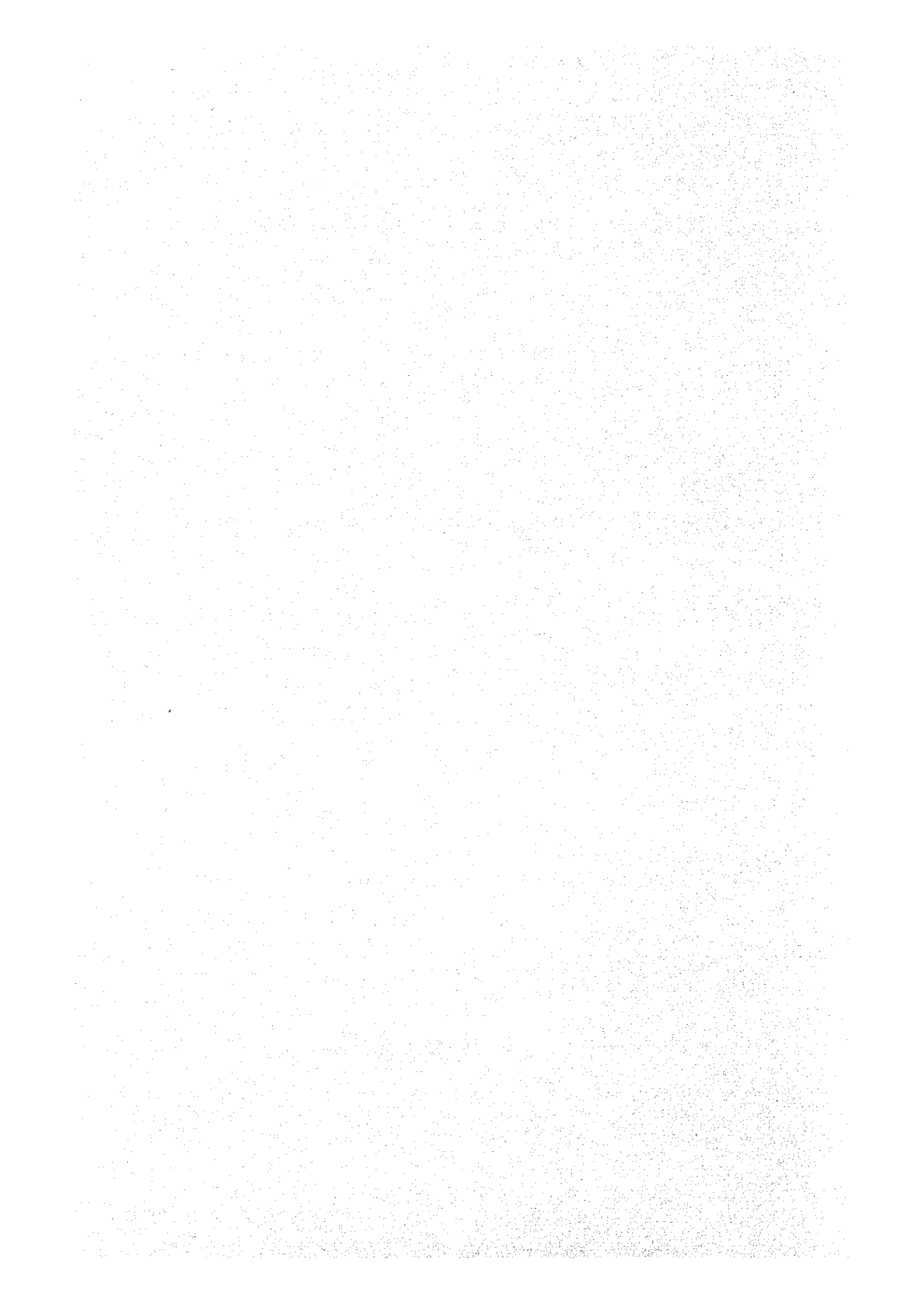


**APPENDIX 3. SEMINAR PRESENTATION BY STUDY
TEAM**



**NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
OPENING SESSION: OVERALL DEVELOPMENT STRATEGIES
Presented by Dr. Jinichiro Yabuta**

Your excellency Deputy Prime Minister Mr. Pong, Mr. Chairman and honorable guests, it is our great pleasure to present the result of our study to the distinguished participants which are to play key role in the development of Thailand.

The Upper Central Region, or let me call it. the UCR, is now at the crossroads between being left behind the national industrialization and urbanization or reviving as a distinct northern block of the capital region, containing substantial industrial and service agglomerations on top of sound agricultural base.

Our proposal addresses itself to the question of how to realize the revival of this region in response to fast changing economic and spatial structure of the country.

What will then be the major national structural changes toward the year 2010?

The first will be a change in the sources of national economic growth. Fast economic growth led by industrial exports, direct foreign investments and agricultural exports will continue during the 1990s. But it will gradually be based on the expanding and diversifying domestic market, broader industrial technological base and higher valued and recyclic use of primary resources.

The second will be the balancing of development and environment. This will be more important than ever in terms of sustaining agriculture and responding to increasing environmental perception of the urban people.

The third will be a smooth transition of rural employment to urban employment. Of growing importance are more non-agricultural employment outside the Bangkok Metropolitan Region(BMR) and the better urban services and amenities as a major determinant of attracting and retaining human resources.

Now, under these national perspectives, on what basis, will the UCR be able to play meaningful role? There are three points.

The first point is that the UCR is an essential part of the Chao Phraya Basin with the largest irrigations system in the country. This region is vital to the national rice production and export as well as to keeping Bangkok from

water pollution and flood. If its agriculture can be well sustained, the UCR would be the national food supply center.

The second point is that the UCR is on the frontier of the BMR and it is receiving fast spill over of industrial investment. Although present pattern of industrial dispersal increases the danger of pollution along Chao Phraya River and undermines the willingness of farmland owners to maintain farmlands, this region would possibly form a new inland industrial base if it has a strong magnet to gather investments within a certain area.

The third point is that the UCR is situated at the gateway of Bangkok to northern and northeastern regions. This means that the UCR is in a best position to make use of the developments in other regions. Not only the traditional agricultural linkages with inland regions but also the potential industrial linkages with seaboard regions including Eastern Seaboard would raise the position of the UCR to be a subnational distribution center.

Looking at what have been happening inside the UCR, however, we have to face with a set of interrelated constraints:

First, in the rural scene, the UCR's agriculture has been unstable due to its heavy dependence on fluctuating international market, the soil erosion caused by excessive cultivation in the upland, the inflexible irrigation water supply vis-a-vis diversifying market demand and the high tenancy, which is a social problem, too.

Second, in the urban scene, urban service centers have been very weak because of the unstable agricultural hinterlands and, in addition, because of strong neighboring pull factor of Bangkok. Without viable regional city, the UCR suffers from weak integration of economy within itself.

Last, these rural and urban constraints have resulted in the continuous out-migration for the past 30 years.

What would happen, if the present situation is left alone?

A simple extrapolation of the past trend suggests that population share of this region will continue to decline from 5% to 4% of the national total in the coming 20 years. GDP share will decline from 4% to 3.5%. Per capita income will continue to stagnate at a level of about 15% lower than the national average.

The UCR would become a mere transit region, encroached by quick-return-oriented industrial investments in a piecemeal manner. Population would migrate out more and more, and presently rich agricultural asset would be devastated. Without viable farmers to succeed agriculture. Deteriorating

environmental conditions would cause the water pollution and flood to seriously hit Bangkok.

Then, what are necessary for the UCR to get out of this possible dark picture?

We think, a key to this question is to maintain old advantages of this region and, on top of this, to capture new possible advantages. The major old advantages are the concentration of rice production, goods distribution activities and industrial resources such as cement and main field crops. The major new advantages would include the expanding and diversifying domestic food market, highway, railway, energy logistics and other major infrastructure projects, which will strengthen the gateway function of the UCR, and the possible spread effect of the Eastern Seaboard.

Overall policy for the UCR should, therefore, be revitalization of its economy. Under this policy, proposed development objectives are three fold:

First of all, to maintain and restore the ecological environment of the UCR.

Secondly, on this basis, to deepen and widen its regional economy.

Thirdly, to strengthen the regions human resource base for the revitalization.

Now let me come to the strategies and targets for these objectives:

First, agriculture, The strategies should be:

Number one, in the Chao Phraya Delta area, to strengthen capability and willingness of the rice farmers.

Number two, in the upland area, to rehabilitate its agricultural environment

Number three, to promote linkages of the production of crops and livestock with the processing industries and domestic market.

With these strategies, the agricultural sector will be able to sustain a long-term growth rate of 3% per year. Livestock and tree crop production are expected to lead this growth, while rice will still be a major contributor to the agricultural GDP.

Second, industry, the strategies should be:

One, to build up, step-by-step, an industrial development core at Sara Buri, in response to the progress of Eastern Seaboard Development.

Two, to diversify intermediate processing of the major field crops and their wastes which concentrate on this region.

Three, as an important part of human resource development, to foster the entrepreneurship of potential local businessmen through intensifying their interactions with nation-wide and even international business activities.

Four, from the environmental viewpoint, to divert industrial investments away from Ayutthaya to Sara Buri in order to protect Bangkok from environmental disruption and to encourage industrial agglomeration.

With these strategies, the industrial sector should grow at an average rate of 7% per year, which is environmentally acceptable. Major sources of this growth will be linkage-type assembly industries and agro-processing industries whereas cement industry is a predominant source at present.

Third, the services, including urban, distribution, marketing and tourism services. The strategies should be:

First, to develop extensive urban service activities at Sara Buri as a breeding ground of regional industrialization.

Second, to develop secondary order centers as a basis to support agriculture and agro-industrial linkages.

Third, to develop hierarchical systems of agricultural marketing and goods distribution with a focal point at the interface between inland waterway and land transport.

Fourth, to promote tourism especially at Ayutthaya, Lop Buri and Chai Nat.

With these strategies, the service sector will maintain a growth rate of 6%.

Now, what would be a likely consequence of these strategies? The total GDP of the UCR will expand by 4 times.

In the production structure, the industrial sector will increase its relative magnitude from about 25% at present up to little more than 30%, while in employment structure, the service sector will remarkably increase its relative magnitude from about 40% up to nearly 50%.

One thing we would like you to take note is a trade off between income increase and employment. Our scenario is to accelerate the income growth to the level of national average growth but to accept the continuation of net out-migration

though to a less extent in future. This would be inevitable in attaining stable and high productive agriculture under the overwhelmingly strong population attractive power of near Bangkok.

For these strategies, we propose four packages of priority projects as major development thrusts.

The first package is Integrated Pasak River Basin Development aiming at maintenance and development of upland agriculture.

The second package is the development of Greater Sara Buri Industrial Core, let me call it GSIC. It aims at the creation of a magnet to attract industrial and urban activities at the best gateway position in the UCR.

The third package is the Agro-Industrial Linkage Development aiming especially at linking the Integrated Pasak River Basin Development and GSIC. This is beneficial not only to the UCR but to other regions such as Northeast and North.

The last one is the human resource development with focus on the middle level manpower for industries, the potential local entrepreneurs and the community leaders for environmental management.

If these development actions take effect, the people of the UCR in the year 2010 would be enjoying stable farm income plus a variety of jobs in offices and factories within their commuting distance. The UCR will be attracting attention of the people not only within but also other regions such as Bangkok and Eastern Seaboard as a nice place to live in, with good environment and urban amenity.

Beyond the year 2000, this region will no more be the metroshadow as named by Dr. Phisit in his paper in 1978, but it will have been revitalized as a center of agro-industrial- and service-based businesses at the midpoint between Bangkok and inland provinces.

Now, let me come to the issue of implementing the proposed scenario. What are the keys to the implementation of regional development in the UCR?

We think they are water resource management, environmental management and urban management.

Unlike the Eastern Seaboard, where intensive public investments play key role in triggering off development, management aspect is as important as investment particularly in the UCR, where local initiative, under the central government leadership, is essential to good maintenance and fullest utilization of the basic infrastructures accumulated so far, the effective monitoring and enforcement of

environmental control and the stimulation of local business activities.

Mr. Chairman, ladies and gentlemen, I started my presentation by discussing the role of the UCR within the national space. They are food supply center, new inland industrial base and subnational distribution center.

I would like now to conclude the presentation by highlighting the roles of 7th Five-Year Plan period within the coming two decade development of this region.

I can say there are three major roles.

First is to initiate the development of Greater Sara Buri Industrial Core or the GSIC as a post-Eastern Seaboard action for the country.

Second is to take immediate actions and strengthen institutional measures for environmental control. River basin management is particularly important.

Third is to implement or expedite the projects which will bring about quick returns by their own, such as the improvement of communication and data management system in Chao Phraya Irrigation, tourism development in Ayutthaya and the early completion of major pipeline projects like Kaeng Khoy-Klong 19 Railway and petroleum products distribution center.

Lastly, let me remind that the UCR is a place which sharply reflects the national issue of keeping balance between development and environment, industry and agriculture or urban and industrial areas.

So, we believe that a success in the development and management of this region would lead to the success in many other places of the country.

Thank you very much for your attention.

NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
SESSION I AGRICULTURE AND WATER RESOURCES:
POLICIES AND PROGRAMS
PART A AGRICULTURE
Presented by Mr. Tadashi Kume

Agriculture and water resource will be discussed in this session. I will explain particularly the aspect of agriculture development. Strategies for the agricultural sector are:

- 1) strengthen capability of the farmers
 - 2) improve agricultural environment, and
 - 3) promote linkages with the industrial sector
- as described previously.

In this session, I will describe three items of

- 1) key issues,
- 2) target and strategy and
- 3) programs and projects

The policies and programs of water resource will be presented by Dr. Nakashima right after my presentation.

Now let me explain the first item of the key issues for agriculture.

Three key issues are identified. These are;

- 1) Maintaining and strengthening rice production base
- 2) Conservation of agriculture environment in conjunction with land use control
- 3) Diversification and expansion of food production in conjunction with agro-industries

The first issue is rice production base.

Rice production has been a primary economic base and a major export commodity of Thailand. A large amount of investment has been allocated for irrigation system development, improvement of production technologies and marketing systems.

The UCR, especially the Chao Phraya Delta, has been and will be one of the most significant regions for rice production. As a regional economic base, this significant role of the Upper Central Region (UCR) should be maintained.

However, for this end, an adequate measure will be required, taking into account changes in the environment of the rice market:

First, it is noted that Vietnam and Cambodia are now participating in this international market, and will be competitive rice export countries. Competitiveness of the Thai rice should be strengthened by raising the productivity.

Secondly, looking at the domestic food market demand, in response to the economical growth, the demand is being more diversified, say, less rice consumption and more demand for fat, meat and dairy products. As a result, rice consumption per head will decline. In order to meet such market change at the farm level, more crop diversification is necessary.

Thirdly, in order to develop the agricultural sector as a whole, expansion of production may be necessary. However it is generally known that there is little more available land for farm land expansion in Thailand. Therefore, increases in the production by expansion of farm land is almost impossible.

Fourthly, a labor shortage in the agriculture sector affects the rice production pattern. The farmers cultivating rice at subsistence level tend to abandon low productive paddy fields and seek cash-earning opportunities in the secondary or tertiary sectors, or they grow other crops rather than rice if it is possible. Land tenancy problem and increasing land less farmers are closely related to this issue.

Consequently, taking into account these conditions, a policy should be taken in such a way that rice field which will have high productivity with less additional investment should be maintained for enhancing the international competitiveness and meeting the domestic demands.

In other words, the principle of the policy must be the agricultural intensification of rice production in the fittest land.

Moreover, it should be noted that paddy field in the Delta area has the environmental function as a retarding basin for flood mitigation of Bangkok.

The second issue is conservation of agricultural environment.

Because of the sensitive natural environment in the tropical climate, conservation of soil and improvement of agricultural environment for stabilizing the agricultural production is the most significant especially in the areas which are located near the foot of mountains and upland area.

Land use should be controlled based on the development potential and environmental sensitivity. It is indispensable to designate the areas to be developed, conserved and preserved according to a distinct classification.

The introduction of tree crops into a land development program is effective for improvement of natural environment.

And this program should be carried out immediately.

It has to be noted that secure land title is one of the most important factors to realize this program.

Third issue is Diversification.

Diversification has been a main issue for the nation.

Diversification in the UCR can be promoted based on the expanding and diversifying domestic market demand, especially perishable food and dairy products to the Bangkok region.

Another advantage is the concentration of agro-processing industries thanks to the locational advantage of gateway to the north and north-east. With these processing industries, farmers can not only supply agricultural materials to the factories, but also get the inexpensive fertilizer made from agro-industrial wastes. This organic fertilizer will effectively contribute to the production of high value crops.

Diversification, the conservation of agricultural environment and agro-industry development are closely related and complementary each other. To maintain smooth interactions and development, the stabilization of products price, quantities, and quality is a significant factor. Improvement of post harvesting technology and marketing is indispensable.

Now let me talk the second item of target and strategy.

Target is set based upon the development strategy of

- 1) agricultural intensification,
- 2) diversification,
- 3) conservation of agricultural environment and
- 4) improvement of post harvest technology and marketing.

Agricultural GRP of the UCR is targeted to grow at 3% per annum as described in previous presentation.

Major sources of production increment will be livestock and field crops followed by fruits. But rice will still be the largest contributor to the agricultural GRP.

Development strategies of the UCR are set by zone;

In DELTA AREA, we propose intensification of rice cultivation by introduction of high yielding variety and water management.

Crop diversification is also recommended in the areas where soil is suitable and dry season irrigation water is available.

Increasing flexibility of water management is the key for this program. Detail will be discussed later in presentation of water management.

In UPLAND area, we propose the introduction of tree crops for crop diversification and improvement of agricultural environment.

Small and medium scale water resource development and on farm pond development also contribute to the diversification.

Productivity of field crop will be improved and source of income for farmers will be more stable.

Now I am going to explain the last item of programs and projects.

I will introduce three selected programs and projects today. These are

- 1) Agro-Forestry Program,
- 2) Land Consolidation Program in Upland Area and
- 3) Dairy Promotion Program.

Firstly Agro-Forestry Program

Agro-forestry program is proposed in the soil conservation area and the forest area to be preserved but already encroached.

The agro-forestry program should be carried out by Central Office of Land Consolidation in the field crop area, and by the Royal Forest Department in the reserved forest areas.

Planting of perennial crops, fruit trees, forage trees and mulberry are suitable crops to be introduced.

Due to the recent development in the soil conservation area or the illegal encroachment to the forest area, how to ensure the community participation and provision of financial support, or in other words, a credit system is essential.

This is the most urgent for the conservation of agricultural environment in the upland area.

A total of 370 thousand rai is identified as the erosion area or the potential erosion area in the UCR.

The second proposed program is Land Consolidation Program in the Upland Area.

Land consolidation has been practiced in the rice producing delta area. It provides good irrigation system, farm road and legalizes land title.

Such project could be applied to the upland cropping area to increase agricultural productivity. One of the most important factors to improving the productivity and agricultural environment in the Upland Area is the introduction of tree crops.

Tree crops can be fruit trees or forage tree, and function as the wind breaker to increase the water holding capacity of farmland and provide the shaded area suitable for vegetable and herb growing. They contribute to improving the agricultural environment and income stabilization with diversification of products.

This represents the main concept of an Integrated Farming System which we are proposing in this study. Participation of Royal Forest Department in tree crop seedling supply is important. The cooperation between Royal Forest Department and Central Office of Land Consolidation can be made effectively, if the existing procedures of the Land Consolidation project is modified in the scheme.

The third proposed program is Dairy Promotion.

The Upper Central Region has high potential for dairy production

Firstly, there are a variety of feed material sources in the UCR such as feed industries, by-products of agro-processing industries and pasture/forage trees to be grown through crop diversification both in the delta area and upland areas.

Secondary, good access to major consumption market is a large potential for the UCR to develop down stream processing industries, such as milk, fresh cream, butter, etc.

For promoting and extending dairy industries, distribution of dairy cows should be urged.

Proposed location of distribution center is Phura Phuttabat where proposed to be a central city to provide various urban services for the upland crop cultivation area.

Sufficient Milk Collecting System and Storage facilities are indispensable for supporting this program.

Now I conclude my presentation of Agriculture, Dr, Nakashima will present water resources in the UCR which is important matter for development of the region.

Thank you Mr Chairman and all the audience.

NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
SESSION I AGRICULTURE AND WATER RESOURCES:
POLICIES AND PROGRAMS
PART B WATER RESOURCES
Presented by Dr. Masahiro Nakashima

Thank you Mr. Chairman, ladies and gentlemen, Following the presentation of agriculture, I will present water resources management and development.

Well, Why do we need water resources planning for the Upper Central Region (UCR)?

This figure shows the Chao Phraya basin and location of the UCR. Water demand has been increasing at the upstream and downstream of the basin.

This figure shows the UCR and we can see the UCR consists of the delta and the upland. In the UCR, we know Chao Phraya delta is in short of water in dry season, and the upland lacks in water always. The effects of water shortage on agriculture was mentioned in the previous presentation. In the urban and industry sector, water demand is also expected to increase as shown in this figure. We can see demand increase toward the year 2010.

Now, let us ask what are the issues, in the UCR? The issues are different between the Chao Phraya delta and the upland. The first half of my presentation focuses on the Chao Phraya delta. And the second half, focuses on the upland, including Pasak basin.

Now, let's discuss the issue, strategy, and measures of water resources at the UCR delta.

As we know, the delta depends its water on the upstream dams, Sirikit and Bumipol dams. We may ask whether there is any possibility to create such an additional large dam at the upstream in the near future? Possible water resources projects have been discussed recently. However, project implementation is still uncertain for the UCR to rely on it. So, we assume the answer to the question is No. This figure shows how much water we have been getting in the delta for dry season irrigation, and we know the amount is limited.

Now, we know the issue is:
how to manage the available water, in order to cope with various demands and to facilitate diversification of agriculture. We have to find a way to manage ourselves to increase efficiency in water use.

So, our strategy to tackle the issue is to manage both water supply and demand.

Then, we can get maximum benefits out of water we have now.

In order to employ this strategy, it is necessary to adopt two kinds of approach, these are, structural measures and institutional measures. I am showing these measures in this figure. Here, I propose four structural measures of water management.

1. Improvement in the operation of Chao Phraya Irrigation Project. This can be achieved by modernizing major irrigation and telecommunication facilities.
2. Provision of intermediate storages at a level of lateral canal. This can be used as a sort of night time storage or can be used for adjusting a time lag incurred due to a large Chao Phraya Irrigation system.
3. Rehabilitation of irrigation ditches and laterals by people's participation. This is essential for maintaining the function of Chao Phraya Irrigation.
4. Implementation of land consolidation with water storage at on-farm level.

Next, I propose three institutional measures for water management.

1. Set up a Subcommittee for Chao Phraya River Basin Management under the National Water Resources Committee. This is to coordinate water related development by many agencies. The National Water Resources Committee should be upgraded for the Subcommittee to function properly.
2. Facilitate growth of water user's organization. We know this is not easy but farmer's incentives are growing due to water shortage.
3. Activate water charge collection. This is also difficult, but this is necessary particularly in dry season since water is not free. This will create a source of government budget for operation and maintenance. These structural and institutional measures will facilitate water management of both supply and demand sides. By more flexible water management, we can facilitate diversification of agriculture.

We can achieve irrigation water supply with right time and right amount, which is necessary for diversification of agriculture and which should be a condition for water charge collection. This concludes the measures to tackle the issue at the delta.

In the second half of my presentation, now, I focus on the upland.

What is the issue at the upland? For the upland area, the issue is how to stabilize the agriculture production, and how to satisfy the increasing water demands, particularly for Greater Sara Buri Industrial Core (GSIC), which is an industrial zone we are planning.

In order to tackle this issue, the strategies are:

1. Implement large scale water resources development in the Pasak river.
2. Implement medium and small scale water resources development in the upland together with water conservation measures.

Under this medium and small scale development, we propose to create a total storage of 200 million cubic meter. including a present storage of 80 million cubic meter.

As one of the measures to tackle the issue at the upland, we propose the Integrated Pasak River Basin Development Program. I will spend the rest of time on this program package. This figure shows an overview of the program.

There are three objectives in this program:

The first objective is to rehabilitate the environmental base of upland agriculture.

The second objective is to diversify agriculture and livestock production.

And the third objective is to support urban and industrial development of the GSIC by providing water of Pasak Dam.

The program package comprises the following components:

First, Pasak Dam Development

Second, Small and Medium Scale Water Resource Development

Third, On-farm Water Storage Development

Fourth, Integrated Farming System Development

And the fifth, Dairy Farming Promotion

The integrated farming system development and the dairy farming program were introduced in the agriculture sector.

So, I will focus on the water related development components.

For the water resources development, we propose an important planning concept. Pasak River has a nature which is difficult to manage and utilize, due to very high flow in rainy season and very low flow in dry season. From the national view point, a larger dam has been proposed mainly for the Bangkok Metropolitan Region (BMR). From the regional view point for the UCR, a

smaller dam may be better in order to minimize damage to the locality.

Here comes our planning concept of basin management. We consider the basin management is more beneficial than a large reservoir. There are two reasons for this.

The first reason is that basin management has the effects of decreasing a flood and increasing a low flow. Both effects will benefit the UCR as well as the BMR, in terms of flood mitigation and water supply.

The second reason is that basin management will create sound environment, which is essential for establishing sustainable agriculture at the upland. An integrated farming system, as introduced by Mr. Kume, is another form of the basin management.

Based on the planning concept of the basin management, we recommend the following water resources development.

The first component is the Pasak Dam Development. The functions of Pasak dam are flood mitigation and water supply. There are two alternatives for the Pasak dam, There are, whether we create a larger dam or a smaller dam.

We propose the Pasak dam will be planned based on the planning concept of basin management as I mentioned.

Regarding the dam site, there are two potential sites. An upstream site is Amphoe Pattana Nikom in Changwat Lopburi, and a downstream site is Amphoe Kaeng Khoy in Changwat Sara Buri. There are advantages and disadvantages for the two sites. In order to decide the dam location, engineering studies are necessary.

If a storage is made available by the Pasak dam, $10 \text{ m}^3/\text{sec}$ can be released for the UCR during the dry season. And the released water may be allocated as you can see in the figure. This water allocation is just to show you how much water the UCR expects from the Pasak dam.

The second component is small and medium water resources development. The small and medium projects should be implemented as soon as possible and as many as possible. We recommend this because such development will provide us with three kinds of benefit.

- 1) It gives quick effects on agriculture
- 2) It gives sources of water supply for the on-farm ponds
- 3) It mitigates seasonal flow fluctuations in the Pasak River.

These benefits matches the concept of basin management.

The last component is on-farm water storage development. Storage should be constructed at the on-farm level to make more water available for agriculture and to improve the agricultural environment by increasing vegetation. This development has the important effects.

They are: first, this development will stimulate farmers aspiration for small and medium scale water resource projects, which can provide water for the on-farm ponds. And secondly, it will raise the efficiency of government investment in water resources projects, since farmers have on-farm storage and they are better prepared to utilize water developed by the government.

This is the brief explanation of integrated Pasak river basin development.

That's all for my presentation of water resources planning. I did not touch on environment, which is an important aspect of water. This environmental aspect of water will be discussed tomorrow.

Thank you very much.

NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
SESSION II INDUSTRY AND ENERGY:
POLICIES AND PROGRAMS
PART A INDUSTRY
Presented by Mr. Toru Ishibashi

Thank you, Mr. Chairman.

Ladies and gentleman, as Dr. Yabuta made presentation in the morning session on overall development strategy in the UCR, objectives of the UCR development are to deepen and widen its regional economy as well as to maintain and restore its ecological environment. The industry is the most important sector as a driving force by which the agricultural sector is stabilized and the service sector is stimulated. In addition, industrialization in the UCR can strengthen regional linkage with the Bangkok Metropolitan Region (BMR), the Eastern Seaboard (ESB), the North, and the Northwest. This implies the necessity of industrial development for the UCR economy.

Now, let me start with the national industrial issues. Thai economy is showing an excellent performance by double digit growth, which is the fastest in the world. However, because of its rapid growth, Thailand is facing various difficulties such as

- 1) excessive industrial concentration in the BMR,
- 2) environmental deterioration,
- 3) dual industrial structure between local and foreign based industries, and
- 4) shortage of upper-middle class human resources.

If no quick countermeasures are taken, these difficulties would surely be the serious bottlenecks for further growth. Therefore, my presentation here focuses on how the UCR can contribute to the national sustainable growth and what direction we should take for the UCR development in view of these national difficulties.

This indicates that the present dual industrial structure has very limited linkage between local and foreign based industries. Since most of the direct foreign investments (DFI) are labor intensive industries, DFI can not be a long term driving force of industrialization as labor cost will surely increase in the future. This may imply the future industrial saturation without sufficient internal industrial organizations.

Then, what should we do?

A very possible answer is to develop the local based industries which will be supporting industries for DFI so that industrial linkage will be strengthened with a result that the Thai economy will be deepened and widened in term of

industrial structure, technologies, and market. In other words, Thailand will sooner or later finish the DFI driven export expansion stage and enter a new stage in which diversifying domestic market will play a significant role and higher Value Added can be generated by technology-oriented and less labor-intensive industries.

Bearing this national context in mind, the objective of our study has been to identify 1) how to develop the industrial linkage between DFI and local by strengthening the local based industries and maximizing benefits from DFI impacts in the UCR and 2) how to manage industrial location, considering environmental management.

TREND OF INDUSTRIAL LOCATION

Can the UCR really contribute to the national industrialization?

Latest trend in the location of industrial investment under the incentive scheme of Board of Investments (BOI) indicates that, although the leading industrial regions are the BMR and the East, some are coming to the UCR, especially in Ayutthaya, the West, and the South.

These facts indicate 1) effect of the spill-over from the BMR to the most southern part of the UCR for linkage type industries, especially, light processing and electronics/precision machining and 2) expansion of resource-oriented existing industries, especially, agro-processing and cement/ceramics. This means that the industrialization in the UCR has already started by both local and DFI, contributing to the national industrialization.

COMPARATIVE ADVANTAGES AND DISADVANTAGES OF THE UCR

What are the comparative advantages and disadvantages in the UCR, especially compared with the ESB which could provide the UCR with additional new industrial linkage?

The first comparative advantage of the UCR is its gateway location of the BMR from the Northeast and the North. Major crops such as rice, maize and cassava have been concentrated on the UCR. In addition, with reinforced linkages in future between the UCR and ESB through highway, railway and fuel energy pipelines, this gateway position could best capitalize the spread effect of the ESB development.

The second is its abundant resources of the construction materials such as cement, ceramics and marble and the agricultural products.

The third is its water potential from both surface and underground. The water quality from underground is extremely excellent for high-tech industries.

However, the UCR has suffered from the following disadvantages.

Firstly, the UCR lacks the strong urban center.

Secondly, the UCR suffers from the lack of highly educated and well-trained human resources.

Thirdly, unlike other areas surrounding the BMR, a constraint on industrial development in the UCR is the definite need to ensure non-polluted water for the people in Bangkok.

Although the UCR suffers from these serious disadvantages, we would like to stress that the UCR can conquer all of these bottlenecks. This means that the UCR has the great industrial potentials, if we can maximize its natural advantage and make a careful effort to overcome these bottlenecks.

TARGET INDUSTRIES

What industrial types are appropriate and feasible to develop in the UCR, based on its advantages and disadvantages?

We recommend the four industrial types. These are

- 1) agro-processing industries,
- 2) construction materials industries,
- 3) light-processing industries, and
- 4) electronics and precision machining.

The industrial waste from these industries can be treated economically and technologically, if industries make an appropriate effort and the public sector manages and supports them by providing industrial hazardous treatment plants, dumping sites, and incinerators.

In addition to these modern industries, we recommend to promote the village industries such as handicraft and blacksmith works. The village industries provide the additional income source to the farmers and strengthen rural economy.

TARGET

How will the UCR look like in the year 2010?

Our macro economic projection for the UCR shows that the industrial GRP and employment will expand by 4.9 times and 1.8 times toward the year 2010, respectively. As a result,

the average industrial growth rate up to 2010 in the UCR will be 7%.

STRATEGIES

What strategies should we take to attain this target?

First of all, we propose to build up the Grate Sara buri Industrial Core(GSIC) as the regional industrial urban center.

Why do we need the industrial urban center?

Because the GSIC can be a strong magnet so that industries will start to concentrate, generating industrial integration effect and avoiding industrial scattering.

Why Sara Buri?

Because of the strategic gateway location and the concentrations of agricultural and mineral resources, and existing industries, Sara Buri can attract industries in such a way jointly considering that the Chao Pia river basin be preserved as agricultural production base.

Second, we propose to intensify agro-industrial linkages by developing downstream activities of agro-processing industries. A focus should be put on the intermediate processing of major field crops such as rice, cassava, maize, soybean, and sugarcane and livestock. The screen shows that, by recyclic use of agricultural materials and wastes, agro-processing chains can be formed and cost competitiveness can be strengthened by efficient use of materials. As a result, local agricultural market, and therefore agricultural sector income, can be stabilized by the constant demand from agro-industries.

The agro-industries will be the key industries in the GSIC.

In this connection, we recommend the Agro-tech Center which provides total technological consulting services mainly for small and medium scale industries and is specialized in applied processing technologies for the major crops. In addition, we also recommend the Integrated Agro-industrial Park which is an industrial estate specialized in the agro-industries, and is equipped with transportation and storage facilities and waste water treatment plant for all factories in the Park.

Third, we propose to foster local entrepreneurship of potential businessmen such as successors of local traders or landlords, spin-outs from DFI, local craftsmen, and graduates from engineering schools. Since their managerial kowhows are not enough to run companies in the modernizing economy, we

recommend the business incubator which offers business infrastructure and managerial assistance. Business information is very limited in the UCR, compared to Bangkok which is a sort of natural business incubator, and, therefore, this has been a major bottleneck to realizing the local industrial potentials and to fully utilizing the local business opportunities. Infant companies born from business incubator will contribute to strengthen the industrial structure of the GSIC.

Forth, we recommend to take an urgent action for environmental and locational controls over rapidly dispersing investment in factories and industrial estates, especially in Ayutthaya. The direction should be shifted from Chao Pia river basin to the GSIC by using policy measures such as incentive measures by BOI and regulation of factory location by Ministry of Industry. These policy measures should be set up in a more area-specific fashion so that industrial location can be managed appropriately.

Five industrial estates are under construction in Ayutthaya now. We can not ignore these investment. As a compromise, we suggest that all newly coming factories in Ayutthaya must be located in the industrial estates and industrial waste water from these industrial estates should be strictly monitored by the government. (This issue will be discusses in more detail in the tomorrow's session on environmental management.)

In terms of development of the GSIC, both hardware and software aspects are important to implement. As for the hardware, key infrastructure should be developed under the central government leadership. As for the software, however, participation of both local government and business sector is mandatory under coordination of the central government. The above mentioned soft type three strategies, namely, agro-industrial linkage, local entrepreneurship development, and environmental management, contribute to building up the GSIC from the viewpoint of industrial promotion and management.

Fifth, we propose the Village Industry Promotion Center which extends advanced processing techniques/technologies and modern design, especially for handicraft and blacksmith works. In contrast to the handicraft industries in other regions, target here should be on high Value Added and practical use products by using advanced technologies and modern design not only for tourism market but also for export. Since there is a famous Aranjuk blacksmith village, which has been suffering from the lack of technology and marketing information, and, since there is the Royal Handicraft Project in Ayutthaya, the Center should take the joint activities with them by providing the latest technology and business information in the world. Actually, local chambers of commerce in the UCR are planning to set up such Center with a coordination of the public sector at present.

This local-private-sector-led movement should much more be encouraged.

DEVELOPMENT SCENARIO

What is the development scenario in terms of time frame and geographical location?

I will show you on the screen.

CONCLUSION

Now conclusion,

As I explained here, the UCR has the great opportunity for industrialization, by which the UCR can contribute to the sustainable industrialization in Thailand, through strengthening industrial linkages between local based industries and DFI.

However, the present industrial development pattern is not so desirable in terms of industrial structure and industrial location. The industrial promotion of local based industries should be more highlighted and the industrial direction should be shifted from Chao Phraya river basin to the GSIC.

If we will pay the significant attention from the viewpoint of industrial management, the UCR can be the first green inland industrial base in Thailand, maintaining or even expanding its function as the national food supply base.

NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
SESSION II INDUSTRY AND ENERGY:
POLICIES AND PROGRAMS
PART B ENERGY
Presented by Mr. Masumi Ishida

Thank you Mr. Chairman.

In supporting the productive sector development as mentioned just before and the envisaged enlarging of activities, the total final energy requirement for the UCR will grow by 3.3 times as much from the current level of 1.5 million tons of oil equivalent.

For the UCR energy planning, this energy requirement alone is not a major factor. Spatial energy endowment, the future perspectives of industrialization in the whole kingdom and the total national energy-mix are important underlying factors.

In further, Thailand economic structure and its momentum no longer call for mere quantitative supply planning, but needs keen attention on the efficient supply system and its management.

Well, ladies and gentlemen, before going into recommended projects, I would like to share with you the finding on the issues and strategic elements for energy sector planning in the UCR.

There are three key issues.

1. First one is the growing but limited energy consumption volume and the least to none energy endowments.

The UCR is characterized as an energy intensive region by consuming 9% of the total national energy supply while the regional population and GDP shares are 5% each.

This character stems mainly from the concentration of cement industry. The UCR holds 84% of the national cement production capacity.

This energy intensive nature of the UCR and a relatively large energy demand share over the national total will continue toward the year 2010.

In looking the inside of this aggregate future demand, however, each energy product demand is significantly small to plan energy replenishment system independently and individually.

In addition, almost no energy resources endowments in the region will make things worse.

Thus the energy planning in the UCR should be directed towards the utilization of the national development plan. This is a crucial part for the UCR energy planning.

2. Second element for planning is the diversified energy structure of the UCR.

In contrast to the national picture, the UCR holds the diversified energy structure, where lignite and coal play a major role, because of the concentration of the cement industry. The table shown by OHP clearly points out this difference.

With regard to this diversification, careful consideration should be called for. The energy balance of supply system, total national economic benefits, the security of the energy are the main stream of such consideration.

It is unclear whether the currently diversified energy supply system for the UCR brings the economic benefit to the nation as a whole or is achieving the sound energy balance. Costs associated with the environmental measures for lignite use as well as the economic cost of lignite transportation may exceed the economic benefits of lignite use.

In pursuing this diversification, energy pricing will play a very important role, especially when the new natural gas development will be on the way.

with regard to the energy security, the utilization of indigenous renewable energy resources could contribute to this aspect.

The UCR holds a potential to apply such system.

3. The third elements to be mentioned is the geographical location of the UCR.

The UCR can effectively capitalize and utilize the national energy logistic structure to the fullest extent because of its very strategic geographical location.

Toward next 5 to 10 years, national level energy sector development are anticipated, namely, the petroleum product pipeline and distribution center, the on-shore nature gas resource development and its pipeline system, and the ultra high voltage trunk transmission system.

As for the petroleum products distribution, the UCR is expected to play a strategic role to be a distribution

center, having the product pipeline from Eastern Seaboard refineries and dispatching those products to North, Northeast and the upper part of the Bangkok Metropolitan Region (BMR) in the future.

As for the natural gas pipelines system, the UCR is also a strategic point of the national natural gas pipelines system, where the on-shore and the off-shore gas will be met.

As for the electricity, the UCR is a power supply gateway to the BMR as having ultra high voltage transmission lines from primary power resources in the North and Northeastern region. Electricity demand in the UCR can easily be met with branch lines from those trunk lines.

Currently, the rapid industrial expansion in the UCR puts some difficulty in electricity supply services. However, Provincial Electricity Authority (PEA) and Electricity Generating Authority of Thailand (EGAT) have already taken remedial measures by constructing new substations in Ayutthaya and Sara Buri in line with the utilization of just mentioned national system.

Having these issues and strategic elements, the following major energy sector projects are planned and recommended.

Project Recommendation

1) Petroleum Product Pipeline

The petroleum product pipeline from Sriracha to the terminal in Sara Buri was studied by Petroleum Authority of Thailand (PTT) in 1989. We strongly endorse this study outcome. The project will also be useful in view of industrializing Greater Sara Buri Industrial Core (GSIC).

2) Natural Gas Distribution System and Natural Gas Pipeline from Nam Phong

Nam Phong gas field in Changwat Khon Kaen is ready to produce 75 Million Standard Cubic Feet Per Day (MMSCFD) of natural gas. EGAT is now constructing a combined cycle power plant at Nam Phong to absorb this natural gas.

In the future, if the gas field will attain a production capacity of 250 MMSCFD on the basis of proven reserve, it has been learnt that PTT has two alternative ideas of developing gas pipeline. Alternative 1 is a direct pipeline between Nam Phong and Bang Pakong power plants and alternative 2 is a connecting pipeline from Nam Phong to the existing pipeline at Sara Buri.

From the viewpoint of UCR development, it is recommended to set the pipeline route to be connected with the existing pipeline with distribution network.

This project will then open up new comparative advantage of the UCR with availability of pollution free, stable and easily controllable fuel source.

If it is assumed that just little over 40% of petroleum products demand in the UCR were converted to natural gas and that all of the fuel for the cement industries were converted to natural gas, the gas absorptive capacity of the UCR in 2010 will surpass the prerequisite volume for the gas pipeline.

In addition to the industrial fuel use of natural gas, a city gas possibility, especially in Sara Buri, and in GSIC area will add another opportunity for the natural gas utilization in the UCR.

3) Rice Husk Utilization

In the UCR, rice husk is potentially available for power generation. It is expected that 2.3 million tons of paddy are harvested in the UCR in 2010.

This husks at this rice production level, if utilized 100% and converted to electricity, would contribute 7% of total electricity requirement in the year 2010.

Although its energy contribution is limited, this project is said to be effective in reducing an ever increasing investment requirement in electricity sub-sector and accommodating agro industry activities.

Electricity generation from the rice husk can thus be a project opportunity where private participation is encouraged.

The movement to amend private sector power purchase regulation in 1989 is hoped to actually be applied for a case like this. Rice mill factory or agricultural cooperative could be the project executor.

In closing my presentation, I would like to express this remark again; the key for UCR energy development is to utilize its locational advantage to be realized by the new opportunities emerging from national development, and to capitalize the fading but lasting comparative advantage of agriculture.

Thank you very much for your listening.

NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
SESSION III URBANIZATION AND INFRASTRUCTURE:
POLICIES AND PROGRAMS
Presented by Mr. Katsuhide Nagayama

In this session, I will present our ideas for urban and infrastructure development in the Upper Central Region (UCR).

My presentation will focus on four topics:

- The first topic is a macro-spatial framework centering on the Bangkok Metropolis, in which the UCR may be situated with some regional functions,
- The second topic is the structure for the UCR development,
- The third topic is a strategic development named Greater Saraburi Industrial Core (GSIC), which is one of the key proposals of our study.
- Lastly, the fourth topic is the projects and programs proposed in the urban sector.

Now, let me start with the first topic of a macro-spatial framework.

1. What are the issues?

Viewing the national growth toward the future, Thailand has faced the three issues to be tackled in terms of management of the national space:

The first is how to guide an effective expansion of the Bangkok economy while eliminating diseconomies of congestion, and decentralize it over the potential regions;

The second is how to formulate a regional linkage system between accumulated industrial investments of the Eastern Sea-Board, and new industrial opportunities which will potentially appear at a regional level;

The third is how to reserve sufficient space or land for strategic development in the future with environmental considerations.

These three are significant national issues, and also regional issues, too, related to the UCR. In order to pursue the first and second issues, we need to employ a broader

spatial framework, centering on the Bangkok economy.

Decentralization of the Bangkok economy is a long-standing national issue. According to a recent data, the momentum of concentration in the inner Bangkok Area seems to cease somewhat, but this momentum is now outstretching over the Bangkok Metropolitan Region (BMR).

The BMR covers the 30-50 km radius area from the center of Bangkok and, at present, intensive urbanization is taking place over the 30 km radius zone with a ribbon development pattern mainly along three corridors. The area of BMR is quite large enough to accommodate the economy being 4 times as large as that at present. But, because of the lack of adequate infrastructures, major urbanization momentum is appearing only in these selected corridors, thereby pushing further outstretching urbanization and resulting in a rise of land prices.

(Fig. 1: Land Prices Climate)

This figure shows a climate of land prices along the major roads, based on the 1989 data of Department of Land. If land prices are regarded as an indicator representing the intensity or pressure of economic development, such pressures are predominant particularly in the eastern corridor, and has reached almost 100 km radius zone.

Looking into this figure, it is predicted that following the eastern corridor, such urbanization and economic pressures will appear in the northern corridor where these pressures are now emerging but land prices are still comparatively low even in the 50 km radius zone.

Based on these observations, the Bangkok economic space now calls for a broader perspective over the BMR. Conceptually, a 100 km radius zone can be regarded as a direct influence area which would be one-day business area, and a 200 km radius zone can be regarded as the space to integrate industrial activities related to the Bangkok economy.

(Fig. 2: Macro-Framework)

This figure shows a proposed structure within a 100-200 km radius zone centering on Bangkok. Two concepts are underlying this proposal.

One is that all potential urban growth centers are integrated and linked with each other in a fish-net pattern. This network is essential to creating an orderly space to disperse the Bangkok's industrial opportunities and to release the congestion of the Bangkok economy. A balanced development among these potential growth centers is important in this integrated structure.

The other is a concept of "Agro-Industrial Belt", which is located in the frontage of 100 km radius zone. This belt is a corridor for technological exchange and mutual linkage between agro-processing activity centers. This is connected with the Eastern Seaboard (ESB), or the gateway to international markets. This agro-industrial belt will also be a frontage of the meeting between the metropolitan economy and the agricultural economy.

(Fig. 3: Concept of Agro-Industrial Belt)

This figure may represent this concept Agro-industrial belt more visibly. The UCR is located at the center of this belt having both right and left wings.

2. The Structure of UCR Development

Next, I would like to focus on the UCR development.

The UCR is the gateway of Bangkok to North and Northeast, but the UCR's regional economy is still stagnant in general. This region is out-migrating and a labor force supplier for Bangkok at the same time.

From the urban planning point of view, the UCR has several constraints as follows:

- 1) First, the service sector economy in the UCR as a whole is quite weak. Data show that the per-capita service sector output in the UCR is less than one-sixth of that in Bangkok in terms of Baht. Consequently, the labor absorption capacity is comparatively small. The economic magnet of Bangkok is too large for the UCR to foster self-sustainable service sector.
- 2) The UCR has not provided sufficient business investment opportunities so far. Viewing the regional money flow in terms of deposit-to-credit ratio, based on the data of Bank of Thailand, that ratio in the UCR was always more than unity, say, 1.0, while that of BMR is less than the unity. This implies that money saved in the UCR is floating out and utilized in the BMR rather than in the UCR.
- 3) The UCR's gateway role can be identified merely as the mineral materials supplier and agro-products distributor. Diversified urban service functions have not been matured.

Major task imposed on the urban sector is to move these constraints first, and at the same time, the urban sector should provide sufficient job opportunities in the service

and manufacturing sectors to achieve a smooth transition from the agriculture-based to the diversified economy-based society in the process of industrialization. However, the urban sector's growth is not necessarily operational, but dependent greatly on the productive sectors' growth.

The urbanization projection was made, taking into account this dynamic system.

(Fig. 4: Urbanization Projection)

This figure shows the outcomes. The projected urban population growth rate up to 2010 will be 2.5%, compared with 0.6% in the past years. Urbanization ratio, in terms of urban population percentage, will be 37% in the year 2010. At present, that is 27%. So, urbanization in the UCR will proceed at a considerably rapid pace.

This projection holds two implications regarding social changes:

One is that agricultural employment will be decreased by around 150 thousand by 2010, and most of them will enter the urban sector's economy.

The other is that the latent out-migrants, who would otherwise migrate to Bangkok, will be absorbed in the urban sector of the UCR. This is a basis of our development scenario.

Looking into the urban population distribution in 2010, two aspects are also noted.

One is that the population of both Sara Buri and Ayutthaya cities will more than double, or more or less 150 thousand. Undoubtedly, both centers will face with serious urban problems in public services and utilities if no measures are taken, and Ayutthaya municipality will hold a critical shortage of land to accommodate the increased population.

The other is that Lam Na Rai, which is now a sanitary district in Changwat Lop Buri and the northeastern part of the UCR, will grow rapidly, and become a significant service center to support agricultural development in the Upland and the Pasak River Basin. This growth potential is sustained by progressing agricultural development in its hinterland. Such potential should be encouraged.

(Fig. 5: Human Settlement System)

Based on our evaluation of urban and human settlement centers, we propose a sub-regional settlement system, as shown in this figure.

This shows relations between urban centers and their hinterland. The UCR consists of 6 sub-regions. By this scheme, we would like to stress that (1) urban and particularly marketing services should be strengthened in each sub-regional center, and (2) the 15 secondary order centers identified here will play quite an important intermediate role to support agricultural diversification activities.

Each sub-center also has to have its own direction of development so as to activate its existing function. For instance,

- Sub-regional wholesale food market development in Sara Buri, Ang Thong and Sing Buri;
- Goods distribution center development in Sara Buri and Ang Thong;
- Higher social services and educational development in Lop Buri and Sara Buri, and
- Tourism Development in Ayutthaya, Lop Buri and Chai Nat;

3. Strategic Development of the GSIC

Now, ladies, and Gentlemen,
I would like to highlight a more specific development image.

As a strategic regional development in the UCR, we would like to propose an integrated urban and industrial development, noting the growth potentials in Sara Buri and its vicinities. We call it "Greater Sara Buri Industrial Core", say, "GSIC" in short.

(Fig. 6: GSIC concept)

Why do we propose such an integrated development like GSIC? The reasons are given by the following five:

- 1) First, the country is calling for some strong economic magnets outside the BMR as centers to facilitate decentralization of Bangkok, and as inland supporting bases for the Eastern Sea-Board to maximize its spread effect. Of course, there exist other potential magnets such as Suphanburi and Chachoengsao. One of such magnets, but with a great potential, is the GSIC.
- 2) Second, the UCR can probably be a breeding ground for agro-processing agglomeration, which would be essential for the next generation of industrialization, targeting the domestic market as well as international markets. Taking into account its locational advantage, the UCR is sitting on the best seat for this new industrial development.

- 3) Third, the UCR needs a urban service center sufficiently capable of inviting industrial and business opportunities, independent of the Bangkok economy. A strategically strong push is necessary to foster such an urban core in a targeted area.
- 4) Forth, industrialization and urbanization have been calling for thoughtful environmental measures. This requirement is getting more crucial. To meet this end, the development pattern needs to be shifted from a spontaneous and fragmented to a deliberate and integrated one. A designated areal development like GSIC is an effective strategy.
- 5) Fifth, in order to accelerate regional development, Thai government has to explore a localized system, unlike the centralized investment system such as the ESB development, This GSIC development could be a model of this national challenge.

In addition to these five reasonings in the national and regional development contexts, there is another reason for the UCR itself, that is, the UCR has to have a structure so as to maximize benefits from on-going or planned national projects such as the Pasak River Basin Development and the Energy and Transport Infrastructures development. The GSIC is the ground for building such a structure.

Based on these considerations, we propose the GSIC as a base of integrated development. However, you may raise a question:

Why Sara Buri? Why other areas are not?

The answer can be derived from three viewpoints:

- (1) the environment,
- (2) urban and hinterland development
- (3) its transport network.

No other places in the UCR are better than Sara Buri and its surrounding areas in terms of natural conditions such as no flooding, stably available water and little environmental impacts. Ayutthaya is environmentally too sensitive to meet these conditions.

From the urban planning point of view, Sara Buri has better access than elsewhere to the industrial base of the ESB as well as the markets of Bangkok, North and Northeast. The agglomeration of urban services in the city of Sara Buri is not necessarily sufficient enough to enjoy the scale of economy at present, but has a potential to be so in the future. More importantly, the Sara Buri city will be able to accept spatial expansion of urbanization with less environmental impacts.

The GSIC is not a single core, but consists of four sub-cores, say, Sara Buri, Kaeng Khoi, Nong Kae and Tha Rua/Tha Luang.

Sara Buri is the central core having various metropolitan services to support agricultural and industrial development in the UCR. Goods collection and distribution function, and a marketing function may be encouraged. The most important role of this sub-core is a business incubator fostering local entrepreneurship.

Kaeng Khoi Sub-core is a crossroad of the UCR and the ESB, having a new railway link. Inter-modal transport facilities such as inland depot and container yard are to be developed. In addition to the existing mineral resource-based industries, linkage-type industries may be located in this sub-core.

Nong Khae sub-core is a front to receive influences of the Bangkok economy. Inland-oriented industries will spill over and be relocated from the Bangkok Metropolitan Region.

Tha Rua/ Tha Luang sub-core will be an industrial center where the new technologies and agriculture products meet together, thereby producing an agro-industrial linkage. A more diversified industries will be located in relation to an existing steel-mill factory.

(Fig. 7: Function of GSIC)

This figure shows a locational pattern of major industrial and urban facilities to be developed, based on the concept of sub-cores' functions I described. I am sorry, but I have no time to explain this in detail. Since we have the same figure in the seminar paper in your hand, please take a look at that one. Only one thing I would like you to remind is that the GSIC should be composed of multi-functions, not a single industrial function.

(Fig. 8 : GSIC area)

This GSIC covers 8 Amphoes of which 6 are in Changwat Sara Buri and 2 in Changwat Ayutthaya with more than 2 thousand sq. km, or 14% of the UCR. The present population is 390 thousand and in future, the year 2010, the population will be more than 600 thousand.

Next, let me show the basic ideas of transport network.

(Fig.6, again)

The primary concern is with the inter-regional highway linkage, including:

- One: Major arterial links with the Bangkok, the ESB, and the hinterland of North and Northeast Region.
- Two: Arterial links with Sub-regional urban centers, or at least Changwat centers.
- Three: The East-West Link as a backbone of the GSIC and a part of the Agro-Industrial Belt in the macro-spatial framework.

As a connection with the ESB, we propose a new arterial link starting from Tha Rua/Tha Luang Sub-core through Nong Khae. This link will be a part of an out-outer ring of Bangkok.

In the sub-regional center's network, a new link between Ayutthaya and Lop Buri is proposed.

As for the east-west link, we consider a double corridor: One is a major link between Ang Thong and Sara Buri, which can connect directly with the national highway route No.2, by-passing Sara Buri City. The other is a link between Pa Mok and Nong Khae through Tha Rua/Tha Luang sub-core, which will have connections with Suphanburi in the west wing and Rout 33 in the east wing.

Regarding railway, given a new rail link between Khaen Khoi and Klong Sip Kao, the GSIC will have a multi-directional railway linkage. This will benefit the UCR industrial activities. In the medium and long run, this railway system should be modernized and improved for passengers' commuting lines especially with Bangkok. In a more long-term perspective, a rapid transit system may be explored to connect between the GSIC and Bangkok as a part of Metropolitan Rail System.

Inland water transport, especially on the Pasak River, has been and will be a significant transportation for specific bulky agro-products such as rice, maize, and tapioca for the time-being. We cannot identify the viability of additional large-scale public investment to facilitate this transportation. However, its importance should continuously be noted and maintained. Access roads to the water way should be more facilitated.

Another key project is urban development of the Sara Buri City as a regional urban center.

(Fig. 9: Sara Buri City Development)

This picture shows a proposal of conceptual urban structure targeting the year 2010. The Sara Buri urbanized area will expand beyond the present municipal jurisdiction. Therefore, appropriate administrative measures to coordinate the local authorities concerned should be taken into account. This

local administrative issue will be discussed in the tomorrow's session in depth.

7. Projects and Programs

Based on all discussions presented here, we come up with recommendations for projects and programs in the urban sector.

We propose three packages of urban projects:

The first package is the Sara Buri Industrial Core development.

The second package is "Basic Urban Needs Projects in sub-regional centers such as Ayutthaya, Sing Buri, Ang Thong, Lop Buri and Chai Nat.

The third one is "Secondary Order Center Development Project"

Regarding the GSIC development, we need to build a thoughtful investment program and guidelines in a long-term perspective, articulating a system of allocating responsibilities for implementation among the central government, local authorities and the private sector.

A strong central government's initiation is necessary, but at the same time, a localized management system should ultimately be established for the local authorities to perform their responsibilities. In order to enhance local authorities' implementing capability in this connection, some arrangements for local financial institution to broaden its financial base are also required.

The urgent tasks are infrastructure projects to support the industrial location in the GSIC, and urban utility system projects to meet the expected urbanization.

Next, regarding sub-regional center development, the highest priority project is to eliminate the flood problem especially in the centers located along the Chao Phraya River.

Urban environmental projects such as waste water and solid waste treatment systems projects should be accelerated. The concept of "Basic Urban Needs" may be employed for a guideline of sub-regional urban center development.

In order to encourage the market functions, feeder access roads to the markets are necessary to be improved.

Tourism development in Ayutthaya, as a regional tourism center, should be urged, taking a favorable timing and climate at present.

In concluding my presentation, I would like to make a summary.

- 1) In order to formulate a deliberate urban system, a broader Bangkok metropolitan framework is necessary. Agro-Industrial Belt outside the BMR and connecting to the ESB function may be considered for integration of agriculture and industry.
- 2) The UCR should be developed so as to make use of its location advantage as a gateway. For this end, the urban services and marketing functions are needed to be strengthened. A must is basic urban needs development such as flood protection and urban utilities in sub-regional centers. Tourism development as an economic stimulus should be emphasized especially in Ayutthaya followed by Lop Buri and Chai Nat.
- 3) In order to support agricultural diversification, secondary order center development should be much more promoted.
- 4) The Sara Buri Industrial Core development should strategically be put into action, in association with urban and other national projects. The central government's initiation is crucial for this development, but a localized development management system should be explored.

Thank you for your kind attention.

NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
SESSION IV ENVIRONMENTAL MANAGEMENT AND DEVELOPMENT
ADMINISTRATION: POLICIES AND PROGRAMS
PART A ENVIRONMENTAL MANAGEMENT
Presented by Mr. Tadashi Kume

Mr. Chairman and honorable guests,

Based on the yesterday's presentations and discussions mainly on what to do with the Upper Central Region (UCR), I would like to present our proposals for how to realize the development scenario.

Our focus is on the environmental management, which I am going to discuss now, and the development administration particularly for urban management, which will be discussed by Mr. Nagayama later.

Environment is the most broad subject covering natural, social, cultural environment and so on.

The matters to be discussed is mainly on the natural environment with an emphasis on the water, because water in the Chao Phraya River Basin is the most critical element when you talk about the environment of the UCR.

My discussion consists of three items of role, issues and recommendations.

(ROLE)

Environment of the UCR cannot be understood and planned without reference to a system of ecological environment of the Chao Phraya River Basin as a whole. From the environmental viewpoint, main roles of the UCR in Chao Phraya River Basin are:

- 1) Production of rice by using water from Chao Phraya River and its tributaries.
- 2) Water supply for the Bangkok Metropolitan Region (BMR). This is quite a distinct role of the UCR compared with other regions surrounding the BMR.
- 3) The flood retarding role. If flood retarding capacity decreases in the UCR, the government would have to spend much more money for flood mitigation in the BMR.

(ISSUES)

Critical issues are identified in accordance with the role of Chao Phraya Basin in UCR. As described in previous sessions, the UCR is categorized in two parts of DELTA area and UPLAND area.

In Chao Phraya River Delta;

The critical problem is the water quality in the Chao Phraya River. The water quality of Chao Phraya River varies by location: from 2 ppm to 10 ppm COD. In general, the level of contamination has already reached the maximum level allowed by the Office of National Environmental Board (ONEB). So, that no more pollution can be allowed. If any measures are not taken now, serious water pollution would occur and affect the water supply not only in the UCR but also in the BMR. Therefore, appropriate measures to protect the Chao Phraya River Basin, especially the delta area are urgent.

In the upland area, the critical issues are inappropriate land use and disorderly development. From the environmental point of view, the sloping land should be protected from excessive use for field crops. Otherwise, soil erosion would continue to expand and soil productivity would gradually deteriorate due to the inappropriate monoculture.

To keep the Chao Phraya River basin environmentally sound, land use must be controlled. Agriculture diversification should be encouraged to maintain soil fertility so as not to encourage excessive use of chemical fertilizers.

Now, in accordance with consideration of environment of the UCR as a part of whole Chao Phraya Basin. We prepared recommendations based on the ISSUES and ROLE of the UCR, I have described now. Recommendations are consist of three subjects of

- (1) Technical measure,
- (2) Environmental Management and
- (3) Institutional Arrangement

We propose Technical Measures against Industrialization, Agriculture and Urban and Human settlement separately.

Measures to be taken for Environment and Industrialization are;

- 1) Expansion of restricted zone around Sam Lae water intake is recommended especially along the areas adjacent to rivers and in flooding zone.
- 2) Existing factories should be obliged to install hazardous treatment facility in Ayutthaya and at the same time monitoring and enforcement measure should be provided as a special regulation. Small industries should be guided to relocate in industrial estate.
- 3) The use of underground water in Delta area of Ayutthaya, Sing Buri, Ang Thong and Chai Nat should be restricted. New location of industries are promoted to the new industry core in Sara Buri with sufficient water supply.

- 4) Industrial air pollution in Sara Buri can virtually be solved by enforcing installation of dust-collecting systems in cement factories, and relocating the settlements adjacent of quarry sites.

Measures to be taken for Environment and Agriculture are;

- 1) Regarding the agricultural waste water from livestock farm and large scale fish ponds should be treated by an effective and economical biological treatment method.
- 2) In long-term, an environmental sound new upland farming system should be promoted

Measures to be taken for Urban and Human Settlement

- 1) Domestic waste water treatment is the single most important measure to decrease the pollution load on the Chao Phraya River. The Public Works Department has developed plans for waste water disposal management in 65 cities. In line with this basic policy of PWD, we recommend that the cities of Ayutthaya, Sara Buri, and Lop Buri should develop sewage treatment systems at an early stage. It is important to expand implementing capability of existing relevant organizations
- 2) Solid waste collection and treatment system is another important measure for urban area. We recommend a conventional sanitary land-fill method with sufficient protection against pollution at this moment.

Insineration is another option, however, there is a study which shows it is much more costly than land fill even in Bangkok at present. Acquisition of space for land-fill is crucial.

The second subject is Environmental Management

We propose 3 items for environmental management. there are;

- (1) Monitoring and Environmental Administration
- (2) Land Use Zoning and Control
- (3) Education for Environmental Awareness

Now, Monitoring and Environmental Administration

Existing environmental regulations for water quality standards are not fully working due to the lack of effective monitoring systems at the local level, Weak coordinating power of ONEB, and the inadequate manpower and technical capabilities in the environmental administration at both central and local levels.

We propose followings;

- 1) Re-organize the Chao Phraya River Environment Policy Committee to expand its area of jurisdiction to cover the whole Chao Phraya River basin.
- 2) Establishment of Local Environmental Monitoring Stations with sufficient personnel and equipment, in collaboration with Ministry of health, Ministry of Industries, Board of Investments, ONEB, the local governments, and academic institutes. Especially the role of Ministry of Health is important at local level.
- 3) Strengthening, the functions of local governments (both Changwat and municipalities) in monitoring the environmental influences and change, and in implementing appropriate corrective measures. In parallel, strengthening the ONEB's function.

The Next is Land Use Control

Disorderly development and resulting environmental deterioration, including pollution is taking place especially outside the municipalities since there is no consistent legislative measures to control land use.

A NATIONAL LAND USE GUIDELINE is necessary to be built as soon as possible. This guideline should have legal authority. We propose the establishment of a central office for land use management to coordinate the land development by various agencies and to prepare land use guidelines. Land use zoning should consist of the following four major categories.

Preservation area which should be designated to preserve and rehabilitate the environment.

Conservation area which has development potentials but are environmentally sensitive.

Historical and cultural conservation area for restricting industrialization and urbanization.

Development area in which district zoning of urban development area and agricultural development area is essential.

The third item is Education for environmental awareness

It should be emphasized that Necessity of social education and enlightening of people for a better environment. Target groups are the local residents, school children and business people. Attention should also be paid to encouragement of cooperation with the NGO's and religious activities.

Now, I am going to explain the last subject "Institutional Arrangement"

In order for the environmental management to be built in the overall development policies, it is recommended to:

- 1) study possible application of pollutor-pay-principle from the viewpoint of private resources mobilization and
- 2) strengthen administrative, technical and financial capabilities of the local authorities to monitor, enforce and plan environmental management.

In ultimate end a public body should be established to be responsible for coordination between planning and implementing agencies for the environment and development in the whole Chao Phraya Basin.

This is all my presentation. From now My Nagayama will discuss another important issue of development management.

Thank you very much.

NATIONAL SEMINAR ON UPPER CENTRAL REGION DEVELOPMENT
SESSION IV ENVIRONMENTAL MANAGEMENT AND DEVELOPMENT
ADMINISTRATION: POLICIES AND PROGRAMS
PART B DEVELOPMENT ADMINISTRATION
Presented by Mr. Katsuhide Nagayama

Mr. Chairman and honorable guests, our focus is on the development administration particularly for urban management.

We can say that regional development administration has sufficiently been working under predominantly rural situation of the country, and this has been a base of favourable development of Thailand until now.

An emerging critical issue, however, is that such administration is unlikely to fully fit to the new situation where rapid industrial and urban expansion has started to take place over the traditional rural areas. The Upper Central Region (UCR) is a typical case in point. This is why we would like to draw your attention to urban management.

Regarding the urban management, there are three major issues which are interrelated :

- 1) How to organize a consistent multi-level system for planning administration, incorporating the inter-Changwat and inter-municipal coordination.
- 2) How to overcome limited urban management measures available for local authorities.
- 3) How to strengthen a local financial base.

Let me discuss these issues one by one.

First regarding Restructuring of Local Planning Administration, we believe this is an important premise for improving the urban management.

The present centralized system of planning administration is effective in the utilization of limited technical resources and the standardization of quality of plans. But, at the same time, we can pinpoint a number of problems, too.

- 1) Since all plans are virtually given from the top, the local authorities tend to always call for central government's supports.
- 2) Locally significant aspects tend to be overlooked in such plans even if an appropriate direction is proposed from the national viewpoints.

- 3) Such a centralized system tends to discourage the local authorities' planning minds and to limit their opportunities of planning practice.
- 4) The present system does not provide local officials to coordinate with neighboring local authorities.
- 5) The centralized planning system hardly stimulate the competition among local authorities, which should be the source of innovative development management.

The last two points will particularly be a serious drawback to regional industrialization. In order to overcome these problems, we recommend an integrated planning system to be established in the long run.

First of all, Thailand needs longer-term perspectives with a 20-years time framework for national development guidelines, on the basis of major issues identified through the accumulation of past Five-Year Plan experiences.

Then, under this national indicative framework, master plans should be prepared at the levels of Changwat, municipality and Amphoe with about 10 years time perspective. A conceptual structure of the proposed planning system is illustrated in Fig. 1.

Key to the local planning is a substantial effort to strengthen and increase planners at the local level through joint planning of experienced national planners and the local planners. "Regional Planning Operation Center (REPOC)" is proposed to be organized by NESDB and Department of Town and Country Planning (DTCP) for providing local authorities with the national policy directions and technical support.

Now, let me come to the second issue of Key Administrative Measures for Urban Management.

Local authority, especially municipality, has to respond to financial and technical requirements to cope with urbanization. Under extensive urbanization, however, municipal administrations find difficulties in meeting Basic Urban Needs (BUNs).

To minimize the difficulties, we propose three administrative measures especially for the UCR.

1. Organizing Local Authorities Associations

In rapidly urbanizing area, municipalities can hardly find pieces of the land for public services such as solid waste dumping sites within their boundaries. Since population size of municipalities is so small that they can hardly make projects of public services

economically feasible due to a lack of the economies of scale.

In order to cope with this situation, "Local Authorities Association (LAA)" is proposed. Major functions of the LAA are to coordinate urban management and attain the economies of scale in such a way that all members (local authorities) can solve their common problems for specific targets, and, collect their funds to save the administrative costs for operation and maintenance.

We recommend the LAA be set up in strategic development areas such as "Greater Sara Buri Industrial Core (GSIC)" as well as in rapidly urbanizing areas such as Ayutthaya Municipality and its surroundings.

2. Adjusting Municipal Boundaries

Adjusting municipal boundaries is to meet with their substantial urbanized area and to make local authorities get "economies of scale" in their financial base. Ayutthaya and Sara Buri will need this arrangement sooner or later, under the explicit instruction by the central government, Ministry of Interior in particular.

3. Project-type-specific Investment Sharing between local authorities and the Central Government

The local authorities must fully or partially be responsible for managing the facilities so that they may benefit local people as much as possible. Instead of being fully subsidized, local authority has to pay investment cost in accordance with the benefit it receives. A recommendation can be made, i.e., an investment-sharing system should be employed between the central and local authorities for selected types of project with the provision of a financial institution suitable for urban projects. This system is effective not only for reducing the central government's financial burdens, but also for strengthening the local authorities' financial base.

Related very much with this second issue is the third issue of Strengthening Local Authority Finance.

Financial base of Thai local authorities has been very shallow and narrow. Recent trend in the revenue and expenditure of 14 municipalities within the UCR suggests the following points:

Regular revenues have favorably increased. However, the regular expenditure that includes personnel, maintenance and other expenses has also increased. "Financial capacity", therefore, does not show much increase. The municipalities

have no more than 3 million baht of financial capacity on average.

In view of the increasing needs of local authorities to carry out multi-year projects such as sewerage, establishment of a new institution is recommended. Let us call it "Urban and Environmental Development Fund (UEDF)"

A major objective of this UEDF is to supply low-cost and long-term loans as a completely independent and purely financial institution for development purpose, under the supervision of the Ministry of Finance. Scope for UEDF's finance should be flexible and cover the local projects and undertakings of critical needs such as :

- (1) Infrastructure development projects
- (2) Municipal enterprises/businesses
- (3) Public and private joint projects
- (4) Private investment in the equipment and facilities for environmental protection (particularly small- and medium-scale industries) and
- (5) Land acquisition for public service facilities

Financial sources of the UEDF could come from various forms of contributions by:

- (1) local authorities;
- (2) the central government;
- (3) the Municipal Development Fund (MDF);
- (4) the private financial sector; and
- (5) foreign and international financial sources.

The UEDF may also extend its service in municipal bond floatation for local authorities, when local authorities gain financial credibility in the security market.

The other indispensable side of this lending scheme proposal is Reform and Rearrangement of local taxation. Some of the important points are :

- (1) Improvement of tax collection administration especially through up-to-date assessment of property value. especially through up-to-date assessment of property value.
- (2) Modification of ongoing tax system such as the land and building tax base to be expanded to include owner-occupied houses, and the tax roll of integrating land and other property taxes.
- (3) Introduction of new taxes such as "Urban Betterment Levy Tax" linked with property tax for the purpose of urban development and planning.
- (4) Another recommendation specific to a situation of the UCR is Compensation Grant based on Resource Tax. This grant is meant to compensate for the extraction of local natural/mining resources upon which the

central government secures its revenue. The UCR is based largely on quarrying activities and suffering from environmental deterioration. This grant should be earmarked for rehabilitation of the environment.

Now, in addition to these three major issues, we cannot but touch of an issue of rapidly growing seriousness. That is: Most local authorities are facing difficulties in the land acquisition for project implementation due to rising land prices. Since the jurisdiction of municipality is limited to a relatively small area in general, once the municipality experienced rapid urbanization, available space with a comparatively low price of land tends to be extremely limited within its jurisdiction.

Land acquisition by the public sector must be rendered at a bear market price reduced by speculated portion. A possible way to resolve this problem is to prepare an official guideline for land prices and land transactions. It should be authorized, publicized among people and periodically amended. This guideline presents standard prices for land transaction and must be based on objective appraisals of "market land prices" in the municipality by officially qualified appraisers.

Regarding the limited land availability within municipalities, arrangement should be promoted so that municipalities may provide the land outside their jurisdiction in coordination with the neighboring local authorities having common interest in public services. Organizing of "Local Authorities Association" should be an effective measure in this connection, too.

Now, ladies and gentlemen, before concluding my presentation, I would like to stress again the importance of local-based approach to regional development. Let us look at the local, listen to the local, further discuss new ideas for development, and put them into action.

Thank you for your attention.

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