

3.7.2 Major Development Plans by Sector

(1) Agricultural Sector

Major agriculture-related projects (in execution and some still without budget) are listed hereinafter.

1. Javaés Project
2. Project of Irrigated Agriculture of Bico do Papagaio
3. Hydro-agriculture use in the State of Tocantins
4. Jalapão (Savannah) Project
5. Tocantins Project
6. Perforation of Deep Well Project
7. Araguatins Irrigation Project
8. Sustainable Development Program of Lowlands of the Legal Amazon
9. Development Project of Agriculture Nucleus and Small Farmers
10. Rural Development Project in São Felix do Tocantins
11. Coordination of Cooperative and Association Activities Support
12. Other

(2) Electric Supply Network

1) Electric Supply Projects

a) Power Supply Situation

Electric energy in the state of Tocantins is mainly generated through hydroelectric and thermic power stations, managed by CELTINS - Tocantins State Electrical Company.

At present, demands of electric energy of Tocantins State is increasing, but the state only covers 40% of the energy demand, being necessary to import the balance from the north/northeast system (Tucuruí) and south/central (Furnas).

The projection of the energy demand up to the year 2005 indicates that the proportion of the energy supply against its demand in Tocantins would be evolved in the range of 30 - 40 % up to 2000 and then would drop to below 30% from 2001 on.

b) Construction of Power Station Projects

The features of the power station development projects is given in the Table 6-2-1. As shown in this table, most of the power stations are constructed without reservoir, therefore they are used for generation of energy only.

2) Rural Electrification

In 1995 the state of Tocantins elaborated the PROMA (Environment Protection Program

through Rural Development) which contains three sub-projects: construction of hydroelectric power stations, installation of low tension LT and rural electrification for areas where are actually attended by diesel generators.

The cost of PERTINS reaches US\$ 100 million, of which US\$68,720 thousand shall be financed from the Eximbank of Japan. The project shall attend 9,000 rural families through the installation of 18,000 km of LT and shall be executed between 1997 and 1999.

The purpose of this project is to distribute electric energy to the isolated locations, at present supplied by diesel generators. The cost of the sub-project shall be borne by the state government and by beneficiaries; the former shall bear the cost of materials and equipment, while the latter shall cover the cost of manpower.

(3) Tourism Development

Tourism activity of the state of Tocantins is not well developed. For the promotion of this sector, the government offers preferential measures of tax exemption in order to reach a desirable development. The potential regions for tourism development are as listed below:

- Region of Aurora do Tocantins, Rio Azul
- Region of Taguatinga, Cachoeira do Registro
- Region of Natividade and Igreja dos Pretos
- Region of the Araguaia and Tocantins river borders
- Lagoa da Confusão
- Paranã, thermal waters of Serra das Caldas
- Bananal Island
- Region of Cantão, tourist area of Araguaia
- Garganta do Inferno - Dianópolis
- Region of Jalapão

Besides these programs, tourist centers are being installed in the regions of Bananal Island, Cantão and Coco Javaés in order to develop the Ecological Tourism.

(4) Agro-industry

1) Export Processing Zone in Araguaia

The Export Processing Zone (ZPE) in Araguaia, created by the Federal Decree No.98,123 of September 6th, 1989, is a mechanism aimed at the regional economic development through the establishment of export-connected enterprises, with an extremely favorable fiscal and foreign-exchange treatment. It is located on the Belém-Brasília roadside and it shall be interconnected by a secondary road up to the North-South Railway.

The ZPE holds a surface area of 300 ha, and has a plan to expand up to 1,000 ha in the future. Although an installation of ZPE office was completed in 1996, no factory has established up to date. Some appropriate measures that meet the current demand are keenly

requested because the world trade circumstances has been greatly changed since Decree for ZPE was established in 1989.

2) Economic development promotion (PROSPERAR)

PROSPERAR is the incentive program for the economic development giving technical and financial support to whatever economic activities which may promote agricultural, cattle-raising, industrial, commercial and tourism development.

The incentive given under the PROSPERAR is to give grace period in payment of the ICMS for the period ranging from 10 to 15 years. This incentive was attractive at the start of the program when high rate of inflation prevailed throughout the country, but is not the case nowadays when the said high rate of inflation has been depressed. In such circumstances, new incentives to attract more investors to the state are required.

Cities of Araguaína, Grupi, Paraiso do Tocantins, Porto Nacional and Palmas established an industrial zone where the infrastructure such as electricity supply, water supply and sewage, city-facilities are equipped in order. And these municipals treat the advanced companies into a industrial zone for local-tax exemption for 10 years under PROSPERAR.

PROSPERAR started in 1989 has applied to 39 companies by 1996, including companies related to agricultural products. 15 companies are applying for PROSPERAR at present.

(5) Human Resources Development

The Federal Government is promoting the human resources development under the PLANFOR as one of 42 priority projects included in the Multi-annual Plan 1996-99.

The PLANFOR is divided into two types of activities: special projects and qualification and re-qualification projects. The special projects are studies, researches and conceptual and methodological events supporting the qualification and re-qualification projects. The other one is composed of courses and training in several fields, aiming the employability of the trainees.

(6) Social Welfare

The social welfare and assistance for the population, at the national level, is carried out by INSS. Social welfare services by INSS cover four fields: free medical services, unemployment pay, retirement pension and old-age pension. There are INSS local offices established in major cities and they attend retired persons and unemployed of all economy sectors, as commerce workers, industry workers, rural workers, miners, etc. At the state level, there is the IPERTINS (Institute of Social Welfare of the Tocantins State) which gives support only to state government employees.

Presently, INSS's offices in the Tocantins State belong to the Goiás State Commission, and there are not many local offices in the State. Consequently, it produces procedures

inconvenience. Urgent establishment of the Tocantins State Commission and of more local offices are demanded from the workers organizations.

3.8 Identification of Prevailing Potentials and Constraints

3.8.1 Conditions of the State Agricultural Sector and Agricultural Producers

The territorial extension of the state is 278 thousand km², which is inhabited by 1,906 thousand people (1996). The annual precipitation ranges from 1,200 mm to 2,200 mm, which enables crop production without depending on irrigation system in the rainy season. Owing to this large amount of precipitation, water resources at the Araguaia-Tocantins fluvial system are abundant and thus their use for development is technically viable. Land resources, on the other hand, are also recognized to have high potential supported by the fact that close to 36% of them are represented by arable land (the proportion is elevated to 52% if land suitable for grazing is included).

The agricultural producers in the state can be divided conveniently into three strata: large holders, medium/small holders and marginal/landless peasant and the farming practice engaged by respective stratum are as follows; the large holders are represented by livestock farmers who predominately carry out extensive cattle raising with low productivity per unit of land; the medium/small holders, who are few in number, cultivate mainly grains and fruits; marginal/landless peasant live on subsistence farming and their living conditions are extremely inferior without being provided with adequate social services such as electricity, water supply, etc.

3.8.2 External Circumstances Besetting the Agricultural Sector

(1) Factors Confronting Agricultural Production in Tocantins

Affected by a recent agricultural reform policy imposed by the federal government, the agricultural sector in Brazil has shown a sign of stagnation for a couple of years; nevertheless, the output of grains has attained growth despite downward trend of the cultivated area. This fact is related to the abandonment of agricultural production among financially handicapped small farmers and it is also the case in Tocantins. The prevailing situation confronting the agricultural sector in the state may be summarized in the following manner:

1. Producers tend to abandon farming due to depressed or negative farm income derived from an elevated production cost in association with inferior productivity.
2. Accumulated debts of rural credit discourage producers to continue farm operation.
3. Decreased investment in the agricultural investment.
4. Phasing out of the federal government of intervention in the agricultural sector affects competitiveness of small and marginal farmers.

5. Decline of farmland price stemmed from dull performance of the agricultural sector.
6. Upward trend of grains price

(2) PPA of the Federal Government

The federal Government in its PPA proposes, besides economic stabilization policy, to accelerate development of infrastructure which constitutes a catalyst for future development of the country's economic sector. The development of the Central-Northern Transportation Corridor which is expected to contribute greatly to the economic development of the state is contemplated among development project of the PPA.

In the agricultural sector, the federal government's policy focuses on the following: introduction of the option contract system for purchase of crops in substitute for the minimum price program, phasing out of public agencies' participation in the rural credit, and revision of the premium for the rural insurance system. These government policies aims to introduce a market-oriented agriculture, but it does not mean that the government forsakes financially handicapped small farmers and marginal peasants; the government intends to supports these farmers with an enforcement of preferential programs like PRONAF, FINAM and FNO. In addition, an emphasis is laid within the government agricultural policies on rationalization of agricultural research and extension system, development of marketing system of agricultural produce, improvement of animal and plant disease control system, incentives for participation of the private sector in the marketing of agro-products. Through implementation of these policies, it is anticipated that the agricultural sector in Tocantins would be benefited in the following aspects, namely:

1. Development of transport network (Central-Northern Transportation Corridor, with an expectation for termination of North-South Railroads in 1998).
2. Reduction of premium of rural insurance system through establishment of priority area for crops.
3. Improvement of animal health protection system.
4. Incentives to invite an investment of external sector in the agricultural sector (caipira 63).
5. Social guarantee plan (PRONAF, etc.).
6. Regional imbalance alleviation policy

By implementing the above policies, the following positive impacts are expected.

1. Comparative advantage for exportation of agricultural produces (soybeans, meats and rice).
2. Consolidation of private sector's investment, both foreign and domestic.
3. To facilitate an introduction of finance for regional development (FINAM, FNO, etc.).

4. To facilitate an application of PRONAF to small farmers.

(3) Trend of Federal Government's Agricultural Policy

The agricultural production in Brazil is largely affected by the agricultural and economic policies of the federal government, in particular, the rural credit, minimum price program and rural insurance.

(4) PPA of the Tocantins State Government

Objectives of the PPA of the Tocantins State Government are as follows:

1. Accomplishment of sustainable development
2. Decentralization
3. Social development and fulfillment of welfare among regional population
4. Environmental conservation

Specific policies in favor of the agricultural sector are as follows :

1. Manpower development to be engaged in research of agricultural technology
2. Improvement of road network to complement the Central-Northern Transportation Corridor
3. Promotion of irrigation project in "cerrado" areas
4. Implementation of Lageado UHE Project with participation of private sector
5. Fostering of agricultural production nucleus
6. Modernization of the marketing sector
7. Upgrading of basic education system and extension of vocational training services
8. Conversion of conventional farming into advanced one

These policies will have positive impact on development of the agricultural sector.

3.8.3 Incentives for Investment

The future agricultural development of the Tocantins State depends on how a large extension of uncultivated lands can be used, which are left at present in vain. To attain this target, it is important to invite producers and agro-business entrepreneurs from outside the state. For inviting this private sector, it is a pre-condition to lay a consolidated foundation of economic structure and living circumstances.

The existence of vast uncultivated lands means that these lands are available with cheaper cost, which can attract investors. At the same time, despite the absolute population is scarce in comparison with territorial extension, the proportion of young people is relatively high and these people, under the circumstances of under-development of labor-intensive agriculture and industry, constitute potential labor force to be employed by the industrial sector to be established.

For inviting more investment, it is a prerequisite that the transport infrastructure should be consolidated; this aspect is already partly secured because the Multidodal Central-Northern Transportation Corridor Project is in progress and the state government is given a high priority to development of inter-state roads system to complement the said corridor.

Another positive factor to invite the private sector from outside the state is an incorporation of the ZPE and an offer of incentives from the state government relevant to taxation and special loan for industrial development like PROSPERAR.

3.8.4 Natural Resources

(1) Climate Conditions

The annual precipitation in Tocantins fluctuates in the range of 1,200 mm - 2,200 mm, of which higher precipitation zone is located over the basin area of the Araguaia River (in this basin paddy cultivation may be carried out with installation of only small-scale facilities to secure irrigation water). This annual precipitation is concentrated in rainy season (from October to April) and crop cultivation without relying on irrigation system is viable in this season, including the Jalapão area which is characterized by less precipitation within the state. Although the mean monthly temperature of the state is less variable throughout the year, the difference between high and low daily temperature is marked, which enables to cultivate a variety of crops. Furthermore, in spite of higher precipitation, the relative humidity is low - a favorable factor to depress the occurrence of diseases affecting crop cultivation.

Even though a high precipitation is secured, it is probable that there would be some continuous dry days without rainfall ("veranico") in the rainy season and in such a case, crop production relying exclusively on rainfall may be damaged. Furthermore, in contrast to high precipitation in the rainy season, the rest of the year has very limited rainfall, which causes difficulty in farming without irrigation system.

(2) Water Resources

Abundant precipitation in and upper part of the state ensures development of water resources of the regional river system represented by the Araguaia and the Tocantins rivers not only in the rainy season, but also in the dry season. Owing to specific soil condition of the "cerrado" areas, discharges among small tributaries are relatively stable without being dried up even though in the dry season. It has been confirmed that not a few sites of the said tributaries offer an opportunity for taking their water for irrigation purpose; land topography

around the tributaries permits to distribute irrigation by gravity. Water resources in the state have been exploited to extremely limited proportion up to date, and it is supposed that problem relevant to water right hardly takes place; in addition, under-development of land resources will mitigate troublesome concerned with the rights of way for construction works required for development of water resources.

As explained above, the potential of the water resources within the state is presumed to be very high, but the constraints pertaining to development of these resources are related to the absence of detailed study on hydrological performance of river system. Another limitation is that the two major rivers - Araguaia and Tocantins - which are flowing at a lower elevation, are not possible to be developed for irrigation purpose taking their water by gravity. Apart from these constraints on development of water resources, abundant river discharge sometimes bring about inundation over some sectors in the rainy season.

(3) Land Resources

In the State of Tocantins about 14,554 thousand (52%) are evaluated to be suitable for crop cultivation, but the actual area occupied by crops is less than 1% (126 thousand ha in 1996) of this potential area. It is roughly calculated that approximately 1,985,700 ha of land are eligible for crop production after deducting the area applied to Amazonian regions and indigenous reserves. It implies that there is a great potential for future development of the agricultural sector in Tocantins. Especially, highly productive lands with class II and superior lands are located in the north region as well as along the Tocantins River.

The land resources, which are sufficient enough in terms of extension, call for some improvement measures from agronomical viewpoint, which constitutes constraints on development. The constraints related with land resources may be resumed in the following manner:

1. Soils with high acidity and high aluminium content are distributed broadly.
2. Generally speaking, soils are less fertile, vulnerable to erosion and hard in formation, and mechanization is essential for farming.
3. The greater part of arable lands are represented by "cerrado" soils, which are sensitive to ecological transformation and are difficult to be recuperated once they are developed.

3.8.5 Farming Technology and Institutional Supporting Services to Farmers

Problems relevant to the poor performance of the agricultural sector are summarized as follows:

1. For the majority of the cases, the crop farming is not conducted according to soil suitability.

2. Subsistence crop farming predominates the State and the farmers are less ambitious in enhancement of farming practice and living standard.
3. Without provision of appropriate extension services of advanced technology to farmers, crop productivity remains inferior and capital formation among farmers is scarcely made. In sum, energy for development is deficient.

The afore-mentioned problems are derived solely or jointly from the factors given below.

1. Marketing channel to farmers is immature.
2. Unconsolidated system for acquisition , maintenance and supply of spare parts of agricultural machinery.
3. Without irrigation system farming in the dry season is not feasible.
4. Agro-based industry is under-developed.
5. Rural organization is not functioning satisfactorily.
6. Technical assistance services are rendered less frequently due to deficient manpower engaged in extension services and lack of means of transport; furthermore, organization to conduct research and development of unconventional technology applicable to local farming has not been consolidated.
7. Difficulty to access to rural credit.

3.8.6 Livestock

(1) Insufficient System of Animal Health Protection

Control of diseases is the most pressing issue in improving productivity of livestock farming. Apart from infectious diseases represented by FMD, diseases affecting breeding and parasitic diseases prevail in Tocantins. The state government is conducting actively campaigns for vaccination against FMD, but measures to prevent diseases other than FMD are not taken because of an absence of necessary equipment and materials. Under the circumstances, small and medium livestock farmers are less conscious of the importance to take precaution against diseases of animals. It is thus expected that an animal diseases diagnostic center should be established as early as possible so that efficient diagnosis and treatment of diseases would be carried out. On the other hand, without inspection system on meat at regional level, it is worried that an outbreak of Brucellosis and other diseases prevailing in the South America may take place and infect local inhabitants with consumption of inspection-free meat and this situation shall cause problem from the viewpoint of public health.

(2) Shortage of Hybrid breeds

Albeit some large livestock farmers launch to produce improved breeds of cattle mixed local breeds with hybrid European breeds or by means of artificial insemination, the rest of local livestock farmers are adhered to the notion that the Nelore breed is highly suited to local farming circumstances; the productivity of this breed is indeed low due to prolonged period of replacement and high index of inter-crossing.

(3) Deficiency of Feed in Dry Season

Despite production of pasture in rainy season is generally abundant, livestock farmers are reluctant to make better use of these pasture, that is to say, to restore them for dry season in the form of dehydrated pasture or silage. This is because proper supporting services are not provided by SAG or RURALTINS.

(4) Under-utilization of Agricultural By-products

Paddy production both irrigated and rain-fed is found at Rio Formoso and other areas, but by-products of paddy such as straw and rice bran are scarcely utilized. This also the case of deficient provision of institutional supporting services to farmers.

(5) Absence of Quality Standard

Although this is not exclusive case of the State of Tocantins, quality standard of animal products except for milk and egg is not established. Cattle is traded on the basis on their liveweight and livestock farmers are less interested in production of high quality cattle.

(6) Less Technological Knowledge among Veterinary Surgeons of Public Institutions

Most of veterinary surgeons working as officials of public institutions are not equipped with appropriate technology and knowledge on livestock except for cattle (beef cattle), which has caused to realizes diversification of livestock farming in the State.

(7) Interference of Intermediaries in Trade of Livestock

It is a common phenomenon that intermediaries take part in the trade of livestock. In particular, small and medium farmers who do not have transportation means of their produces rely on these intermediaries sacrificing considerable portion of their profit.

3.8.7 Agro-industry

An agro-industry has not been developed in Tocantins except for some rice processing factories located at paddy cultivating zones like Formoso do Araguaia e Lagoa da Confusão. This situation comes from the fact that an agricultural output with an exception of paddy has not reached to such a volume as to supply the agro-industrial sector with raw materials

for processing them on economically competitive basis. And, it should be also noted that rice processing industry in the region is unable to produce high-quality processed rice, because paddy, the raw material to be processed, is inferior in quality and the processed rice is disadvantageous in comparison with celebrated products supplied from the Rio del Sul Region and other regions. The marketing facilities including wholesale market are also under-developed under the circumstances of low level of demand associated with less population density and depressed income among consumers.

The agro-industry and marketing sectors, which are inactive at present as described briefly above, may have a chance to attain a remarkable development in the future, provided that the demand for food increases in parallel with burgeoning population of the state and that an expansion of agricultural output (in particular, that of paddy and soybeans) is realized through rational use of uncultivated arable lands.

The geographical condition, which is a critical factor in development of agro-industry and marketing system, favored Tocantins State, because the state is endowed with a comparative advantage in this aspect being located at the central part of the country and being eligible as a point of supply of commodities for destination of various options; especially, the saved distance to the Northeast Region, where is constrained from an agricultural production due to inferior land fertility and thereby is seeking for commodities of medium-level quality to comply with income standard of the population, is of particular advantage.

For making the most of the geographical advantage, it is a determinant that the transport infrastructure should be consolidated; the actual progress for development of the transport infrastructure is behind the times (the road network density is as low as 38m/km²), in particular, in so far as the road network connecting to the trunk highway (BR153) is under-developed both in density and in quality (pavement works). As mentioned in other sections, the Multidodal Central-Northern Transportation Corridor Project is in progress and the state government is given a high priority to development of inter-state roads system to complement the said corridor including construction of a bridge over the Tocantins River. With completion of the transportation network, both inside and outside the state, it is beyond doubt that the marketing of regional agricultural products would be facilitated.

3.8.8 Marketing

(1) Consolidation of Market-related System

CONAB is a public agency in charge of marketing of agricultural commodities and the target of marketing policies of the government is to disperse potential risks concerning trade of agricultural produces by means of introduction, expansion and generalization of various marketing means of the private sector. Another responsibility of the agency is to prepare conditions for private sector to realize marketing of agricultural commodities with its own stocks or to perform coordination function through international market. For this purpose, it is of importance to improve information system on trade and price of agricultural commodities both at domestic and international markets and to disclose the process in

formation of market and prices. Above all, an essential factor is to consolidate circumstances to motivate major participation of the private sector in the field of marketing.

(2) Geographical Position

The Tocantins State is an inland state surrounded by six states and easily accessible to Brasilia - capital city of the federative republic with an accomplishment of burgeoning development - as well as to the Northeast Region including such cities as São Luis, Belém, Teresina and Salvador where it is not viable to attain self-sufficiency of food constrained from its natural conditions. This geographical advantage suggests that the state has promising potential to play a role of major food supply nucleus of the country; this is the case in terms of transportation distance for both domestic market-oriented commodities and exports if a comparison is made with the rest of the states of the country. The completion of the Central-Northern Transportation Corridor shall needless to say reinforce this advantageous factor of the state.

In the State of Bahia, located adjacent to the State of Tocantins, irrigation system is indispensable for realization of grains production, meanwhile, the State of Tocantins has comparative advantage over this state because grains can be cultivated at rainy season without relying on irrigation system.

(3) Advantage and Constraints for Development viewed from the Condition of Transportation Network Infrastructure.

Improvement in transportation network is an important factor to increase agricultural and livestock production. A reduction in transportation cost derived from the improvement work in transportation network not only contribute to the efficient transportation of the crops and production inputs but also it has the equal effect to the producer to the reduction in the production cost.

1) Present Condition of Road Improvement

Because Tocantins state is located in the inland and about the center of Brasil, it should have a very good advantage in transportation once the transportation infrastructure is improved.

A principal road BR53 is running the center of the State from south to north, making it easy to construct transportation network throughout the State.

Road density of federal road and state road is low 38 m/km² present. It is necessary now to pave the existing road in order to improve the road condition in the rainy season. Marketing commodity in the State are roughly divided into east and west by the Tocantins river. There are only two bridges in the State, Porto Nacional and Estreito. East of Tocantins river is in a difficult situation for marketing commodities. In order to improve this situation, construction of bridges at Palmas, Miracema do Tocantins and Pedro Afonso are proposed. But presently implementation plans have not been made yet.

2) Present Condition of Waterway Transportation

In this State, two main rivers are running from north to south, the Araguaia river and Tocantins river. Because large volume transportation is possible through waterway, waterway transportation program utilizing the river is progressing. It is the main project among long-term projects of the federal government. In actual case, produce of Tocantins state has not been marketed through waterway, although some grains were transported from Nova Xavantina at upper stream section of Araguaia river as Rio das Mortes to Xiambioa, Tocantins state in the past. If this project shall benefit Tocantins state, it is necessary to study the construction cost for waterway utilization in the state and the effect (merit) of its utilization.

3) Railway

About 40% of the construction work to extend the South-North railway, from Imperatriz to Estreito has been completed as of May 1997 and 100% shall be completed by the end of 1998.

At Estreito, the bridge on the Tocantins river has already been completed for route BR-010. From Tocantins state, Estreito is easily accessible. Therefore, transportation cost should be calculated from Estreito for the time being.

Further extension of South-North railway has not been decided but because bridge girders on the Tocantins river have been completed, the railway would be extended to Colinas do Tocantins of south in future. And if a bridge was constructed at Pedro Afonso, soybean transportation cost in PRODECER†Varea would be greatly reduced. It is obvious that the soybean produced in Tocantins state will be in advantage compared to the one produced in other states.

4) Shipment Port

South-North railway and Carajas railway are managed and controlled by CVRD. Therefore, consistent and integral transportation up to the shipment port of Sao Luis (Madeira wharf) is maintained. In Madeira wharf, grain terminal silos (75,000 ton) were constructed and it has the handling capacity of several hundred thousand ton annually. Existing facility can easily handle the shipment of estimated quantity of 320,000 ton for 1997.

5) Marketing Services

Because marketed quantity has been rather limited, transportation companies (by truck), grain wholesalers (atacadista), etc. have not been developed in Tocantins state. Further, due to small population and resultant small market, CEASA is not opened. However, population is rapidly increasing at some places like Palmas and its need is increasing. Presently, a considerable quantity of fruit and vegetable is coming from CEASA in Goiania and Anapolis in Goias state.

However, if production of agricultural produce that can be cultivated in the State such as carrot, cabbage and sugar beat is promoted, those produce can be supplied in consumption area such as Belem where those fruit and vegetable are in shortage .

(4) Merit in Improving Transportation

Among future programs there are state road and local electrification improvement programs, both are being implemented by state governments. Also national road (BR-153) widening program being chalked out by federal government, Araguaia and Tocantins river navigation plan and South-North railway improvement plan, both are parts of transportation infrastructure improvement. It is expected that the state road improvement program shall make a good progress with the introduction of BID fund. The local electrification program is also expected to progress considerably. National road BR-153 widening program of federal government level will also be put into execution and transporting capacity would be greatly improved, although there are some doubts about practicability of the plan.

With the completion of this plan, transportation of the State produce to South-North direction will be improved. Further, with the improvement of state roads being implemented by the state government, collection of produce will be made much more efficiently. As a consequent, accessibility to large consuming sites such as Goiania and Brasilia, also Belem, Fortaresa, Lesife, etc., consuming sites in the north will be improved.

Opening of Imperatriz/ Estreito railway, which is an extension of South-North railway, will increase competitiveness of grain producing industry, where low cost transportation is essential. It will secure export route to overseas market from Sao Luis port.

When all these projects are completed, it is anticipated that advantageous position of grain cultivation industry in the State who needs mass transportation means will be secured.

According to a study made by AHITAR who is promoting Araguaia and Tocantins river navigation scheme, transportation cost of grain from San Luis to Rotterdam is 21R\$ while that of Santos, one of the main grain export port in Brazil, to Rotterdam is 32R\$ per ton. Considering the ocean freight after opening of South-North railway (Imperatriz/ Estreito) is expected to be 11R\$, transportation cost from Estreito to Rotterdam may possibly be 32R\$, same as the cost to transport from Santos. This show that in the field of transportation, Tocantins state has an advantage over other states of Brazil.

In other words, the distance from Estreito which can be a base of transportation is judged to be an important factor for grain production with the completion of Sao Luis port and the start of grain transportation by Carajas railway and South-North railway, geographical disadvantage of this state in the past would change into the convenience.

It is expected that the improvement of the federal road BR153 would be an important factor for the development of state economy because the BR153 is the main access road from

majority of the state areas and the transportation on this road is expected to increase in future.

How to carry the produce economically to Estoreito, a base of marketing, is the important task for the state to plan on the grain production and marketing. In this point, present state road improvement project is judged to have a great impact on the activation of agricultural sector.

It is difficult at present for east side areas of the Tocantins river to cross the river and access BR153, making it necessary to study other means at producing areas including the waterway transportation through the river up to Estoreito.

(5) Problems and Improvement Measures for Transportation

Transportation convenience in the state would be improved in general by the federal government and state government. However, it is possible that the east side of Tocantins river may still remain unimproved.

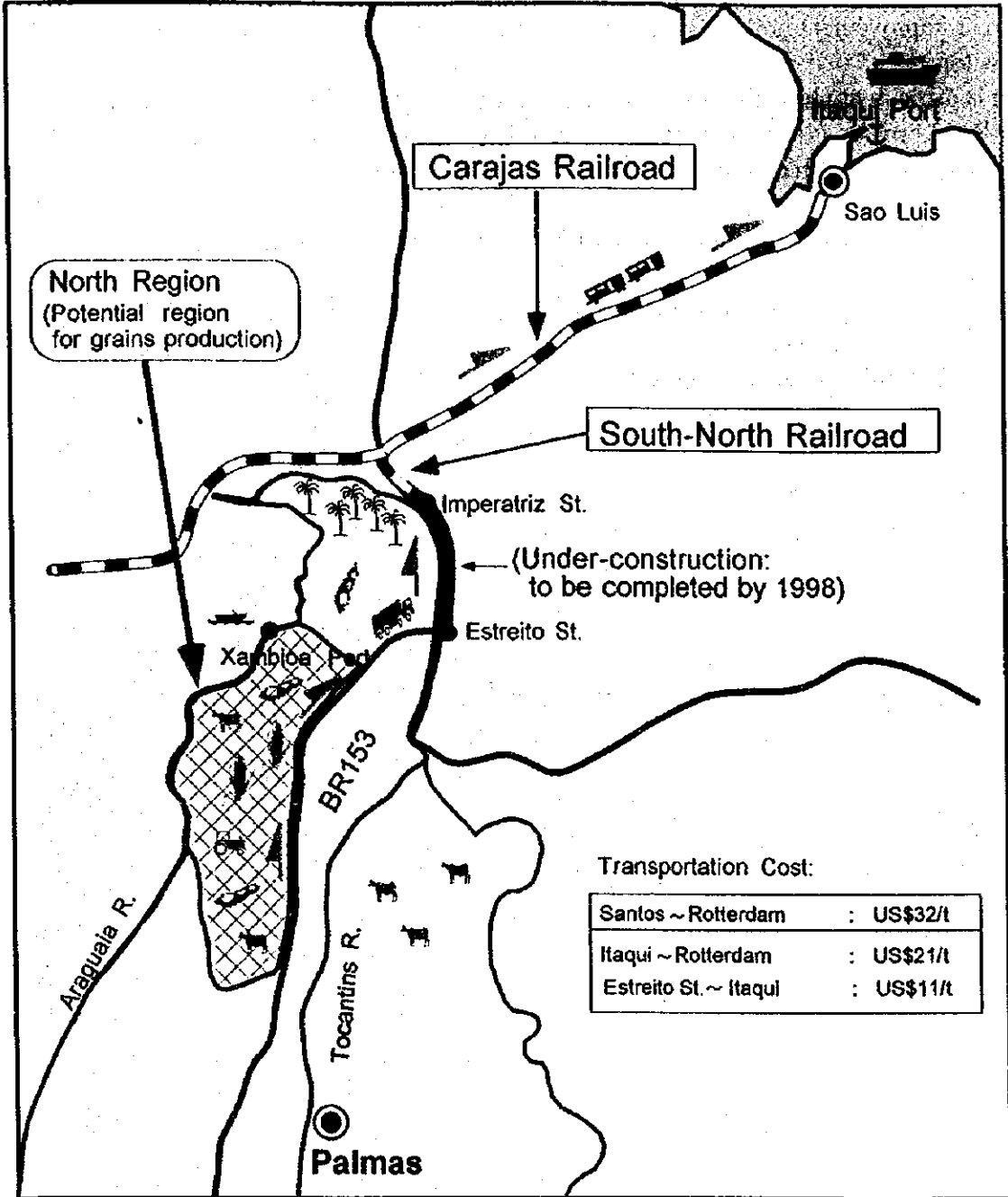


Fig.3.4 Proposed Agricultural Commodities Shipment Route

3.8.9 Rural Society

The rural society in the state is under-developed in terms of services of public organizations, education level and basic public health services as explained hereinafter.

(1) Services of Public Organizations

An inappropriate services provided by public organizations stem from deficient manpower engaged in relevant services, an evasion of necessary vocational training for empowerment of human resources, locally distorted assignment of staff, lack of financial resources, etc. In addition such physical constraints as obsolete installations and deficient number of vehicles impede rendering proper services to rural population.

(2) Education

Unsatisfactory education level together with low literacy rate at present has a great deal with insufficient number of qualified teachers, supply of poor educational materials and the prolonged distance to the points of education. Low literacy rate among rural adult people constitutes a bottleneck in introduction of advanced farming technology and promotion of rural organization. Deficient education level among rural women is a factor to decelerate improvement of rural quality of life.

(3) Basic Public Health Services

Due to shortage of staff, physically deteriorated facilities and equipment, limited supply of medicines and other materials, public health services to rural population are rendered inappropriately. Besides, an absence of basic education on prevention of disease causes prevalence of epidemics and parasite-related diseases. In addition, poor nutrition and personal health control affect farmers to dedicate to farming work.

Despite being confronted with above problems, the rural society in Tocantins may be improved with adequate application of the following factors to development.

1. Existence of large number of potential labor force
2. Relatively higher proportion of rural population which is easily accessible to urban facilities due to diminished distance between rural and urban areas.
3. Lands are easily available and horticultural farming can be introduced without severe difficulty.
4. Vast extension of land resources would not likely to produce social conflict between land owners and landless peasant in relation with the latter's collection of babassu.

5. Rural population is willing to form rural organization, especially in the north region where a foundation for this formation is consolidated.
6. Past experience in land titling will mitigate conflict on land ownership.

3.8.10 Environmental Conservation and Sustainable Agriculture

The majority of land resources in Tocantins consists of "cerrado" soils which are vulnerable to erosion caused by ecological transformation, thus the most scrupulous attention should be paid in development of the area. Different to the rest of the PRODECER project areas, the development of lands in Tocantins is subject to legal regulation in the realm of ecological conservation, because the Tocantins State is involved in the Legal Amazonian Region; the development of land for agricultural purpose is limited to 50% of the total extension of the land. In addition, included in the total territory in Tocantins are the Araguaina National Park and indigenous reserves and care in formulation of development works is also needed so as to evade negative impact on these reserves. Another important zones related with environmental conservation coincide with the Bico da Papagaio area, the peripheral area of the Bananal Island and the golden mines situated in the southeast region.

3.8.11 Summary of Potentials, Constraints and Issues to be Tackled

The potentials and constraints presented in the previous sections, together with the issues to be tackled for an optimization of potentials and overcoming constraints are summarized by respective category in the Table 3.1.

Table 3.1

Summary of Potentials, Constraints and Issues to be Tackled

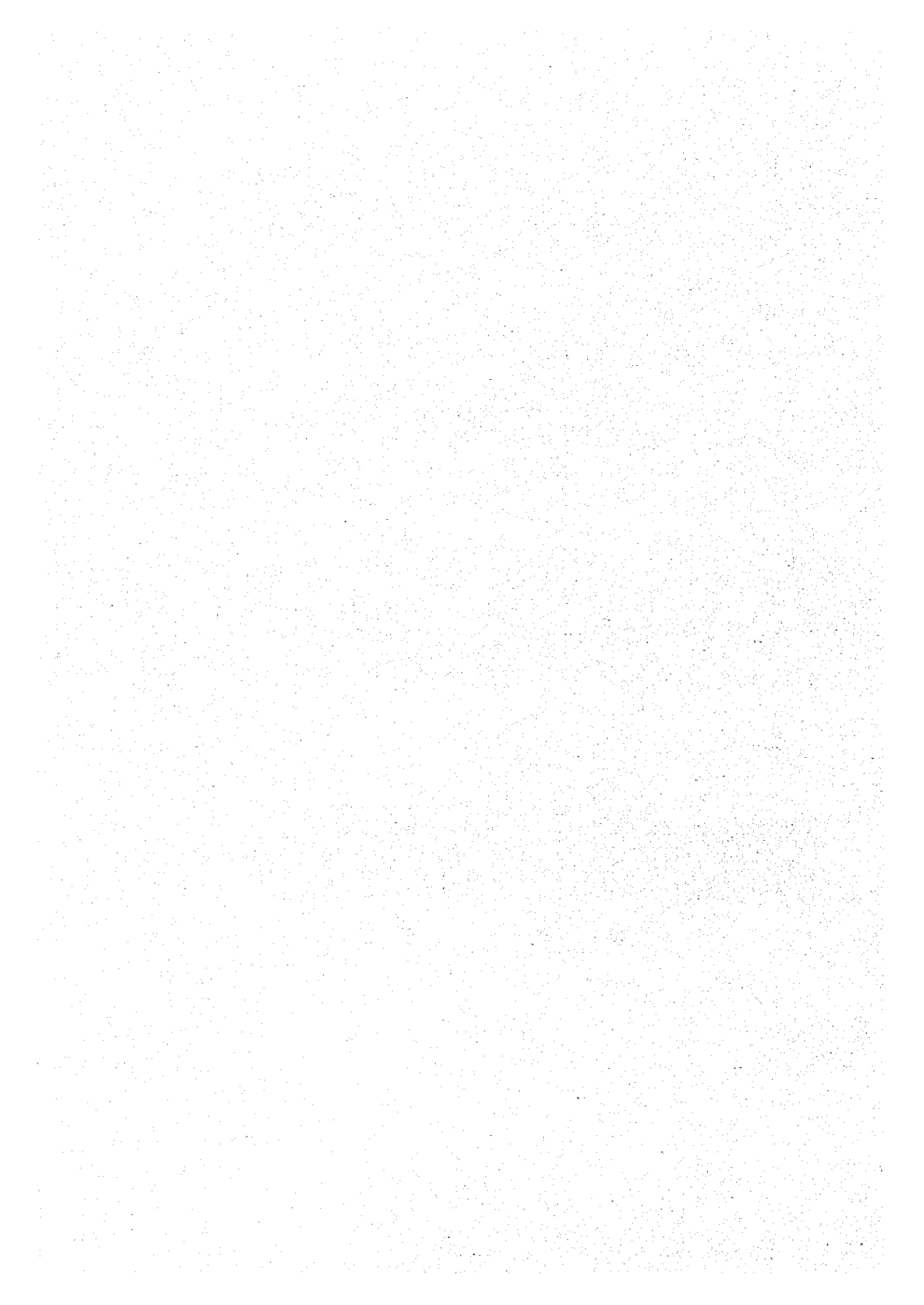
| Category | Potentials | Constraints | Issues to be Tackled |
|--------------------------------------|---|---|--|
| State budgetary system | <ul style="list-style-type: none"> • Tax-related revenue is not sufficient but is growing steadily • Investment on development projects is not exaggerated | <ul style="list-style-type: none"> • Inactive economic performance is associated with deficient tax-related revenue • Dependence on state bonds is not healthy budget formation | <ul style="list-style-type: none"> • Increase of tax-related revenue by vitalizing regional economy • Budgetary formation without dependence on state bonds • Investment promotion from outside the state • Activation of development investment |
| Agricultural policy | <ul style="list-style-type: none"> • Encouragement to efficient farm management aiming at elevating productivity • Revision of premium of rural insurance system will facilitate crop production in accordance with land suitability • Improvement of crop quality owing to reinforced competitiveness • Preferential policies on small farmers still remain in force | <ul style="list-style-type: none"> • Backwardness of protective measures • Increasing cost of rural credit • Difficulty in getting supports from federal research agencies | <ul style="list-style-type: none"> • Fostering competitive producers (in particular, medium farmers) • Guidance to ensure crop farming according with land suitability • Intensification of state-owned organization (UNITINS, RURALTINS) • Expansion of rural credit services |
| Investment environment | <ul style="list-style-type: none"> • Land price is less expensive • Potential labor force is abundant • Central - Northern Transportation Corridor Project and state road networks development project are in progress • Incorporation of ZPE and various preferential measures to invite investment to the state | <ul style="list-style-type: none"> • Economic structure is not solid • Under-development of infra-structure (transport, energy, communication) • Manpower development and public health services are unsatisfactory • Environment to invite private sector in investment of infrastructure is immature | <ul style="list-style-type: none"> • Vitalization of economic activities (increase and diversification of crop production) • Development of infra-structure and bottom-up of economic level • Acceleration of roads system development as well as electric and communication network |
| Natural resources | <ul style="list-style-type: none"> • High precipitation and high temperature to enable diversification of crop production • Development of tributaries can be made with less investment • Soils suitable for crop cultivation • High availability of hydric resources with quality and adequate climatic conditions | <ul style="list-style-type: none"> • Seasonal distribution of precipitation is irregular • Rivers discharge vary notably by season; inundation at rainy season • Great investment is required for development of the major rivers • High acidity of soils which calls for improvement • Presence of temporary hydric sources | <ul style="list-style-type: none"> • Implementation of hydro-logical investigation of river system • To conduct a detailed study on efficient use of natural resources • Increment of aquaculture |
| Crop farming/ Supporting services | <ul style="list-style-type: none"> • Favorable soils and climate conditions for crop cultivation • The existence of vast extension of uncultivated land makes it possible to conduct projected farming • Manpower at supporting institution are capable for executing their duties • Possibility of introduction of new crops | <ul style="list-style-type: none"> • Actual crop farming does not coincide with soil suitability • Under-development of inputs and produce marketing channel • Farmers are reluctant to accept advanced farming technology • Inappropriate system to develop technology suitable to local conditions • Extension services are not rendered adequately due to lack of manpower and means of transport | <ul style="list-style-type: none"> • Upgrading of technical services to farmers to convert their farming practice from subsistence crops to cash crops • Reinforcement of rural organization • Amelioration of living standards such as health care and nutritious conditions • Enhancement of rural infra-structure • Enlargement of rural credit services in par with expansion of cultivates area • Improvement of research institutions • Budgetary arrangement to enhance institutional services |

Table 3.1 Summary of Potentials, Constraints and Issues to be Tackled (Continued)

| Category | Potentials | Constraints | Issues to be Tackled |
|---|--|---|--|
| Livestock | <ul style="list-style-type: none"> • Climate conditions are favorable to a variety of livestock activity • Elevating productivity may be attained owing to substitution of natural pasture • Raw materials for animal feeds are available locally • Geographical advantage to market produce to Northeast and North Amazonian Regions where demand for livestock produce is high | <ul style="list-style-type: none"> • Indifference to diversification of activity adhering to cattle raising • Difficulties to introduce high quality breeds of animal • Absence of institution engaged in research applicable to peculiar local conditions • Deficient organization in charge of animal health protection • Difficulty to access rural credit • Lack of means of transport for marketing of produce | <ul style="list-style-type: none"> • Incorporation and renovation of research institution and breeds production farm • Upgrading of animal health protection system • Organization of small and medium producers • Establishment of animal feeds manufacturing factory • Effective use of composts • provision of information and technical assistance services for diversification of activity |
| Marketing/ Agro-industry | <ul style="list-style-type: none"> • Perspective for expansion of agricultural output • Agro-based raw materials for processing may be diversified • Increased production of grains will enable to make use of by-products for processing • Being located at central part of the country, various options as destination of produce are considered • Incentives to invite industry by the state government (ZPE, tax exemption, etc.) | <ul style="list-style-type: none"> • Except for some crops, output is not enough to provide raw materials for processing • Quality of crops for processing is not satisfactory • Deficient demand for agricultural products due to low population intensity and depressed level of income • Under-development of road network • Lack in quantity and quality of electric energy | <ul style="list-style-type: none"> • Study on comparative advantages of the state's marketing circumstances • Research on combination of various raw materials for processing • Promotion for development of transport and other infrastructure such as road network and electric energy system • Improvement of agro-industrial section of UNITINS • Organization and strengthening of research, control and follow-up sector for the products commercialization in the State • Improvement of the zoosanitary inspection and fiscalization conditions. |
| Rural society | <ul style="list-style-type: none"> • Proportion of rural population is higher than the national average • Improvement of rural infrastructure is in progress • Existence of Rural Qualification Programs | <ul style="list-style-type: none"> • Decreased rural population • Young population's reluctance to farming • Under-development of infrastructure • Depressed level of farm income • Low literacy rate among rural population and inadequate education facilities | <ul style="list-style-type: none"> • Amelioration of rural circumstances (electricity, water supply, sewerage, hosing, public health) • Enhancement of education system • Encouragement for participation of rural population in community circle (including women's circle) • Continuity of rural Qualification Programs |
| Environmental Conservation/ Sustainable agriculture | <ul style="list-style-type: none"> • Owing to regulation on land use, degradation of soil fertility may be evaded, which contributes to realization of sustainable agriculture | <ul style="list-style-type: none"> • Land use for crop farming is not at farmers' disposal. | <ul style="list-style-type: none"> • Preventive measures to evade soil erosion and water contamination to be caused by expansion of crop cultivated area • Incentive to recuperation of degraded areas • Increment to the rational use of natural resources |

CHAPTER 4

DEVELOPMENT CONCEPT OF THE MASTER PLAN STUDY



CHAPTER 4

DEVELOPMENT CONCEPT OF THE MASTER PLAN

4.1 Background and Targets of the Development Scenario

4.1.1 Background of the Development Plan

The Tocantins state will have a foreseeable future because the county is one of the few regions in which a considerable space remains for future expansion of the agricultural frontier in Brazil. It will be without doubt that this potentiality of the state should attract agricultural producers and entrepreneurs to invest in the state and, so as to tackle with such situation it is indispensable to formulate an agricultural development plan in harmony with the environment to enable sustainable development, taking account of an optimum utilization of resources under coordinated and systematic planning.

4.1.2 Development Potentials and Constraints

In formulating development plan of the present Master Plan, it is essential first of all to analyze adequately the potentials and constraints on development of the State, and then to forge measures to make optimize potentials and to ease constraints. Potentials and constraints of the State may be summarized in the following manner:

Potentials

- Far-reaching area of arable lands
- Favorable climatological and soil conditions on expanding grains production
- Abundant water resources
- Favorable topographic conditions for commercialization

Constraints

- Under-development of infrastructure to motivate new investment
- Absence of studies and research on assessment of potentials on development
- Deficient revenue of the state government to increase investment on infrastructure
- Shortage of financial resources to launch investment (Private sector)
- Disordered development without proper farming technologies and deterioration of natural resources (fire at mountain areas, soil erosion, deforestation, etc.) due to less consideration on environmental conservation.
- Lack of proper technologies of agriculture and livestock suites to local conditions
- Rudimentary level of institutional supporting services to farmers including insufficient manpower training system

Subject to completion of traffic network consolidation projects undertaken by federal and state governments, it is anticipated that elevated transportation cost to forward agricultural produces to major markets of the country would be eased and comparative advantage in production of grains in Tocantins which entails large-scale transportation system would be established accordingly. It is further verified that the State of Tocantins has superiority over other states located within the "Cerrado" region from agro-ecological standpoint, because grains can be produced in Tocantins even under rain-fed condition. In addition, great extension of virgin and fallow lands may serve as potentials for development of grains production which is anticipated to fulfill pressing demand of grains worldwide. Judging from these external factors the State of Tocantins has high potential in agricultural development, especially in production of grains.

It is of importance for the State of Tocantins to proceed with methods which accompany environmentally friendly and sustainable development of the agricultural sector and for attaining this objective, an accomplishment of the following components is vital.

- Implementation of research and study on assessment of potentials of natural resources, and formulation of projects for optimization of these resources.
- Institutional strengthening to realize sustainable agriculture
- Promotion of environmental conservation

Further study is required to identify potentials of natural resources and, in addition, measures to invigorate economic activities should be taken to motivate investment in these resources. It should be nevertheless taken into account that the State of Tocantins has shorter historical background in hastening sustainable agriculture, therefore reinforcement of necessary structure including strengthening of public institutions rendering supporting services to farmers and engaging in agriculture-related research is indispensable.

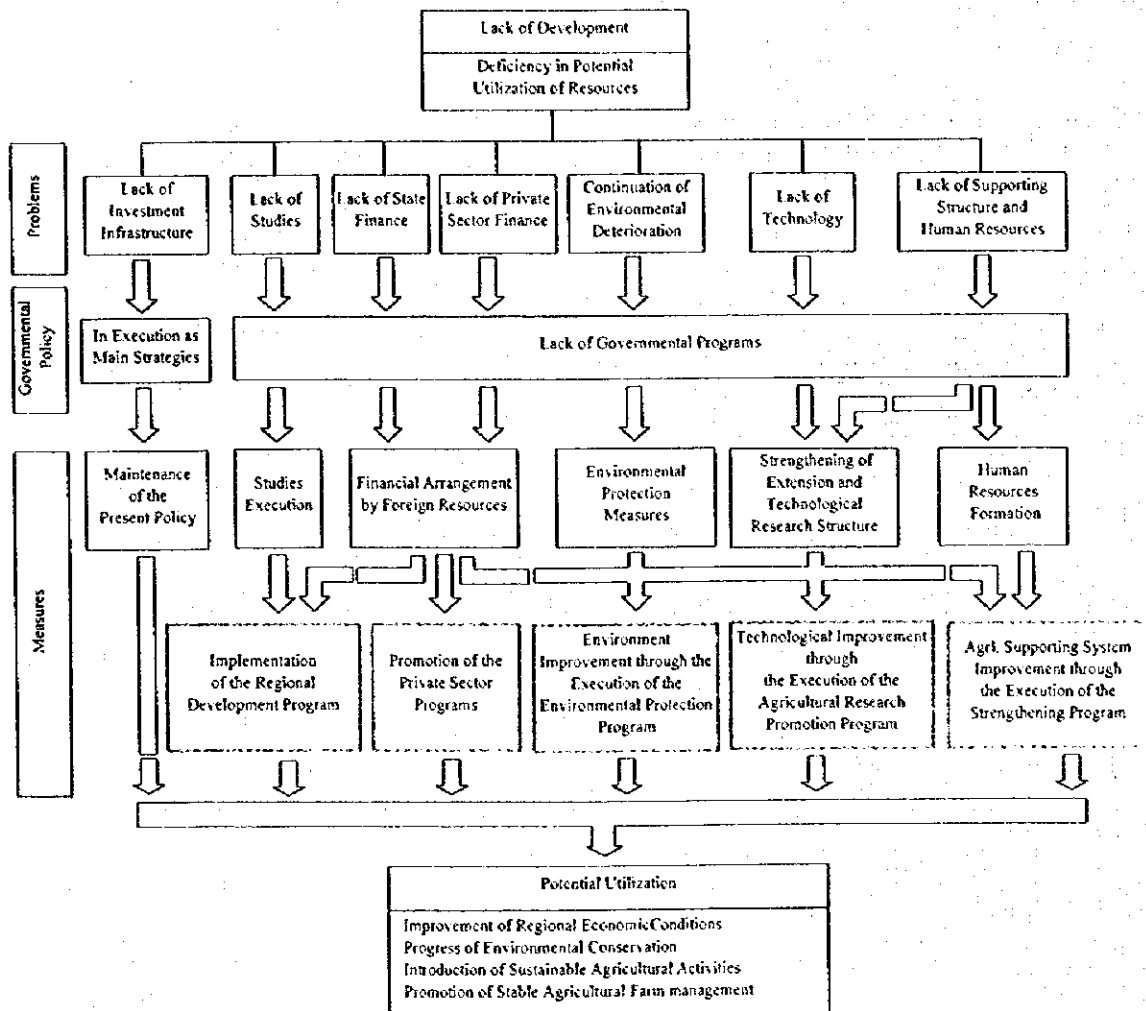
4.1.3 Anticipated Goals of Development

In due consideration of the above-mentioned background, the Master Plan for Integrated Development of Agriculture and Livestock in the Tocantins State with a target year of 2015 shall be formulated aiming at to accomplish the following targets, namely:

1. Activation of regional economy through promotion of agricultural production and agro-based industry as well as through development of necessary infrastructure.
2. Promotion of sustainable agriculture in harmony with the environment.
3. Environment Conservation.

4. Stabilization of farm operation supported by consolidation of productive infrastructure.
5. Income elevation of rural population and amelioration of rural living circumstances to serve rectification of regional and social disparities.

On the other hand, the role anticipated by this Master Plan in the realm of regional and national economy shall be: putting an end to under-development of the regional economy in the country, contribution to mitigate regional disparity in Brazil - the primary concern of the federal government, optimum use of potential resources for agricultural production, and major advance of the regional economic sector to the international market.



4.2 Development Strategies

4.2.1 Development Targets and Basic Principles

(1) Development targets

As mentioned before, the development targets of the present Master Plan Study consist of: 1) Activation of regional economy, 2) Promotion of sustainable agriculture, 3) Environment Conservation, 4) Stabilization of farm operation and 5) Rectification of regional and social disparities, and these targets, in turn, have the following specific targets:

| General Targets | Specific Targets |
|---|--|
| 1) Activation of regional economy | 1. Expansion of grains production 2. Diversification of crop production 3. Modernization of livestock 4. Promotion of agro-industry |
| 2) Environmental conservation | 1. Promotion of environmental conservation 2. Environmental monitoring and education |
| 3) Promotion of sustainable agriculture | 1. Realization of crop production in accordance with land suitability 2. Upgrading research system to put sustainable agriculture into force |
| 4) Stabilization of farm operation | 1. Establishment of appropriate system for extension services 2. Promotion of diversification for agricultural sector |
| 5) Rectification of regional and social disparities | 1. Consolidation of social infrastructure in less development regions 2. Invigoration of agricultural production activity in less development regions |

The Activation of the regional development aim to explore the potentialities of the natural resources and to expand the grain production, using the location comparative advantages for the product which require mass transportation and climatic conditions. However to take consideration to the participation of small farmer in a development process is a fundamental factor, in order to no increase the social disparities. In this context, the introduction of diversified agriculture will act as an absorber of social problem, increasing the work opportunities and participation possibilities of small farmers. The modernization of the livestock activities aims to vitalize the economic activities through the improvement of the commercial conditions for market and the introduction of small animal. The promotion of agro-industries has objectives to promote the agricultural production's activities through the adding values of the product and to create the work opportunities.

The environmental conservation aims to prevent the deterioration of environmental conditions, through the decrease of the burning that is the major environmental problems of the State. In this context, the implementation of environmental monitoring by the

public sector is required to conserve the natural resources. And the participation of the private sector force is the fundamental.

The introduction of sustainable agricultural method is an basic factor to obtain the sustainable development. For the introduction of sustainable agriculture, implementation of agricultural research for the sustainable agricultural method and the introduction of adequate cropping technologies, will be required.

The promotion of the stable economies for farmers is basic concept to obtain the sustainable development. In this sense, upgrading the farmer's agricultural techniques to increase the productivity and achieving the sustainable agricultural method are the fundamental factors for the planning. Considering the debilities of the institutions, such as SAG, RURALTINS and ITERTINS, the strengthening of the institution will be required as a first step to upgrading the state productivity, in order to improve the extension and research services. Furthermore, the introduction of diversified activities will be required, particularly for the small farmers.

The alleviation of the spatial disparities, as principal policies by the Federal and State Government, is an important fact to take consideration in a planning. For this reason, the improvement of the social infrastructures and strengthening of the rural association in a poverty area will be require to included.

(2) General Considerations

In attaining development targets, care shall be taken to the following items.

1. Land use plan shall be forged in due consideration for long-term and efficient utilization of the resources as far as the circumstances permit.
2. Aiming at major participation of the non-traditional entities in the agricultural and livestock sector, an emphasis on formulation of development plan will be placed on development of infrastructure.
3. Major effort shall be made to procure financial resources for development from outside the state.
4. At the same time, programs to be financed by the private sector shall be proposed.
5. To propose an improvement of installations and equipment of institutions in charge of research and development of agricultural technology suitable to local environment.

6. To pay attention to basic education system and to improve social infrastructure as measures to fulfill the basic human needs.
7. The development plans to be delineated should not accelerate the grade of imbalance among regions of the country.
8. To lay emphasis on major participation of beneficiaries from planning stage of projects and to propose programs which enable to equip beneficiaries with empowerment in the field of appropriate operation and management of project after their completion. To promote at the same time women's participation in social affairs.
9. To lay out institutional services intensification programs including fostering human resources and expansion of facilities in relation with an improvement of land productivity.
10. To promote development of agro-based industry leading to activation of regional economy and creation of job opportunity so that projects' benefits might be distributed to as many people and as equitably as possible.
11. To ensure conservation of natural resources by mitigating negative outcome of project implementation on them such as water contamination, degradation of soil fertility, deforestation, etc. and thus to guarantee enforcement of sustainable agriculture and protection of living circumstances of regional population.
12. To devise an elastic project formation which may be reconstructed as required in response to change of external circumstances like world food supply and demand condition, reform of the federal government's agricultural policy, etc.
13. To forge development plan which entails comparative advantages of the Tocantins State in comparison with the rest of Brazilian states.
14. Maximum utilization of the state human resources
15. Including the Tocantins State government plan in the project

Agricultural development model is shown in Fig 4.1. The Fig. 4.2 illustrates the schematic concepts of the development targets and the development strategies leading to accomplishment of targets.

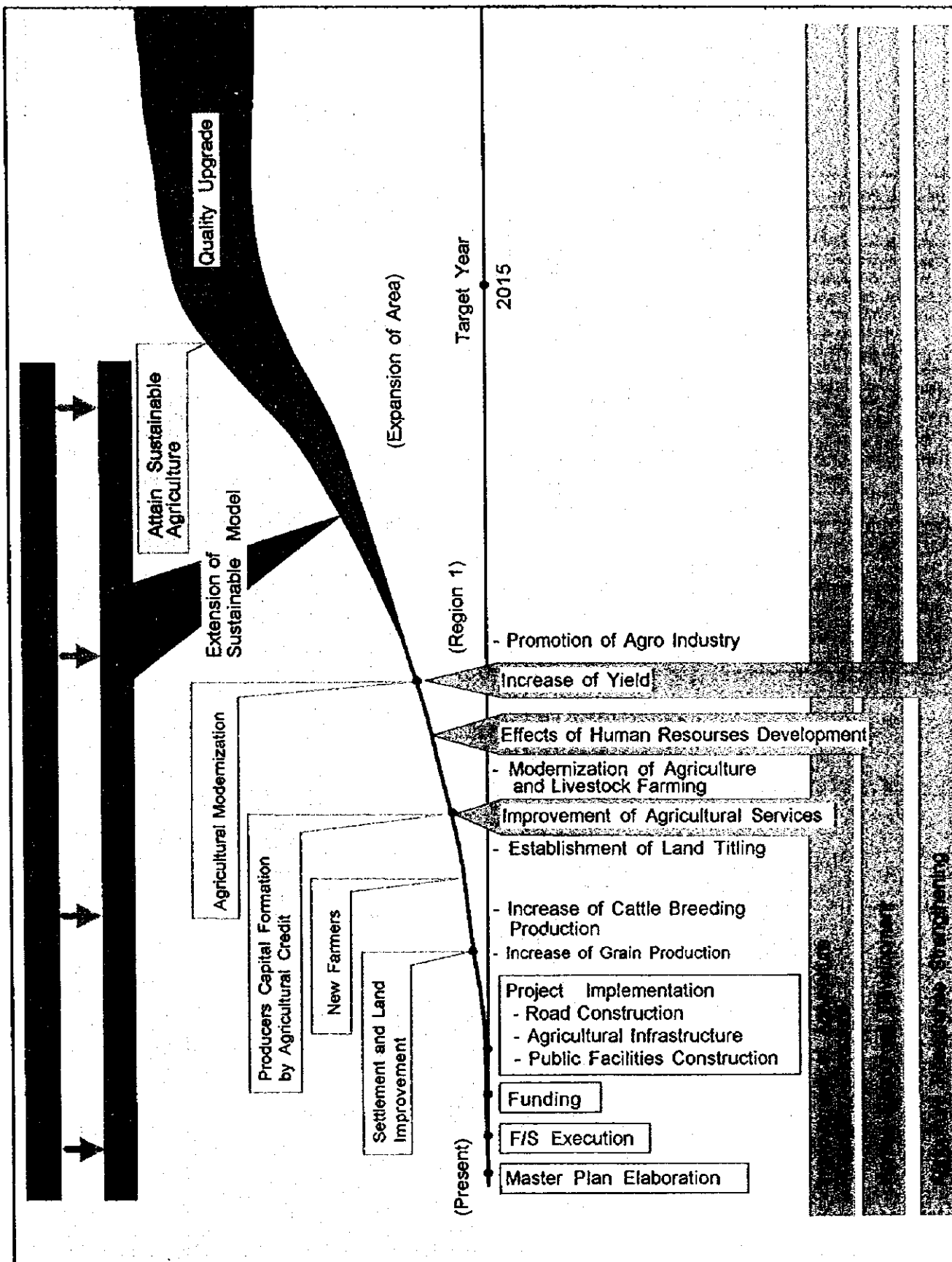


Fig.4.1 Agricultural Development Model

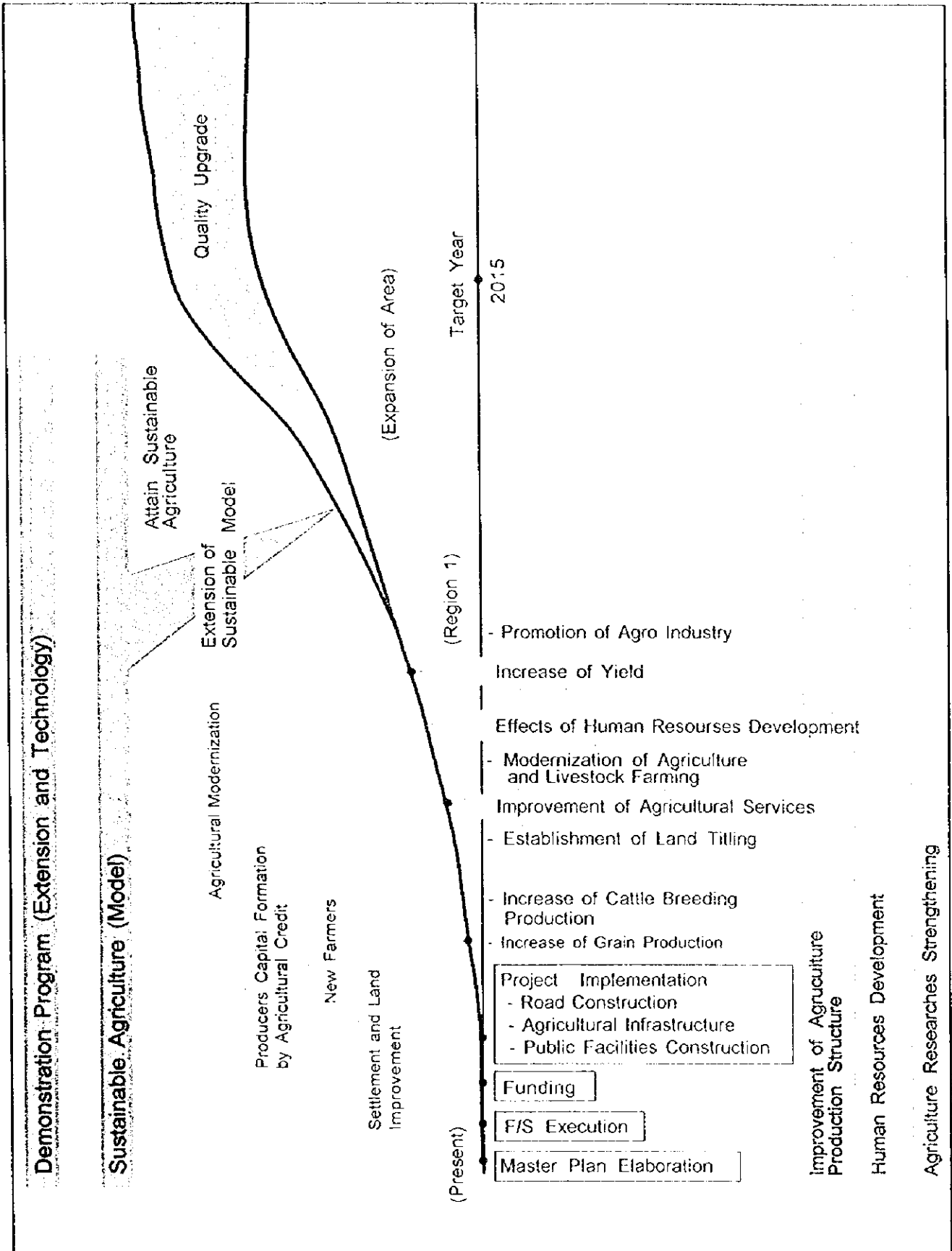


Fig.4.1 Agricultural Development Model

Development Strategies

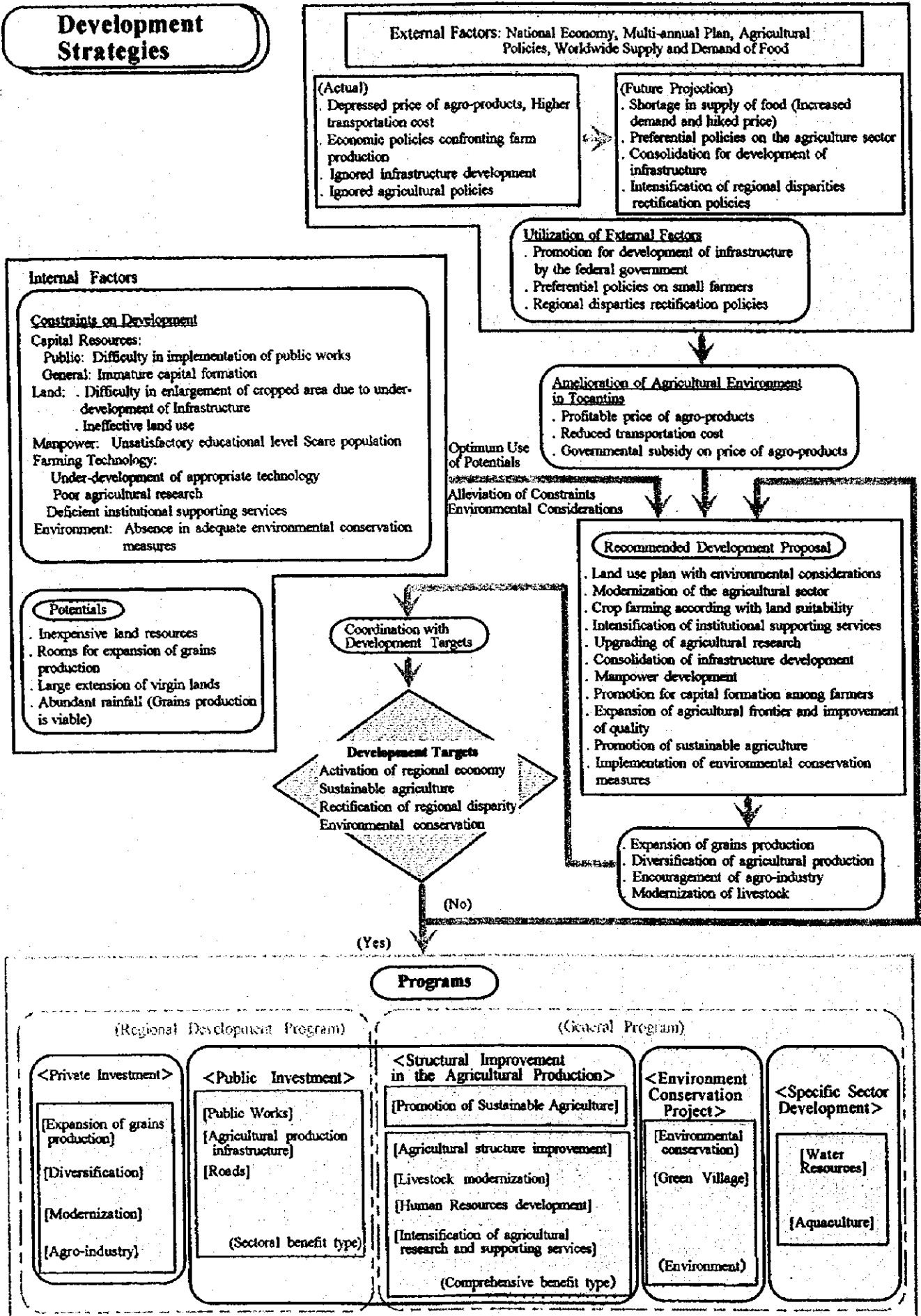


Fig.4.2: Development Strategies

4.2.2 Development Methodology

The state of Tocantins is situated amongst the least development states of the country without finding appropriate measures to make optimum use of abundant and fertile land resources. For alleviating this impasse, it is needless to point out that natural resources should be exploited effectively, and for this end, it is advisable to take the following measures.

(Utilization of Natural Resources)

1. Formulation of land use plan with major attention paid on environmental conservation (implementation of crop farming in conformity with land suitability).
2. Modernization of the agricultural sector to raise land productivity.
3. Selection of development entity to proceed development and proposal of incentives for this purpose (promotion of capital formation among existing farmers and invitation of new comers).
4. Improvement of marketing channel and infrastructure to facilitate comparatively topographic advantageous topography of the state.
5. Amelioration of rural circumstances to brake exodus of rural population to urban area.

(Environment Conservation)

1. Improvement of Environmental Conditions.
2. Incentives for the promotion of Investments in the fields of Environment Conservation.

(1) Implementation of Crop Farming in conformity with Land Suitability

The state of Tocantins is favored by natural conditions like rainfall and land fertility. Up to a couple of years before, the development of the state had been depressed due to disadvantageous geographic condition for marketing of agro-products, deficiency in accessibility, etc, but this disadvantageous situation has been eased recently owing to consolidation of infrastructure. Nonetheless, this is a partial evasion of under-development and is not the case to cover the whole area of the state.

In order to reinforce comparative advantage of the state in agricultural production, it is essential to save production and transportation costs as well as to establish farming technology suitable to national conditions of the region. In this sense, it is necessary to introduce farming practice to accord with natural conditions of the area.

According with land suitability classification, land with higher suitability may be used in order of the following purposes: 1) fruits and vegetables cultivation, 2) grains cultivation, 3) grazing and 4) reforestation, and the land use plan for the present Master Plan Study shall be delineated in conformity with this land classification method. It is worth while to indicate that the selection of crops for respective land shall be also made taking geographical position into consideration.

(2) Modernization of the Agricultural Sector

The agricultural productivity in Tocantins remains comparative inferior both per area and per labor unit, which is particularly the case among small and medium farmers; the smaller the land holding of farmers are, the lower the productivity per area and per labor unit becomes. For attaining more agricultural returns, it is a matter of course to introduce instruments which contribute to raise the productivity in terms of both per area and per labor unit; the productivity per area may be improved with application of greater amount of agricultural inputs, strengthening of agricultural extension services and introduction of advanced cropping technology, meanwhile elevating productivity per labor unit can be made through realization of farm mechanization. In addition, it should be noted that an introduction of these technologies can not be attained unless upgrading of farmers' educational grade is made. In this context, the training program aimed at manpower development and quality improvement of the factors concerned through the assistance and extension activities shall be proposed within the development plan of the present Master Plan Study.

(3) Selection of Target Beneficiaries and Promotion of Capital Formation among Farmers

Basically, target beneficiaries of development plans shall be farmers, who are expected to attain higher returns from farm activity. About half of farmers within the state hold lands in the range of 100 – 1,000 ha and the crop intensity rate of these lands is extremely low. By contrast, large holders enjoy higher agricultural returns than medium and small holders with practice of advanced farming system, although there still remains room for further improvement in their farming. To equip these farmers with an opportunity for capital formation and to encourage their farming activity and to raise crop intensity rate of their lands constitute important measures in expansion of grains and livestock output.

Apart from above proposal, attracting farmers and entrepreneurs from outside the state will be a promising measure in pursuit of further expansion of grains and livestock output as well as major participation of new comers for diffusion of renovated farming technology to farmers forming the medium producers in the state and in the peripheral areas.

(4) Consolidation and Infrastructure and Expansion of Agricultural Frontier

Potentially arable lands are widely extended throughout the state, but development of these lands has been postponed up to date in an absence of indispensable infrastructure for this development. So as to secure the comparative advantage of the state, saving of transportation cost attributable to improvement of transport infrastructure shall be an indispensable factor.

(5) Strengthening of Supporting Services and Agricultural Research System

Without being incorporated agricultural research institutions within the state, the development of agricultural technologies suitable to local salient conditions has been put aside, despite they are requisite condition for promotion of the agricultural sector of the state. In view of the fact that the technological level among farmers is different according to the natural factors such as soils and climate as well as to the social factors, farming technologies to be employed and integrated by respective farmer shall produce higher effects if they are proposed in due consideration of local conditions. Therefore, the success of the agricultural and livestock development depends partially on development of locally suitable unconventional technologies, selection of crop varieties and development of cropping techniques applicable to each development area, establishment of an organization in charge of integrating developed technologies and reinforcement of extension services.

(6) Amelioration of Rural Circumstances

The rural population in Tocantins has decreased by approx. 18% for the last six years due to out-migration of these rural population to the urban area. Factors explaining this phenomenon are an aggravation of living circumstances in connection with under-development of social infrastructure and dull performance of farming activities caused by deficient provision of supporting services to farmers. Taking account of this situation, it is essential to consolidate rural infrastructure, to invigorate rural activities and to hasten manpower development for putting the brakes on out-migration of rural population.

(7) Improvement of Environmental Conditions

Despite the existence of abundant natural resources in the State, these resources are extremely deteriorated due to the lack of adequate conditions for their conservation. One of the main causes for this deterioration is the fire caused by "queimadas". Bearing this fact in mind, the Environment Conservation Program is given priority within the Master Plan.

(8) Incentives for the Promotion of Investments in the fields of Environment Conservation

Besides the public sector performance in the promotion of investments aiming at the Environment protection, the participation of the private sector is extremely important. For this reason, necessary measures to stimulate the participation of the private sector were taken into consideration.

The basic concepts and development model of the present Master Plan are presented in Figures 4.3.

DEVELOPMENT CONCEPT

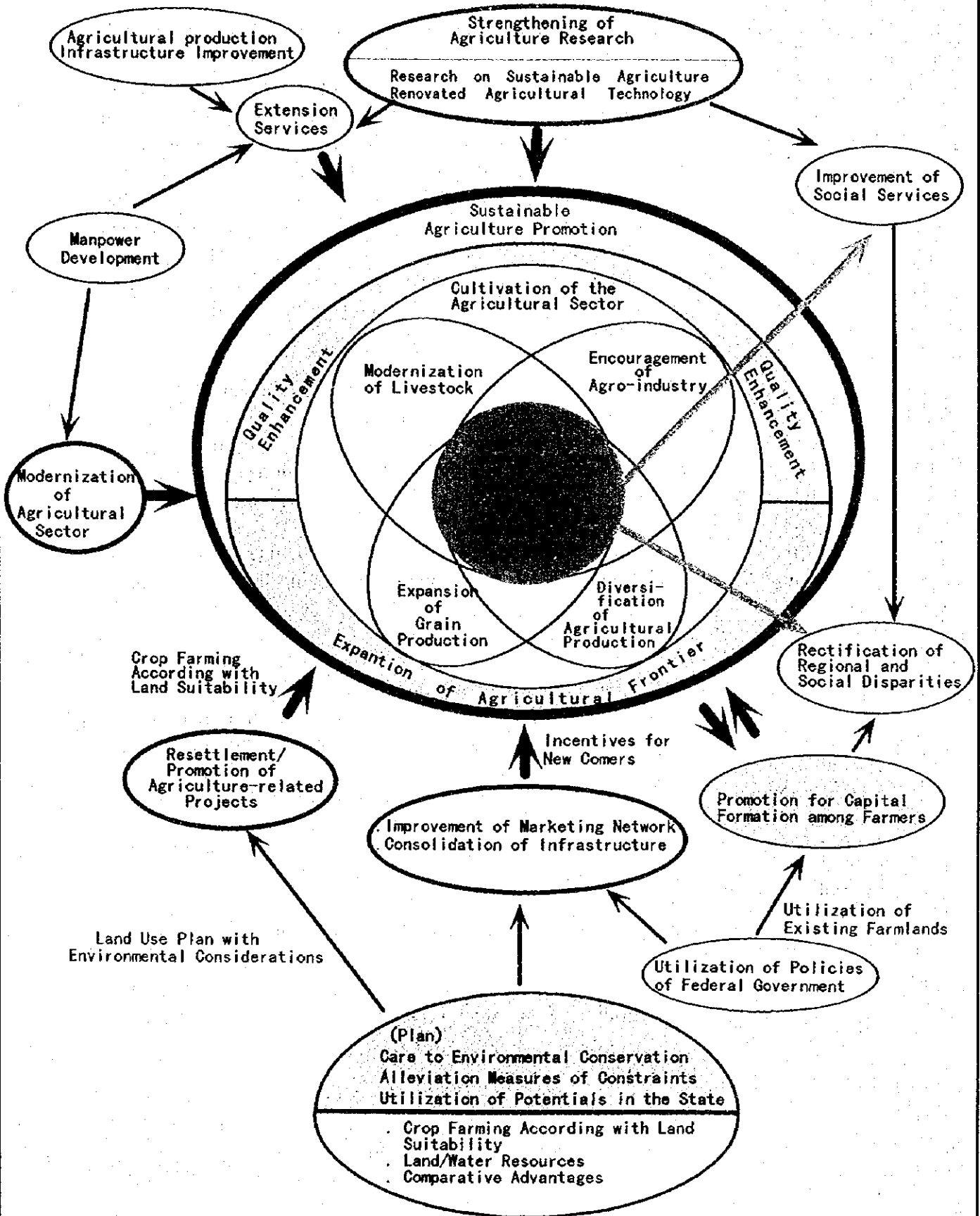


Fig. 4.3 Development Concept

DEVELOPMENT CONCEPT

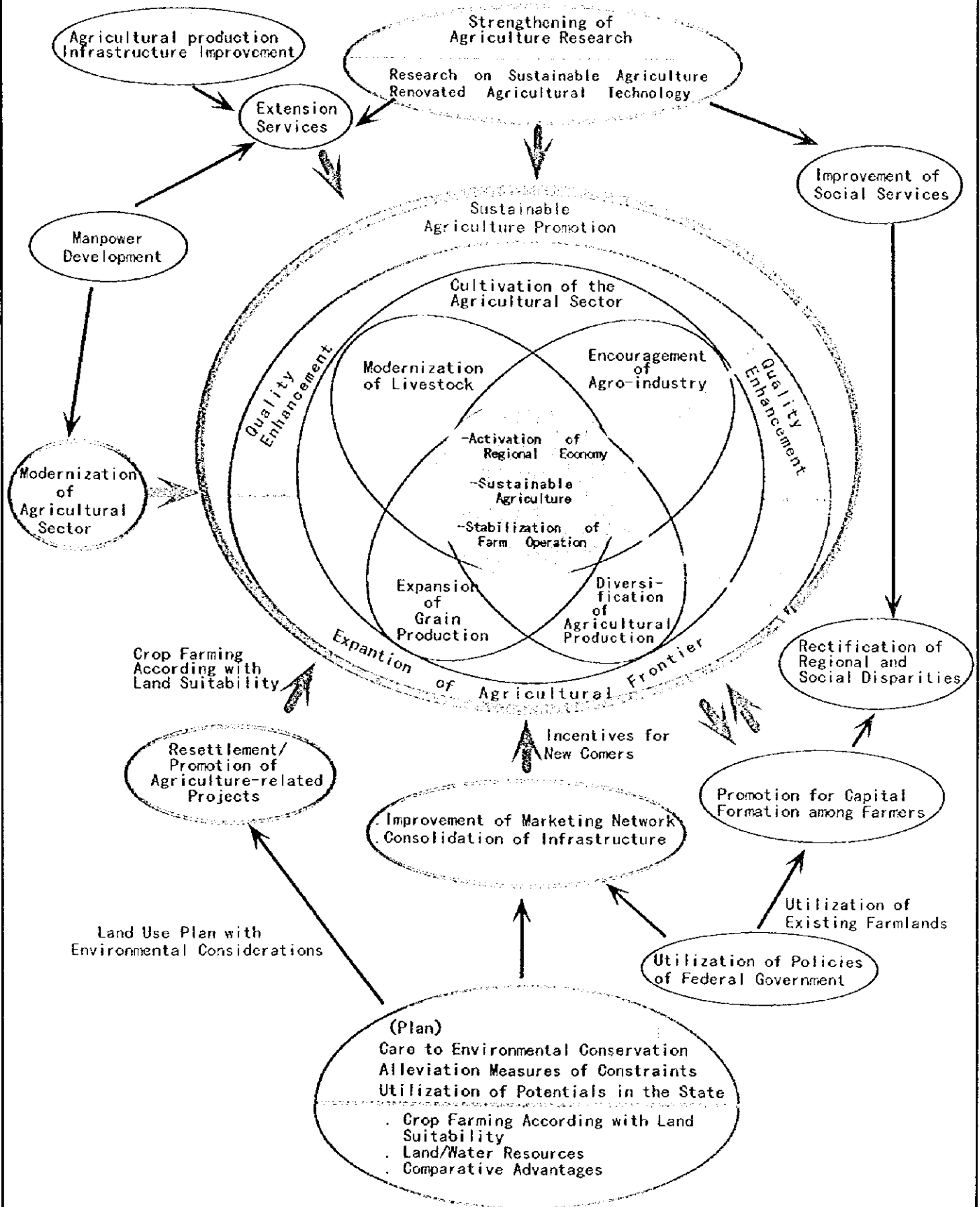


Fig. 4.3 Development Concept

4.2.3 Sources and Procurement Method for Financing Development Projects

The present program shall be implemented on the basis of the development plans formulated for respective region and financing proposal for the program shall consist of the public investment option and private investment option. Prior to implementation of programs, a master plan will be prepared at first, which is followed by implementation of a feasibility study, in view of avoiding disordered development of natural resources and optimization of these resources. Projects contemplated in the public investment option shall coincide basically with social infrastructure development, meanwhile projects relevant to the private investment option shall be such works as are required in connection with the resettlement program. The formulation of development projects shall be made with attention paid to the following aspects:

The State budget, owing to the undeveloped industries in the State, is not sufficient to promote new investment, and the farmer's level too does not capacitated to initialize new investment, exempt some grand landowner, with low level capitalization. For the development of the region, immense capital for the development will be required both in the public and private sector.

For these reason, the gradual development method will be proposed, developing on where locate a comparatively advantageous for other region, capitalizing the State financial capacities for the next step.

In so far as the projects of the private investment option, care shall be taken to contribute to capital formation of existing farmers. Taking into consideration that the existing farmers has an advantage, owing the proper land and consequently requiring a comparatively low fund for investment, with newly participant, the incentive of the existing farmers for the participation of the new investment will be planned. However the participation of the new farmers will be required to introduce the innovated technologies. Proposed sources of finance for this option shall, but not be limited to, the transfer of the federal government's fund and loan from foreign governments and international banking institutions.

(1) Procurement Method for the Development Fund required for Long Run

To procure the development capital required for long run is necessary to utilize the internal capital efficiently, introducing the external capitals by the following method.

Financing proposal for the private sector

A considerable extension of lands potential for grains cultivation exists in the state of Tocantins, which will promise a foreseeable future for the state taking pressing worldwide prospect for supply and demand of food in the near future. The completion of

the South-North Railroad for the section Imperatriz – Estreito shall integrate it with the BR153 and the Carajas Railroad and form a consistent transport network leading to the Port of Itaquí and this transportation network shall have positive effect on saving transportation cost of grains to be produced in Tocantins. This favorable outlook is expected to promote an attraction of investment from outside the state. Nonetheless, it is worth while to reflect prevailing situation for agricultural production that is resumed as : 1) Discouraged farmers' intention on conducting farming affected by large amount of rural credit-related debt, 2) Recession of the whole industrial sector due to decreased amount of investment in the agricultural sector and 3) Notable down-side trend of land price associated with dull performance of the agricultural sector and then to forecast the possibility of the participation of farmers/entrepreneurs of southern regions of the country in the agricultural production in Tocantins.

The following two alternatives may be conceived as a style of agricultural investment in Tocantins.

- A. Farmers and/or agricultural entrepreneurs realize farming activity with their own resources.
- B. Farmer and/or agricultural entrepreneurs realize farming activity with finance relying on credit rendered by others.

An example of the above alternative A is the PRODECER III which is just operated recently within the state and is expected to have a success in supporting unconventional agricultural structure of the state with introduction of soybeans cultivation. By contrast, no example for the Alternative B has been cited in the state up to date, although is the case among developed southern regions of grain production like the state of Minas Gerais where the practice of a loan from the buyers including grains majors is predominant. The program Caipira 63 is an incentive policy to attract an investment of foreign capitals, but this policy is generally utilized as a measure for commercial banks to get finance from foreign banks and to loan, in turn, this finance to the sales agents of fertilizers and agro-chemicals who give "pre-harvest" credit to farmers; thereby, no access to this program is made from the part of farmers at present. In any case, the Alternative B is accompanied by the productive activity and will come into fashion according with expansion of crop production.

The realization of the Alternative A, namely invitation of farmers and entrepreneurs endowed with technical and financial qualification, are a practical and the easiest way to attain an enlargement of agricultural production. And, so as to facilitate this realization, it is necessary that the state government should prepare incentives such as consolidation of infrastructure and exemption and/or reduction of taxes. Furthermore, in advance of preparing the said incentives aiming at the realization of the Alternative A, it is also prerequisite and effective way that the state government and existing farmers in the state should made efforts in increasing agricultural production and in yielding satisfactory

achievements and to develop infrastructure such as transportation system, silos and agro-industry in line with these achievements.

(2) Capital Procurement Method for Short Run

Procurement of the capital in a short run for the activities of the agricultural production will be done utilizing the Federal Level's Agricultural Credit and the loan of the Foreign countries. Recent agricultural policies applied by the Federal Government is aiming to promote agricultural production, especially in the North region of Brazil, the Government are applying the good condition of credit. By these reason, the efficient utilization of the federal credit system should be considered.

Rural credit promotion plan

The federal government has disclosed its agricultural policy for the crop year 97/98 in June 11, 1997 and the rural credit program contemplated in this policy may be compared with that of the crop year 96/97 in the following manner.

| | Crop Year 96/97 | Crop Year 97/98 |
|--|--|---|
| Interest rate | 12%, 9%(PRONAF) | 9.5%, 6.5%(PRONAF) |
| Amount to be credited | R\$ 5,200 million R\$ 574 million (PRONAF) | R\$ 8,500 million R\$ 1,650 million |
| Agricultural investment (ceiling amount) | R\$ 30,000 | R\$ 40,000 |
| Credit amount/crop or livestock | R\$ 30,000 (sorghum) R\$ 30,000 (soybeans) R\$ 30,000 (livestock and others) | R\$ 150,000 (sorghum, central and southern regions) R\$ 100,000 (soybeans, central, western and northern regions) R\$ 40,000 (livestock and others) |

An outstanding increase of credit amount for soybeans from R\$ 30,000 to R\$ 100,000 shall make up an incentive for the crop's expansion in combination with the program PRE-CUSTEIRO which was put into force in the previous year. In addition, the increased ceiling amount for agricultural investment supported by extremely low interest rate of 9.5% is expected to bring about an acceleration of agricultural mechanization among farmers.

The interest rate for the PRONAF has lowered to 6.5%, but the problem relevant to this program falls on limited amount of credit (R\$ 5,000 for crop cultivation and R\$ 15,000 for agricultural investment). The proposal to overcome this problem is to conduct farming by forming an association or other kind of farming group, because the limited amount of credit for group hikes to R\$ 75,000, which will enable to access to holding agricultural machinery for participating grains production. Even though, large-scaled agricultural machinery represented by combine can not be purchased with that limited amount of

credit, therefore it is advisable that some measures like an establishment of pilot-type mechanization center should be taken.

Although the credit conditions for the crop year 97/98 has become advantageous to farmers, the prevailing rural credit is not easily accessible by marginal and small peasants. Therefore RURALTINS or other governmental agencies should take some special cares to open way to rural credits among marginal and small peasants.

By the reason that the application of the Federal Government's credit system has some difficulties for the Tocantins State's farmers, the State Government are trying to create Proper credit system. In this purpose, the creation of State Development Bank are under planning, in order to loan for the State farmers in a low interest, through the procurement of the foreign loans with low interest. Through the creation of Development Bank, the State Government will promote the activation of the investment.

(3) Procurement Method for the Public Sector's Activities

For the promotion of the private sector's investment, the constructions of the infrastructure, which enable to feasible the activities, are basic conditions, such as traffic structure and communication facilities. In case of the State, these type of investment were implemented by the effort of the State Government, and these conditions were improved significantly.

At present, the direction of the public sector investment is recommended to change, especially, in the strengthening of the research and extension service which enable to capacitate the farmer to change their traditional agricultural techniques. Consequently, the strengthening of the institutions is inevitable. Further more, the implementation of the studies will be required as to invest in a adequate method. The necessary study should be carried out by the public sector.

In so far as public financing option is concerned, various options (e.g. fiscal arrangement of federal and state governments including procurement of external loan, own finance of public enterprise, introduction of private finance for operation - concession, BOT, BOO, etc., private investment and so on) shall be presented for a wide variety of selection. At the same time, the share of the beneficiaries with respect to project investment shall be clarified. The development method shall also involve time schedule for implementation of projects/programs contemplated in the Master Plan. So as to enlarge so that the synergy effect of the Master Plan, projects and programs of the Master Plan shall consist of: 1) an integration of a general development proposal aiming at improving agricultural productivity of the state as a whole and 2) regional development proposal which benefits are anticipated to be diffused to peripheral areas.

Judging from the financial capacities of the State, implementation of the public works,

which require more investment should not be adequate, at present. In a short run, the implementation of the works which requires low unit cost per beneficiary will be recommended. Implementation of the high cost public work should be implemented a time when the State financial capacity is increased.

4.2.4 Development Zoning

In accordance with social features, land suitability for crop farming and amount of precipitation, the total territory of the state has been divided into the following six zones:

- Zone I: Bico do Papagaio
- Zone II: Northern area between the BR (National Route) 153 and the Araguaia River (From Araguaina to Colinas do Tocantins)
Central-south area extending alongside the Tocantins River to the south from Pedro Afonso
- Zone III: Western area between the BR 153 and the Araguaia River (From Colinas do Tocantins to the south)
- Zone IV: Southeast area with relative high altitude
- Zone V: Northeast area and east area represented by Jalapão
- Zone VI: Ecological reserves represented by the Bananal island and indigenous reserves

The map, which delimits the agronomic zoning, is shown in the Figure 4.4.

Tocantins State
 • Zone of production increase and environmental protection by intensification of the agricultural sector (rural extension, research activities).

Zone I

• Zone of formation of mini and small farms by the development of the intensive agriculture and cattle breeding.

Zone II

• Zone mainly for cereal production (soy bean, corn) and cattle breeding development.

Zone III

• Zone mainly for paddy field and cattle breeding.

Zone IV

• Zone for mini and small farms formation by fruit production and cattle breeding.

Zone V

• Zone mainly for regional development of cattle breeding/fruit production/silviculture.

A Extreme North

B North

C Northeast

D Northwest

E East

F West

G Central

H Southeast

I Southwest

J South

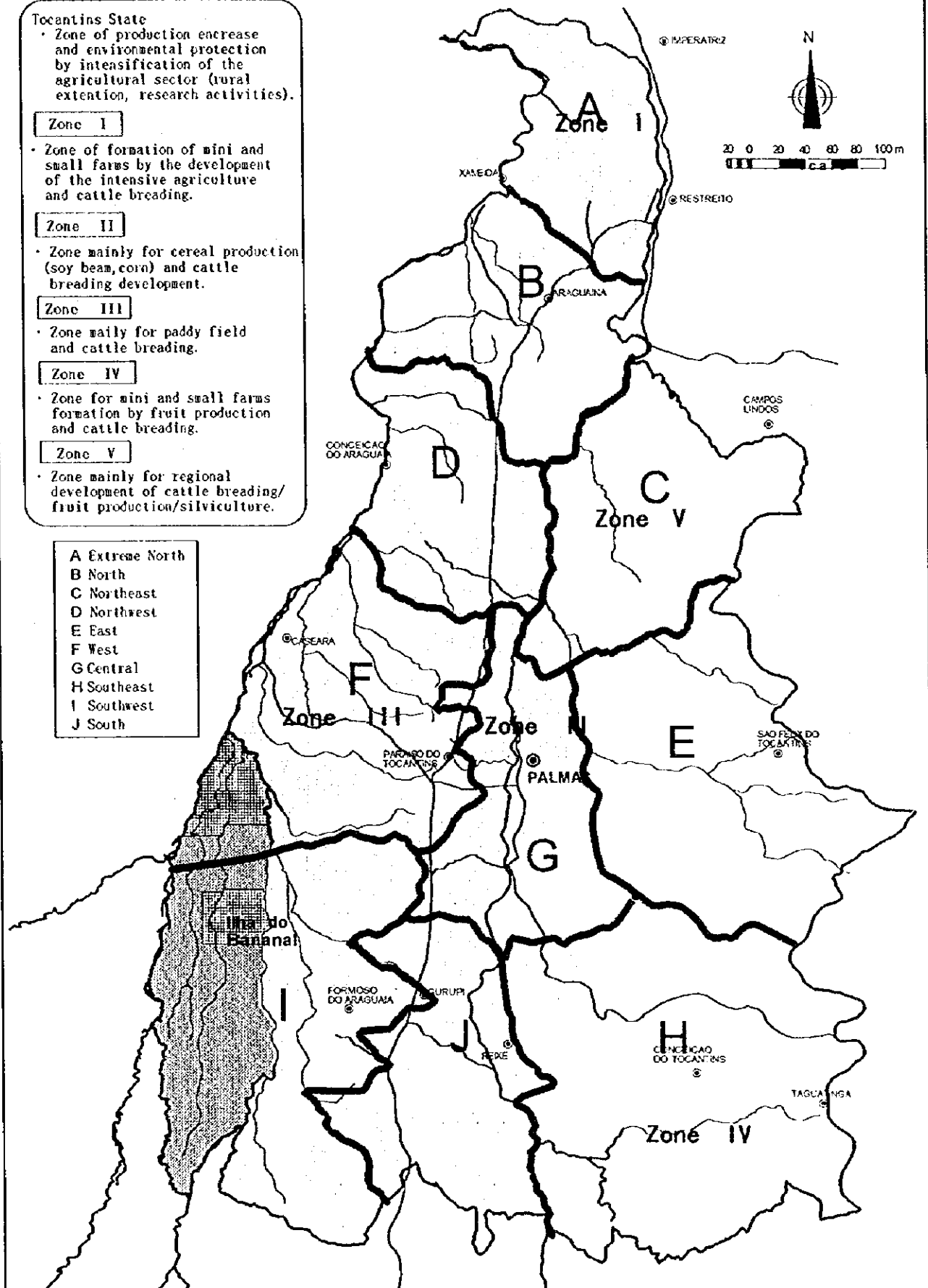


Fig. 4.4 Agronomical Zoning

The salient features for each respective zone is mentioned in the table shown below.

| Regions (Zones) | Salient Features |
|--|---|
| Extreme-North (Zone I) | <ul style="list-style-type: none"> • The class II lands are concentrated with higher proportion • High intensity of fluvial system and potential area for small-scale hydraulic resources development • Higher population density and abundant potential labor force • Major concentration of new immigrants as well as landless peasants without land titling • Under-development of infrastructure compared with the number of municipalities, thus development of road infrastructure is critical for development |
| North (Partial)/ Northwest (Partial) (Zone II) | <ul style="list-style-type: none"> • Greater majority of the territory is occupied by the class II lands • Large holders predominate, so capital formation of farmers is relatively high. • Higher density of road network and easily accessible to the city of Estreito, a future entrepôt of agricultural commodities |
| Northwest (Partial)/ Central-west/Southwest (Zone III) | <ul style="list-style-type: none"> • Suitable lands for crop production are extended over plains along rivers. • Higher precipitation • Paddy cultivation is a common practice • State roads to be united with the BR153 is being constructed |
| Central/South/ Southeast (Partial) (Zone II) | <ul style="list-style-type: none"> • Class II lands are widely distributed over plains along the Tocantins River • Under-development of road network except for northern sector |
| Southeast (Highland) (Zone IV) | <ul style="list-style-type: none"> • Located at relatively high altitude • Class I lands are sparsely found • Difference between daily high and low temperature is notable |
| East/Northeast/North (Partial) (Zone V) | <ul style="list-style-type: none"> • Low density of population and less active of agricultural industry in comparison with the remainder of the state • Sandy soils which are less suitable for crop production are widely distributed • Potential lands for development are scattered • Least development regions with respect to consolidation of infrastructure |
| Environmental Reserve (Zone VI) | <ul style="list-style-type: none"> • Environmental and indigenous reserves |

In view consideration of the salient features mentioned above, the development proposal for each zone shall be formulated in principle with the combination of the following development alternatives and on the basis of the administrative regions established by the state government.

1. Expansion of grains production
2. Rectification of disparities and increase of crop and livestock production among marginal and small farmers
3. Modernization and expansion of livestock industry
4. Encouragement of agro-industry
5. Amelioration of rural circumstances
6. Environmental conservation and sustainable agriculture

Farming proposal for each zone is as described below.

| Zone | Farming Proposal |
|-----------------|---|
| Tocantins State | Expansion of production owing to strengthening of the agricultural sector (Extension services and research and development) |
| Zone I | Upgrading marginal and small farmers with introduction of intensive farming |
| Zone II | Concentrated farming of grains (soybeans and maize) and livestock |
| Zone III | Concentrated farming of paddy and livestock |
| Zone IV | Fostering marginal and small farmers with introduction of fruits cultivation and horticulture |
| Zone V | Core development with introduction of livestock, fruits cultivation and reforestation |

4.2.5 Implementation Method of the Master Plan

(i) Implementation Phasing

Bearing territorial extension and under-development of infrastructure into mind, an implementation phasing for development of the Master Plan is prerequisite for activation of state industrial sectors. The present Master Plan is a long-term planning task with a target year of 2015 that comprises various development components, thereby the projects/programs contemplated in the Master Plan should be put into implementation in conformity with the phasing order to be set following the grade of importance and urgency by sector and by region.

The under-development of the state's agricultural sector is due greatly to inappropriate utilization of land and water resources. In planning development projects/programs, focus shall be laid on improvement of agricultural productive infrastructure and social infrastructure that will enable rational and optimum utilization of resources, and expansion and diversification of agricultural production as well as improvement of living standard shall be realized in accordance with the phasing order mentioned before.

The implementation phasing of the Master Plan shall consist of: short-term (starting 5 years), medium term (6th – 10th years) and long term (remaining 5 years).

The development projects/programs can be divided into two categories: public investment option and private investment option; the former is further classified into three sub-categories: 1) those which cover the whole state in producing benefits, 2) those which are developed regionally and 3) those which are developed in harmony with environmental conservation, and higher priority shall given to sub-categories 1) and 3). Meanwhile, the priorities for the projects/programs classified as 2) shall be set referring to the following criteria:

1. Economic returns
2. Regional and social urgency
3. Direct and indirect effects of implementation
4. Environmental conservation
5. Investment cost

(2) Development Entities

Taking account of limited financial resources available for development of projects/programs of the state government as well as the federal government's reformed policy on investment of public works, effort shall be made to incorporate strategic development core sites as far as possible. In principle, the development entities shall be the local governments with participation of proposed beneficiaries, but for some projects that can not be implemented by local governments due to nature of their components, an implementation entity shall be created for each project.

(3) Method of Administration

For the smooth execution of each program till the objective year of 2015, the state SEPLAN, with the cooperation of other concerned organisms, must periodically monitor the following :

1. Evaluation of the results of each program
2. Identification of the problems
3. Revision of the Master Plan by a feed back process
4. Estimation of necessary financial resources

4.2.6 Environmental Considerations

The state of Tocantins is a prospective state, which is expected to accomplish higher development in the near future, and, so as to enable this development sustainable, it is essential that devoted environmental considerations on evading negative effects of development projects should be taken. Land use plan to contemplate crop farming in conformity with the land suitability shall be thus forged prior to project implementation; on the basis of this land use plan, resettlement plan for new comers and land use plan for existing farmers shall be incorporated. In view of mitigating negative effect of project implementation on environment as far as possible, environmental monitoring system shall be proposed. Within this context, proposal will be also made to regulate the practice for burning grassland. The specific development strategies together with measures following these strategies are as resumed hereinafter.

4.2.7 Specific Development Strategies

The specific development strategies together with measures following these strategies are as mentioned below.

| Specific Strategies | | Measures (Specific proposals) |
|---|--|--|
| Targets | Description | |
| Expansion of grains Production | To expand grains represented by maize, soybeans and rice and to aim at participating in the world market contributing to offset deficiency of grains worldwide in the future. Also to encourage an investment from outside the state. | <ul style="list-style-type: none"> • Preferential policies (taxation, land, etc.), to accelerate investment • Incentive measures to attract investment (taxation, land distribution, etc.) • Establishment of sustainable production system for grains • Participation of small holders in grains production • Development of agricultural infrastructure (irrigation system) • Research on production of hybrid seeds |
| Diversification of crop farming | To attain more stable farming operation with introduction of horticulture | <ul style="list-style-type: none"> • Introduction and promotion of fruit culture • Introduction and promotion of vegetables culture |
| Modernization of livestock industry | To diversity livestock activity and to establish proper animal health protection system | <ul style="list-style-type: none"> • Improvement of animal breeding system and establishment of free zone for animal health protection • Encouragement of swine and poultry farming • Promotion of buffalo raising among medium farmers • Modernization of small and medium-scale slaughter house and improvement of inspection system |
| Development of agro-industry | To lay foundation stone for producing fertilizer within the state by optimum use of mineral resources available in the state. The challenge also involve development of agro-based industry for processing locally available produce so as to maximize value-added of commodities, to activate regional economy, and to general job opportunity. | <ul style="list-style-type: none"> • Reorganization of Exports Processing Zone (ZPE) • Incentive instruments for participation of private sector in investment • Better use of mineral resources (limestone) compatible with crops cultivated area • Utilization of by-products of grains (rice bran, soybean meat, etc.) • Intensification of producers' organization • Consolidation of transport infrastructure • Creation of animal feeds production industry |
| Improvement of marketing network | Aiming at reinforcement for competitiveness of the state, to improve transportation system represented by road and railroad and to consolidate logistics of agricultural commodities to invigorate marketing of commodities | <ul style="list-style-type: none"> • Improvement of transport infrastructure (road, railroad, waterway) • Modernization for logistics of commodities |
| Rectification of regional disparities and enlargement of agricultural production due to fostering of marginal and small farmers | In so far as soil and climate conditions permit, to aim to produce vegetables and fruits, consumption of which is heavily dependent on importation from outside the state. | <ul style="list-style-type: none"> • Colonization of landless marginal peasants • Strengthening of farming technology research and development system • Enhancement of extension services to farmers • Incorporation and intensification of farmers' organization (sharecropping, marketing) |
| Amelioration of rural environment | To provide comfortable rural infrastructure to serve ameliorating of rural living standard and thus to impede an exodus of rural inhabitants to urban area. | <ul style="list-style-type: none"> • Construction of social infrastructure (electricity, water supply, school, public health facility, community center) • Promotion of rural social activities • Incorporation of small-scale rural industry |
| Environmental conservation and sustainable development | To evade negative effects of project implementation on natural and social environment and to propose development plan which enables to sustain development benefits as long as possible | <ul style="list-style-type: none"> • Soil and water quality conservation • Environmental enlightenment education • Implementation of agro-forestry and social-forestry project • Establishment of environmental monitoring system • Protection of biological diversity |
| Fostering of small farmers | To provide existing small farmers with technical and financial assistance to upgrade these small farmers to the level of medium farmers | <ul style="list-style-type: none"> • Expansion and revision of NPA • Enlargement of technical assistance • Strengthening of rural credit services |
| Upgrading supporting services to farmers | To reinforce agricultural research system for development of crop farming technology suitable to local conditions | <ul style="list-style-type: none"> • Establishment of proper land tilling system • Improvement of quarantine and disease control system • Upgrading research system • Provision of adequate supporting services |
| Manpower development | To raise educational standard of local population to contribute technical renovation of agricultural sector. | <ul style="list-style-type: none"> • Upgrading vocational training • Consolidation of educational institutions |

4.3 Development Framing and Identification of Beneficiaries

Phased development shall be proposed and the time span up to 2015 shall be classified into three terms: short, medium and long, and each term shall have a target year of fifth, tenth and fifteenth years from commencement of the Master Plan, respectively. Development framing for respective time shall be as follows:

(Short-term)

1. Implementation of projects/programs which can reduce social problems and insert inactive producers in productive activities.
2. Manpower development and supply of facilities and equipment for improvement of agricultural technology research system.
3. Formulation of institutional supporting program to farmers
4. Formulation of implementation program for regional development projects in areas where are highly suitable for agricultural production, less constrained from negative factors and are anticipated to produce highest returns.
5. Improvement of inspection, fiscalization, standardization and classification of agriculture and livestock products.

(Medium-term)

1. Implementation of highly benefited projects with eye laid on future outlook regarding supply and demand of food in the world.
2. Presentation of development proposal and formulation of projects implementation program for less developed areas.
3. Enforcement of policies to encourage development of agro-industry.

(Long-term)

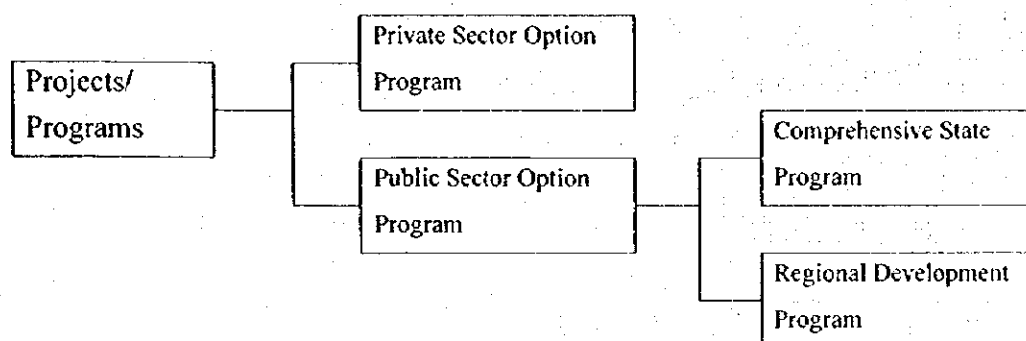
1. Exposition of projects in areas where are potential for agricultural production.
2. Development of agro-industry.
3. Implementation of a study on rational use of natural resources.

Beneficiaries of projects/programs of the Master Plan are defined as follows:

| Term | Direct Beneficiaries | Indirect Beneficiaries |
|--------|--|---|
| Short | <ul style="list-style-type: none"> • Farmers living in the region where is highly potential for agricultural production (north region) • Marginal peasants living in the suburbs of urban areas. | <ul style="list-style-type: none"> • Peripheral inhabitants of project implementation area |
| Medium | <ul style="list-style-type: none"> • Farmers living in less developed regions. • Farmers living in remaining regions with high potentiality for agricultural production | <ul style="list-style-type: none"> • Farmers covering the whole state |
| Long | <ul style="list-style-type: none"> • Farmers covering the whole state | |

4.4 Development Concepts of Projects/Programs

The development projects/programs conceived in the Master Plan can be divided into two categories: public investment option and private investment option; the former is further classified into two sub-categories according with the coverage of projects' benefits: 1) comprehensive state program and regional program. Furthermore, the comprehensive state program shall consist of environmental conservation, agricultural research/extension, manpower development, while the regional program shall be an integrated regional development.



(1) Comprehensive State Program

The comprehensive state program is composed of the programs, the covering area of which is extended throughout the state and the program comprises projects related with environmental conservation and expansion of agricultural production.

1) Agricultural Production Supporting System Strengthening Program

As the programs related to the increase of the agricultural production, the strengthening of the agricultural sector' institutions, the modernization of the livestock activities, strengthening of the research and development of the human resources are the necessary factors to improve the agricultural activities.

(Institutional Reform)

Presently, the state is not equipped with agricultural research and extension services system to be suited to local conditions and farmers are not adequately enlightened on farming. This situation justifies to propose strengthening of agricultural education and research/extension system as well as to proceed development of human resources to be engaged in the agricultural sector.

In the case of the State Secretary of Agriculture, apart from strengthening of the organization, strengthening of the plant protection and plant guaranteeing are also required in order to prevent the diseases and secure the quality of agricultural products.

(Livestock Sector Modernization)

Taking into consideration that the livestock production is one of the important industry, the stabilization and increasing of the livestock productivity is key factor for the stabilization of the State economy. Particularly, the stabilization of the livestock product through the freedom from disease which difficult the exportation and valorization of the product will contribute the stabilization of the economy, enabling to export to other countries with aggregated price. These freedom of disease will contribute to improve the small farmer's economic conditions to valorizing the product. Furthermore, the free zoom from disease, strengthening of the inspection of animal disease and qualities control will be require for its achievement.

(Agricultural Technology Research and Extension Organization)

At present, research activities related to the agricultural sector are carrying out by the faculty of agronomy and veterinary of the UNITINS with the poor facilities, some time the research activities are difficult to realize by the reason that the equipment are not sufficient. For the development of the research activities of the State, the collaboration of the UNITINS are fundamental factor. Furthermore, the installation of the research center which enable to carry out sufficient and advanced research should be considered, especially to promote the introduction of the sustainable agricultural techniques.

(Human Resources Development)

In a promotion of the State development, the human resources development is an inevitable factor. However the State structure does not equipped to educate the human resources. In the course of the development, at a first stage, the strengthening of the education of the agricultural technicians for the extension of the innovated techniques will be recommended.

Strengthening of the agricultural sector shall be attained through the following steps:

1. Investigation on necessary equipment and installations and on the scope for improvement
2. Formulation of strengthening programs/projects (human resources development, agricultural education, agricultural research, extension services, etc.)
3. Consolidation of infrastructure
4. Implantation of Civil Works
5. Implementation of programs/projects (education and research)
6. Intensify extension services

The programs/projects to be formulated are as numerated below.

| Public Investment Option: Programs of High Public Interest | Projects |
|---|--|
| Institutional reform | <ul style="list-style-type: none"> - Land titling and registration system improvement - Structural reform of organizations - Plants inspection system - Agro-products inspection system |
| Livestock sector modernization | <ul style="list-style-type: none"> - Establishment of animal disease-free zone - Strengthening of animal health |
| Agricultural technology research and extension organization | <ul style="list-style-type: none"> - Strengthening of UNITINS agricultural division at Gurupi - Promotion of school of veterinary medicine of UNITINS |
| Human resources development | <ul style="list-style-type: none"> - Agricultural vocational training - Educational institutions strengthening - Farmers' organization promotion - Improvement of the living conditions of the rural women |

2) Environmental Conservation Program

As a program for the conservation of the environmental factors, attention to the following factors will be paid.

1. Forest fire caused by practice of burning off
2. Deforestation due to disordered development
3. Water contamination stemmed from sewage of agro-industry

For the prevention of the natural resources deterioration, comprehensive measure composed by the implementation of public investment and participation of the private sector will be required. The public sector role is to control the deterioration and private sector's role is to contribute for the improvement of the environmental conditions. For the participation of the private sector particularly in an investment, the measures for the

introduction of the incentives to increase the investment will be necessary.

The contents of the Program are summarized as follows;

| Public Investment Option: Programs with Major Component of Environmental Conservation | Projects |
|---|--|
| Environmental conservation | <ul style="list-style-type: none"> - Promotion of sustainable reforestation - Control of burning off natural vegetation - Mitigation of water contamination - Environmental enlightening and education - Establishment of environmental monitoring system |
| Green village | <ul style="list-style-type: none"> - Improvement of rural environment - Sustainable farming model - Distribution of seeds and seedlings |

On the basis of the utilization of the private sector force to improve the environmental conditions, the project required the implementation by the public sector will be planned as a public sector implementation. For the utilization of the private sector force, special credit line will be established. The state agricultural development programs except the Javaes Project are of small scale, having the environmental aspect which is the reason for including in this program.

(2) Regional Development Program

The development program shall be formulated regarding the following then (10) regions divided by the state government.

1. Extreme-North Region (Zone I)
2. North Region (Zone II & Zone V)
3. Northwest Region (Zone II & Zone III)
4. Northeast Region (Zone V)
5. Central-West Region (Zone III)
6. Central Region (Zone II)
7. East Region (Zone V)
8. Southwest Region (Zone III)
9. South Region (Zone II)
10. Southeast Region (Zone II & Zone IV)

The expansion of agricultural output for respective region shall be by means of various measures relevant to grains, fruits and vegetables cultivation together with promotion of livestock sub-sector. Various measures shall comprise, but not limited to, the following items, namely:

1. Identification of potentials for each regions to comply with the results of the Master Plan Study

2. Implementation of the feasibility study on development of infrastructure in connection with potential development areas
3. Formulation of development projects
4. Implementation of development projects
5. Operation of infrastructure and commencement of productive activities
6. Rendering extension services
7. Provision of rural credit
8. Encouragement of agro-industry
9. Introduction of livestock projects

Projects/programs to be taken up for the regional development may be summarized in the following manner.

| Regional Development Program | Description of Sub-programs |
|--|--|
| 1. Extreme-North Region (Zone I) | - Expansion of grains production |
| 2. North Region (Zone II & Zone V) | - Diversification of productive activities |
| 3. Northwest Region (Zone II & Zone III) | - Promotion for improvement of livestock |
| 4. Northeast Region (Zone V) | - Encouragement of agro-industry |
| 5. Central-West Region (Zone III) | - Improvement of marketing network |
| 6. Central Region (Zone II) | - Consolidation of social services |
| 7. East Region (Zone V) | |
| 8. Southwest Region (Zone III) | |
| 9. South Region (Zone II) | |
| 10. Southeast Region (Zone II & Zone IV) | |

Despite the fact the feasibility study is done for the Javaes Project which is situated in the southeastern region of the state, the state government is revising the study. So, it is included in the southeast regional development project in spite of being treated as an individual project in the integrated development plan.

(3) Private Investment Option

Programs to be included in the private investment option shall be combined with those of the public investment option so that expected effects of project implementation may be multiplied. Proposed programs in this category are as listed below.

| Sub-programs | Projects |
|--|---|
| Incentive for Exports Processing Zone | - Exports Processing Zone - Installation of Dry Port (Inland Custom Clearance Station) |
| Modernization for Marketing of Agro-products | - Incentive to the Creation of Commodities Stock Market - Installation of CEASAs |
| Encouragement of agro-industry | - Rice processing, leather processing, Oil extraction, and Balanced ration |
| Program for Effective Utilization of Agricultural Inputs | - Promotion for Supply of Lime, Organic Inputs and Fertilizers |
| Improvement of Livestock Products | - Modernization of Slaughterhouses for Swine |