

4.5 Agricultural Development Plan

4.5.1 Brief Description of the Agriculture and Livestock Development Plan

The formulation of the Master Plan for the Agriculture and Livestock will be carried out for the following components for the target year of 2015.

- Regional Development Program
- Agriculture Production Supporting System Strengthening Program
- Environmental Conservation Program
- Technologies Development Program for Sustainable Agriculture and Livestock
- Specific Sectors Development Program
- Private Sector Program

Regional Development Program will be planned for the 10 regions in which the state was divided by the government, taking into consideration the economic and social priorities of each region. The implementation of the program will be carried out gradually according to its priority. In the Planning, the projects will be classified as private sector projects and public sector projects. In the implementation schedule for the public sector project, the economic and social aspects of each project will be examined. Based on the results of the economical and social studies, the priority of each project will be determined, taking into consideration their contribution for the alleviation of the social discrepancy problem. Regarding the private sector projects, consideration will be given to the promotion of investments and farmers capitalization, promoting the expansion and diversification of agricultural production as well as the modernization of the livestock production.

The objectives of the Agriculture Production Supporting System Strengthening Program are to assist the agricultural production activities through the strengthening of the agricultural extension and research services and the human resources fostering plan. Considering the long term period necessary for the Program to achieve its objectives and its importance to increase the agricultural production, the implementation of this Program is highly recommended to be carried out at an early stage and in due consideration of the State Budget conditions.

The objective of the Environmental Conservation Program is to promote the harmonious development of the State together with environmental conservation activities. This Program is composed of two subprograms, one is the environmental conservation program and the other one is the so called "Vila Verde" program. This last subprogram objectives are to study alternatives for the sustainable agricultural development which can be implemented utilizing agricultural credit.

The objective of the Technologies Development Program for Sustainable Agriculture and Livestock Farming is to demonstrate the alternatives for a sustainable agriculture aiming

the future regional development. This program shall be implemented prior to the implementation of other programs, through the installation of a model farm where the experiences are going to take place. In this model farm, the introduction of new innovative agriculture methods and agricultural extension services will be studied. The Private Sector Program is composed of subprograms which will be financed by the private sector. In the implementation of the Program, alternatives to increase propensity for investments will be studied.

The contents of the Master Plan are shown in Fig 4.5. This program aim to achieve the sustainable development through the mutual interaction of each program. The detail of the each program are as follows;

Program	Subprogram
Regional Development Program	<ul style="list-style-type: none"> • Extreme-North Region Development • North Region Development • Northeast Region Development • Northwest Region Development • East Region Development • Central West Region Development • Central Region Development • Southeast Region Development • Southwest Region Development • South Region Development
Agriculture Production Supporting System Strengthening Program	<ul style="list-style-type: none"> • Structural Reform of Public Institutions • Modernization of Livestock Sector • Intensification of Agricultural Technologies Research and Extension Services • Human Resources Development
Environmental Conservation Program	<ul style="list-style-type: none"> • Environmental Conservation • Green Village • Demonstration Farm Development
Technologies Development Program for Sustainable Agriculture and Livestock Farming	<ul style="list-style-type: none"> • Promotion for Technological Development for sustainable Agriculture and Livestock Farming
Specific Sectors Development Program	<ul style="list-style-type: none"> • Water Resources Development • Acuaculture
Private Sector Program	<ul style="list-style-type: none"> • Incentive for Exports Processing Zone • Modernization for Marketing of Agro-products • Encouragement of Agro-industry • Program for Effective Utilization of Agricultural Inputs • Improvement of Livestock Products

The specific sectors development program treats the effective utilization of the abundant water resources of the state and promote the development of aquaculture for the incentive investors of the other state.

Fig. 4.5 Composition of the Master Plan for Integrated Agriculture and Livestock Development

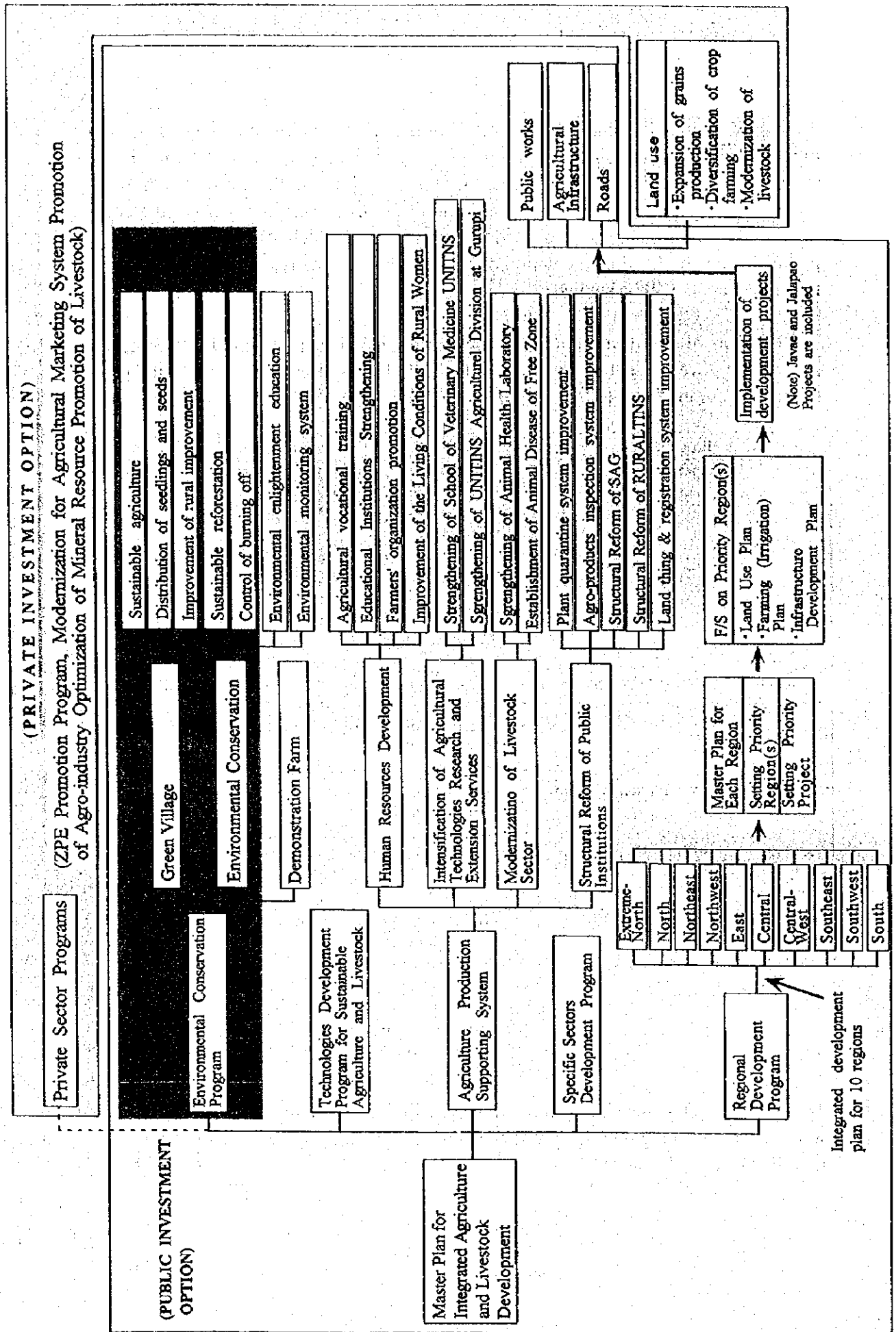
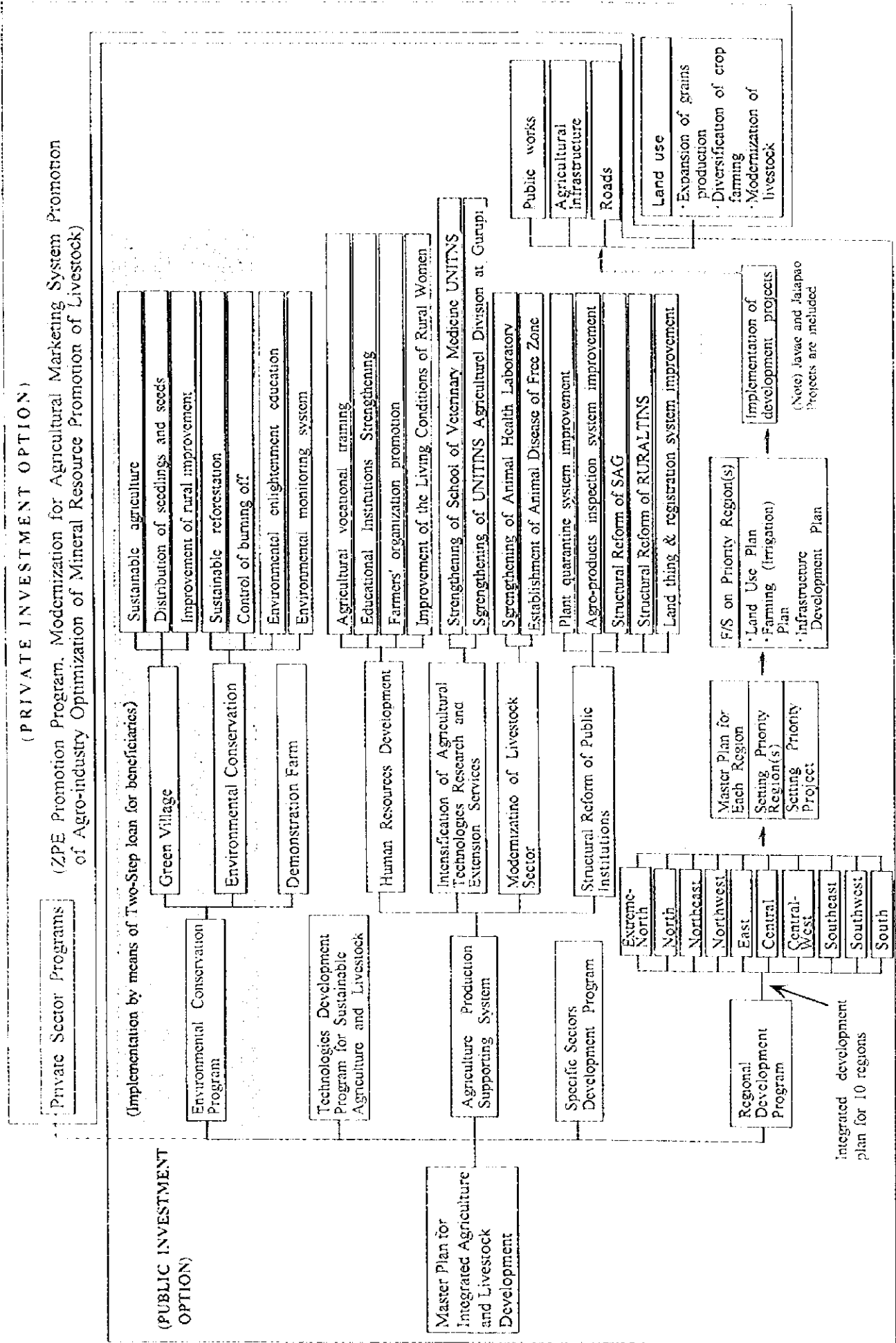


Fig.4.5 Composition of the Master Plan for Integrated Agriculture and Livestock Development



4.5.2 Regional Development Program

The objectives of the Regional development program are to promote the vitalization of regional economic activities through the formulation of a regional master plan study for the agriculture and livestock sectors, establishing an adequate land use plan, increasing crop production and diversification of agricultural activities, promoting the livestock sector modernization and the agro-industrial activities. Prior to the implementation of the program, it is necessary to carry out a Master Plan study in order to investigate the adequate development method. The Studies will be carried out for the 10 regions defined by SEPLAN. The main characteristics of each region are as follows;

Region	Characteristics
Extreme-North Region	<ul style="list-style-type: none"> • Existence of vast areas with a Land Suitability of class II • River density is high and it is possible to make use of the water resources through small scale development works • Population density is high as well as the labor force number • Great number of new residents and workers without land ownership (sem-terra) • Great number of extractive activities • Inefficient infrastructure, specially road network
North Region	<ul style="list-style-type: none"> • Existence of vast area with a Land Suitability of class II, especially the area between BR-153 and Araguaia river • Great number of large land holders with a comparatively high capitalization capacity • Moderately good conditions of road network, and good location in relation to the future embarkation site "Estreito"
Northeast Region	<ul style="list-style-type: none"> • Land suitability for agricultural use is not good, except for some parts. A future suitable activity for this region is silviculture. • Road access to BR-153 is not good because of the Tocantins River. In a future development, the construction of bridges over the river aiming to flow out the agricultural production is necessary
Northwest Region	<ul style="list-style-type: none"> • Existence of an area with a Land Suitability of class II in the northern part of this region • Geographically, this region is located close to the future embarkation site "Estreito" • Existence of paddy land suitable areas • High precipitation is verified
Central West Region	<ul style="list-style-type: none"> • Existence of land suitable for agriculture purposes along the Tocantins River margins • High precipitation is verified • Paddy cultivation is already being carried out
East Region	<ul style="list-style-type: none"> • Sparsely populated and small scale agriculture and livestock activities are carried out • Great distribution of sandy land, presenting low suitability for agricultural use due to low fertility • The infrastructure, specially road network, is extremely precarious
Central Region	<ul style="list-style-type: none"> • Great area of suitable land for agricultural use along the Tocantins River margins • Inefficient road network, except northern part of this region
Southwest Region	<ul style="list-style-type: none"> • Existence of suitable land for agricultural use along the river margins • High precipitation is verified • Existence of paddy cultivation • Existence of a M/P study (Javaés Project) • Installation of road network is in progress
Southeast Region	<ul style="list-style-type: none"> • High elevation is verified • Existence of Land Suitable Area Classified as I • High Variation of Daily Temperature
South Region	<ul style="list-style-type: none"> • Existence of suitable land for agricultural use along the Tocantins river margins • Good conditions of road access to BR-153
Environmental Preservation Area	<ul style="list-style-type: none"> • Environmental Preservation and Indigenous Reservation Areas

In the Regional Development Program, the Study for the North Region, which has a high prosperity for the development, will be carried out at the first stage and the

implementation of the program will be carried out as follows;

1. Clarification of the Program contents, through the M/P and F/S Studies
2. Determination of the Implementation Organization and budget accommodation
3. Implementation of the Project (Public Sector)
4. Invitation for the private sector investments

The contents of the M/P or F/S Study are as follows;

1. Land Use Plan
2. Agriculture Infrastructure Plan
3. Agro-Economy Plan
4. Livestock Improvement Plan

(1) Land Use Plan

1) Land Suitability for Agricultural Use

It is important that the agriculture and livestock development should be planned based on the suitability of land which include soil characteristics, topography etc. At present, the land use in the State of Tocantins is mainly focused on livestock farming and still there is a high potential for agriculture and livestock development. Especially the farms with less than 1000 ha area should diversify the farming by cultivation of crops other than pastures in order to increase the agricultural production.

As shown in Fig.4.6, land suitable for agriculture and livestock production can be divided to land suitable for agriculture, animal husbandry, and silviculture. Land suitable for agriculture can be further divided into land suitable for upland agriculture and low land agriculture. Ecological reserves and Indian reserves will be kept as reserved areas. Although the land classes with high land suitability (classes 1 and 2) are classified as agriculture lands, these areas are also suitable for livestock farming. Although the class 3 lands also have a restricted suitability for agriculture, high level of technology is required for these areas and therefore agricultural farming in these lands are not profitable. Therefore these areas can be recommended for livestock farming. The total areas covered by these categories are shown below :

Land Suitability Classification	Area (1,000 ha)	Proportion to Total Area (%)
Total Area	27,842	100.0
Agriculture	8,809	31.3
Livestock ^{1/}	12,469	44.8
Forest ^{2/}	23,434	84.2
Conservation Area and Useless Area	4,407	15.8

Note: 1/ includes suitable area for agriculture

2/ includes suitable area for both agriculture and livestock

Distribution of the land suitability for each region are as follows;

Unit: ha

Regions/ Suitability	Total	Agriculture	Livestock 1/	Forest 2/	Useless Area	Conserva- tion
External North	1,596,720	895,000	921,060	1,429,293	148,100	19,327
North	2,108,210	1,087,560	1,087,560	2,010,890	0	97,320
North - East	2,403,281	382,900	382,900	2,043,303	350,200	9,778
North- west	1,908,099	919,820	982,770	1,785,350	0	122,749
East	3,411,320	204,654	204,654	3,134,478	34,130	242,712
Central West	3,045,930	607,928	733,520	2,590,488	444,490	10,952
Central	2,307,940	1,083,310	1,083,310	2,017,490	290,000	450
South East	4,743,290	1,504,490	2,867,600	3,675,310	0	1,067,980
South West	4,049,679	491,915	2,373,653	2,582,979	1,466,700	0
South	2,267,601	1,632,140	1,832,580	2,165,120	0	102,481
Total State	27,842,070	8,809,717	12,469,607	23,434,701	2,733,620	1,673,749

Note: 1/ includes suitable area for agriculture

2/ includes suitable area for both agriculture and livestock

Calculated area under the Legal Amazon regulation for each region is as follows;

Unit:ha

	Total	Agriculture	Livestock 1/	Forest 2/	Useless Area	Conserva- tion
External North	1,596,720	447,500	460,530	968,763	148,100	19,327
North	2,108,210	543,780	543,780	1,467,110	0	97,320
North - East	2,403,281	191,450	191,450	1,851,853	350,200	9,778
North- west	1,908,099	459,910	491,385	1,293,965	0	122,749
East	3,411,320	102,327	102,327	3,032,151	34,130	242,712
Central West	3,045,930	303,964	366,760	2,223,728	444,490	10,952
Central	2,307,940	541,655	541,655	1,475,835	290,000	450
South East	4,743,290	752,245	1,433,800	2,241,510	0	1,067,980
South West	4,049,679	245,958	1,186,827	1,396,153	1,466,700	0
South	2,267,601	816,070	916,290	1,248,830	0	102,481
State	27,842,070	4,404,859	6,234,804	17,199,898	2,733,620	1,673,749

Note: 1/ includes suitable area for agriculture, 2/ includes suitable area for both agriculture and livestock

In the arable land, a high priority should be given to the land with the land suitability classification of 1 and 2 and these classes occupy an area of 0.5% (140,000 ha) and 27.2% (756,000 ha) respectively. Especially the extreme north and northern region have a high percentage of land suitable for agriculture followed by southeast, southwest and southern regions. Most of the lands suitable for paddy cultivation are mainly concentrated in the central west and southwestern region. Fig. 4.6 illustrates the proposed land use plan.

2) Land Use Plan

In order to make an effective land-use plan, not only the land suitability but also other factors such as the socioeconomic conditions, road infrastructure and climatic conditions should also be considered. Besides, the zoning, which was made by SEPLAN, is also used as the basis of the land use plan. The land use plan for the 10 zones are briefly described in a broader sense as shown below and a more detailed discussion on individual projects in the different regions is provided in Section 9.4.

- **Extreme North Region:** Agriculture lands are highly concentrated in this area. And there is a high population density with abundant labor force. Besides, landless peasants and new immigrants are also concentrated in this area. However there is a poor infrastructure development in this area. The annual precipitation in this area falls in the range of 1500-1700 mm. considering all these factors, it is suggested that an intensive agriculture plan shall be carried out in this region. Apart from the cultivation of food crops such as rice, feijao, cassava, soybean, the intensive agriculture should also include vegetable cultivation, fruits (banana, pineapple, orange etc.) so that the labor force can be used more effectively. An intensive livestock farming shall include rearing of pigs, chicken etc. This type of farming can be carried out as family agriculture, by which the adult members of the family can be engaged in intensive agriculture. The agricultural research on the intensive agriculture and livestock farming shall be carried out at the Federal Agriculture School in Araguatins.
- **North Region :** Similar to the extreme northern region, the western part of the northern region is also concentrated with lands of high land suitability. Besides, the large holders predominate in this area. There is a higher density of road net work in this region with the big city Araguaina being located at the center of the region. The rainfall in this area range from 1300-1800 mm. In this region, commercial farming with soybean and maize shall be followed. Livestock farming shall also be carried out at a bigger scale. And the Araguiana city shall be commercial center of the region for the marketing of agriculture and livestock products.
- **Northeast Region :** This region has pockets of lands suitable for agricultural production in the western areas at Itapiratins, Santo Mario do Tocantins, and Pedro

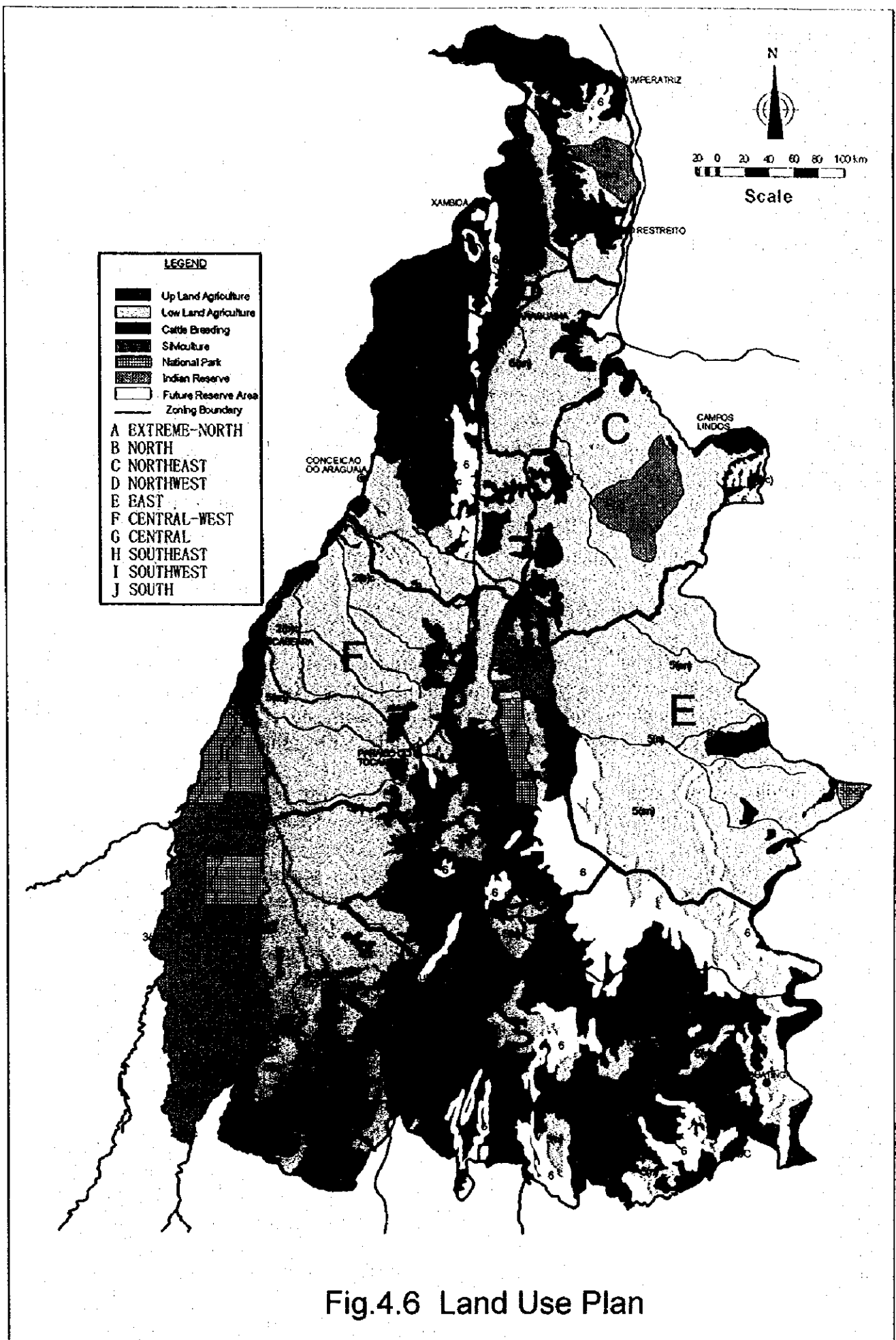


Fig.4.6 Land Use Plan

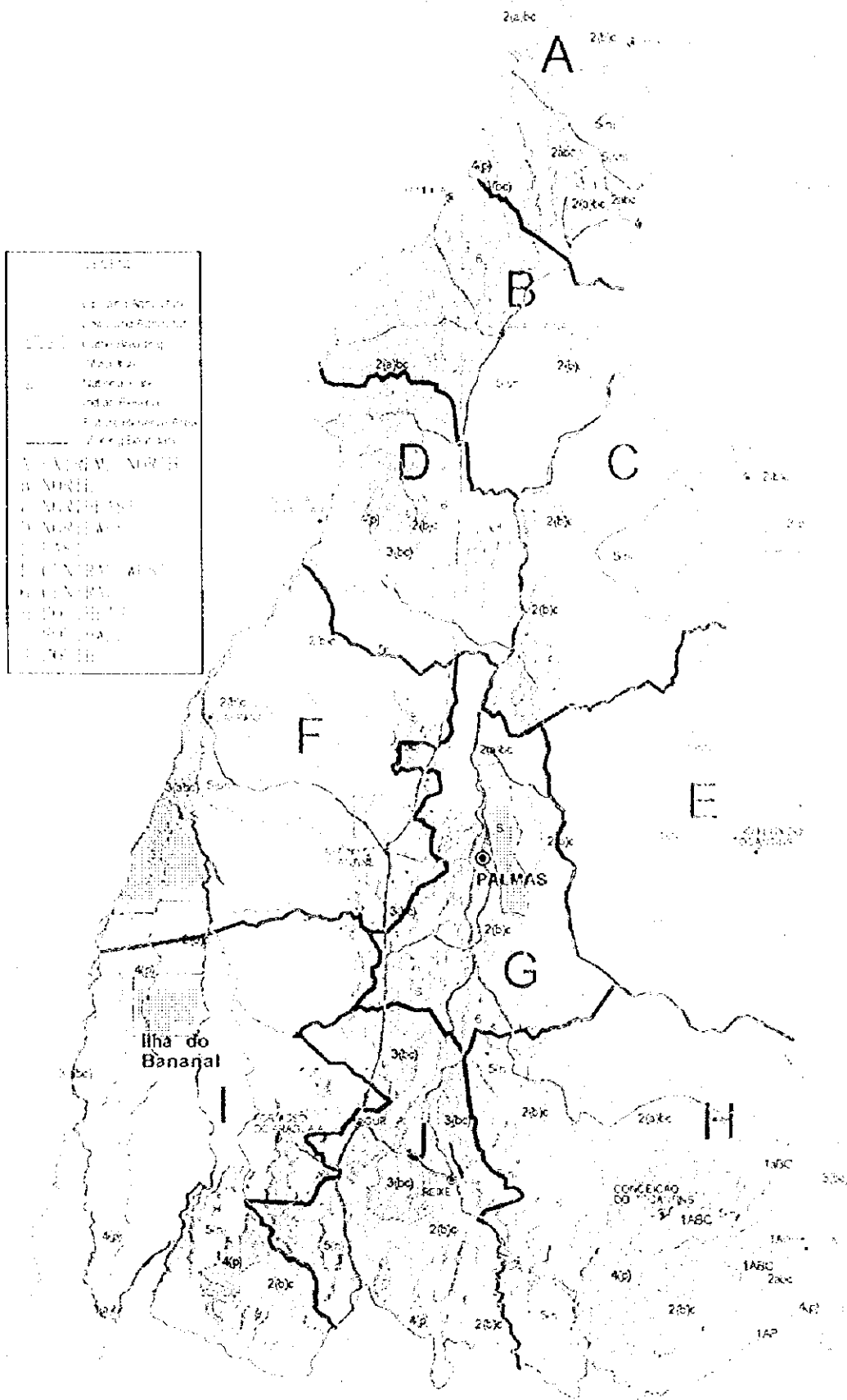


Fig.4.6 Land Use Plan

Afonso. Besides, there are also suitable lands in the eastern areas at Campos Lindos. Other than these pockets of lands, most of the area is suitable for silviculture and some of the areas are kept as Indian reserve areas. The annual rainfall in this area is around 1600-1800 mm. In the above mentioned areas where the lands are suitable for agriculture, cultivation of annual and perennial crops shall be carried out. Silviculture is more suitable for most of the region and this area is also suitable for livestock farming with pasture cultivation.

- **Northwest Region :** In the northern part of the northwestern region, there are lands suitable for agriculture cultivation. This region also has areas suitable for livestock farming and silviculture. At present, livestock production is the main economic activity in the region. In some of the areas rice, corn and feijao beans are cultivated. Rainfall in this area amounts to 1800 - 2200 mm. Livestock farming is carried out extensively and milking cattle is widely spread out. The milk is sold to the nearby municipality or delivered to milk processing plants in the region. Poultry is also practiced for self consumption. Therefore, upland cultivation and paddy cultivation (some low lying areas) combined with corn and soybean and livestock farming shall be recommended for this region.
- **Central-West Region :** In western region, there are suitable lands along the rivers. These areas also have a higher precipitation of 1700 - 2200 mm. Lowland paddy cultivation is recommended for these areas. Besides, corn and feijao beans can also be cultivated. At present, most of the areas are occupied with pastures with small use of annual and perennial crops. Furthermore most of the lands are still kept as fallow land. In this region, paddy cultivation combined with corn and soybean shall be recommended. Besides livestock farming and poultry are also recommended.
- **East Region :** The eastern region which is mainly represented by Jalapao covers a wide area with a land use of mainly silviculture. There are many areas which higher altitude. These areas receive an annual rainfall of 1300-1600 mm. There are some areas around the municipalities of Sao Felix and Mateiros which are more suitable for livestock farming. In Jalapao, Buriti trees can be found in most of the areas near the water courses. With suitable irrigation facilities, fruit cultivation can also be carried out in these Municipalities. At present, this area has a poor road net-work. In the future, when the road infrastructure is developed in the region, fruit cultivation and cultivation trees of Buruti and coconut can be carried out near the water courses.
- **Central Region :** In this region, the lands suitable for agriculture are extended along the Tocantins river. This area has a rainfall of 1600-1800 mm. The Capital city Palmas is located in the center of the region and it can be considered that this region has a high potential for marketing of vegetables and fruits. A green belt of agricultural farms shall be established around the Palmas city. There are also areas in the western and northern part of the region which are suitable for livestock farming and

silviculture respectively.

- **Southwest Region** : The western part of the region is mainly covered with the Bananal Island. And there are wide areas which are suitable for irrigated rice cultivation. There are also areas suitable for upland cultivation in the southern part of the region. Silviculture and livestock farming can be carried out in the eastern part and southeastern part of the region. Livestock farming mainly concentrates on bovine and poultry. The annual rainfall in this area range from 1500-2000 mm. This region shall mainly focus on rice cultivation and livestock farming.
- **South Region** : This region has an annual rainfall of 1300-1500 mm. Most of the region fall in the land suitability classes of class 2 and 3. Besides, the national high way BR-153 also runs through this region. The agronomy department of UNITINS is also located in the region. Agriculture and livestock farming shall be carried out more extensively in this area. Besides, agriculture research areas and some pilot farms shall also be selected in the southern part of the region which can be easily accessible to the UNITINS Gurupi Center.
- **Southeast Region** : This region also has a high percentage of lands suitable for agriculture which are distributed in the middle-northern part and southeastern part of the region in the municipalities of Natividade, Almas, Chapada. This region also has highly suitable land of level 1, in the municipalities of Aurora do Tocantins, Novo Alegre, Novo Jardim and Taipas do Tocantins. This region receives an annual rainfall of 1200-1700 mm. At present, livestock farming is carried out extensively in the area and therefore pasture cultivation is carried out in most of the area. There are also other cultivations such as rice, corn, feijao, sugarcane and cassava at a lesser scale. Agriculture areas should be developed more in the region, especially where the lands with high suitability (land class of 1). Besides vegetable cultivation should also be increased more in the region.

(2) Agricultural Infrastructure Improvement Plan

At the M/P Study, the agricultural infrastructure improvement plan will be established, from the point of irrigation and drainage facilities, road facilities, storage facilities, marketing facilities and social facilities. In the Study, consideration to the alleviation of the financial factor for the State Government will be taken.

(3) Farming System Development Plan

The main basis of the agricultural production plan is sustainable agriculture production while focusing on the following major objectives :

- 1) Increasing the agricultural yield and the total production of the State

- 2) Improving the farmers income and the standard of living
- 3) Provision of employment opportunity for the landless farmers

These major objectives can be achieved through the implementation of various projects which are discussed in detail in section 9.4. In order to achieve the sustainable agriculture production, the agriculture and livestock plan should keep the concept of maintaining the production at the same level or at a better level. The improvement in production can be achieved only through the implementation of new technology and therefore new technological research on the suitability of new & innovative technology which can be adopted to local soil, climate and hydrological conditions becomes important. It can be achieved through new researches to be conducted through pilot farms which can be carried out by UNITINS and other similar research institutions. The research should focus on new varieties, cultivation technology and the crops such as fruit crops which are suitable for the local conditions. In order to carry out an effective research, the betterment of the facilities of UNITINS and other research institutions becomes necessary. The new cultivation technology should also be disseminated to the following through proper extension of RURALTINS and therefore strengthening of RURALTINS also becomes important.

Another important factor to achieve sustainable agricultural production is to maintain the soil fertility and preventing the soil degradation and soil erosion. Soil organic matter is the most important criteria with regard to soil fertility. It has a significant influence on the physical properties of the soil and strongly influence its chemical and biological properties. Soil organic matter acts as nitrogen reservoir and furnishes a large portion of soil phosphorus and sulphur. One of the possible ways to improve the soil organic matter is by carrying out combined agriculture and livestock farming. At present livestock farming is carried out extensively even in areas where the lands are very suitable for agriculture cultivation such as class 1 lands in Aurora do Tocantins. If combined agriculture and livestock farming can be carried out, it not only will increase the agricultural production, and benefits to the farmers but also will maintain the soil fertility. The basic strategy of combined agriculture and livestock farming development is mentioned below :

The field will be divided into two parts where one half will be used for agriculture and the other half will be used for animal husbandry. In the agriculture field, the grains such as corn, soybean and feijao can be carried out. Through the introduction of suitable irrigation system, the cultivation can be carried out even during the dry season. In the other half of the field, pasture shall be grown which will be fed to the livestock, especially the beef cattle. After a period of four or five years, the farming should be interchanged and the agriculture field should be converted to livestock farming and vice versa. Because of the livestock farming, the soil organic matter in that half of the field will increase more during the 4 or 5 years period, which will be effective for increasing the agriculture production. The soil fertility which was lost by agricultural cultivation can be replenished

by shifting the livestock farming to this half of the field. By this way, the sustainable agriculture and livestock production can be continued.

Another type of farming which is suggested is vegetables and fruits production combined with pig and poultry farming. This type of farming shall be carried out near the suburb of the towns (such as Araguaina, Palmas, Gurupi) which can be developed as green belts. The products of these farms such as fresh vegetables, fruits, pigs and poultry can be easily marketed to the major towns.

Intensive agriculture is recommended for the areas with high population density with abundant labor force such as the extreme-north region. Intensive agriculture also provides employment opportunity for the landless farmers. Intensive agriculture should include vegetable cultivation (water melon, tomato, onion etc.) fruits (banana, pine apple, orange etc.) so that the labor force can be used more effectively. An irrigation system such as drip irrigation or sprinkler irrigation is suitable for these areas. Intensive livestock farming shall include rearing of pigs, poultry etc. These type of farming can also be carried out as family agriculture, by which the adult members of the family can be engaged in intensive agriculture. The agricultural research on the intensive agriculture and livestock farming shall be carried out at the Federal Agriculture School in Araguatins.

One of the areas which needs more improvement is the eastern Jalapao region. At present, this area has a poor road net work. This is a semi-arid area which is mostly suitable for silviculture. There are many areas which has higher altitude. In this region, livestock farming can be carried out around the municipalities of Sao Felix and Mateiros. And with suitable irrigation facilities, fruit cultivation (cashew nuts, buriti, biqui, coconut etc.) can also be carried out in these Municipalities. Considering the future development when the road infrastructure is developed in the region, it can be extended to other parts of the region based on the results of the pilot farms.

Formation of associations and rural cooperatives is also important in the agriculture and livestock development plan. Unlike the big landholders, the small landholders and marginal farmers can not keep their own farm machinery. The farm machinery and farm inputs can be supplied to the farmers through these associations and the farm products can also be sold through these associations. Therefore formation and strengthening of these associations should also be included in the agriculture development plan.

Development of infrastructure facilities such as irrigation facilities, road net work, rural roads are also important parts of the agriculture and livestock development plan. Without a proper transport net work, it would be difficult to market the products within the state and out of the state. Suitable storage facilities are also necessary. A more detailed discussion on individual projects based on the agriculture development plan are provided in section 9.4.

(4) Livestock Development Plan

Livestock industry is one of the most important sectors of the Tocantins State economy and this situation is considered not to change hereafter. Since livestock activity has been practiced in all over the state, most of the farmers earn their living from it. Thus, it is quite important to improve the livestock industry in order to develop the economical situation of the state. Future development measures should be taken as follows:

1) Development Measures for Cattle

a. To improve stocking rate

Production per unit of land is an important measure for efficient use of pasture. The stocking rate may vary depending on the farm scale. In general, smaller-scale farms raise one mature cattle in 5 to 6 ha while larger-scale farms are capable to keep it in 2 to 3 ha. Production per unit area of pasture can be dramatically increased when the carrying capacity is improved. To improve the stocking rate, the following measures should be taken.

To improve calving and weaning rate

It is recommended to improve nutrient and health condition of the cattle herd by upgrading the calving rate (up to 60-70%) and weaning rate (up to 80%). To achieve this target, training system of the SAG and RURALTINS must be strengthened so that local veterinarians and AI technicians can improve their diagnosis and treatment abilities for reproductive disorder of cattle.

To supply adequate feed during the dry season

When struggling a feed shortage due to scarceness of pastures or green grasses in the dry season, converting natural grassland to improved pasture land is one of the effective measures to be taken. However, it is more recommended to utilize Andropogon grass, which exists all over the state, as a forage grass. Comparing to other grasses, Andropogon has extremely high yield performance, 100 ton/ha per year, as it can be harvested six times a year. Andropogon can be used in the form of silage (when considering current high cost of construction materials and farm implements in Tocantins, the trench or bunker silo is recommended for silage storing), hay, or whatever crop residues available. In order to sustain much increased livestock production, measures, such as increasing fodder crop production for zero-grazing or stall grazing, expanding controlled pasture area, and improving quality feed supplement, must be taken together with a feeding program. Therefore, extension services of the SAG and RURALTINS need to train farmers more effectively by improving their programs. The training programs must

include selecting grasses, managing pasture, as well as practicing proper feeding. Moreover, smaller tractors or grass choppers may be needed in group working.

To promote extra feed preservation during the dry season

In order to supply feed in the dry season, we can utilize alternative resources such as farm waste (rice straw, corn stovers, soya stovers, sugar cane top, etc.) and farm by-products (grained rice and beans, damaged fruits, etc.), which are constantly available. This will result in increasing the capacity at farms by preventing weight loss of cattle in the dry season. Thus, it is necessary to promote this alternative feeding supply among local cattle producers.

To promote natural grassland improvement

Since the productivity in native grassland is low, it must be improved in order to increase its nutritive value and productivity by raising Brachiaria or Napier at smaller farms. There are usually many spring waters and damp areas even in smaller farms, so cultivating these grasses may not be very difficult. Introduction of these grasses may result in high annual cattle production as yield performance of green fodder will be highly increased.

b. To promote terminal crossing

In this country, it has been more and more popular to perform crossbreeding system in which two purebreds are crossed to produce F1 (first filial generation) crosses, as this system produces high quality beef in relatively short growing period. In addition, it produces a cattle with resistance to disease, heat, and ticks is considerably high. Continuous single crossing or systematic crossing will produce F1 by taking advantage of heterosis in the crosses. A terminal crossing between temperate and tropical breeds is recommended as one of the simple crossing system. In this system, European purebred bull is used. SAG or RURALTINS technicians should stimulate the utilization of Artificial Insemination. The feasibility and combination of breeds in smaller farms and the region deserve further study.

c. Animal disease repulsion

To promote calf pneumonia prevention measures

In general, June through October is a dry season which falls on calving season. Calf mortality in the state becomes significantly high during this season as its first cause, pneumonia often outbreaks while a calf is suffering from scours due to sudden changes in the environment temperature and humidity. In order to decrease the mortality rate, pregnant cattle and new-born calves must be abundant in barns or corrals. This gives both mothers and calves proper treatment under strictly controlled environment. As crossbred

calves have higher resistance to diseases, promoting a crossbred production must be the first prevention measure to reduce calf mortality rate.

To promote parasite control

The parasitic disease, which especially brings aggravate result to reproductive physiology and growth rate, often outbreaks due to combined several parasites and a low nutritive value. Periodical deworming, dipping, and spraying are recommended as practical prevention measures. These measures are also effective to shorten cattle growing and feeding periods at smaller farms, which usually take 4-5 years to raise their cattle to 400 kg. Regular farm visit by SAG or RURALTINS technicians should also be highly encouraged.

2) Measures for Another Livestock Industry

Tocantins livestock products are less competitive within the country because of its high transportation cost. This also results in increasing its production cost. Therefore, it is necessary to improve new livestock field (including hogs, local chicken, buffaloes, and possibly goats) and farming system (both for backyard and commercial) which have not been performed systematically in other states. Buffalo production is especially important as it produces mozzarella cheese and low cholesterol buffalo meat which are popular in world-wide market. Also, establishment/enhancement of commercial enterprises for local poultry meat and eggs must be encouraged, because these products have large potential to increase when targeting the middle class consumers. In particular, demand for mozzarella cheese has been exceeded its supply, as it is gaining world-wide popularity. Its demand has increased even in Brazil. Since current systematic buffalo production is limited mostly in the southern states, it is expected to develop this production in Tocantins, which has a quite suitable climate for raising buffaloes.

Although swine industry has consistently dominated other livestock products in the world in terms of volume, value of production, and trade, it has not been well practiced in Latin American countries. However, following industrialization and increment of GNP in these countries, processed pork is now enjoying its great popularity in Brazil as well as in other South American countries. It is expected that swine industry in Latin America would grow more and more in the near future. Because Tocantins is known for its rice and soybean production, it has a great possibility to become a competitive feed producing state when maize production is introduced. In spite of its high transportation cost, Tocantins has other advantages to offset such problem and to decrease production cost; i) its climate eliminates the necessity of heating system in winter, ii) it has a capability for farm waste treatment in their extensive land. Particularly, the waste treatment has become serious problem in other countries where swine production are more advanced. Because of pig's high fertility and growth rate, swine industry can yield a relatively rapid return to

the capital employed. It is thus recommended to develop the industry in the state, as there is an enormous potential of the growth.

(5) Social Infrastructure

It is not long since the Tocantins State was established, and the living environment in the rural area is underdeveloped. The disparities of health, education and the quality of life between urbane and rural areas are remarkable. Among the rural people, malnutrition, high morbidity, and low literacy rate come out of undeveloped rural community. Further these circumstances bring about an outflow of rural people to the urbane area, and accelerate the decline of rural community. In order to improve these situations, the solution of these problems will be made through the community development of the rural people including provision of the basic infrastructure for rural life. Accordingly, the concept of the development will set the point in educational levels, health conditions and living skills, and the schemes consisting of (1) social infrastructure, (2) rural community development, and (3) rural home industry will be formulated.

1) Social Infrastructure Improvement Plan

In accordance with the agriculture and livestock development plan, provision of the rural infrastructure which will promote farmers' positive activities relating to improvement of health and welfare, education, and agricultural productivity will be considered. These infrastructures are proposed as follows:

Municipal/Village Roads and Farm Roads

Lack of traffic and transporting system restrains to improve farming and to diversify crops, and impedes marketing of farm outputs and inputs. Concerning the existing road condition within the state, the rate of asphalt pavement of the whole road network in the state is very low as 22.1%, as mentioned in 4.4.1(1). Furthermore, road in the rural area is not practically maintained, so that it is hard for the access of road in the rainy season to transport. Consequently, it will give a preference for improvement of existing road network (municipal/village road).

Presently, there are farm roads, mostly constructed and maintained by farmer themselves, but the condition of these roads is very poor; in other words, almost like foot path. Therefore, improvement of these roads is also important for the transport of farm outputs and inputs.

Improvement and rehabilitation of the road network (municipal/village roads) will provide not only permanent access from BR153 and the state roads to each village, but also allow continued access to light traffic to serve the agricultural and social needs of the

rural people. This scheme will be proposed to be implemented following the development schedule of the agriculture and livestock development plan.

For the master plan study, design standards commonly applied to rural roads and farm roads in Brazil is applied.

Domestic Water Supply

There are no village and rural community which has rural domestic water supply system, and they depend on the water resources from nature. Rural domestic water supply will reduce the work load of rural women and girls who take a job on water fetching, and clean water means good health. At present, supply of clean water is able to depend on the status of nature. In the scheme, considering such conditions as hydrogeology, topography, availability of electricity and number of farm households, the following three water supply systems are proposed.

- a. Gravity flow piped water system
- b. Village water supply system by tubewell and elevated tank using electricity
- c. Tube well with hand pump

In the village of group housing type, the gravity flow piped water system is the most suitable if the water is available within an economical distance from the village. In the system the construction of an intake structure with a sand filter tank is proposed for a continuous supply of clean water. Where a gravity flow system is not suitable due to topographical conditions and a village size is over 50 farm households, a village water supply system with elevated tank using electricity should be considered.

In the village of scattered housing type, the tube well with hand pump is the best suited. Improvement of existing well by installing hand pump and diffusion of simple filtration system recommended by the Secretariat of Health will be promoted.

Rural Electrification

Regarding the rural power supply in the state, aiming to deliver electric power to the distanced locations, at present supplied by diesel generators, the rural electrification project by PERTINS, which shall attend 9,000 rural families through the installation of 18,000 km of LT, shall be executed between 1997 and 1999. For the rural area which is out of the project, the study on potentials of micro-hydropower generation development from hydrogeologic and topographic views will be proposed. As a result of the study, it is desirable to materialize the micro-hydropower generation development according to the agriculture and livestock plan.

Educational Facilities (Primary School)

Although the most rural communities and settlements have primary schools, the majority of the school facilities have very poor conditions with only one classroom for a basic series-four year schooling (combined class). The most school buildings are constructed by thatched roof, clay wall and earth floor. There are few schools with tiled roof, brick-built wall and cement floor. But school facilities in the INCRA's settlement are constructed by brick-built. However, rehabilitation of school facilities is not going up caused by the budget shortage of the state.

The master plan aims to rehabilitate and reconstruct existing school facilities to permanent building as brick-built. The proposed primary schools rehabilitation includes sufficient space, necessary equipment, water supply facilities and latrines. In addition, provision of sufficient educational materials and facilities for providing school meals will be considered. Owing to realize the rural community improvement as the agriculture and livestock development plan implemented, it is to be desired that the scheme is carried out in line with the development schedule. Besides, the improved school facilities will be used not only children's' education, but also adult education for improve literacy level.

Health Facilities

Rural health posts are familiar health facilities to rural people. However, village which has not a rural health post is widely distributed in the rural area of the state. In addition, medical supplies in existing posts are insufficient because of limited budget, so that health control and medical services for farmers are poor in substance.

On this account, in the master plan, the posts will provide under the schedule to the annual target of the state. Rehabilitation will provide sufficient space, necessary medical equipment and supplies, water supply facilities and latrines. Further health services will complete through the strengthening of PACS (Community health agent program).

Community Hall

There is no community hall as exclusive facilities which is made full use for community activities. In the settlements, settlers conduct their community activities at the hall used of former temporary school facilities. Community halls at village level are not only for social communication among the villagers, but for agricultural development activities such as marketing of agricultural outputs, farmer's training and farmers' association.

In the master plan, it is proposed that one community hall should be constructed in each village with necessary equipment and furniture such as tables, benches and blackboards. The community hall will use for community works, agricultural extension, farmer's

training, health services, meeting, rural life improvement and women's activities for improving their social status.

Rural Community Development Plan

SAG and RURALTINS have a responsibility of rural community development, but the development target could not be attained because of lack of staff and low quality of staff. Consequently, augmentation of the staff and strengthening of staff training will be proposed. Through the cooperation with social assistance experts trained by Projeto Lumiar and NGOs, improvement of rural community's environment will be promoted. Community development will be implemented by the programs which include the improvement of the living standard, such as food and nutrition, hygiene, etc., increase in cash income, and the security of water resources for domestic use and irrigation.

Short-Term

The model area for rural community development will be established. In the model area, the following points are necessary to secure improvement of income level and stability of living standard by the agricultural development.

- To start the community development program along the priority of the model area
- To strengthen the supporting services for rural community development
- To rehabilitate and or construct farm roads, school facilities, health facilities, rural domestic water supply system and community hall

Medium- and Long-Terms

In the medium and long terms, main foundation of agricultural production is assumed to be improved with the progress of socio-economic development of the state. A success of rural community development is easily influenced by providing the basic rural life infrastructure. Accordingly, for this purpose, villager's participation to the community activities is essential, namely, development and enlightenment for community awareness of rural inhabitants is required. In terms of community development, improvement of living conditions by the community activities is necessary.

2) Rural Home Industry Promotion Plan

In order to generate supplementary income which assists farm income indirectly, promotion of rural home industry will be proposed. As mentioned in 9.3.4(3), in the Extreme North region, collection, marketing and processing of babacu coconut are carried out systematically by rural women. The income derived from their works is under control by women, and contributes to the improvement of the social status of rural women. On the other hand, production of handicraft (traditional textiles, daily necessities),

secondary farm products (confectionaries, liquors, preserves), dairy products (cheese, butter), etc., is made in part of villages in collaboration with RURALTINS and NGOs. This earning makes valuable income source for rural women.

The objectives of the scheme are to obtain the income resource which contributes to rich rural life, through the generation of rural home industry (handicraft, secondary farm products, herbal medicines and dairy products) which makes the best use of regional characteristic of agriculture and livestock, in order to contribute the improvement of the social status of rural women. On this account, technical and marketing assistances for promote rural home industry by RURALTINS' staff and grass-root supporting activities by NGOs will be expected. The scheme will be conducted being a link of the rural community development activities as mentioned in section (2).

4.5.3 Agricultural Production Supporting System Strengthening Program

This Program aims to assist the regional development program in the form of upgrading the agricultural production techniques, through the improvement of the research and extension service by the State Government. This program is composed of the followings 4 components;

1. Structural Reform of Public Institutions
2. Modernization of Livestock Sector
3. Intensification of Agricultural Technology Research and Extension Services
4. Human Resources Development

(1) Structural Reform of Public Institutions

To assist the agricultural activities, the following measures are necessary;

1. Land Titling and Registration System Improvement
2. Structural Reform of SAG
3. Structural Reform of RURALTINS
4. Plants Inspection System and Agro-products Quarantine System Improvement

1) Land Titling and Registration System Improvement

One of the serious social problems in Tocantins State is the invasion of land, caused many times by the lack of land registration. The recent creation of the State and the absence of an organized administration are the main reasons for land registration problem. Furthermore, the lack of definition of land ownership restrains the procurement of bank financing by farmers and provokes conflicts related to land. To carry out the land registration it is fundamental the registration in the town notary public's office based on

the land cadastral map. However, nowadays this service is hindered by bureaucracy and lack of administrative definition in the local governments (municipalities). This Program aims to stabilize the rural population life conditions, reducing the problems before mentioned through the establishment of a Land Registration System. The description of this program is made thereafter.

Realizing regional development efficiently and promptly in accordance with the plan that has been laid down requires a condition in which land transaction can be performed freely and safely based on indisputable land ownership.

Since completion of land registration for all the land that exists in the state is important for putting forward development of the state, the improvement project is for solving this problem.

2) Structural Reform of SAG

Due to the recent emancipation of the State, the state government organization structure is still not yet well defined. It doesn't present a sufficient and capable human resources to elaborate the agricultural and livestock development policy nor a necessary laboratory to carry out the analysis of agrochemical and animal health. This fact can be clearly verified in the regional offices where, sometimes, even the refrigerators for vaccines storage are damaged. Therefore, it will be necessary the elaboration of a restructuring plan for SAG, thus assuring a minimum administrative level.

In the State, there is no experimental farm which is vital for the improvement of the agricultural production. In the past, the today extinct Cooperative of Cotia, although being just a cooperative, constructed, for the Cerrado Project, two experimental farms in Bahia State and other two in Minas Gerais State, aiming to classify the appropriate species to the region and to carry out training of the cooperative members.

It is foreseen, in this Program, the institutional improvement of the veterinarian and agronomy departments of UNITINS aiming to strength the research organism.

Therefore, there is an urgent need, in the medium and long terms plan, to give institutional support to the regional offices of SAG and to the RURALTINS rural extension activities, installing agricultural and livestock experimental fields in the most important regions of the State.

3) Structural Reform of RURALTINS

RURALTINS have 7 regional offices and 54 local offices, to which 80% of its staff is assigned. The RURALTINS activities comprehend, besides the technical assistance and rural extension, activities held with the farmers in agricultural production, as well as the

elaboration of documents for the small farmers in order to obtain rural credit. The Agricultural Production Nucleus program, NPA, carried out by the state government is also responsibility of RURALTINS. Therefore, with the emancipation of this program, foreseen for the future, it will be necessary an increase in the organization staff.

The RURALTINS activities directly contribute to the State agricultural development. Therefore, it is necessary to provide an adequate structure, reevaluation budgetary and structural aspects. The institutional restructuring is also a prior item to the start of the rural extension activity development.

4) Plants Quarantine and Agro-products Inspection System Improvement

In Brazil inspection standards for agricultural produce and plant quarantine system are enacted in federal laws. In preparation for liberalization of trade within the area of MERCOSUR, recently there is an urgent need in Brazil to establish and standardize inspection system for agricultural produce and plant quarantine system in order to promote its marketing. Presently, coordinating works are proceeding among related countries. In overseas markets, problems in plant quarantine hamper export of Brazilian agricultural produce.

The federal government is presently emphasizing the importance of improvement in plant quarantine system among their agricultural policy. In view of these circumstances, this project aims at strengthening the operations of existing institutions in the State.

In the state of Tocantins, SAG is the executing organization for agricultural produce inspection and plant quarantine. Inspection of standards for agricultural produce not only guarantees the grade and uniformity and facilitates its marketing but also accelerate quality improvement.

It also secures safety of the produce against residue of agricultural chemicals. For importing countries, safety of foods against human body is very important and often they demand the strict inspections to be carried out in producing areas. On the other hand, establishment of plant quarantine system and its complete enforcement are also important in the producing areas for continuous production and production increase of the agricultural produce. The plant quarantine is also important for consuming countries in order to protect their domestic agricultural produce. Therefore they strongly demand the improvement of plant quarantine system in the producing countries. Presently, there are 29 quarantine officers in SAG and it maintains 13 inspection offices. This project contains strengthening of organizations, increasing and training of staff members, technical cooperation and building laboratories.

(2) Modernization of Livestock Sector

In agriculture sector, the livestock sub-sector in Tocantins has been considerably growing and has contributed to the state's economy. To promote modernization of livestock industry and improvement in livestock productivity, establishment of Foot and Mouth Disease (FMD) free zone and strengthening of animal health status are essential.

The strategy for developing each sub-sector within livestock modernization approach should be carried out as follows:

1. Establishment of animal disease-free zone
2. Strengthening of animal health laboratorial structure

1) Establishment of Animal Disease-Free Zone

According to the data currently available, per capita livestock population of cattle, buffalo, and hog in Tocantins has been third largest in Brazil. This indicates that there is an over supply to the local demand in the state, thus Tocantins has to rely on external markets, such as the Northeast region and Amazon areas, to sell their livestock and livestock products. There are four major beef packing plants in which modern facilities are equipped in the state, but they cannot export their products to other countries because of its incidence of FMD. To solve this problem, an animal disease free zone must be established in the state. Tocantins is geographically isolated from other states as there are two large rivers in east, north, and west, and a mountain area in south, so it is not very difficult to shut off livestock animals without vaccination for the disease including Swine Fever at its borders. These activities will be performed by the SAG livestock services. By conducting mass vaccination campaign followed by intensive surveillance program, the Tocantins can declare itself as a FMD and Swine Fever free state. There have been already such disease free zones in two southern states, in which meat export is significantly increased. Especially their pork exports established a new record in 1996. There is no doubt that Tocantins will be a competitive meat exporting state once such disease free zone is created and livestock health condition is much improved. Plans for OIE (Office des International Epizootic) to approve Tocantins to be FMD-free state by 2015.

2) Strengthening of Animal Health Laboratory

Disease is one of the major factors that constrain livestock productivity. The provision of an efficient animal health service will require pursuance of a two-pronged strategy: i) development of a disease reporting system, and ii) creating a disease control program. The disease reporting system is supposed to contain information on the incidence, mortality, distribution area, occurrence season, dynamic of the situation and epidemiological interactions of hosts, agents and environment within a temporal frame.

This reporting system will be useful to make decision on conducting countermeasures when tackling disease outbreaks.

Once the disease reporting system is established, following two approaches are taken in the disease control program: i) strategic planning, and ii) delivery system. Strategic planning for controlling different diseases which affect economically encompasses: i) short term planning (5 years) to reduce incidence and economic losses, ii) medium term planning (5 - 10 years) to decrease incidence of a disease to negligible levels and to start its eradication from parts of the state, and iii) long term planning (10 years) to eradicate the disease from the state. The delivery system calls for vaccination programs, sanitation, quarantine, test and slaughter, treatment and extension programs for farmers. Its supporting system must consist diagnostic laboratories, vaccine laboratories, and research units.

At present, there are no qualified animal disease inspection laboratories in the state, and farmers ask an animal disease research institute in other states for diagnosis. It is difficult for an institute to make proper diagnosis as it usually takes many hours until they receive a specimen from Tocantins. Moreover, a wrong specimen is sometimes delivered. Once a sound principle management for an appropriate and timely diagnosis is realized, about 80% of the disease problems can be eliminated. It is almost impossible for farmers to make a diagnosis by themselves, so local laboratories must provide assistance. There is emergent need to consult a laboratory where equipment and trained/experienced staff are available. There has been a significant population grow that will cause shortage of food reserves, especially livestock products. Moreover, the improvement of socio-economic conditions all over the world will require more value added products. Therefore, we need a further intensify on livestock production in more efficient and cost-effective manner.

(3) Intensification of Agricultural Technologies Research and Extension Services

1) Strengthening of UNITINS Agriculture Division at Gurupi

The technological level of each farmer varies according to the social and natural conditions such as soil and climate. The technology to be adopted by each farmer shall be specific for each region in order to increase and stabilize the production. The only research organism in the State is UNITINS. However, this organism has facilities and equipment below the standard and some items are missing. In order to propitiate the development of Tocantins State it is necessary the installation and materialization of research organisms. Furthermore, it is necessary to choose adapted technologies for each state region through research, having as a base for that the UNITINS. With this purpose, it is necessary to improve the UNITINS facilities and to insert a new research department in RURALTINS, thus creating a research network.

The important themes to be researched in the following 10 years could be the following:

1. Evaluation of soils (reevaluation and revision of the existing soils map, elaborating a more detailed map) and land agricultural aptitude in the State.
2. Selection of crops per region, formation of new species (soybean, corn, feijão beans, irrigated rice, upland rice, pasture, greenery, etc.)
3. Researches about soil conservation technology, environmental protection, quality improvement and productivity, reduction of production costs.
4. Research of post-harvesting technology (transportation, storage).
5. Research in the field of fruitculture (including post-harvesting).
6. Research about irrigation systems and agricultural mechanization utilizing heavy machinery.
7. Research on methodology of regional development plan, farms design, farm management and applied agricultural technology.

For the fast execution of these items, new departments shall be installed such as rural engineering and fruitculture, which are not existing in the UNITINS, and at the same time the staff, facilities and equipment shall be strengthened.

2) Strengthening of School of Veterinary Medicine of UNITINS

The State of Tocantins has great potential of land and water resources for the development of agriculture, specially the livestock sector. On the other hand, there are several epidemic and tropical plagues which shall be prevented, being necessary for such a task the formation of experimented veterinarian staff. The State shall promote the livestock sector, increasing the exportation of meat to other states and countries, thus stabilizing the economy. For this purpose it is necessary to combat the Food and Mouth Disease and other diseases to reach this goal. The faculty of veterinary of UNITINS is the newest one in Brazil. In order to improve the livestock activity in the State, it would be necessary to strengthen the research in the field of animal health and the formation of human resources, having as the center of activities the faculty of veterinary of UNITINS. Especially for the establishment of disease free zones and animal health inspection posts, it would be vital the formation of highly qualified veterinarian doctors.

The present program aims to strengthen the faculty of veterinary, still young, having as main goals the animal health as a central line for research and the formation of human resources. Together with the improvement of education quality, it is intended to establish hospitals and experimental fields, to raise the clinic technology level of the students, raising the technological level of veterinary, which would also serve for the training of already graduated veterinarian doctors.

(4) Human Resources Development

Among the weakness of the state institutions of agriculture and livestock, the lack of human resources development is as one of the factors which impede their activities. This put many difficulties in the agricultural extension activities including social assistance for rural community. Furthermore, the low qualification of education and low literacy rate in rural areas makes a serious limitation to introduce new agricultural techniques and to carry out smoothly organization of farmers and its management. The lack of women's' education constrains rural life improvement. Consequently, these problems will be solved by the strengthening of human resources development in the public institutions and vocational education of agriculture and livestock, and basic education system. The program consists of the following sub-sectors:

1. Agricultural Vocational Training
2. Educational Institution Strengthening
3. Farmers' Organization Promotion

1) Agricultural Vocational Training

Vocational training/education in the agricultural and livestock sector is considered the strengthening of man-power training for extension staff (agricultural extension and social assistance) of RURALTINS and farm producers in line with the integrated development plan of agriculture and livestock. The program is as follows:

Technical Training for Extension Staff

The lack of knowledge for farming management on crop cultivation and animal raising among extension staff is given distrustful of technical assistance for farm producers. It hinders development of regional agriculture. In terms of social assistance (home economics-income generation, nutrition, health and hygiene, etc.), improvement of rural life environment is an obstacle from lacking leadership qualities in spite of strong demand of farmers.

In line with the integrated development plan of agriculture and livestock, increase of technical training course in each region and participation of extension staff will be promoted. The training course will be implemented and managed by RURALTINS as a working organ, and it makes substantial training course with collaboration of SENAR, SEBRAE and UNITINS. Implementing human resources development as vocational training project by PLANFOR, and the strengthening and continuation of the project by the State government is anticipated.

Intensification of Training Programs for RURALTINS's Staff

The RURALTINS is an institution which performs an important driving duty on implementation of the integrated development for agriculture and livestock of the Tocantins State, due to this institution has a responsibility on farm design, operating plan of farm and guidance of farming directly to farmers. Accordingly, it is necessary to strengthen and expand RURALTINS previously to implementing the development plan. In addition to that, through the staff training of RURALTINS, the improvement of the capacity of extension staff toward to the development will be essential.

Presently, the Coordination of Qualification and Development of RURALTINS in Palmas is carried out the planning and implementation of staff training. However, the staff training cannot held regularly due to lack of budget. In 1997, the training courses such as irrigation, coconut, handicraft, environmental issues are scheduled, and dispatch of extension staff to Goias, UNITINS, and DATER is also planned.

For improving the qualification of extension staff toward to the development, intentional personnel interchange with the Goias State which is advanced state of development, and implementation of intentional staff training follow the training program needed to the development is essential. In addition, the provision of budget, facilities and machinery and equipment for training is required.

Intensification of RURALTINS's Training Program of On-Farm Training

Through the strengthening and expansion of RURALTINS toward to the development plan, implementation to cover every eventuality of practical skill training for small-scale and mini farmers is indispensable. In particular the following regional offices as development bases should be imposed the duty of receiving on-farm training for settlers in case of settle to colony (INCRA, NPA).

Cereal production plan of small-scale farmer: North, Center-south and Southeast regions

Vegetable production promotion plan: Araguaina, Palmas, Gurupi

Farming plan of undeveloped areas: Bico do Papagaio, Jalapao

In the above development areas, the regional offices which have responsible to the above plans will establish the practical skill training center, and carry out on-farm training for settlers. The trainees are considered mainly successors to agriculture who come out active members of the rural producers association organized by small-scale farmers, i. e., young men's group. Considering low literacy rate, the audiovisual and practical skill training system will be adopted. Therefore, the provision of budget, training facilities and machinery and equipment will be required.

The details of the programs are as below.

1. Preparation of Training Program

- Methodologies of design on regional development plan, farm design, and farm management design, and of technical and managerial evaluation of farming
- Method of mechanized cultivation for cereals and pastures
- Technologies of prevention of soil degradation in order to perform sustainable agriculture, environmental preservation, increase of yield and improvement of quality, and reduction of production costs
- Technologies of post-harvests
- Technologies of vegetables and fruit cultivations
- Methodologies of operation and maintenance of irrigation facilities and farm machinery and their utilization techniques (operation)

2. Securing of Training Instructor

3. Provision of Training Facilities: Training room, Workshop for educational materials, library, farm for training, dormitory, etc.

4. Provision of Machinery and Equipment for Training

Provision of irrigation facilities for farm and farm machinery

Provision of audiovisual aids (portable audio system, videocorder, video camera etc.)

Provision of printing machinery

5. Technical Training for Farmers of Familiar Agriculture

The guidance of agricultural techniques for farm producers by the public institutions is a few. Especially, technical assistance of crop cultivation has been nonexistent. At present, the training course is concentrated beekeeping, fruit processing, animal raising and so on. Most the farmers follow the traditional farming practices.

In the agricultural development plan, introduction of cash crops and crop diversification will be promoted. In order to achieve the goal of the plan, RURALTINS will be held continuous and regular training courses in each region, by selecting effective time for crop cultivation. In addition, the demonstration and trial farm will be established with collaboration of progressive farmer. It will be set up a demonstration farm for some villages as an unit. RURALTINS will be implemented definite on-farm training at the farm.

2) Educational Institutions Strengthening

The strengthening of educational institutions in the rural areas will be considered to attain the goal through the strengthening of basic education including improvement of the quality of teachers and the expansion of vocational education system of agriculture. With the implementation of this plan, a bright future of the agriculture and livestock sector in the Tocantins State will be expected.

Strengthening of Basic Education

The disparities of the quality of basic education in the rural areas are an obstacle to improve agricultural management caused by manifest the low literacy rate of adults. In particular the low quality of teachers and school lesson by combine class of four series brings about reduction of an incentive to learning and leave school without completing the course. In order to solve these problems, SEC provides training systems for improve the quality of teachers. The implementation of this training systems with collaboration of UNITINS is essential.

In terms of secondary education (high school level-2nd grade), new training system for teachers under the agreement between the State government (SEC) and UNITINS starts from 1997. However, there is no regular training course for teachers of the 1st grade schools which is conducted by regional education office. The training courses by short term base are carried out irregularly. The majority of the 1st grade school in the rural areas has only four series (primary course). The 1st grade school with secondary course (four series) exists in mainly urbane areas. Moreover, teacher's low salary reduces their professional awareness.

The basic education in the rural areas, aiming to improve the education level of farmers which makes progress and improve farming environment, will be strengthened.

Strengthening of Vocational Education (Agriculture)

Presently, an institution of vocational education such as technical school of agriculture, which is in practice nurseries for technicians in agriculture and livestock sector, is only four schools in the State. It is found the differentials among the schools as to the level of educational contents, teacher's qualification, and substance in educational materials and equipment. Poorly educational institutions in this sector keep the potentialities of limited factor against future economic growth of the Tocantins State.

In order to achieve the goal of agricultural development plan, from these circumstances, the improvement of teacher's qualification of the technical school of agriculture, adoption of the school curriculum conformable to regional agriculture, and provision of educational materials and equipment in existing schools with cooperation of the State

government, UNITINS and Federal agricultural institutions will be planned. Furthermore, the State government will construct the technical school of agriculture at each region, especially agriculture-based region. It is essential to educate a capable rural people who will be the backbone of agriculture, through the strengthening of vocational education of agriculture.

3) Farmers' Organization Promotion

At the national level, Ministry of Agriculture of the Federal government is promoting an organization of the Rural Producers' Association for small-scale and mini farmers who perform familiar agriculture, supported by UNDP. The SAG and RURALTINS are conducting the support to establish the association. Through the establishment of the association, it will facilitate the access to agricultural credit and technical assistance, and the improvement of rural communities' environment such as health, education, and social infrastructure. The formation of this association aims to strengthen the rural community. Accordingly, promotion of the establishment of the association for familiar agricultural producers will be planned. In particular, the strengthening of rural community in the following regions, which have a remarkable regional difference caused by underdeveloped compared with other region in the State, will be planned.

Bico do Papagaio Region

This region belongs to the Extreme North region by administration division of SEPLAN, and is the most backward region in the development within the State. Most the people is landless and mini farmers, and there are existing high population density and poverty. Under the circumstances, INCRA is implementing selectively the settlement projects for this region in the State. Number of the INCRA's settlement in the region as of 1997 is 50 (43% of the State) with 3,276 families.

In the INCRA's settlement in the region, the supporting activity for establish the rural producers' association is conducted in cooperation with INCRA and RURALTINS. Presently, the associations are established in 14 settlements, and most of them are organized by a part of settlers (990 families).

On the other hand, the associations organized by small-scale farmers except for settlers of INCRA are 32 associations with 2,113 families. Within the associations, the Bico do Papagaio rural working women's association (162 members), which aims at collecting and processing of babacu coconuts by rural women, is included.

Regarding the agricultural cooperatives, the Bico do Papagaio agriculture and livestock mixed cooperatives (COMBIPA) organized by large- and medium-scale farmers (180 members) exists in Augustinopolis. Recently, the cooperatives' activities are stagnated

because the agricultural financing policies by the government have been applied pressure on agricultural management.

Establishment of the rural producers' association which assists to familiar agriculture contributes to strengthen and stabilize the rural community through the improvement of farming and living environments of small-scale farmers and mini farmers in the region. In order to improve the regional difference, establishment of the association in the whole rural area is an important problem to be promoted.

Jalapao Region

According to the administration division by SEPLAN, this region belongs to the East region. The region remains an underdeveloped area within the State. Low population density (0.81) and high poverty following the Extreme North region are in existence. Presently, six rural producers' associations are organized in the region. Number of the member is 377 (12% of the total farm household). Though the region consists of 8 municipalities, the association has not been organized in four municipalities. By the results of farm survey, over 60% of farmers are not participate the association. Because the most farmers are working at cattle farms and/or large farms as farm worker and perform self-sustaining agriculture, organization of farmers does not step ahead.

4) Improvement of Rural Women's Status

The disparities in the living environments (health, education, etc.) between rural community consisting of producers of familiar agriculture who are broadly distributed in the rural areas and the urbane area in the Tocantins State are existent. In order to rectify the differentials, it is indispensable to improve the living conditions through the improvement of food, nutrition, health and hygiene, etc., increase of cash income, and securement of water resources for domestic use through the rural women's participation to community development. The improvement in the social status of rural women will be promoted through incentives in community participation. On this account, formation of women's group and provision of a place for women's activities will be facilitated.

4.5.4 Environmental Conservation Program

In spite of the abundant land resources, major part of the land were exploited at past, the existence of the natural forest are scarce. Major part of the State is covered by the Cerrado Vegetation which is fragile to the environmental change. Major problem of the environmental aspect in the State are the gold mine problem at Southeast part of the State, and the colonization program realized at the 1970 without accompanying the land use planning.

Considering the future development trend for the State because of the World Food balance situation, adequate planning for the preservation of the natural resources will be necessary.

As a measure for the future development trend, followings programs will be implemented;

1. Environmental Conservation (Formulation of land use plan in harmony with conservation of natural resources, promotion of sustainable forestation, control of burning off natural vegetation, environmental enlightening and education and establishment of environmental monitoring system)
2. Green Village (Improvement of rural environment, sustainable farming model, promotion for rural organization for specific)
3. Demonstration Farm

(I) Environmental Conservation

Major parts of the State land are utilized for the livestock pastureland in the form of extensive livestock with low efficiency of utilization. At the pasture land, burning to maintain pasture are practiced. Owing to this burning practice of the pastureland, natural land covered by the original Cerrado vegetation is damaged. The number of the occurrence of fire caused by the pasture burning account more than 80,000. The reason of the fire are many time very simple, some as to maintain road, to prevent the animal attack, etc. And the preservation of the rare spaces is too important for the State. This Program is composed by the following components;

1. Promotion of Sustainable Forestation
2. Control for Burning off of Natural Vegetation
3. Mitigation of Water Contamination
4. Environmental Enlightenment and Education
5. Establishment of the Environmental Monitoring System

1) Promotion of Sustainable Forestation

This Program is the same project executed by the IBAMA as a sustainable forest. Taking into account of the importance of sustainable forest for the conservation of the environmental aspect, this project was included in the program.

1. Incentive of Reforesting
2. Incentive of Forest Management
3. Incentive for the recovery of degraded areas
4. Incentive of the Agro-forestry system

2) Control for Burning Off of Natural Vegetation

This subprogram aim to control the practice to burn off natural vegetation that is one of the most serious environmental programs found in the State of Tocantins. The following activities shall be developed within this plan:

1. Incentive of evasion of Burning off practice
2. Incentive of Extrativism (Natural Extraction) activities

Control method of the burning varies from the regional habit. Each type of burning control adequate for each region will be formulated through the participation of rural residents. Burning control will be achieved by the credit for the farmers to give incentive the implementation of the burning control and by the extension service to teach the burning control method.

3) Mitigation of Water Contamination

This project aims to mitigate contamination of water in rivers caused by emission of sewage discharged from agro-industrial sector by means of providing credit to owners of agro-industry.

4) Environmental Enlightenment and Education

The Environmental Education sub-program aims the formation of the population to carry out this environmentally feasible activity, propitiating the improvement of their life quality. In this sense, it is necessary to implant the State Environmental Education program that was already elaborated to the substantiation of the proposed objective.

The following activities will be implemented:

1. Environmental Education
2. Creation of an Environmental Laboratory Center
3. Creation of an Agroecological Center
4. Implementation of Agenda-21

5) Establishment of Environmental Monitoring System

This sub-program will be carried out as a public sectors action program. Objectives of this Sub-Program will be achieved by the implementation of the following actions;

1. Monitoring for Burning off natural vegetation
2. Construction of Laboratory Center (UNITINS)
3. Installation of Agro-meteorological Observation System

4. Monitoring for Agriculture, Livestock and Industries Activities
5. Installation and Maintenance of the Naturalist's Regional Center

(2) Green Village

The present program aims to preserve the Cerrado environment, defining agricultural development models in harmony with the characteristics of each region. Basically, this program comprehends the introduction of a sustainable agriculture with the participation of the inhabitants of the region, reducing the degraded area by well administrated agriculture realization, increasing the green area. Introduction of fruits and adopted pastures will reduce the main reason of fire that is the abandoned burn of natural vegetation. This type of burn will be substituted by a controlled one and finally will improve the inhabitants living conditions.. It is composed of the following items:

1. Improvement of Rural Environment
2. Distribution of Seeds and Seedlings
3. Sustainable Farming Model

The enterprise aims to create model development areas considering the environmental point of view, extending the methods utilized in these models to the neighboring producers, propitiating thus an environmental improvement in the State.

1) Improvement of Rural Environment

Project for Introduction of Sustainable Agriculture by Mini and Small Scale Farmers in the Bico do Papagaio Region

It is recommended to encourage the activities of mini and small farmers in the Bico do Papagaio region, through the formation of associations with approximately 10 farmers, for the development of activities such as horticulture, fruitculture, swine and poultry raising, utilizing irrigation facilities, in order to improve the life and income conditions of this population.

Therefore, based on the plans of improvement of agricultural credit conditions and investment for mini and small farmers, it is planned to create farms with management conditions to obtain better income and a sustainable production of fruits, greenery (including the planing of environmental protection areas), elaboration of rural management plans and testing their efficiency, allowing the effective implantation of efficient rural management, farms design and agricultural credit.

Introduction of Integrated Sustainable Agriculture of Buffaloes Raising and Fruit Cultivation in the Jalapão Region

The Jalapão region has good natural soil, climate, geomorphology and water conditions, requiring the improvement of social infrastructure such as roads and electrification, investment and rural credit to encourage the small farmer's production. Through the sustainable production of fruits and buffaloes raising, it is intended to raise their condition turning them into medium producers, utilizing adequate management methods.

2) Distribution of Seeds and Seedlings

The following organisms are proposed and shall be evaluated: State Agricultural Cooperatives Association (composed of regional associations of already existing associations) and Agricultural Materials Supply Company (creation of a new organism or reform of existing ones). Through RURALTINS, it is intended to reduce production costs, increase the competitiveness and reduce the price of agricultural materials to the producers. For this purpose the above mentioned organizations will be necessary. The first one will act in the purchase of agricultural materials and in the production of animal feeding ration and the second one will produce and commercialize these materials. Investment will be necessary to install these organizations.

As for the supply of agricultural materials, they shall be supplied as a loan (credit service) to the members. Furthermore, for an efficient utilization of these materials, SAG and RURALTINS shall provide technical guidance.

3) Sustainable Farming Model

The present project aims to realize a sustainable agriculture at the farm level, initially improving the social infrastructure (roads and electrification) in regions with proper conditions regarding to soil, climate, geomorphology, water resources. Planning of farms and management will be carried out in order to implement a sustainable production of grains in this region.

The present sub-program consists of the following projects, namely:

1. Integrated Vegetables and Swine Production Farming by Mini and Small Farmers in Suburbs
2. Integrated Cereals and Beef Cattle Production Farming by Small Farmers
3. Integrated Cereals and Beef Cattle Production Farming by Middle and Large Scale Farmers
4. Fruit Production in Tocantins State.

Integrated Vegetables and Swine Production Farming by Mini and Small Farmers in Suburbs

The basic objective is to create green belts around urban centers through the formation of producers associations composed of 10 members. These green belts will be located in the surroundings of Gurupí (South), Palmas (Central) and Araguaína (Norte), in which the integrated production of greenery and fruits, in irrigated areas, and swine and poultry raising will be carried out. It is intended to raise these small producers to the level of medium producers through programs of farm management planning, also regarding investment and rural credit.

Integrated Cereals and Beef Cattle Production Farming by Small Farmers

This project aims to cover the small farmers with holding in the range of 100 - 500 ha (41% of all the farms, 25% of the total area). The proposed model farm shall be established in such areas as are endowed with favorable natural conditions such as soils, climate, topography, water resources as well as are equipped with social infrastructure represented by water supply system and electricity. The project comprises privilege measures to attract investment of small farmers and promotion program of rural credit. The model farm is to be designed so as to realize sustainable production of grains aiming at elevating income level of small farmers to that of medium farmers. In this farm design, reserves of ecosystem is also taken into account. In sum, this model farm has objective to demonstrate its fruits to other farms of similar natural and socio-economic conditions.

Integrated Cereals and Beef Cattle Production Farming by Middle and arge Scale Farmers

Eligible one model farm shall be located each in north, central south and southeast regions of the State and these model farms are proposed to undertake production of grains and pasture in combination with unconventional beef cattle farming. The project involves design of farm including reserves of ecosystem. The objective of this project is formulation of farm operation plan and demonstration of its effect so as to attract investment of middle and large farmers in this type of farming activity.

In so far as beef cattle farming is concerned, it is proposed to get rid of conventional raising system and to embark innovated one with introduction of European hybrid breeds so that effective beef cattle production with shorter fattening period might be realized. As long-term target, exportation of local beef is conceived.

Fruit Production in Tocantins State.

Fruit production plan to suit local agro-climatological conditions is to be forged. For this purpose, selection of seedlings shall be made for respective region after making research on it at both domestic and international markets. Agro-industry-oriented fruit shall be

identified once marketing research on geographic positioning, availability of raw materials and shipment and storage of produce for establishment of relevant industry will have been conducted. The project also contemplates proposal for supply of seedlings and extension of adequate farming technologies.

Bearing in mind that small farmers can also undertake fruit production, design of model farms (reserves of ecosystem are included) aiming at these small farmers will be made. With this model farm, income of small farmers is expected to rise to that of medium farmers and it will serve as guideline for attracting investment in this type of farm activity.

(3) Demonstration Program

In the Tocantins State, otherwise the extensive agriculture and livestock activities, intensive agricultural methods which considered as a exploitation of natural resources, such as soy beans and pineapple cultivation, are increasing recently.

The Tocantins State locate in an Amazons Legal Area on which has a restrict development policies. Taking into consideration that the existence of the Indians Reserves and Banal Island "one of the world Patrimony" and state location as a Amazons Legal area , establishment of the environmental preservation system and attainments of the sustainable development paid to environmental aspect, is urgent subject for the State.

The Demonstration Program has a objective to research and collect necessary data for the attainment of a sustainable agriculture, association forming method and adequate technology for the State, through the cooperation between State and Federal Government, and rural resident.

The results of the studies at the demonstration farm will be applied for the model farms at various regions, in order to study the applicability for each region. On the demonstration farms, method of the sustainable agriculture, planning for the appropriate development , environmental preservation method and monitoring method will be examined.

In this Program, demonstrative work to examine development technology, promotion system appropriate for the State will be done. This Program contains following items;

1) Contents of Demonstrative Program

(Operation System for the Promotion of Environmental Type Agriculture)

1. Examination and Operation of Promotion System for the Agriculture and Livestock Development, and Environmental Conservation
2. Examination of the Natural Resources for the Agriculture and Livestock and Development Model

3. Examination of Development Technology and Environmental Assessment
4. Others

(Research Works)

1. Rotation of Crop and Pasture
2. Cultivation of leguminosae such as crotalaria in between the harvests
3. Non arable Cultivation and Cultivation by Minimum Agricultural Input
4. Suitable Farming Pattern at Amazons Legal Arc
5. Selection of Suitable Crops and Vegetables
6. Cultivation Technology
7. Selection of Suitable Fruit Cultivation
8. Integrated production of meat cattle and grains
9. Integrated production of greenery and livestock around urban centers

(Extension and Training)

1. Demonstration and Extension of Sustainable Agriculture Method
2. Explanation and Publication of Results
3. Training
4. Extension Activities
5. Technology Transfer for the SAG and RURALTINS Staff
6. Demonstration of application of agricultural input
7. Distribution of Seedling and seed

(Monitoring)

1. Evaluation of Environmental Effect
2. Forest Conservation Method
3. Control of Soil Erosion

2) Installation of Demonstration Center

In order to demonstrate for more number of visitors, the proposed site for this installation is highly recommended to construct on where has a good access, because of the objective of this installation is to demonstrate the research, extension and monitoring activities. The installation will contain followings;

4.5.5 Technological Development Program for Sustainable Agriculture and Livestock Farming

Aiming at the achievement of the sustainable agriculture as a strategic policy of the State, this Program aims to establish the strengthening of the extension system for rural farmers, optimization of the agricultural sector's research system and facilities. The contents of the Program are as follows;

1. Unification of the existing research system (facilities and personals)
2. Strengthening of the research activities in following areas;
 - ◆ Technological Development on Environmental Monitoring and Environmental Impact Assessment
 - ◆ Technological Development on Sustainable Agriculture and Livestock Farming
 - ◆ Technological Development for New Livestock Farming

The research center of the sustainable agriculture will be constructed for the strengthening of the research system, and the regional research center for the experimental farms in large scale will be improved with the objective of carrying out the studies regarding to the adaptability of the regional characteristics.

4.5.6 Specific Sector Development Program

Judging from the necessity of the implementation of the project, otherwise does not included into the Regional Development, Agricultural Sector Reform and Environmental Conservation Program, following projects are considered as necessary to carried out;

1. Water Resources Development Plan
2. Aquaculture

Water Resources Development Plan aim to carry out the necessary studies to survey the water resources potentialities in an agriculture and hydroelectric sector. AS a first stage, the execution of the data collection related to the climate and hydrology will be required. For the aquaculture plan, the execution of the detailed studies to survey the market and technical conditions will be required.

(1) Water Resources Development Plan

In the Tocantins State, two big rivers, the Araguaia river (which is the border between the states of Pará and Mato Grosso by one side and Tocantins by the other) and the Tocantins river (which crosses the state territory in the north-south axis) flow down south to north, constituting a dense fluvial network. With the high rainfall and non-exploited resources, the possibility to explore the water resources is high.

As a strategy of State development, water resources development regarding to the agricultural use, industrial use, waterway transportation and electrical explorations are necessities to implement with the detailed studies. However, the situation of study to the state water resources was not implemented until now. The implementation of the following studies will be necessities/.

1) Basic Hydrological Study

In order to survey the basic data, the studies for the following will be required.

- a) Hydrometeorological Study
- b) Geohydrological Study
- c) Sedimentation Study

2) Model of Evaluation/Management of Water Resources

The model of evaluation and management of water resources (hereon called "model") shall be elaborated or adjusted to already existing models with the objective to evaluate/manage the region superficial water resources, also concerning to floods, through proper modeling techniques at the available information level supplied by the Basic Hydrological Study.

3) Inventory of Regional Water resources

This inventory consists in an informative technical document about the State water resources availability, aiming not only to support the Project elaboration but also to give information about this theme to interested public and private organisms. The inventory document shall contain a synthesis of the results aiming the utilization of regional water resources, distinguishing the following aspects:

- a) Utilization of Superficial Water resources
- b) Utilization of Underground Water resources
- c) Support System to the Monitoring of Water resources Utilization

4) Meteorological and Hydrological Stations

The knowledge of climatological and hydrological conditions, together with other natural factors such as soils, topography, etc., are the base for that the various planning, research, execution organisms can carry out precise and reliable works. All the natural factors are important, although individually their utilization is limited. Each natural factor interacts, influencing the others, thus becoming difficult to evaluate them individually. Therefore it is essential to collect several factors data parallel forming a set of basic natural data.

The Tocantins State has several measurements of natural conditions. However this data is incomplete and partial, not proportioning full conditions for more refined work. Another important item is the availability of this data. The access to this data shall be easy, which doesn't happen in the reality, hindering the execution of many projects and plans.

The basic studies previously presented will only be effective if there is availability of meteorological and hydrological data. In this document it will be talked about two basic factors: Meteorological and Hydrological. Considering the present conditions of the meteorological stations in the State, in principle the following measures can be proposed:

- Establishment of agreements between the State and organisms responsible by the measurement;
- Checking of the stations operation conditions;
- Re-construction of the data exchange and storage system;
- Ecadastering of all stations in the State;
- Reevaluation of location and number of stations;
- Training of technicians;
- Project of standard stations;
- Evaluation of the necessary quantity of stations;
- Selection of necessary software.

(2) Aquaculture

According to FAO, the consumption of aquatic foods was 65 million tons in 1992, of which 25 %, or 16 million tons were produced by aquaculture. Also, FAO foresees that the fishery production is reaching the maximum exploring capacity of 100 million tons per year, and will not sustain the demand.

The Brazilian fish consumption is approximately 5 kg/year/person, while in developed countries, this average is over 20 kg/year/person. Applying this already low national average for the state of Tocantins, the State would need at least 5 million-kg, whereas only 600 thousand-kg of fish will be produced (estimate for 97/98).

This state, which was created in 1988, offers favorite natural conditions for tropical aquatic animals, with a large variety of aquatic form, few prominent relieves and compatible land prices for this activity. But the aquaculture needs more information about the reasonable exploring limit.

Therefore an Aquaculture Development Program could be formulated through the information attained through a Feasibility Study on Aquaculture in the state of

Tocantins, which would mention productive and market aspects and would contain the following information;

- a. Situation (information level and technical level) of fishery farmers;
- b. Appropriate and available sites;
- c. Level of technicians who follow the future Program;
- d. Markets of exotic and native fish;
 - in the state;
 - in the country;
 - in the world;
- e. The most productive species, where and how to sell them;
- f. The study must cover all over the state;
- g. Profile of the state's fish culture associations;
- h. Infrastructure for implementation of fishery industry.

4.5.7 Private Sector Program

Private sector program needs no financial assistance from the State government and its implementation may be carried out entirely within the private sector. Considering the characteristics of the area, the programs are categorized as follows:

Sub-programs	Projects
Incentive for Exports Processing Zone	<ul style="list-style-type: none"> • Exports Processing Zone • Installation of Dry Port (Inland Custom Clearance Station)
Modernization for Marketing of Agro-products	<ul style="list-style-type: none"> • Incentive to the Creation of Commodities Stock Market • Installation of CEASAs
Encouragement of agro-industry	<ul style="list-style-type: none"> • Promotion of Secondary Processing Products of Grains and Oily nuts
Program for Effective Utilization of Agricultural Inputs	<ul style="list-style-type: none"> • Promotion for Supply of Lime, Organic Inputs and Fertilizers
Improvement of Livestock Products	<ul style="list-style-type: none"> • Modernization of Slaughterhouses for Swine

(1) Incentive for Exports Processing Zone

1) Exports Processing Zone

The Federal Government was created the Export Processing Zone (ZPE) in the 15 cities through the Federal government's decree at 1989, in the purpose of to promote regional development. In the Tocantins State, the ZPE was established in the Araguaia City located near the national high way BR153, with the area of 25 ha. There is customs office and warehouses at the site but operating companies are none. At present, in the ZPE, the installation of some company is not stated. Since ZPE Federal Law enacted in 1989, world's trade situation has been greatly changed making measures that will meet the demand of the times necessary.

At long term, the necessity of the installation of the ZPE is clear, in order to promote the regional development. However, the review of the incentive method is inevitable through the following method;

1. Introduce special tax concession for the enterprises that will decide to operate in the zone at an early stage.
2. Facilitate the extension of South north railway leading to Araguaina ZPE from Imperatriz/Estoreito in order to improve the transportation means to the export/import Port of Sao Luis.
3. Official finance to introduce facilities for preventing environmental pollution such as the ones for treating wastewater and for air cleaning.
4. Execution of detailed feasibility study with official fund.
5. Application of special rate for public utilities such as electricity and water supply for about five years (1998--2003).

2) Installation of Dry Port (Inland Custom Clearance Station)

As a measure to solve the State transportation problems which located inner side of continent with the more distance of 1,000 km from the port site, the installation of the dry port which has the objective to facilitate the import and export procedure, is necessary to promote the vitalization of State industries. By this installation, the product of the State will secure the access to the international market. The proposed site to install the dry port is where has a good condition of transport facilities and easy accessibility to other cities.

(2) Program for Modernization of Agricultural Commodities

1) Incentive to the Creation of Commodities Stock Market

Considering the deficiencies in the agriculture and livestock commercialization in Tocantins State and the potentiality represented by the negotiation through the Stock Market, it is proposed to evaluate the possibility to create or to establish a regional representation of the Stock Market in the State, aiming the constitution and strengthening of future markets. The supplier side is that the group composed by the agricultural producer, association and CONA and the buyer side are that the group composed by the rice mil maker and grain stock companies. In the attempt to modify this situation, the Future and Commodities Stock Market - BMF, is trying to raise the volume of negotiated agriculture and livestock products participation, through the creation or modification of financial instruments negotiable during the sellers cry and destined to the agricultural sector.

2) Modernization Project for Marketing Agricultural Produce

Presently, there is no wholesale market that functions for collection and distribution of agricultural produce specially vegetable grown within the State of Tocantins or outside the State and transported into the State. It means that there is no price formation function and it is difficult to obtain marketing information. In the way of promoting vegetable production in Tocantins State, if there is no wholesale market for wholesaler, growers will have to find their own produce outlets, which is not easy. For this reason, public wholesale market (also retails) should be built mainly for vegetables within the State to improve their marketing

In the implementation of this project, the regulation of establishment of city market and the construction of transport and communication infrastructure by the state government are required. The operation of the City market will be made by the private sector composed by the association of dealers. However, considering the Inexistence of the vegetable production in the Tocantins State, as a first step, the introduction of vegetable production techniques from other state are required. Agricultural produce grown in Tocantins State is presently sold directly by growers within the State to dealers (wholesaler) outside the State. In this case, growers have no market information and cannot effectively control the shipment.

(3) Encouragement of Agro-industry

Processing of agricultural produce is to be made in principle with use of locally available raw materials, thus it differs from other industries which rely on raw materials imported from outside the State. Agro-industry represented by processing paddy, cattle and lumber has already established an important position within economic sector in Tocantins. In order to accomplish an expansion of the industry, it is prerequisite to make an optimum and use of agricultural produce and their by-products in Tocantins.

The growth in production of grains, fruits, vegetables and livestock in the future shall inevitably accompany an expectation for development of processing industry of these products, but an attainment of this development would not be made unless combined efforts of both public and private sectors should be made for integration of such components as procurement of raw materials, processing technology, finance and marketing. Furthermore, production of elevated quality of raw materials is an indispensable factor for development of agro-industry.

1) Processing of Paddy

Processing of paddy is the leading sector of agro-industry in Tocantins and its technological level is considered to be of standard. For attaining further development, it is essential that seeking for wide variety of markets and cultivation of products to comply

with needs of consumers. Besides, cultivation of by-products, such as processing chaff, rice bran and broken rice for production of animal feed is also expected.

2) Extraction of Oil

Subject to hiked increase of production in soybeans in such level as to promise consistent supply of raw materials, an establishment of soybeans processing factory may become viable; to elevate value-added of soybeans, the factory has to launch to produce not only crude oil but also refined oil and by-products.

Babacu is less competitive than oil palm, processing of the same is advisable to seek not for oil but for actives out of husk.

3) Concentrated Feed

The incorporation of animal feed manufacturing factories depends on an increase of grains, above all maize, in Tocantins. Apart from feed made from grains, it is worth while to assess the possibility to manufacture concentrated feed with processing by-products of paddy, grounds of soybeans, etc. for supplying feed for farming of poultry, swine and freshwater fish.

4) Tanning Industry

In order to improve quality of leather product, quality control of tanned product is essential. In addition, residual sewage discharged from tanning factories causes environmental problem which calls for urgent solution. It is thereby necessary to take precaution against contamination of water resources affected by tanning factories.

(4) Project for the Effective Use of Agricultural Inputs

1) Promotion for Supply of Lime

Although there is a vast distribution of limestone in the State, this resource is not fully utilized as a land improvement input in the State. For the Cerrado soils, the utilization of the lime is inevitable. Considering that the demand for the lime will be increased accompanying with the expansion of agricultural frontier, the promotion for supply of lime will be required.

2) Supply of Fertilizers

The consumption of chemical fertilizer in Tocantins remains far lower than other states, but it may be grown keeping pace with an enlargement of cultivated area. In order to respond to this proposed expansion of demand for fertilizers, consolidation of their supply system including saving in cost of their transportation is required.

This proposal aims to establish consolidated transportation network of imported fertilizers and to arrange circumstances to produce mixed organic fertilizers within the State. Imported fertilizers are to be unloaded at Itaquí Port, the State of Maranhão, and then transported to the State of Tocantins by means of Carajás and South-North Railways. Thus transported fertilizer will be mixed with other raw materials to produce organic fertilizer. This proposal has advantages of saving transportation cost as well as providing fertilizers suited local agro-climatological conditions. An expected saving of transportation cost shall be 40-50 dollars per tonnage cheaper than the products coming from South and East Regions of the country, which contributes to saving of production cost of crops.

As the case of the State of Minas Geras, it should be evaluated technical and financial feasibility to produce organic fertilizers with use of the leftover at urban areas as a long-term target.

(5) Improvement of Livestock Products

1) Modernization of Slaughterhouse of Swine (Private Investment Option)

Existing meat processing industry in Tocantins is limited to 4 privately-operated beef processing factories and 2 slaughterhouses (exclusively for cattle) located in Araguaína and Palmas. Without relevant slaughterhouse, processing of swine is actually made outside the State in an absence of inspection system for meat. Local demand of pork and its processed product such as ham bacon, sausage is high, but these products processed in the State are home-made ones at farms in which inspection equipment is not provided.

Swine farming within context of diversification of livestock industry is promising activity in the future and so as to forge this activity it is vital that processing facilities of meat equipped with modernizes and sanitary devices would be incorporated. These facilities should be located where have dense population and elevate head of swine in and around lest processed products should not affected by outbreak of such diseases as brucellosis, tuberculosis or anthrax. Operation of slaughterhouses is to be undertaken by the private sector, meanwhile the public sector (SAG and municipal offices) shall take charge of technical assistance and sanitary supervision for their operation.

4.6 Programs Implementation Method

The implementation method of the programs is variable according to the characteristics of the programs and is summarized in the following manner.

Programs	Sub- Programs	Planning				Implementation	
		M/P	F/S	D/D	Others	I/P	O/P
Regional Development Program							
	Optimization of land	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pr	Pr/Pr	Pr/Pr
	Roads	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu-B	Pu/Pu-B	Pu/Pu-B
	Productive infrastructure	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu-B	Pu/Pu-B	Pu/Pu-B
	Public works	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu
Structural Reform of Public Institutions							
	Land titling	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu-B	Pu/Pu-B	Pr/Pr
	Reform of organizations	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu
	Agro-products quarantine	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu
Modernization of Livestock Sector							
	Free zone	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu-B	Pu/Pu-B	Pu/Pu-B
	Disease control system	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu-B	Pu/Pu-B	Pu/Pu-B
Intensification of Agricultural Technologies Research and Extension Services							
	Supporting services	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu
	Agricultural research	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu
Manpower Development Program		Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu
Environmental Conservation		Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu-B	Pu/Pu-B	Pu/Pu-B
Green Village		Pu/Pu	Pu/Pu	Pu/Pu	Pu/B	Pu/B	Pu/B
Demonstration Farm Development		Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu	Pu/Pu
Specific Sector Development Program		Pu/Pu	Pu/Pu	Pu/Pu		Pu/Pu	Pr/Pr
Private Sector Program		Pu/Pu	Pu/Pu	Pr/Pr	Pr/Pr	Pr/Pr	Pr/Pr

Note: Pu/Pu – Public Option for both program implementation and cost sharing (federal and state government)

Pu/Pu-B – Public option for programs implementation; public and beneficiaries option for cost sharing

Pu/B – Public option for programs implementation; beneficiary's option for cost sharing

Pu/Pr – Private option for both programs implementation and cost sharing (partial participation of public sector)

Pr/Pr – Private option for both programs implementation and cost sharing (without participation of public sector)

4.6.1 Regional Development Program

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 first of all, which is followed by implementation of a feasibility study, in view of decelerating 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:

- 1 To economize the public portion of the project cost as far as possible, both by beneficiary and by unit development area.
- 2 To diffuse benefits of project to a wide variety of beneficiaries
- 3 To identify projects of high economic returns

In so far as the projects of the private investment option, care shall be taken to contribute to capital formation of existing farmers. 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.

4.6.2 Agricultural Production Supporting System Strengthening Program

This program pretends to render more adequate institutional supporting services to farmers by means of an improvement of task executing capacity of agriculture-related organizations represented by SAG, RURALTINS and INTERTINS; INTERTINS is a responsible agency in reform of land titling system; SAG takes charge of formulation and implementation of agricultural development plans and plants and animals disease control system; RURALTINS engages in rendering extension services directly to farmers. The upgrading quality of services rendered by these organizations is closely concerned with an improvement and encouragement of farmers' farming activities. The implementation of this program will be made under the realm of the public investment option, thus procurement of required finance for the program is prerequisite prior to formulation and implementation of the program.

4.6.3 Environmental Conservation Program

The formulation of environmental conservation programs shall fall basically on the responsibility of governmental agencies, but part of the finance for the program shall be covered by beneficiaries of the program. It is recommended that the portion of finance by beneficiaries should be procured as far as possible through the rural credit program. Nevertheless, in hastening private investment in environmental conservation program which is suffered from less economic impact of investment, it is recommended that the governmental sector would take some measures to support farmers who are willing to embark on environmentally friendly farming practice. Besides, it is proposed to establish an environmental monitoring system through institutional strengthening of NATURALTINS in an attempt to elevate economic effect of investment.

The present program has high priority in the realm of mitigating environmental deterioration of natural resources, so earlier implementation of the same is highly anticipated. The fund earmarked for implementation of the program may be procured from sources of foreign governments with an eye to providing farmers with rural credit of lower interest to be used for launching environment-oriented farming practice.

Advised in effective implementation of the program is to encourage participation of various public institutions like SAG, RURALTINS, SEPLAN and NATURALTINS.

4.6.4 Technologies Development Program for Sustainable Agriculture and Livestock

The executing entity for this program shall be incorporated newly with participation of SAG as a core organization, UNITINS and RURALTINS. The program is proposed to comprise three tasks: investigation, research and extension and these three shall be carried out in parallel. The participation of farmers is a vital factor of this program and it will be intended that the fruits of the program to be demonstrated at farms of the program would be extended directly to farmers.

4.6.5 Private Sector Program

This programs shall be put into implementation with exclusive finance of the private sector from planning phase and the role expected by the public sector shall be development of infrastructure and elaboration of incentives, both of which are indispensable factor to attain expected outcome of the program.

4.7 Selection of Priority Projects

The present Agriculture and Livestock Master Plan Study shall consist of four schemes: regional development, agricultural productive structure strengthening, environmental conservation and so on, with a target year of 2015.

4.7.1 Criteria for Selection

The prioritization for long-listed projects/programs shall be on the basis of their needs for urgent implementation, side effects, economic returns, environmental conservation, etc.

General speaking, the coordination with the federal and state development plans as well as the sectorial development plans other than the agricultural sector shall be taken up first of all as the criterion for selection of high priority projects, and high priority is given to projects corresponding to the agendas which call for urgent measures for easing prevailing constraints confronting the agricultural development of the state of Tocantins.

Furthermore, it is of importance to judge projects whether their benefits to be anticipated after their implementation would have high impact on regional society and economy bringing about a wide range of side effects.

On the other hand, it is also important to delineate projects with technological levels acceptable to project implementation agency. Nonetheless, it is necessary to introduce new technologies, to upgrade traditional technologies, to promise farmers with foreseeable prospects of farm operation and to contribute to agricultural development of unconventional fields, thereby the proposed projects should also be evaluated from these points of view. Although an implementation of projects independently is reasonable, an integration of a project with other project(s) is advisable in view of the fact that integrated projects would produce greater synergy effects.

The state of Tocantins belongs to the region where predominates "cerrado" soils. These soils are characterized by vulnerability to be difficult to recuperate their original structure once they are eroded. This leads to the consideration that the sustainability of development with attention paid to environmental conservation is an indispensable factor that should not be eliminated in prioritization of projects.

Bearing all of above considerations in mind, the prioritization of projects among projects/programs proposed in the chapter 9 shall be made. The said projects/programs are divided into two categories: the public investment and the private investment; the latter category projects/programs shall not be a target for prioritization of projects, because this type of projects are proposed to be put into implementation at such phase as will have been arranged circumstances for investment with the progress of state development projects/programs based on the present integrated agriculture and livestock master plan together with activation of productive sectors and consolidation of infrastructure. The public investment category is further divided into two sub-categories: programs for small area development or strengthening of public organizations consist of 1) Environmental conservation program, 2) field demonstration program and agricultural productive structure improvement program and regional development program with large development area, and selection of high priority area for the latter category shall be made among ten (10) administrative regions established by the state government.

Because the target programs for selection of high priority projects have substantially distinct characters, the criteria applied for respective program are different as exposed hereinafter.

(1) Regional development programs

1. Extension of lands with higher suitability for crop farming and facility for development
2. Higher grade of infrastructure development and advantage on marketing agricultural inputs and produces

3. Existence of SAG, RURALTINS and other relevant institutions and accessibility in rendering extension services
4. Consolidation of land tenure and progress of capital formation among producers
5. Comparative dense population easily available as labor force of development projects
6. Anticipation for higher economic return and multiple development effects

(2) Programs for small area development and strengthening of public organizations

1. High public interest
2. Responsible to agendas calling for urgent solution of problems confronting agricultural sector of the state
3. Viability for implementation from the viewpoint of the state's budgetary capability
4. Practical implementation without requiring complicated skills of project executing agency
5. Sustainability to accord with environmental conservation
6. Rectification of social disparities among regions
7. Easy applicableness to other similar areas
8. Impact on improvement of circumstances for attracting private investment
9. Contribution to capital formation of producers
10. Generation of multiple effects with combination other projects/programs

4.7.2 Selection of High Priority Area for the Regional Development Program

The salient features of ten (10) regions as target areas for selection of the high priority area are resumed in 4.2.4 and they are taken into account in prioritization of ten regions in accordance with the criterions exposed in table 4.1. As a result of this prioritization task, the North Region has been identified as the high priority area supported by the following justifications.

- The greater majority of the region is represented by the lands with the class II of the crop suitability classification; in particular, the sector between the national highway BR153 and the Araguaia River is endowed with lands highly suitable for crop farming.
- Large holders predominate in the region, and capital formation among farmers is advanced.
- Road network is comparatively dense and is advantageous geographically due to accessibility to the city of Estreito, which will become an entrepot of agricultural commodities.
- The city of Araguaina, the most populated city in Tocantins, is situated in the region and thus marketing of agricultural inputs and produces is activated.
- The ZPE is also located within the region and is advantageous from the viewpoint of agro-industry development in the future.
- Regional offices of SAG, RURALTINS and other governmental institutions as well as the Faculty of Veterinary Medicine of the UNITINS are established in the region. The existence of these public institutions will enable to render more appropriate supporting services for farmers.
- With greater extension of lands suitable for crop farming together with advantageous position on marketing agro-products, the development of the region is anticipated to produce higher economic returns in comparison with the remainder of the regions.

Because the total area of the North Region is around 2,100 thousand ha, it is vital that more detailed data and information should be collected in advance to putting development programs/projects into implementation in this region. In this context, it is recommended that a master plan to cover the whole region should be formulated and a feasibility study on high priority projects/areas proposed in the said master plan should be carried out. All these considerations lead to the suggestion that a detailed survey on establishment of the scope of the work for the master plan to cover the North Region should be conducted during the subsequent step of the present study.

Table 4-1 Prioritization of Regional Development Program

PROGRAM	REGION	Distribution of Agriculturally Suitable Land	Condition of Infrastructure	Existence of Agriculture-related Institution	Consolidation of Land Tenure	Population	Expectation of Development Benefit
REGIONAL DEVELOPMENT PROGRAM	Extreme North Region	◎	△	△	×	◎	△
	North Region	◎	◎	◎	◎	◎	◎
	Northeast Region	×	×	△	○	△	△
	Northwest Region	○	○	○	○	○	○
	Central West Region	×	×	×	○	×	×
	East Region	△	△	△	○	△	△
	Central Region	○	△	◎	○	○	○
	Southeast Region	△	△	△	○	△	△
	Southwest Region	○	○	○	○	○	○
	South Region	○	○	◎	○	○	◎

4.7.3 Selection of High-priority Programs and Projects for Environmental Conservation and Agricultural Production Supporting System Strengthening Programs

These programs have the following sub-programs and projects.

Programs	Sub-programs	Projects
Agricultural Production Supporting System Strengthening	Structural Reform of Public Institutions	<ul style="list-style-type: none"> - Land tiling and registration system improvement - Structural reform of SAG - Structural reform of RURALTINS - Plants inspection system and agro-products quarantine system
	Modernization of Livestock Sector	<ul style="list-style-type: none"> - Establishment of animal disease-free zone - Strengthening of animal health laboratory
	Intensification of Agricultural Technologies Research and Extension Services	<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
Environmental Conservation	Environmental Conservation	<ul style="list-style-type: none"> - Promotion of sustainable reforestation - Control of burning off natural vegetation - 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
	Demonstration Farm	
Technologies Development For Sustainable Agriculture and Livestock		
Specific Sector Development Program	Water Resources Aquaculture	

Having evaluated above sub-programs and projects relevant to criterions cited before, all of them are considered to be eligible ones to implemented within context of the Integrated Development Master Plan for Agriculture and Livestock in the State of Tocantins. Hence, detailed formulation of their contents shall be made in the subsequent chapter.

Table 4-2 Evaluation for Selection of Priority Program and Projects

PROGRAM	SUB-PROGRAM	ITEM	HIGH PUBLIC INTEREST	RESPONSE TO URGENT ALLEVIATION OF CONSTRAINTS	FINANCIAL VIABILITY	TECHNICAL VIABILITY	ENVIRONMENTAL SUSTAINABILITY	SOLUTION OF REGIONAL REGIONAL DISPARITY	DEMONSTRATION EFFECT	IMPROVEMENT OF INVESTMENT CONDITION	FARMS CAPITALIZATION EFFECT	SYNERGY EFFECTS	
AGRICULTURAL STRUCTURE REFORM	AGRICULTURE STRUCTURE REFORM	Land Tilling System	⊙	⊙	⊙	△				⊙	⊙		
		Reform of SAG	⊙	⊙	⊙	⊙	⊙	△		○	△	⊙	
		Reform of RURAL TINS	⊙	⊙	⊙	⊙	⊙	△		○	△	⊙	
		Agro-products Inspection Plant Quarantine	⊙	○	⊙	○		△		○	△	⊙	
AGRICULTURAL STRUCTURE REFORM	MODERNIZATION OF LIVESTOCK	Animal Disease Control Free Zone	○	○	○	○		△		○	△	⊙	
		Animal Health Inspection	⊙	⊙	⊙	⊙		△		○	△	⊙	
AGRICULTURAL STRUCTURE REFORM	AGRI-SUPPORTING SERVICES AND RESEARCH STRENGTHENING	Reconstruction of Institutions	⊙	⊙	⊙	○	⊙	○		○	△	⊙	
		Extension Service	⊙	⊙	⊙	⊙	⊙	○		○	△	⊙	
AGRICULTURAL STRUCTURE REFORM	MANPOWER DEVELOPMENT	Vocational Training	⊙	○	⊙	⊙	○	○		○	△	⊙	
		Rural Organization	○	○	⊙	⊙	○	○		○	△	⊙	
ENVIRONMENTAL CONSERVATION	ENVIRONMENTAL CONSERVATION	Formulation of Land Use Plan	⊙	⊙	⊙	⊙	⊙			○		○	
		Sustainable Forest	○	○	△	○	⊙	△	⊙			○	
Burning Control		⊙	⊙	⊙	⊙	⊙	△	○		△		○	
Environmental Education		⊙	○	⊙	⊙	⊙		○		△		○	
ENVIRONMENTAL CONSERVATION	GREEN VILLAGE	Environmental Monitoring System	⊙	○	⊙	○	⊙		○	△		○	
		Environmentally Inferior District	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	⊙	○	
ENVIRONMENTAL CONSERVATION	GREEN VILLAGE	Distribution of Seedling and Seeds	⊙	⊙	⊙	⊙	⊙	⊙	○	○	⊙	○	
		Sustainable Agriculture	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	⊙	○	
DEMONSTRATION PROGRAM													
SPECIFIC SECTORS DEVELOPMENT	Water Resources		○		△	○	△					○	
		Aquaculture	△		△	○		△	△	○	△		

Table 4-2 Evaluation for Selection of Priority Program and Projects

PROGRAM	SUB-PROGRAM	ITEM	RESEARCH AND INQUIRY	ENVIRONMENTAL IMPROVEMENT	CULTURAL HERITAGE	SOCIETY AND COMMUNITY	ECONOMY	SCIENCE AND TECHNOLOGY	ARTS AND CULTURE	SPORTS AND RECREATION	HEALTH AND WELFARE	EDUCATION	ENVIRONMENTAL PROTECTION	GENERAL	EVALUATION																			
															1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PROGRAM	SUB-PROGRAM	ITEM	RESEARCH AND INQUIRY	ENVIRONMENTAL IMPROVEMENT	CULTURAL HERITAGE	SOCIETY AND COMMUNITY	ECONOMY	SCIENCE AND TECHNOLOGY	ARTS AND CULTURE	SPORTS AND RECREATION	HEALTH AND WELFARE	EDUCATION	ENVIRONMENTAL PROTECTION	GENERAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			RESEARCH AND INQUIRY	ENVIRONMENTAL IMPROVEMENT	CULTURAL HERITAGE	SOCIETY AND COMMUNITY	ECONOMY	SCIENCE AND TECHNOLOGY	ARTS AND CULTURE	SPORTS AND RECREATION	HEALTH AND WELFARE	EDUCATION	ENVIRONMENTAL PROTECTION	GENERAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			RESEARCH AND INQUIRY	ENVIRONMENTAL IMPROVEMENT	CULTURAL HERITAGE	SOCIETY AND COMMUNITY	ECONOMY	SCIENCE AND TECHNOLOGY	ARTS AND CULTURE	SPORTS AND RECREATION	HEALTH AND WELFARE	EDUCATION	ENVIRONMENTAL PROTECTION	GENERAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			RESEARCH AND INQUIRY	ENVIRONMENTAL IMPROVEMENT	CULTURAL HERITAGE	SOCIETY AND COMMUNITY	ECONOMY	SCIENCE AND TECHNOLOGY	ARTS AND CULTURE	SPORTS AND RECREATION	HEALTH AND WELFARE	EDUCATION	ENVIRONMENTAL PROTECTION	GENERAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			RESEARCH AND INQUIRY	ENVIRONMENTAL IMPROVEMENT	CULTURAL HERITAGE	SOCIETY AND COMMUNITY	ECONOMY	SCIENCE AND TECHNOLOGY	ARTS AND CULTURE	SPORTS AND RECREATION	HEALTH AND WELFARE	EDUCATION	ENVIRONMENTAL PROTECTION	GENERAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			RESEARCH AND INQUIRY	ENVIRONMENTAL IMPROVEMENT	CULTURAL HERITAGE	SOCIETY AND COMMUNITY	ECONOMY	SCIENCE AND TECHNOLOGY	ARTS AND CULTURE	SPORTS AND RECREATION	HEALTH AND WELFARE	EDUCATION	ENVIRONMENTAL PROTECTION	GENERAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<p>RESEARCH AND INQUIRY</p> <p>ENVIRONMENTAL IMPROVEMENT</p> <p>CULTURAL HERITAGE</p> <p>SOCIETY AND COMMUNITY</p> <p>ECONOMY</p> <p>SCIENCE AND TECHNOLOGY</p> <p>ARTS AND CULTURE</p> <p>SPORTS AND RECREATION</p> <p>HEALTH AND WELFARE</p> <p>EDUCATION</p> <p>ENVIRONMENTAL PROTECTION</p> <p>GENERAL</p>			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20												
<p>RESEARCH AND INQUIRY</p> <p>ENVIRONMENTAL IMPROVEMENT</p> <p>CULTURAL HERITAGE</p> <p>SOCIETY AND COMMUNITY</p> <p>ECONOMY</p> <p>SCIENCE AND TECHNOLOGY</p> <p>ARTS AND CULTURE</p> <p>SPORTS AND RECREATION</p> <p>HEALTH AND WELFARE</p> <p>EDUCATION</p> <p>ENVIRONMENTAL PROTECTION</p> <p>GENERAL</p>			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20												