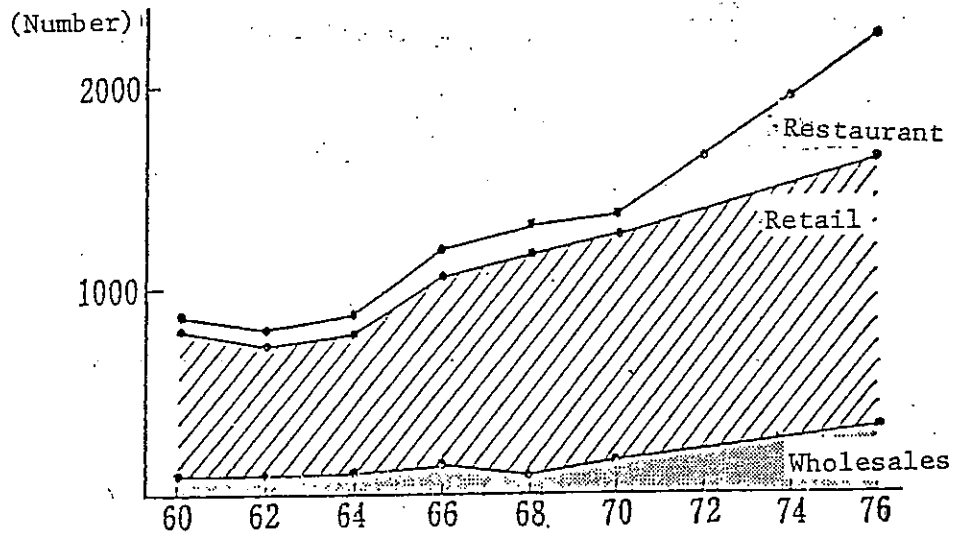


Fig.7 Number of Restaurants, Wholesales and Retail Stores

Source: Ibaraki Prefecture, Commercial Statistics in Ibaraki Prefecture

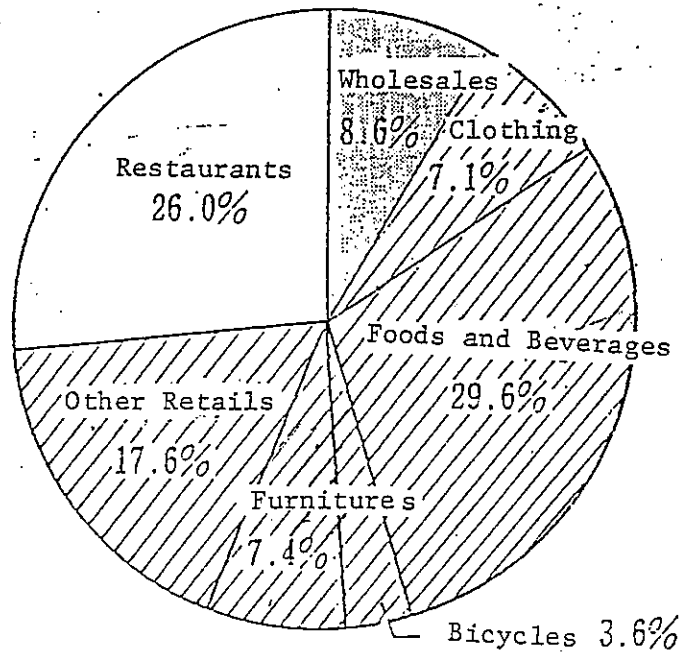


Fig.8 Percentage of Stores by Item (1976)

Source: Ibaraki Prefecture, Commercial Statistics in Ibaraki Prefecture

spreading autonomously and spontaneously along sprawling residential areas. Residents continued to rely on the existing commercial areas of Sawara and Choushi because there was little agglomeration of wholesales functions and stores of consumer durables in the area. In addition, the over-all agglomerating process was said to lagging behind.\*8

\*

First, an analysis is made, on the basis of economic base theory, of the effect of creating employment opportunities on non-basic industries brought about by the employment increase on basic industries.

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  $\beta$  is defined to  $E_{NB} / E_B$ , the equation is:

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

In this region,  $\beta$  does not become a stable value over time owing to the changes in the industrial structure; the decline of agricultural labor is caused by the development of the manufacturing industry, which is defined as a basic industry.

Therefore, if  $\beta$  is defined as a shock multiplier due to an increase in employment, then:

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

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 in tertial industry for population is  $\eta = 4.1634$ . This shows a very high elasticity. This also indicates that the development brings a very significant impact on the tertial industry.

Next, analysis is made of the impacts of the prefectural government's implementation of the urban infrastructure improvement projects by estimating the production function of the tertiary industry. The following equation is obtained:

$$\log Y_3 = 0.135326 \log K_T + 1.28079 \log L_3 + 0.0561532$$

(2.933223)                      (17.6038)                      (0.312645)

$$R^2 = 0.9880 \quad D.W. = 1.7200$$

- $Y_3$  : 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 by the improvement of urban infrastructure to the tertiary industrial income is statistically supported.

Despite the above analysis, in reality, the development of the local commerce did not lead to the formation of new commercial areas, and demand leaked to the existing commercial centers due to the small demographic agglomeration plus negative policy guidance. As for the orientation to be followed in improving the urban infrastructure, the sprawling of residential areas should be prevented, and shopping districts should 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 should be renovated through measures to redevelop the existing cores of commercial areas and local commercial centers in a wide-ranging perspective. By adopting the above-mentioned policy, better absorption of the benefits should become possible.

#### 4. A socio-econometric model for comprehensive evaluation of the development policies

Here, a socio-econometric model is constructed for comprehensively evaluating the alternative policies of the Kashima development program.

The objective of this model is to evaluate the multifarious impact on the regional socio-economic system caused by the investment of the prefectural government and private manufactu-

ring industry. Through policy simulations, improvements of programs are proposed by examining the strategies used to implement the regional development projects in order to facilitate the positive impact of development in the target region while avoiding any confusions.

In the model, public investment related to the development and private investment in the manufacturing industry are considered to be policy variables. By this formulation, it is possible to examine the effects of the development strategies of prefectural government on the regional economy and society, with a focus on the allocation of public investment funds among sectors and over time, and the strategies for inducing private investment in manufacturing.

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

In the economic sector, the private investment in manufacturing induced by the prefectural government increases the regional population by triggering the development of the regional economy, and stimulates the tertiary industry. The model also incorporates the mechanism for the improvement of agricultural productivity through the investment by the prefectural government, and includes the mechanism for the decrease in farmers caused by the productivity difference.

In the fiscal sector, township finance is formulated to be completely endogenous under the scheme for task-sharing between the prefecture and townships. The revenue is determined by the



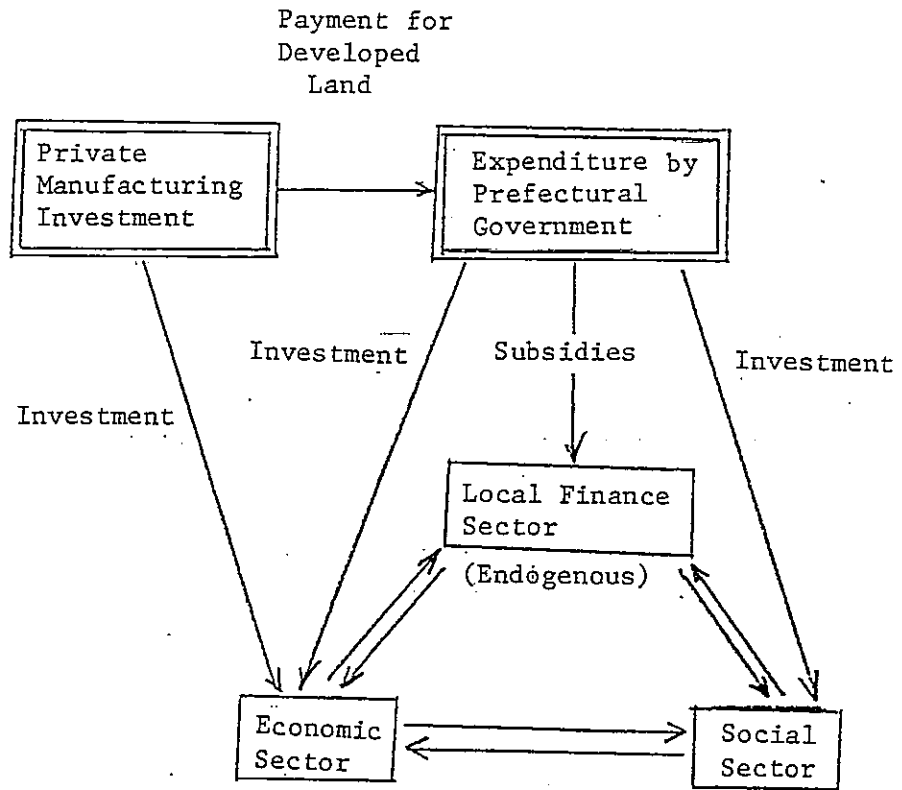


Fig. 9 - Basic Structure of the Model



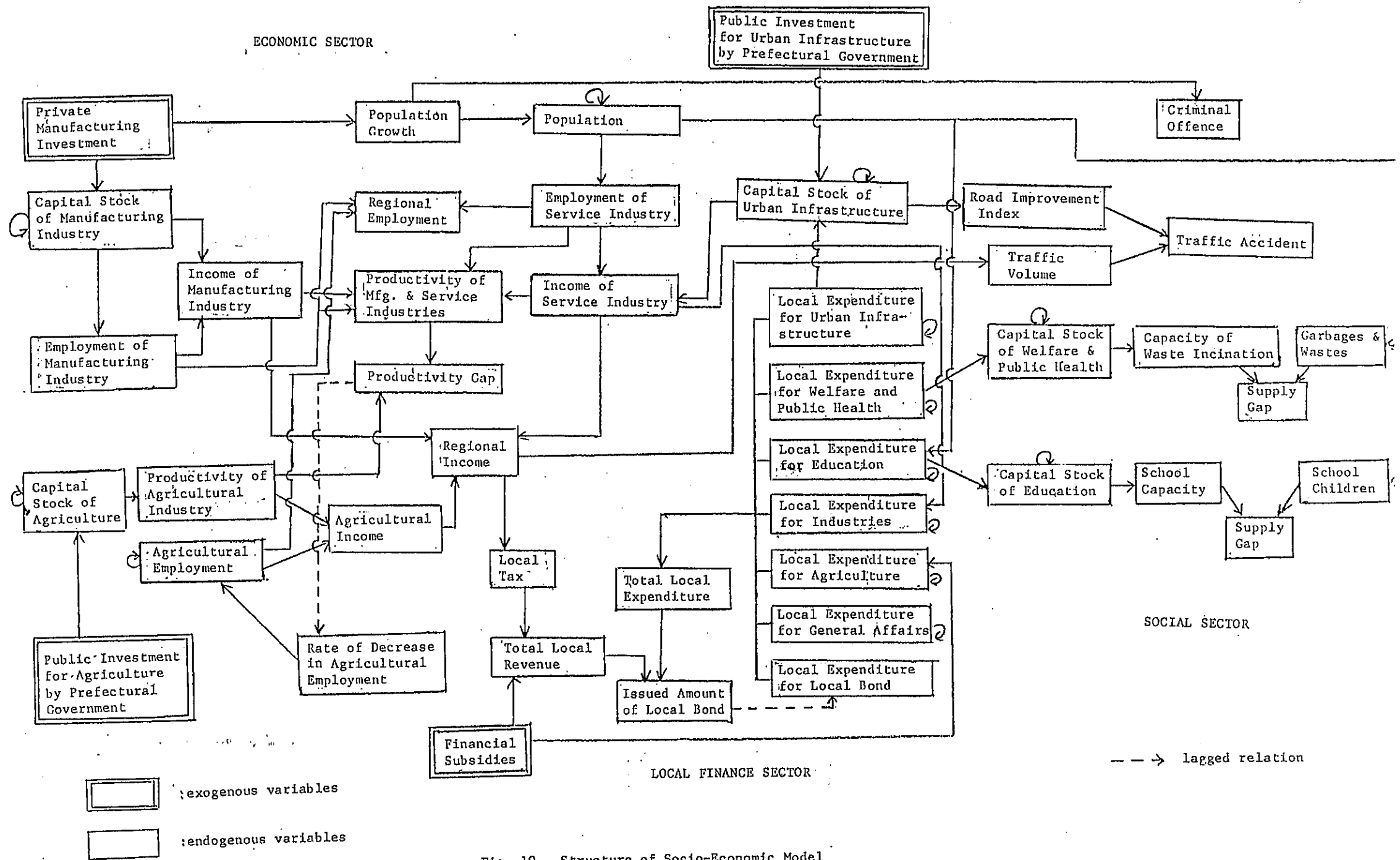
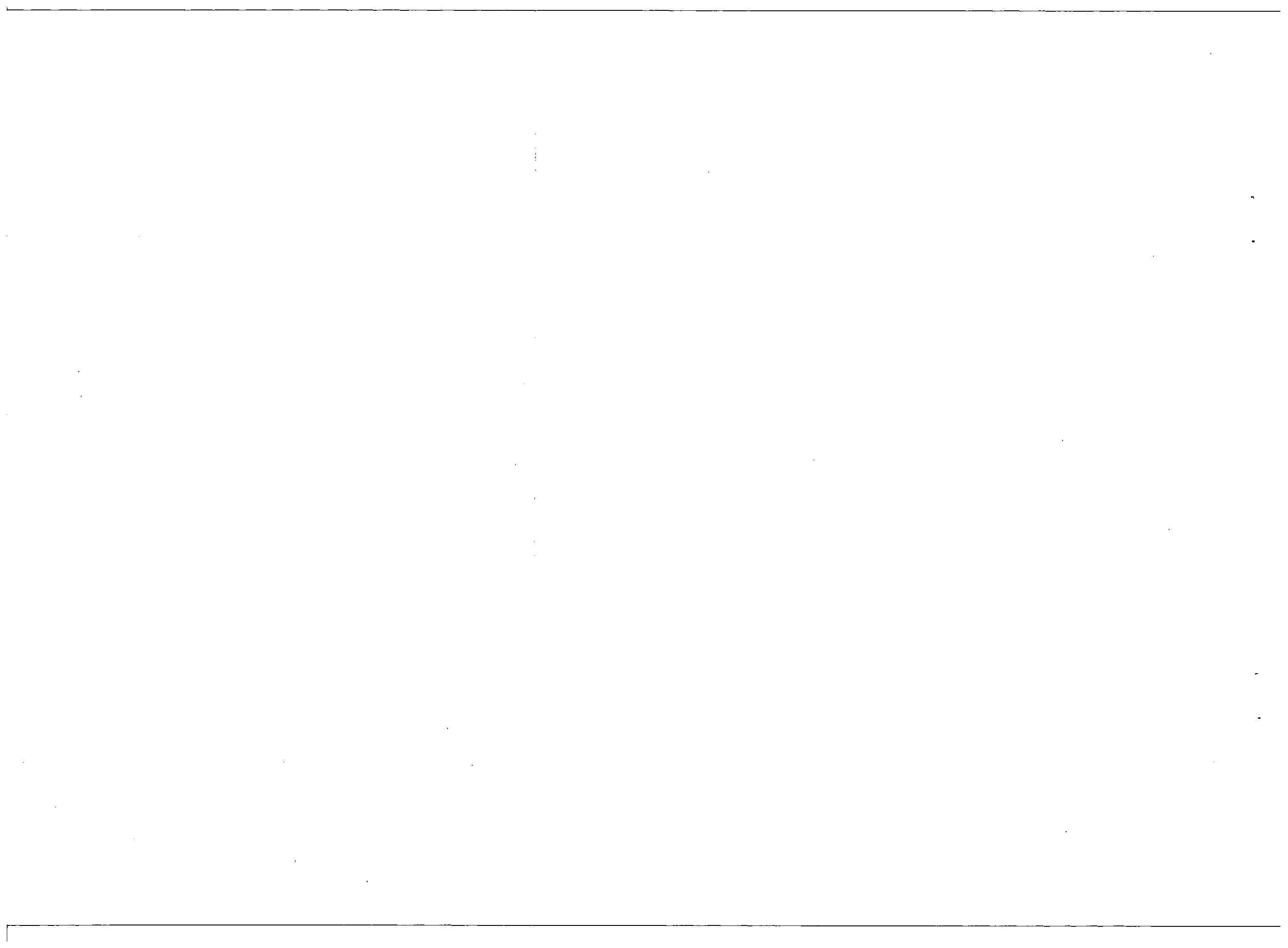


Fig. 10 Structure of Socio-Economic Model



outcomes of economic activities within the three townships, and prefectural subsidies. It is possible to examine changes in the fiscal balance of the three townships over the years as reflected in the patterns of fiscal expenditure 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 public service levels are determined by the public capital stock or flow formed by fiscal activities. The required level of services, on the other hand, is derived from population and regional income level. The appropriateness of a given policy is judged by the difference between the two.

## 5. Policy simulation

### 5-1. Policy tasks.

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

- (1) Improvement of agricultural measures
- (2) Comparison of merits between the agricultural and commercial measures as policies to guide local industries
- (3) Improvement of the implementation schedule of the development projects, in particular, to avoid the lop-sided implementation between main and supportive projects

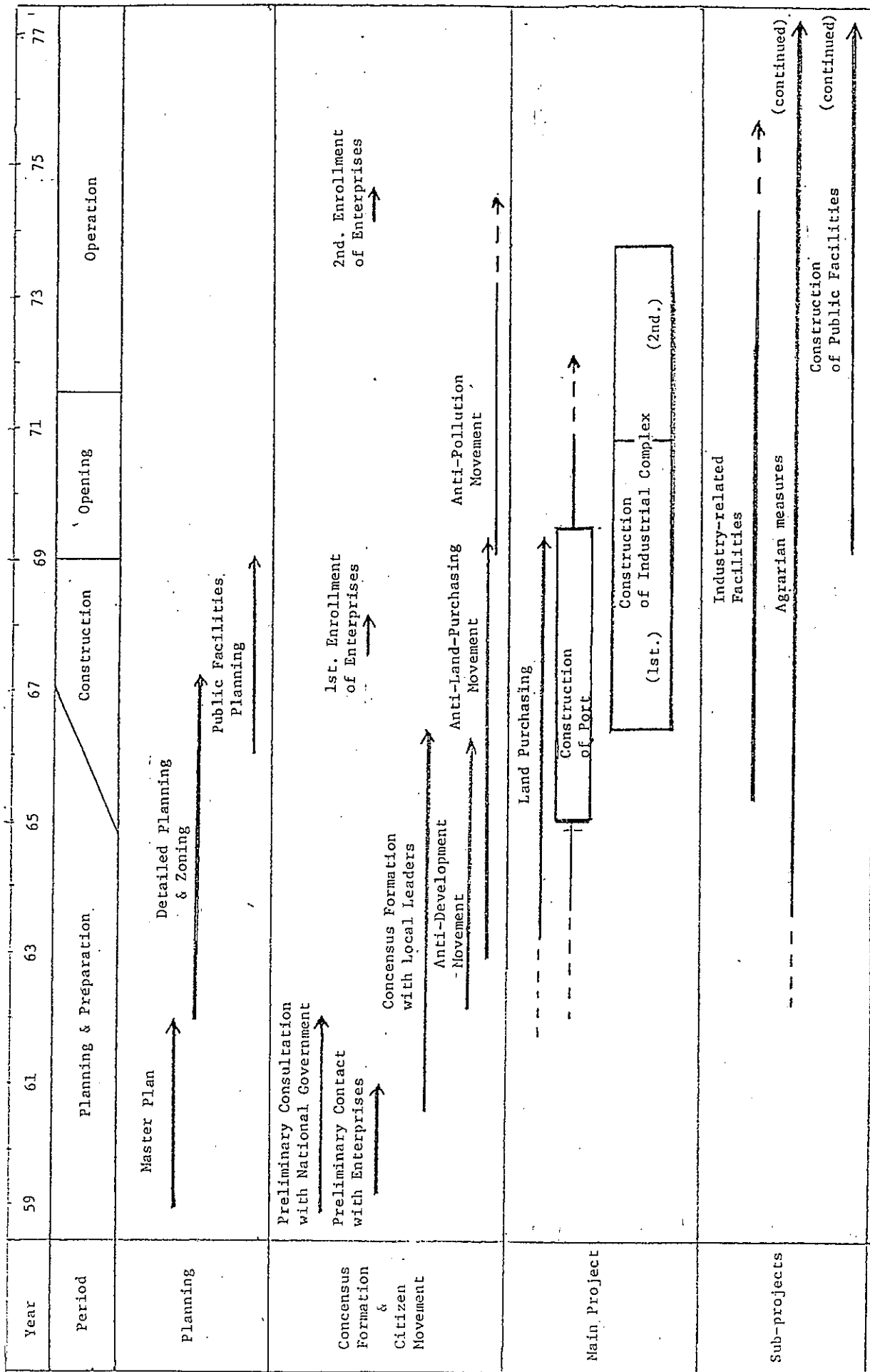


Fig. 11 Actual Progress of Kashima Area Development

Regarding the first point, an examination is made of fund allocation in agricultural measures over time. An analysis is made of the effects of policy improvement when public investment for agriculture, which was lagging behind, were given priority and emphasis before the plants began operations. Regarding the second point, an examination is made of merits of agricultural and commercial measures by comparing the impact of public agricultural investment with macroscopic commercial measures centering on investment of urban infrastructure. Regarding the third point, merits of policy improvement are examined in 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 the distribution of investment over time, especially an even distribution of private manufacturing investment and a consecutive, not simultaneous start of operation of the plants set up in the region.

In making these analyses, changes in time allocation and inter-project fund allocation is 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 Results

### 5-2-1 Improvement of agricultural measures

Two alternative cases are prepared for agricultural policy simulation. In Case 1, the total amount of the investment of

(In billion Yen)

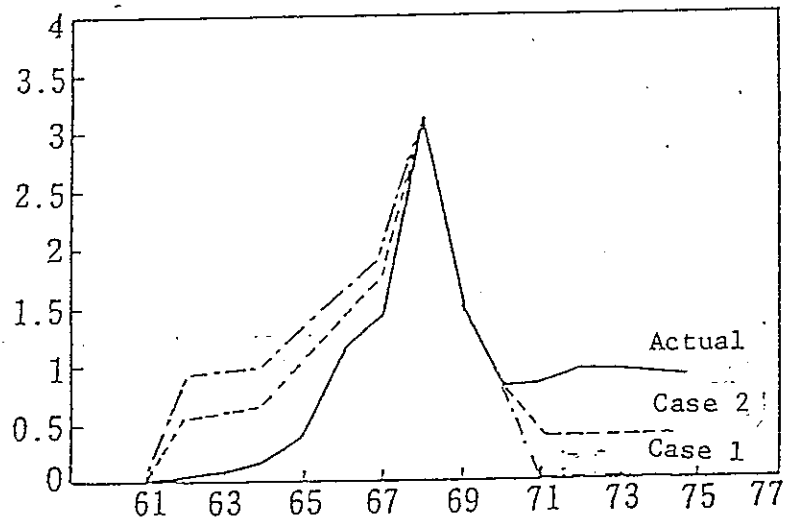


Fig.12 Agricultural Investment  
(Exogenous Variable)



(In million Yen)

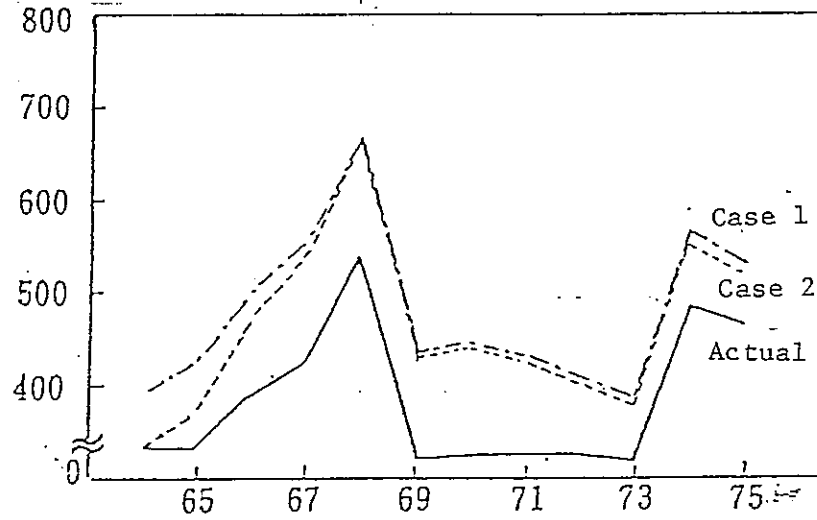


Fig.13 Agricultural Income

(In thousand Person)

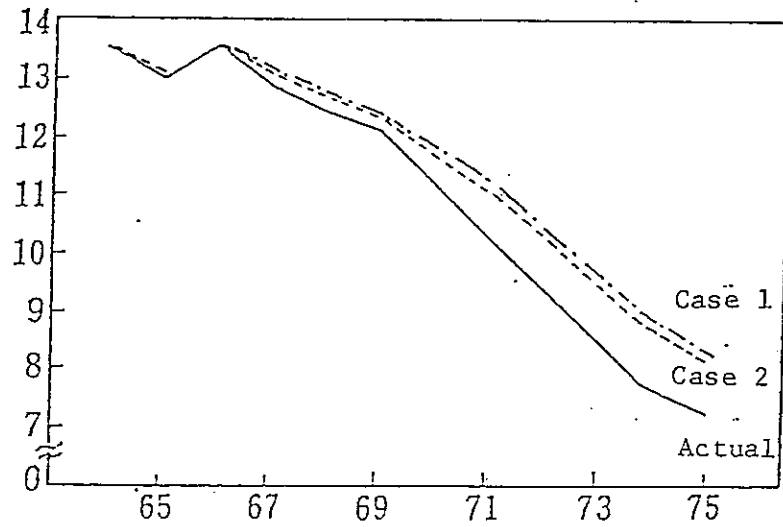


Fig.14 Agricultural Employment

measures for agriculture since 1971 is allocated to the period prior to the construction of industrial complexes between 1961 and 1967. In Case 2, three fifth of the same is allocated 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 agricultural income as of 1975 is 1.16 fold of the actual level in Case 1. In Case 2, it increases 1.17 fold. Thus, early implementation of investment in agricultural measures shows favorable results. As for agricultural population, it is impossible to halt the decrease caused by productivity difference. Although the actual decrease rate for the ten-year period beginning in 1966 is 47.6%, in Case 1, the corresponding percentage is 29.9%; in Case 2, 39.4%. In each case the decreasing trend is moderated. Therefore, an early implementation of agricultural measures makes for the stabilization of farming through advanced investment. It is also clear that the early implementation of agricultural measures can moderate the drastic decline of agriculture caused by the start of operation of the plants.

#### 5-2-2 Comparison of the merits of agricultural measures with those of commercial measures

As in the case of agriculture, early implementation 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

(In billion Yen)

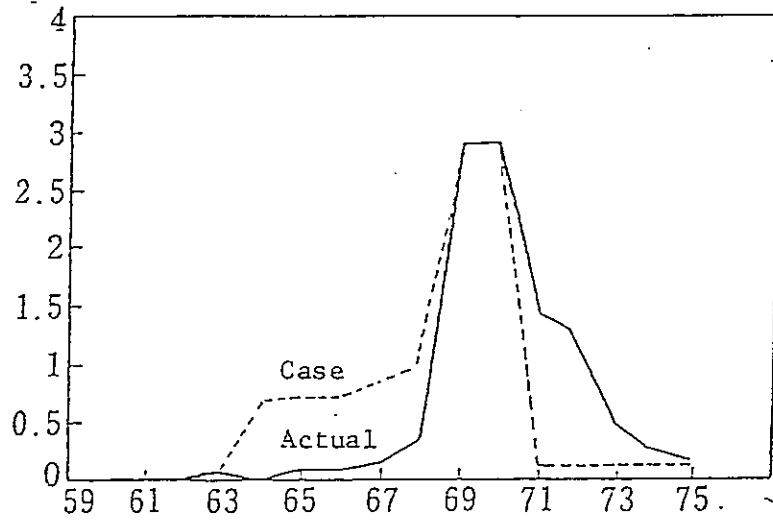


Fig.15 Public Investment for Social Overhead Capital  
(Exogenous Variable)

(In billion Yen)

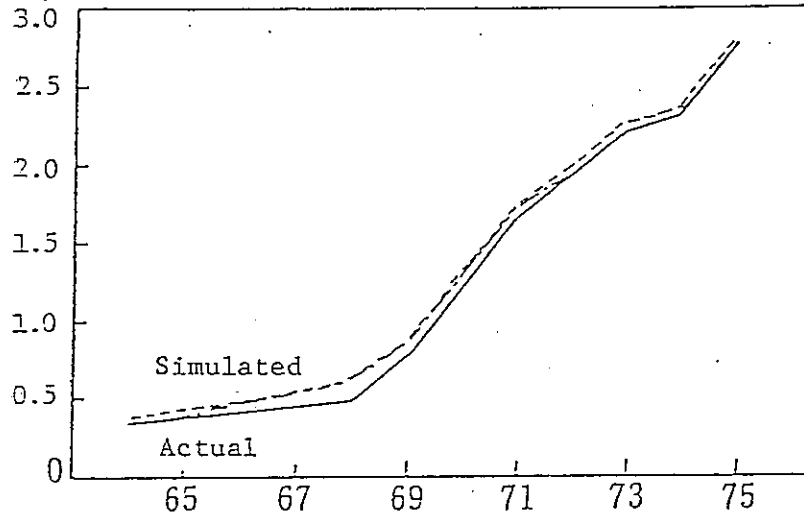


Fig.16 Income of Service Industry

(In Number)

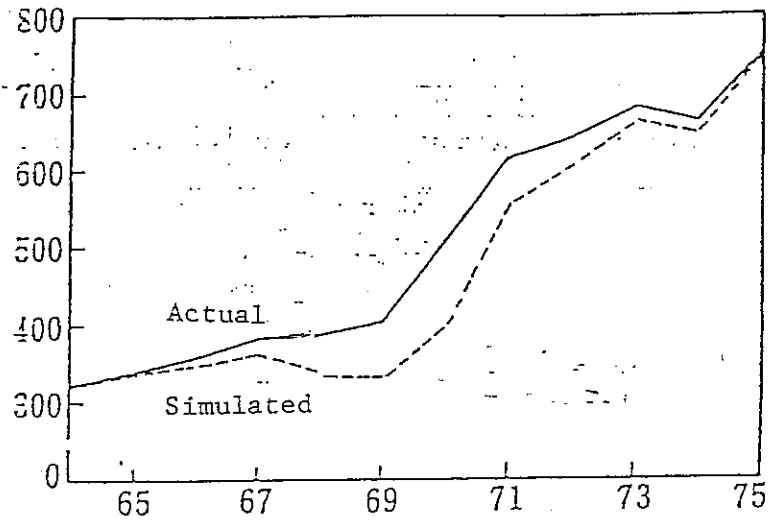


Fig.17 Number of Traffic Accident

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 agricultural measure.

As a result, as of 1969, a slight improvement of 1.07 fold of the actual level is observed in terms of the tertiary industrial income. When seen in terms of regional income, the benefit is greater than in the case of agriculture. In the nature of the structure of the model, the impact of investment in manufacturing industry is more influential in determining the income level than the impact of the stock in urban infrastructure is on the tertiary income. Also, with the rise in the income level in manufacturing and tertiary industry, the income disparity with the agricultural sector widens further, and the decrease in the agricultural income is aggravated by the decrease in farming population.

However, in terms of the resident's living environment, the improvement of urban infrastructure contributes to the improvement of social welfare. For example, traffic accidents are reduced at the time the plants start operation through the improvement of road traffic conditions. As of 1969, 16 % of traffic accidents were reduced.

#### 5-2-3. Improvement of implementation schedule of the development program

The lop-sided project implementation in developing the Kashima area was seen not only in the field of industrial promotion policy tested above. This lop-sidedness affected the entire

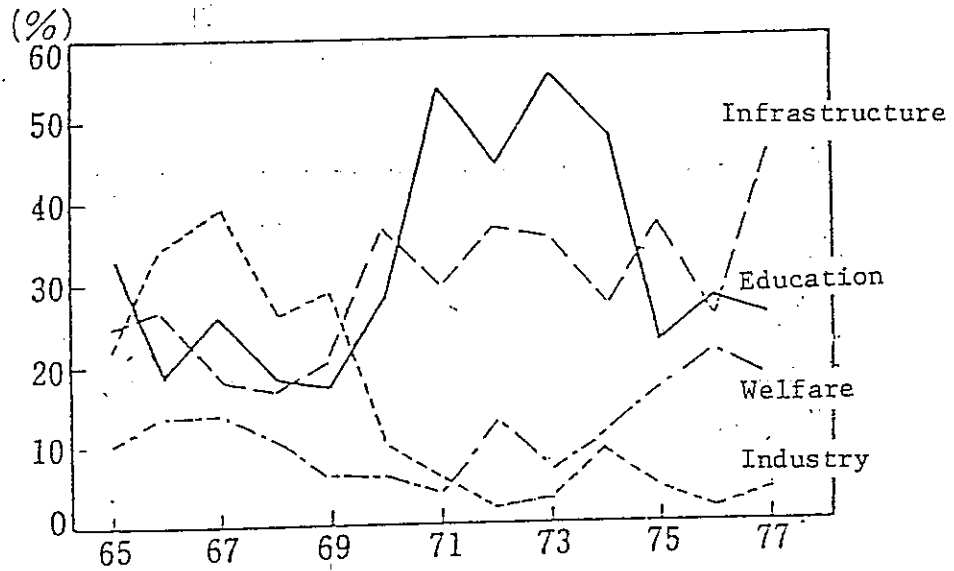


Fig. 18 Percentage Distribution of Local Public Expenditure for Construction in the Kashima Area

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)

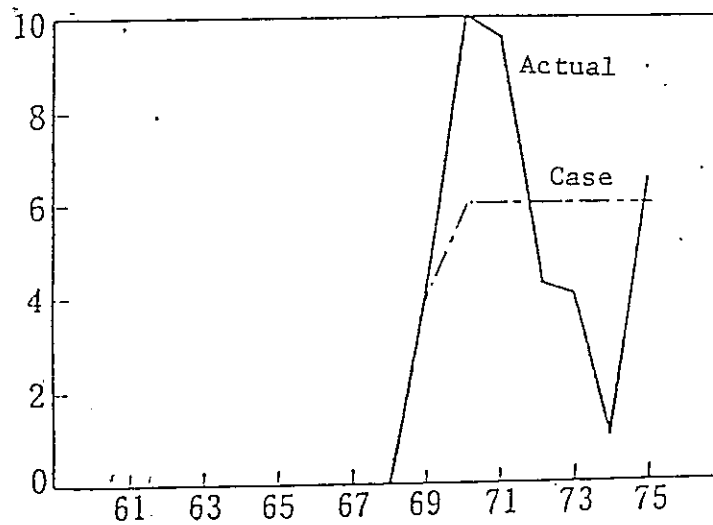


Fig. 19 Private Manufacturing Investment (Exogenous Variable)

(In billion Yen)

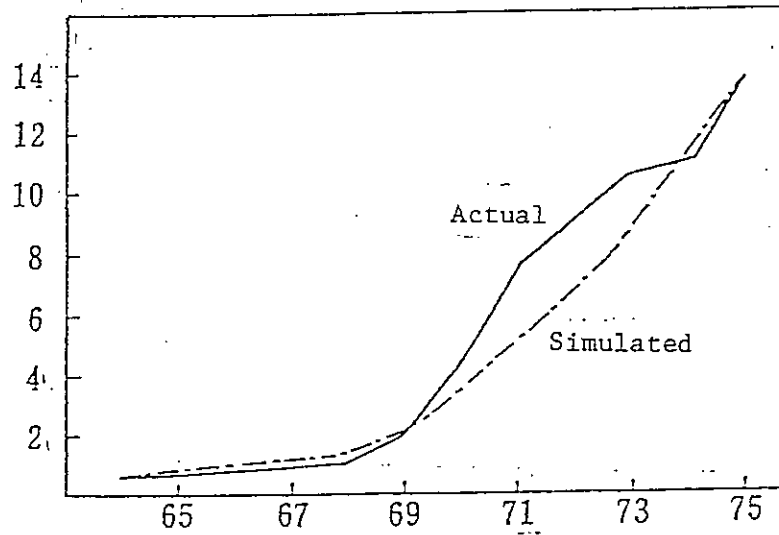


Fig. 20 Regional Income

(In million Yen)

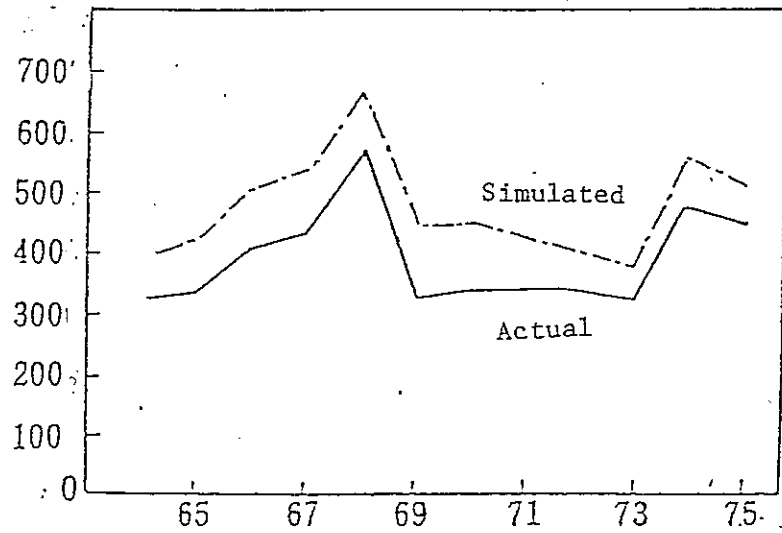


Fig. 21 Agricultural Income

aspect of improvement in 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 after the plants started operations. Nevertheless, in terms of expenditure, a major portion of the budget for construction projects was allocated 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 environment was observed. In order to moderate this rapid increase in population, a simulation is made for a case in which all the plants started their operation consecutively over a six year period, instead of the actual three 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 implemented early.

As a result, in terms of the regional economy, the more evenly distributed the investment in manufacturing industry is, the lesser the regional income. A similar trend is observed regarding the tertiary industry. Early implementation of investment in agriculture brings about a favorable impact, and mitigates agricultural decline. In terms of the finance of the townships, a little over 2.7 billion yen in tax revenue is lost as a result of tardy advance of the plants into the area. However, at the same time, the total amount of expenditure is



reduced by about 10 percent. In particular, expenditure for education is reduced by 20 percent during the peak period due to moderation of the rapid population increase. Thus, a well-balanced financial management becomes possible.

In terms of public services, a temporary decline of standards when plants begun operation is avoided. Especially in terms of the livelihood-related facilities, such as public health, a constant service level is maintained. Traffic accidents would increase only gradually with the breakdown of the pattern of drastic growth during the same period. The crime rate would not peak as much as was the case with a rapid population increase.

On the whole, it is clear that the negative impact on the regional community can be avoided to a considerable degree by sequencing and evenly distributing the start of operations within the cluster of plants and by correcting lop-sided progress of project implementation.

## 6. Conclusion

As a result of the study, the following can be pointed out regarding the management of regional development projects from the viewpoint of stabilizing the effects of development and avoiding negative impact on local communities.

### 6-1 Regional industrial promotion policy

As symbolized by the phrase "the full compatibility of agriculture with manufacturing industry", the development program

under study adopted an agricultural policy with a view to dealing with the residents relocated in the region as well as adopted a local industrial promotion policy which would emphasise absorption of the spill-over effect from the process industry. Agricultural measures had a direct benefit in terms of productivity and income. However, with the widening of productivity difference, it was not possible to prevent the decline of the agricultural industry in the area. Therefore, an examination of measures for agriculture should be made in terms of stabilization of the regional community by avoiding the more drastic changes caused by the development on the regional industrial and social structures. Direct impact of development on regional employment and the spill-over to related industries the process industry exercised were not substantial. Rather, the orientation of absorbing the benefit of the regional development should be sought in the industry centering on commerce and service industries. For such absorption, it is necessary to formulate a relevant land use plan in order to both heighten agglomeration, and improve the urban infrastructure in a wide-ranging perspective.

#### 6-2 Implementation schedule of the program

In carrying out the development program, a lop-sided progress was observed between main project and supportive projects as an exclusive emphasis was laid on the main project against the backdrop of the retardation in purchasing necessary tracts of land. In addition, it should be pointed out that supportive

projects which aimed at absorbing the effects of development in the regional community and avoiding negative impacts were lagging behind. This lop-sidedness between the main and supportive projects brought about a variety of social problems in the regional community at the time the plant began operations. By deploying supportive projects as early as possible, a greater benefit can be expected in avoiding the negative impacts concomitant to the progress of development, even if the invested amount remains the same. In controlling the progress of project implementation, a overaccelerated progress on the main project should be avoided, and supportive projects should be implemented early. When projects are implemented in this manner, a balance can be maintained between the two, and it is possible to avoid the temporal confusion in the regional community which was experienced in this particular case.

The capability required to carry out policies in both fields requires a sense of balance between policies on the basis of an accurate assessment of their impact on the regional social system. It requires, as well, a capability for flexible control of the policy implementation. In implementing regional development projects, it should be borne in mind to avoid lop-sidedness by coordinating policies in a wide-ranging policy perspective. It is essential to facilitate the effects of development while avoiding 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 was conducted to work out agricultural measures. as there is a possibility that the farming population was exaggerated, a dummy variable was inserted.
- \*7 Isard <2>.
- \*8 Kawakami op. cit.

## REFERENCES

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- <2> Isard, W., "Methods of Regional Analysis" MIT Press, 1960.
- <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.

